



December 8, 2016

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

**Re: Docket 4679**  
**LED Street Light Tariff Advice Filing**

Dear Ms. Massaro:

On behalf of the Pascoag Utility District (Pascoag or the District), we herewith file an original and nine copies of Pascoag's proposed LED Street Light Tariff Advice, which will impact RIPUC No 607 Public and Private Lighting Rates. The District would like to add a Decorative LED street light to existing tariff. This submission is made to the Commission for their review and approval.

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

Very truly yours,

Harle Round  
Manager of Finance & Customer Service

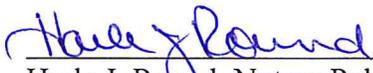
Cc: Ms Karen Lyons, Esquire  
Cc: Mr. William Bernstein, Esquire

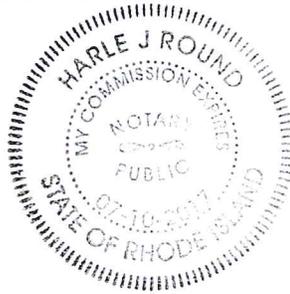
**Docket No. 4679 - Pascoag Utility District – LED Decorative Street Light  
Tariff Advice  
Service List updated 12/7/16**

<b>Name/Address</b>	<b>E-mail</b>	<b>Phone</b>
Michael R. Kirkwood, General Mgr./CEO Pascoag Utility District 253 Pascoag Main St. PO Box 107 Pascoag, RI 02859	<a href="mailto:mkirkwood@pud-ri.org">mkirkwood@pud-ri.org</a> ;	401-568-6222
Harle Round Pascoag Utility District 253 Pascoag Main St. PO Box 107 Pascoag, RI 02859	<a href="mailto:Hround@pud-ri.org">Hround@pud-ri.org</a> ;	401-568-6222
William L. Bernstein, Esq. 627 Putnam Pike Greenville, RI 02828	<a href="mailto:wlblaw@verizon.net">wlblaw@verizon.net</a> ;	401-949-2228
Leo Wold, Esq. Dept. of Attorney General 150 South Main St. Providence, RI 02903	<a href="mailto:Lwold@riag.ri.gov">Lwold@riag.ri.gov</a> ; <a href="mailto:Al.contente@dpuc.ri.gov">Al.contente@dpuc.ri.gov</a> ; <a href="mailto:steve.scialabba@dpuc.ri.gov">steve.scialabba@dpuc.ri.gov</a> ; <a href="mailto:dmacrae@riag.ri.gov">dmacrae@riag.ri.gov</a> ; <a href="mailto:jmunoz@riag.ri.gov">jmunoz@riag.ri.gov</a> ;	401-222-2424
<b>Original &amp; nine copies file w/:</b> Luly E. Massaro, Commission Clerk Public Utilities Commission 89 Jefferson Blvd. Warwick, RI 02888	<a href="mailto:Luly.massaro@puc.ri.gov">Luly.massaro@puc.ri.gov</a> ; <a href="mailto:Todd.bianco@puc.ri.gov">Todd.bianco@puc.ri.gov</a> ; <a href="mailto:Patricia.lucarelli@puc.ri.gov">Patricia.lucarelli@puc.ri.gov</a> ; <a href="mailto:Sharon.ColbyCamara@puc.ri.gov">Sharon.ColbyCamara@puc.ri.gov</a> ;	401-780-2107

**CERTIFICATE OF SERVICE**

I hereby certify that copy/copies of this Street Light Advise Tariff, RIPUC Docket No.: 4679 were served electronically on the individuals named in the above List of Recipients of Filing, this 8<sup>th</sup> Day of December, 2016.

  
\_\_\_\_\_  
Harle J. Round, Notary Public  
My Commission expires July 10, 2017



**State of Rhode Island and Providence Plantations  
PUBLIC UTILITIES COMMISSION**

**RE: PASCOAG UTILITY DISTRICT  
RIPUC NO.:4679**

**NOTICE OF CHANGE IN RATE TO: The Public and Private Lighting Rate**

Pursuant to Rhode Island General Laws (R.I.G.L.), Section 39-3-11, and in accordance with Section 2.4 of the Rules of Practice and Procedure of the Rhode Island Public Utilities Commission (RIPUC), the Pascoag Utility District hereby gives notice of a proposed change in rates filed and published in compliance with R.I.G.L. 39-3-10.

The proposed changes are contained in the exhibits accompanying the filing. The new rates, as proposed, are to become effective February 1, 2017.

The Addition of:  
73 Watt LED Decorative Street Light 5,962 Lumens  
Proposed Rate:                      \$8.59 Monthly                      \$103.08 Annually

Be advised as follows:

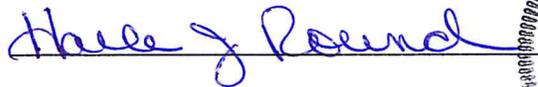
- 1) Pascoag Utility District, incorporated by a special act of the General Assembly, is a quasi-municipal utility within the Village of Pascoag with offices located at 253 Pascoag Main Street, Pascoag, Rhode Island.
- 2) The Electric Department of the Pascoag Utility District operates an electric distribution system providing retail electric service to customers in the Villages of Pascoag and Harrisville, both in the Town of Burrillville, Rhode Island.
- 3) Correspondence for Pascoag Utility District in this case should be addressed to Michael R. Kirkwood, General Manager, Pascoag Utility District Electric Department, 253 Pascoag Main Street, P O Box 107, Pascoag, Rhode Island, 02859.
- 4) In accordance with the RIPUC Rules and Regulations, the documents accompanying this filing contain data and information in support of Pascoag Utility District's application. A copy of this filing is at our offices and may be examined by the public during business hours.



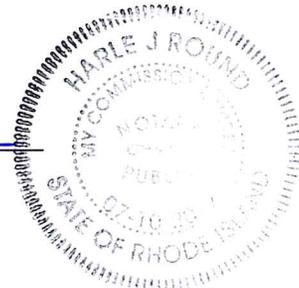
Michael R. Kirkwood, General Manager  
Pascoag Utility District

STATE OF RHODE ISLAND  
COUNTY OF PROVIDENCE

Subscribed and sworn to before me on the 9th day of December, 2016.



Notary Public





In RE: Pascoag Utility District  
RIPUC Docket No 4679  
Tariff Advice

Pascoag Utility District would like to add a 73 Watt LED Decorative Street Light to its Public and Private Lighting Rate. The District is replacing all of its 150 Watt HPS Decorative Street Lights with 73 Watt American Revolution LED Series 247L. The District's customers will not see a savings, in fact they will see a \$0.46 increase in the current rate they are being charged. This is mainly due to the higher price on the LED product and the fact that the State of RI installed 150 W HPS Decorative Street Lights in the Village of Pascoag and Harrisville years ago and the District continued to charge them at the existing rate for the 150 W HPS Street light. A rate study was never conducted and I do not have the pricing but I believe that we have been under-collecting on the 150 W HPS Decorative Street Lights for the monthly fixed cost only.

The benefit to the LED Decorative street lights is that they are rated for 100,000 hours and will last 20+ years and require less maintenance. The District will also see a decrease in Kwh usage from 62 Kwh for the 150 HPS to 26.30 Kwh for the 73 Watt LED, a savings of 35.71 Kwh per month and 428.52 kWh per fixture annually. I have included the product overview for the fixtures that we purchased through a grant from the RI Regional Green House Gas Initiative (RGGI).

I have included a marked up copy of the current Tariff RIPUC No. 607 with the proposed changes and a clean copy of the proposed Tariff RIPUC No. 608. I have also included a copy of the Determination of Street Light Charges Schedule 1 through Schedule 5. I have highlighted the 73 W Decorative information in yellow.

Sincerely yours,

Harle Round  
Manager of Finance and Customer Service

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:		
25W LED/2111 Lumens	\$2.87	\$34.44
50 W LED/ 3816 Lumens	\$3.71	\$44.52
120 W LED Flood/ 11,730	\$8.13	\$97.56
240 W LED Flood/ 22,797	\$12.73	\$152.76
72 W LED Decorative/5962	\$8.59	\$103.08

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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: ~~May 6, 2015~~ November 30, 2016

Effective Date:

PUBLIC AND PRIVATE LIGHTING RATE

<u>Lamp Size</u>	<u>Monthly Rate</u>	<u>Annual Rate</u>
Mercury:		
175 Watt	\$8.47	\$101.64
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50 W LED/ 3816 Lumens	\$3.71	\$44.52
120 W LED Flood/ 11,730	\$8.13	\$97.56
240 W LED Flood/ 22,797	\$12.73	\$152.76
<u>73 W LED Decorative/5,962</u>	<u>\$8.59</u>	<u>\$103.08</u>

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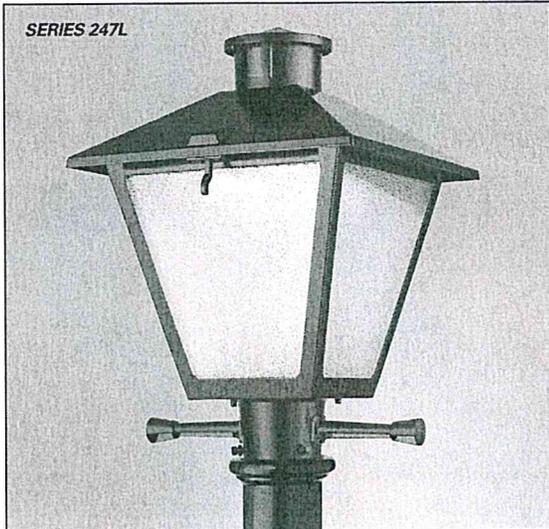
Filing Date: November 30, 2016

Effective Date:



# American Revolution LED Series 247L

## PRODUCT OVERVIEW



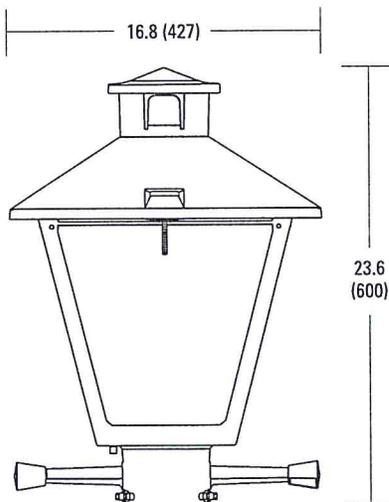
### Features:

- Die-cast aluminum housing and hood for long-life performance
- Die-cast trigger latch (TL) and captive thumb screws option available for easy access to internal components
- Optical assembly designed for maximum performance, available in Type II, Type III and Type V
- Hinged hood and captive thumb screws provision afford quick, easy access to electrical and optical area for servicing
- Slipfitter with three set screws allows secure installation to pole sizes 2-3/8" or 3" O.D.
- Surge protection device (standard) exceeds ANSI C62.41 Category C1 criteria (surge tested at 10kV/5kA)
- Complies with ANSI: C136.2, C136.10, C136.15
- CSA listed and suitable for up to 30°C ambient
- **Rated L70, LED life greater than 100,000 hours at 25°C**
- Replaces up to 150W HPS light source incumbant models
- LED electronic 0V-10V dimmable driver
- DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at [www.designlights.org/QPL](http://www.designlights.org/QPL) to confirm which versions are qualified.

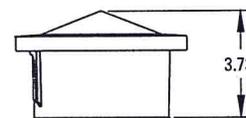
### Applications:

- Streetscapes
- Walkways
- Pathways
- Parks

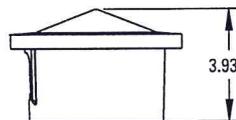
## DIMENSIONS



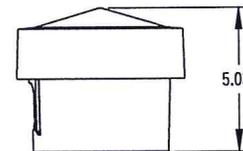
**Effective Projected Area (EPA)**  
 The EPA for the American Revolution Series 247 is 1.6 sq. ft.  
 P5 or P7 option total height is 24.9 (633).  
 Approx. Wt. = 36 lbs.



Cupola height  
 P3 without ROAM  
 Shown in line diagram



Cupola height  
 P5/P7 without ROAM



Cupola height  
 P5/P7 with ROAM

All dimensions are inches (millimeters) unless otherwise noted.

# American Revolution LED

## Series 247L

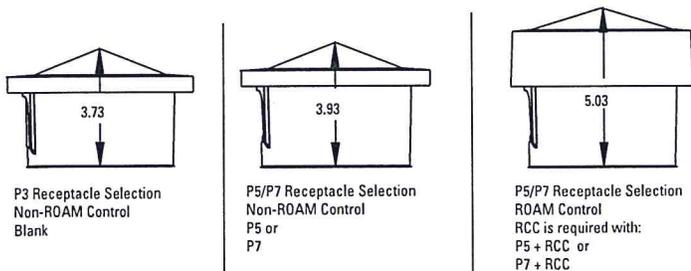
### ORDERING INFORMATION

Example: 247L 20LEDE70 MVOLT 4K R3 AY

Series	Performance Package	Voltage	Color Temperature (CCT)
247L American Revolution LED	<b>20LEDE10</b> 20 Chips, 1050 mA Driver, 72 input watts <b>20LEDE70</b> 20 Chips, 700 mA Driver, 45 input watts <b>10LEDE10</b> 10 Chips, 1050 mA Driver, 38 input watts <b>10LEDE70</b> 10 Chips, 700 mA Driver, 25 input watts <b>10LEDE53</b> 10 Chips, 525 mA Driver, 18 input watts <b>10LEDE35</b> 10 Chips, 350 mA Driver, 13 input watts	<b>MVOLT</b> Multi-volt, 120-277V <b>347</b> 347V <b>480</b> 480V	<b>3K</b> 3000K <b>4K</b> 4000K <b>5K</b> 5000K

Distribution	Optics	Options
<b>R2</b> Type II <b>R3</b> Type III <b>R5</b> Type V	<b>AY</b> Acrylic <b>PY</b> Polycarbonate	<u>Paint</u> <sup>1</sup> <b>(blank)</b> Black (standard) <b>GY</b> Gray <b>DDB</b> Dark Bronze <b>WH</b> White <b>BZ</b> Bronze  <u>Photocontrol</u> <b>(blank)</b> 3 pin NEMA Photocontrol Receptacle (standard) <b>NR</b> <sup>2</sup> No Photocontrol Receptacle <b>P5</b> <sup>3</sup> 5 pin NEMA Photocontrol Receptacle (dimnable driver included) <b>P7</b> <sup>3</sup> 7 pin NEMA Photocontrol Receptacle (dimnable driver included) <b>PCLL</b> <sup>4,5</sup> Solid State Long Life Photocontrol <b>PCSS</b> <sup>4,5,6</sup> Not CSA Listed Solid State Long Life Photocontrol (120-277V)  <u>Miscellaneous</u> <b>SS</b> Stainless steel hardware <b>NL</b> NEMA Label <b>XL</b> Not CSA Listed <b>TL</b> Tool-less Entry <b>LDR</b> <sup>7</sup> Ladder Rest <b>SH</b> Shorting Cap <b>SHX</b> <sup>6</sup> Not CSA Listed Shorting Cap <b>HSB</b> House Side Shield Black <b>HSW</b> House Side Shield White <b>CR</b> Enhanced Corrosion Resistant Finish <b>RCC</b> <sup>8</sup> ROAM Dimming Node Cupola Cover  <u>Accessories</u> <b>RNC57</b> <sup>3</sup> ROAM Dimming Node Cupola Cover

Cupola size based on type of control and receptacle



#### Notes:

1. Other colors available, please contact factory
2. PC and SH not available with NR option
3. Taller cupola cover (RCC) is required when used with ROAM or other similar wireless monitoring control systems
4. Standard failure mode="Fail On"
5. Photocontrols supplied with ANSI Standard Turn-On levels
6. XL option is required
7. Ships with unit, field installed
8. Required when using ROAM or other similar wireless monitoring control systems



AEL Headquarters, 3825 Columbus Road, Granville, OH 43023  
 www.americanelectriclighting.com  
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Warranty Five-year limited warranty. Complete warranty terms located at:  
[www.acuitybrands.com/CustomerResources/Terms\\_and\\_conditions.aspx](http://www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx)  
 Actual performance may differ as a result of end-user environment and application.  
 All values are design or typical values, measured under laboratory conditions at 25 °C.  
 Specifications subject to change without notice.

Please contact your sales representative for the latest product information.

Page 8 of 19

# American Revolution LED

## Series 247L

### OPERATING CHARACTERISTICS

DLC products are listed in **BOLD**.  
Non DLC products are indicated by shaded box.

LED Quantity, mA, CCT	Input Watts	TOTAL LUMENS											
		R2-AY	LPW	R3-AY	LPW	R5-AY	LPW	R2-PY	LPW	R3-PY	LPW	R5-PY	LPW
20LEDE10 3K	73	5,495	75	5,553	76	6,068	83	5,156	71	5,210	71	5,694	78
<b>20LEDE10 4K</b>	<b>73</b>	<b>5,900</b>	81	<b>5,962</b>	82	<b>6,516</b>	89	<b>5,451</b>	75	<b>5,576</b>	76	<b>6,111</b>	84
20LEDE10 5K	73	5,937	81	5,999	82	6,556	90	5,568	76	5,626	77	6,149	84
20LEDE70 3K	46	4,103	89	4,147	90	4,531	99	3,848	84	3,889	85	4,249	92
20LEDE70 4K	46	4,407	96	4,453	97	4,867	106	4,115	89	4,164	91	4,545	99
20LEDE70 5K	46	4,434	96	4,481	97	4,897	106	4,140	90	4,184	91	4,573	99
10LEDE10 3K	39	2,936	75	2,967	76	3,242	83	2,779	71	2,808	72	3,068	79
10LEDE10 4K	39	3,153	81	3,187	82	3,482	89	2,959	76	2,990	77	3,267	84
10LEDE10 5K	39	3,173	81	3,206	82	3,504	90	2,981	76	3,011	77	3,292	84
10LEDE70 3K	26	2,115	81	2,137	82	2,336	90	2,012	77	2,034	78	2,223	86
10LEDE70 4K	26	2,271	87	2,295	88	2,508	96	2,106	81	2,128	82	2,326	89
10LEDE70 5K	26	2,285	88	2,309	89	2,523	97	2,126	82	2,148	83	2,347	90
10LEDE53 3K	19	1,662	87	1,681	88	1,836	97	1,561	82	1,578	83	1,724	91
10LEDE53 4K	19	1,785	94	1,804	95	1,972	104	1,670	88	1,688	89	1,845	97
10LEDE53 5K	19	1,796	95	1,816	96	1,984	104	1,683	89	1,702	90	1,859	98
10LEDE35 3K	14	1,150	82	1,162	83	1,270	91	1,079	77	1,090	78	1,191	85
10LEDE35 4K	14	1,234	88	1,248	89	1,364	97	1,162	83	1,175	84	1,284	92
10LEDE35 5K	14	1,243	89	1,256	90	1,372	98	1,165	83	1,177	84	1,287	92



AEL Headquarters, 3825 Columbus Road, Granville, OH 43023  
www.americanelectricleighting.com  
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**Warranty** Five-year limited warranty. Complete warranty terms located at:  
[www.acuitybrands.com/CustomerResources/Terms\\_and\\_conditions.aspx](http://www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx)  
Actual performance may differ as a result of end-user environment and application.  
All values are design or typical values, measured under laboratory conditions at 25 °C.  
Specifications subject to change without notice.

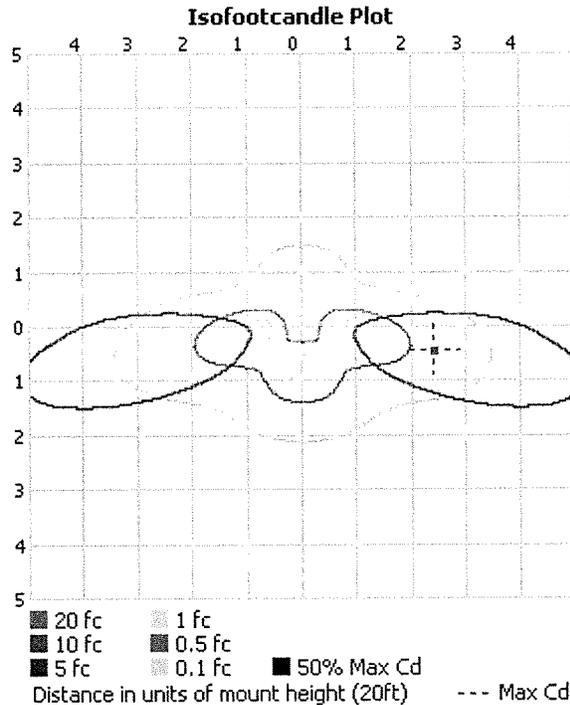
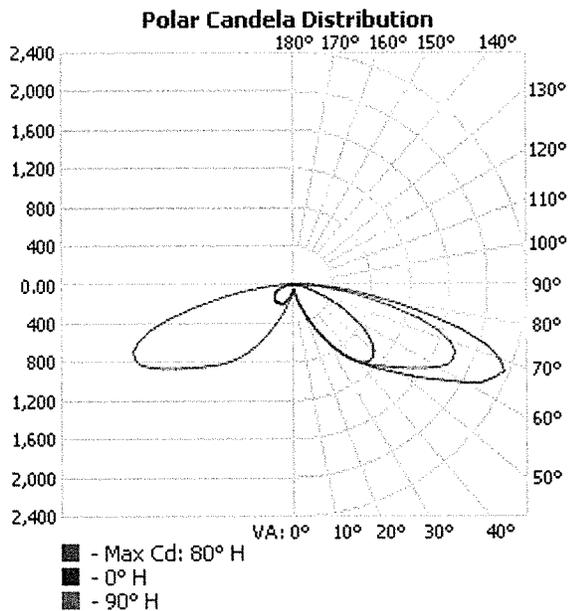
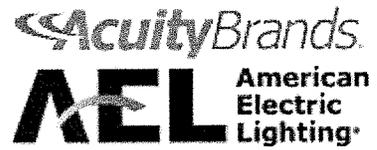
Please contact your sales representative for the latest product information.

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**OUTDOOR PHOTOMETRIC REPORT**

CATALOG: 247L 10LEDE10 XXXX 4K R2 AY

TEST #: LTL24261P128  
 TEST LAB: SCALED PHOTOMETRY  
 TEST NOTES: SCALED FROM ABSOLUTE TEST: LTL24261P0  
 TEST DATE: 1/14/2016  
 CATALOG: 247L 10LEDE10 XXXX 4K R2 AY  
 DESCRIPTION: 247L AMERICAN REVOLUTION LED, 10 LED, R2, 4000K, ACRYLIC CLEAR RAIN PANELS  
 SERIES: SERIES 247L LED - AMERICAN REVOLUTION  
 LAMP CATALOG: NICHIA 219B 4000K  
 LAMP: LED  
 LAMP OUTPUT: TOTAL LUMINAIRE LUMENS: 3153.1, ABSOLUTE PHOTOMETRY \*  
 BALLAST / DRIVER: LEDINTA1050C140DOM  
 INPUT WATTAGE: 38  
 LUMINOUS OPENING: RECTANGLE W/LUMINOUS SIDES (L: 9.96", W: 9.96", H: 11.16")  
 Max Cd: 2,348.4 AT HORIZONTAL: 80°, VERTICAL: 67.5°  
 ROADWAY CLASS: MEDIUM, TYPE II



\*TEST BASED ON ABSOLUTE PHOTOMETRY WHERE LAMP LUMENS=LUMENS TOTAL.  
 \*CUTOFF CLASSIFICATION AND EFFICIENCY CANNOT BE PROPERLY CALCULATED FOR ABSOLUTE PHOTOMETRY.

VISUAL PHOTOMETRIC TOOL 1.2.46 COPYRIGHT 2016, ACUITY BRANDS LIGHTING.  
 THIS PHOTOMETRIC REPORT HAS BEEN GENERATED USING METHODS RECOMMENDED BY THE IESNA. CALCULATIONS ARE BASED ON PHOTOMETRIC DATA PROVIDED BY THE MANUFACTURER, AND THE ACCURACY OF THIS PHOTOMETRIC REPORT IS DEPENDENT ON THE ACCURACY OF THE DATA PROVIDED. END-USER ENVIRONMENT AND APPLICATION (INCLUDING, BUT NOT LIMITED TO, VOLTAGE VARIATION AND DIRT ACCUMULATION) CAN CAUSE ACTUAL PHOTOMETRIC PERFORMANCE TO DIFFER FROM THE PERFORMANCE CALCULATED USING THE DATA PROVIDED BY THE MANUFACTURER. THIS REPORT IS PROVIDED WITHOUT WARRANTY AS TO ACCURACY, COMPLETENESS, RELIABILITY OR OTHERWISE. IN NO EVENT WILL ACUITY BRANDS LIGHTING BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF THIS REPORT.

LTL24261P128  
 VISUAL PHOTOMETRIC TOOL

PUBLISH  
 PAGE 1 OF 4

Page 10 of 19

**OUTDOOR PHOTOMETRIC REPORT**  
 CATALOG: 247L 10LEDE10 XXXX 4K R2 AY



**ZONAL LUMEN SUMMARY**

Zone	Lumens	% Luminaire
0-30	212.2	6.7%
0-40	547.4	17.4%
0-60	1,711.5	54.3%
60-90	1,343.7	42.6%
70-100	724.6	23%
90-120	87.1	2.8%
0-90	3,055.2	96.9%
90-180	97.8	3.1%
0-180	3,153.1	100%

**LUMENS PER ZONE**

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	7.4	0.2%	90-100	56.2	1.8%
10-20	48.5	1.5%	100-110	20.8	0.7%
20-30	156.2	5.0%	110-120	10.1	0.3%
30-40	335.3	10.6%	120-130	5.6	0.2%
40-50	515.1	16.3%	130-140	2.9	0.1%
50-60	649.0	20.6%	140-150	1.2	0%
60-70	675.3	21.4%	150-160	0.6	0%
70-80	479.8	15.2%	160-170	0.4	0%
80-90	188.6	6.0%	170-180	0.1	0%

**ROADWAY SUMMARY**

Distribution:	TYPE II, MEDIUM	
Max Cd, 90 Deg Vert:	209.5	
Max Cd, 80 to <90 Deg:	1,069.8	
	Lumens	% Lamp
Downward Street Side:	2,153.9	68.3%
Downward House Side:	901.1	28.6%
Downward Total:	3,054.9	96.9%
Upward Street Side:	50.3	1.6%
Upward House Side:	47.4	1.5%
Upward Total:	97.8	3.1%
Total Lumens:	3,152.7	100%

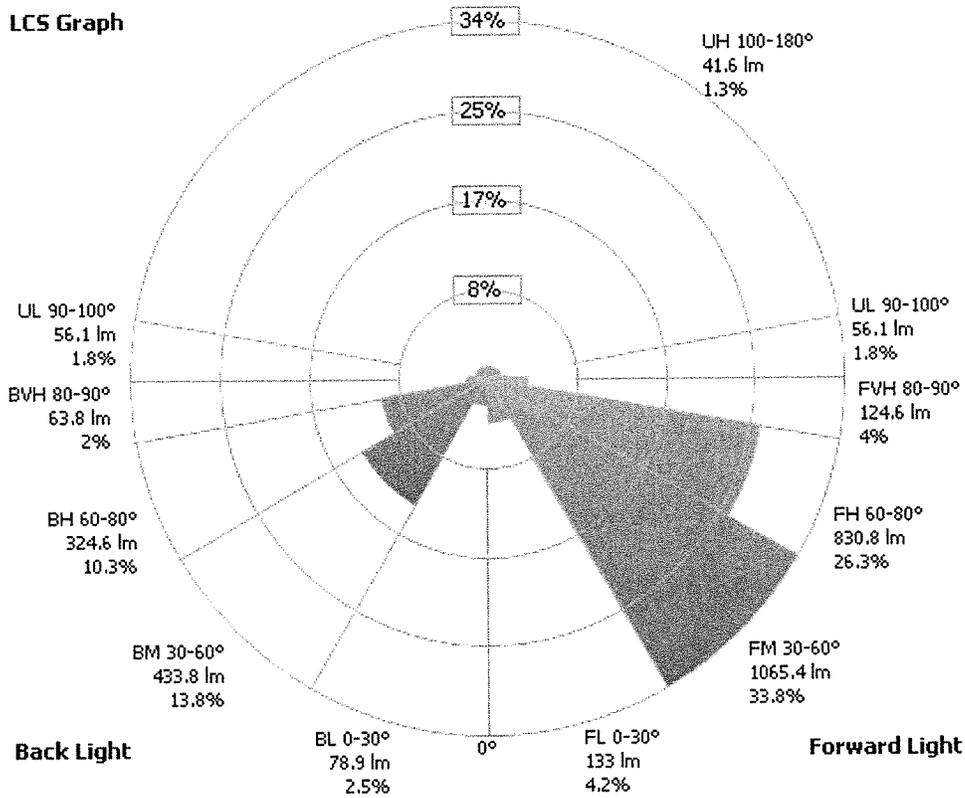
**LCS TABLE**

BUG RATING	B1 - U3 - G2	
FORWARD LIGHT	LUMENS	LUMENS %
Low(0-30):	133.0	4.2%
Medium(30-60):	1,065.4	33.8%
High(60-80):	830.8	26.3%
Very High(80-90):	124.6	4%
BACK LIGHT		
Low(0-30):	78.9	2.5%
Medium(30-60):	433.8	13.8%
High(60-80):	324.6	10.3%
Very High(80-90):	63.8	2%
UPLIGHT		
Low(90-100):	56.1	1.8%
High(100-180):	41.6	1.3%
<b>TRAPPED LIGHT:</b>	0.4	0%

**OUTDOOR PHOTOMETRIC REPORT**  
CATALOG: 247L 10LEDE10 XXXX 4K R2 AY



**LCS Graph**



**Back Light**

**Forward Light**

Scale = Max LCS %

Trapped Light: 0.4lm, 0%

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**OUTDOOR PHOTOMETRIC REPORT**  
 CATALOG: 247L 10LEDE10 XXXX 4K R2 AY



**CANDELA TABLE - TYPE C**

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	
0	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
5	68	81	80	79	75	73	72	73	72	69	64	61	57	53	50	49	50	49	48	48
10	114	134	130	124	121	119	117	116	114	109	102	93	84	80	75	73	73	72	79	79
15	193	218	207	195	186	182	182	185	186	183	172	153	133	119	110	107	106	104	117	117
20	305	336	312	283	263	257	265	282	297	296	273	234	190	158	142	137	139	142	155	155
25	466	501	446	390	350	342	366	410	451	458	413	330	247	189	162	157	168	180	197	197
30	677	701	618	514	445	432	478	569	645	663	583	435	294	205	170	174	196	217	233	233
35	887	902	790	645	536	522	601	739	851	868	742	521	316	203	172	186	213	232	241	241
40	1042	1035	921	754	621	606	728	900	1035	1036	846	553	310	194	170	190	215	237	250	250
45	1106	1085	990	822	684	684	841	1061	1219	1177	902	539	285	184	170	193	224	247	259	259
50	1071	1051	977	832	711	746	957	1256	1427	1327	947	506	256	183	179	202	233	249	253	253
55	947	927	885	782	689	759	1054	1479	1699	1504	974	452	233	186	190	212	232	239	240	240
60	758	728	712	654	611	729	1111	1711	2029	1700	975	400	215	189	197	213	225	227	225	225
65	539	489	493	490	496	633	1064	1858	2274	1808	910	338	202	192	197	206	209	215	212	212
70	306	283	320	338	368	506	925	1773	2258	1708	751	277	190	184	184	186	184	188	184	184
75	161	159	193	230	266	373	685	1372	1794	1324	532	217	170	163	160	157	153	156	148	148
80	90	93	119	154	185	262	451	835	1070	767	323	153	142	130	128	122	117	118	106	106
85	49	53	72	97	119	167	256	428	528	362	170	102	99	94	94	89	84	82	69	69
90	28	31	43	60	74	100	132	187	205	143	86	66	67	64	65	63	59	54	41	41
95	17	21	29	38	47	60	67	77	83	69	49	44	46	46	46	47	43	36	25	25
100	11	15	21	26	29	33	34	34	38	36	30	30	31	30	31	33	31	24	16	16
105	9	12	16	19	19	19	19	19	20	20	20	21	21	20	21	24	23	17	12	12
110	8	10	13	14	13	12	12	11	11	11	13	14	14	14	16	17	17	13	9	9
115	7	9	11	11	11	10	9	7	7	9	10	11	11	10	11	13	13	10	8	8
120	7	9	10	9	9	7	6	4	5	6	7	9	8	8	9	10	10	9	8	8
125	7	9	9	7	6	4	4	3	4	5	6	5	5	6	6	7	9	9	8	8
130	7	9	7	6	4	3	3	1	3	4	4	4	4	4	4	6	7	7	6	6
135	6	7	7	4	3	1	1	1	1	2	2	2	3	3	4	5	6	7	6	6
140	6	7	6	4	1	0	0	0	0	1	1	1	1	1	2	3	6	6	5	5
145	5	6	6	3	0	0	0	0	0	0	0	0	0	0	1	3	4	6	5	5
150	5	6	4	1	0	0	0	0	0	0	0	0	0	0	0	1	4	5	4	4
155	4	5	4	1	0	0	0	0	0	0	0	0	0	0	0	1	4	4	4	4
160	4	5	4	1	0	0	0	0	0	0	0	0	0	0	0	1	3	4	4	4
165	5	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	3	4	5	5
170	6	6	4	1	0	0	0	0	0	0	0	0	0	0	0	0	3	5	6	6
175	6	6	4	1	0	0	0	0	0	0	0	0	0	0	0	0	3	6	6	6
180	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

**Determination of Street Lighting Charges**  
Pascoag Utility District

Schedule 1

***Monthly Fixed Cost***

	Annual 25W & 50W	Annual 120W	Annual 240W	Annual 73W	
LED/ photo controls Cost	\$ 254.64	\$ 761.35	\$ 911.26	\$ 1,234.00	See Schedule 5
Cost Recovery Period (years)	20	20	20	20	
Cost Per Fixture	\$ 12.73	\$ 38.07	\$ 45.56	\$ 61.70	
Installation per street light	\$ 137.70	\$ 137.70	\$ 137.70	\$ 137.70	See Schedule 5
Cost Recovery Period (years)	20	20	20	20	
Cost Per Fixture	\$ 6.89	\$ 6.89	\$ 6.89	\$ 6.89	
Washing Maintenance per street light	\$ 82.32	\$ 82.32	\$ 82.32	\$ 82.32	See Schedule 3
Cost Recovery Period (years)	20	20	20	20	
Cost Per Fixture	\$ 4.12	\$ 4.12	\$ 4.12	\$ 4.12	
2% Failure Cost recovery	\$ 8.40	\$ 18.53	\$ 21.53	\$ 27.99	See Schedule 4
Cost Recovery Period (years)	20	20	20	20	
Cost Per Fixture	\$ 0.42	\$ 0.93	\$ 1.08	\$ 1.40	
<b><i>Total Annual Rate per Lamp</i></b>	<b>\$ 24.15</b>	<b>\$ 50.00</b>	<b>\$ 57.64</b>	<b>\$ 74.10</b>	
Monthly Rate per Lamp	\$ 2.01	\$ 4.17	\$ 4.80	\$ 6.18	

***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/ 2,188 Lumens	25.72	360.25	9.27	\$ 0.09167	\$ 0.85
50W LED/ 3,956 Lumens	51.30	360.25	18.48	\$ 0.09167	\$ 1.69
120W LED/ 11,730 Lumens	120.00	360.25	43.23	\$ 0.09167	\$ 3.96
240W LED/ 22,797 Lumens	240.00	360.25	86.46	\$ 0.09167	\$ 7.93
73W LED Decroitive with pole	73.00	360.25	26.30	\$ 0.09167	\$ 2.41

***Total Street Lighting Charge***

Lamp Wattage and Type	Monthly Lamp Energy Cost (\$)	Monthly Fixed Cost (\$)	Monthly Lamp Rate (\$)	Annual Lamp Rate (\$)
25W LED/ 2188 Lumens	\$ 0.85	\$ 2.01	\$ 2.86	\$ 34.32
50W LED/ 3956 Lumens	\$ 1.69	\$ 2.01	\$ 3.71	\$ 44.52
120W LED/ 11,730 Lumens	\$ 3.96	\$ 4.17	\$ 8.13	\$ 97.56
240W LED/ 22,797 Lumens	\$ 7.93	\$ 4.80	\$ 12.73	\$ 152.76
73W LED Decroitive with pole	\$ 2.41	\$ 6.18	\$ 8.59	\$ 103.08

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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	459
	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](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  
Pascoag Utility District

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

Year	Labor	Total	Present Value	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	\$	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>

Year	Truck	Total	Present Value	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	\$	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 56

Total Washing Maintenance per Fixture \$ 82.32

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Calculation of Costs due to Street Light Failure  
Pascoag Utility District

**25W & 50W Fixtures**

Total Cost to replace Fixture	\$ 254.64	See Schedule 5
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>	

**120W Fixtures**

Total Cost to replace Fixture	\$ 761.35	See Schedule 5
Average Installation costs for Replacement	<u>\$ 165.30</u>	See Schedule 4 (page 2 of 2)
Total Replacement Cost	\$ 926.65	
Potential Failure rate	<u>2%</u>	See Schedule 5
2% Failure Cost recovery	<u><u>\$ 18.53</u></u>	

**240W Fixtures**

Total Cost to replace Fixture	\$ 911.26	See Schedule 5
Average Installation costs for Replacement	<u>\$ 165.30</u>	See Schedule 4 (page 2 of 2)
Total Replacement Cost	\$ 1,076.56	
Potential Failure rate	<u>2%</u>	See Schedule 5
2% Failure Cost recovery	<u><u>\$ 21.53</u></u>	

**73W Fixtures**

Total Cost to replace Fixture	\$ 1,234.00	See Schedule 5
Average Installation costs for Replacement	<u>\$ 165.30</u>	See Schedule 4 (page 2 of 2)
Total Replacement Cost	\$ 1,399.30	
Potential Failure rate	<u>2%</u>	See Schedule 5
2% Failure Cost recovery	<u><u>\$ 27.99</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%

<u>Year</u>	<u>Labor</u>	<u>Present Value</u>	<u>20 year average</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				
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>

<u>Year</u>	<u>Truck</u>	<u>Present Value</u>	<u>20 year average</u>	<u>Hours</u>	<u>Cost</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				
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

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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 25W or 50W Led Street light @\$237
- 1 120W Led Street light(includes photo control) @\$701
- 1 240W Led Street light(Includes photo control) @\$850.50

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 for 25W & 50W fixtures@\$17.64

The 120W and 240W size street lights require an additional bracket and miscellaneous mounting Fasteners

- 1 120W bracket@\$50.35
- 1 240W bracket@\$50.76
- 1 additional mounting fasteners@\$10.00

Total cost per fixture

	Cost 25W & 50W	Cost 120W	Cost 240W	Cost 73W
1 Led Street light	\$ 237.00	\$ 701.00	\$ 850.50	\$ 416.00
1 photo control	\$ 17.64	\$ -	\$ -	\$ -
1 additional bracket/Pole	\$ -	\$ 50.35	\$ 50.76	\$ 808.00
1 additional mounting fasteners	\$ -	\$ 10.00	\$ 10.00	\$ 10.00
	<u>\$ 254.64</u>	<u>\$ 761.35</u>	<u>\$ 911.26</u>	<u>\$ 1,234.00</u>

Installation of a streetlight and photo cell

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

	Hours	Rate	Cost
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