

TECHNICAL MEMORANDUM

DATE: November 18, 2016
TO: Phoebe Johannessen
FROM: Marc Kendall
SUBJECT: Preliminary Illumination Technical Memo
PROJECT NUMBER: 554-1521-075
PROJECT NAME: East Lake Sammamish Trail - Inglewood Hill Parking Lot

SSDP2016-00414

PROJECT SUMMARY

Project Description

As part of the East Lake Sammamish Trail project, lighting is required at the Inglewood Hill Parking Lot along East Lake Sammamish Parkway SE between NE 16th St and NE Inglewood Hill Rd. The lighting requirement stems from City of Sammamish Public Works Standards Interim section PWS.15.330, which requires all developments requiring frontage improvements to install street lights.

The East Lake Sammamish Trail project is being funded by King County.

Existing Illumination

There is no existing lighting at the parking lot, trail or adjacent East Lake Sammamish Parkway SE.

The area is primarily a residential area Lighting Zone with low ambient lighting.

The site slopes down gradually from East Lake Sammamish Parkway SE through the parking lot and then there is a fairly steep slope down towards waterfront residences and the shoreline of Lake Sammamish.

The main source of pedestrians is the East Lake Sammamish Trail.

Proposed Illumination Upgrades

Illumination is proposed in order to provide for safety of traffic and pedestrian circulation in the parking lot and sidewalk through the parking area. Since the neighborhood is residential with low existing ambient lighting levels, up-light and light trespass are primary concerns and should be minimized.

Per City of Sammamish Public Works Standards Interim, Section PWS.15.340, pedestrian scale light poles shall be 16 feet high, with acorn style fixtures. Per City of Sammamish Municipal Code Section 21A.30.230, parking lot lighting fixtures shall be partially shielded to limit up-light and shall be installed to cause minimal or no light trespass onto adjacent properties. Acorn style fixtures are not ideal in this application because their design makes it difficult to limit up-light and light trespass. Because of these limitations, an alternative light is proposed.

Since the majority of lighting within the City is installed and maintained by Puget Sound Energy (PSE), an alternative fixture was selected from the PSE standard fixtures list. The Architectural Area Lighting (AAL) Providence fixture was selected because it is typically used in similar applications as the acorn, has no up-light, and has minimal light trespass. A second alternative, the AAL Largent fixture was also checked as a second alternative option.

LIGHTING DESIGN PARAMETERS

Design Standards

The design for this project was based on the following documents in order of precedence:

- City of Sammamish Public Works Standards Interim (2000)
- City of Sammamish Municipal Code
- City of Sammamish Public Works Standards 2016 – Draft
- IES Lighting Handbook (IESNA RP-8-14)
- WSDOT Design Manual, Chapter 1040 (July 2014)

Design Parameters

The design areas included in the design are limited to the parking lot entrances and access to East Lake Sammamish Trail. After dark pedestrian volumes are anticipated to be low, which roughly equates to 0-10 peak hour after dark pedestrians per hour (IES Chapter 2.2).

The parking lot is considered a minor parking lot because it is anticipated that there will be a nighttime peak hour usage of 50 or fewer vehicles (WSDOT DM 1040.05(16)).

East Lake Sammamish Parkway SE is a minor arterial (PWS.15.050).

Design Areas

There are five illumination design areas within the project area, which are the two parking lot entrances (WSDOT DM Ex 1040-17), the sidewalk that goes through the parking lot area, the plaza area and the ramp that connects to the East Lake Sammamish Trail.

Illumination Standards

Lighting requirements for the two parking lot entrance design areas, the sidewalk area and the ramp area include 0.8 fc horizontal average illuminance and 4:1 or better uniformity (WSDOT DM Ex 1040-25). The minimum weak point light shall not be less than 0.2 fc (PWS.15.340). Lighting shall not exceed 5.0 lumens per square foot (SMC 21A.30.220).

The plaza area does not have specific lighting requirement. To remain consistent with other design areas, a 0.8 horizontal average illuminance is recommended for the plaza area.

All lighting shall be designed to use metal halide or LED light sources and light trespass and up-light shall be minimized (SMC 21A.30.220).

LIGHTING ANALYSIS

Software

Lighting analysis was completed using AGi32 version 17.2 software. The direct only method of calculation was used within the analysis area. Grids were spaced at 5 x 5 feet.

Assumptions

Several assumptions were made relating to the lighting analysis.

- No light from businesses, homes or other sources outside of existing and proposed roadway lighting was included in the modeling.

- The LED lamp lumen depreciation factor was modeled at 0.90.
- The luminaire dirt depreciation factor was modeled at 0.85, to approximate a seven year cleaning/maintenance schedule in a clean environment with no nearby smoke or dust generating activities.

Fixture(s)

Per Interim Sammamish Public Works Standards, the luminaire should be a King Luminaire K118 Washington acorn style fixture (PWS.15.340). Due to up-light and light trespass issues associated with acorn fixtures it is recommended that an alternative fixture be used.

The Architectural Area Lighting Providence fixture was selected as an appropriate alternative because it is typically used in similar applications as the acorn, has no up-light, and has minimal light trespass.

A second alternative, the AAL Largent was also checked at the same spacing and mounting height if the client should decide against the Providence.

Per current standards, light poles will round tapered fiberglass, and be 16 feet high (PWS.15.340). Although draft 2016 standards have yet to formally be adopted, they specify concrete poles and do not have a pole height standard. To remain consistent with PSE, it is recommended that light poles be Stresscrete Washington series concrete poles with a 15 foot height.

In addition to decorative fixtures, Kliksystems LEDpod 50 gripping rail lights are recommended at 8 foot spacing to light the ramp between the parking lot plaza and the East Lake Sammamish Trail.

It is recommended that the color temperature of new luminaires be 3000K maximum.

Illumination Summary

The illumination summary has been completed as part of the design and the results are summarized in the table below. Lighting for the design areas is approximately 3.0 lumens per square foot (38841 lumens/12868 sf).

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Parking Entrance - North	Illuminance	Fc	1.15	2.35	0.78	1.47	3.01
Parking Entrance - South	Illuminance	Fc	1.07	1.60	0.57	1.88	2.81
Plaza	Illuminance	Fc	1.01	2.79	0.26	3.88	10.73
Ramp - Isolated	Illuminance	Fc	0.80	2.08	0.38	2.11	5.47
Sidewalk	Illuminance	Fc	0.89	2.72	0.28	3.18	9.71

These results meet the standards outlined above for average and uniformity (Avg/Min).

Attachments

- AGi32 – Report
- Preliminary Plan Sheet IL1
- Product Sheets for Providence and Largent Fixtures
- Conceptual Renderings (2) of the parking lot illumination



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User and Job File Information

User Information

Marc Kendall, PE
Parametrix

Voice Number : 253-604-6749
Fax Number :
Email Address : mkendall@parametrix.com

Job File Information

Filename : Preliminary Illum - Rev B.AGI
Location : U:\PSO\Projects\Clients\1521-KingCo\554-1521-075-ELST\99Svcs\CADD\Phase
Created By : Marc Kendall, PE
Created Date : 11/10/2016 7:52:25 AM
Created Version : 17.2.12
Modified By : Marc Kendall, PE
Modified Date : 11/15/2016 9:22:57 AM
Modified Version : 17.2.12
Total Time (Hrs) : 26.15
Description : Inglewood Analysis - Providence Fixture
Information :
11/15/2016 8:56:56 AM - Marc Kendall, PE :



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Luminaire Definition(s)

PROL-T2-56LED-3K-700

PROL-T2-56LED-3K-700MA

Filename	PROL-T2-56LED-3K-700.ies
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	6556
Luminaire Lumens	6556
Luminaire Efficiency (%)	N.A.
Lamp Lumen Depreciation (LLD)	0.900
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.765
Luminaire Watts	132.45
Arrangement Watts	132.45
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type III, Short, N.A. (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	188.4	N.A.	2.9
LCS-FM	2561.3	N.A.	39.1
LCS-FH	2089.3	N.A.	31.9
LCS-FVH	55.2	N.A.	0.8
LCS-BL	131.2	N.A.	2.0
LCS-BM	858.7	N.A.	13.1
LCS-BH	640.4	N.A.	9.8
LCS-BVH	31.8	N.A.	0.5
LCS-UL	0.0	N.A.	0.0
LCS-UH	0.0	N.A.	0.0
Total	6556.3	N.A.	100.0

Indoor Classification	B2-U0-G2
LER	Direct 49

PROL-T4-56LED-3K-450

PROL-T4-56LED-3K-450

Filename	PROL-T4-56LED-3K-450.ies
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	4077
Luminaire Lumens	4077
Luminaire Efficiency (%)	N.A.
Lamp Lumen Depreciation (LLD)	0.900



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Luminaire Definition(s) - Cont.

Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.765
Luminaire Watts	85
Arrangement Watts	85
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type IV, Very Short, N.A. (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	124.3	N.A.	3.0
LCS-FM	1913.0	N.A.	46.9
LCS-FH	1604.0	N.A.	39.3
LCS-FVH	44.6	N.A.	1.1
LCS-BL	71.2	N.A.	1.7
LCS-BM	213.0	N.A.	5.2
LCS-BH	94.1	N.A.	2.3
LCS-BVH	12.7	N.A.	0.3
LCS-UL	0.0	N.A.	0.0
LCS-UH	0.0	N.A.	0.0
Total	4076.9	N.A.	100.0
BUG Rating	B0-U0-G1		
Indoor Classification	Direct		
LER	48		

PROL-T3-56LED-3K-450 PROL-T3-56LED-3K-450

Filename	PROL-T3-56LED-3K-450.ies
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	4218
Luminaire Lumens	4218
Luminaire Efficiency (%)	N.A.
Lamp Lumen Depreciation (LLD)	0.900
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.765
Luminaire Watts	85
Arrangement Watts	85
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type III, Short, N.A. (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	108.8	N.A.	2.6
LCS-FM	1712.3	N.A.	40.6



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Luminaire Definition(s) - Cont.

LCS-FH	1431.5	N.A.	33.9
LCS-FVH	38.7	N.A.	0.9
LCS-BL	76.7	N.A.	1.8
LCS-BM	488.4	N.A.	11.6
LCS-BH	344.2	N.A.	8.2
LCS-BVH	17.7	N.A.	0.4
LCS-UL	0.0	N.A.	0.0
LCS-UH	0.0	N.A.	0.0
Total	4218.3	N.A.	100.0
BUG Rating	B1-U0-G1		
Indoor Classification	Direct		
LER	50		

LEDPOD50-2W-500-3000K-Asym

PCLens-WhiteAsymRef-2W-LED-500mA-LEDPOD-3000K-direct

Filename	LPD50-PCLens-direct-WhiteAsymRef-2W-LED-500mA-LEDP
Lumens Per Lamp	145
Number of Lamps	1
Total Lamp Lumens	145
Arrangement Lamp Lumens	145
Arrangement Luminaire Lumens	107
Luminaire Lumens	107
Luminaire Efficiency (%)	74
Lamp Lumen Depreciation (LLD)	0.900
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.765
Luminaire Watts	2
Arrangement Watts	2
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type III, Very Short, Cutoff (deprecated)
Indoor Classification	Direct
LER	53



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Calculation Summary

Parking Entrance - North

Project: Project_1
Polygon
Coordinates in Feet

Point Spacing L-R 3
Point Spacing T-B 3
Grid Orient 0
Grid Tilt 0
Meter Type Horizontal

Illuminance (Fc)
Average 1.15
Maximum 2.35
Minimum 0.78
Avg/Min 1.47
Max/Min 3.01

Parking Entrance - South

Project: Project_1
Polygon
Coordinates in Feet

Point Spacing L-R 3
Point Spacing T-B 3
Grid Orient 0
Grid Tilt 0
Meter Type Horizontal

Illuminance (Fc)
Average 1.07
Maximum 1.60
Minimum 0.57
Avg/Min 1.88
Max/Min 2.81

Parking Lot

Project: Project_1
Polygon
Coordinates in Feet

Point Spacing L-R 3
Point Spacing T-B 3
Grid Orient 0
Grid Tilt 0
Meter Type Horizontal



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www.agi32.com

Calculation Summary - Cont.

Illuminance (Fc)	
Average	0.90
Maximum	2.74
Minimum	0.06
Avg/Min	15.00
Max/Min	45.67

Plaza

Project: Project_1
Polygon
Coordinates in Feet

Point Spacing L-R	3
Point Spacing T-B	3
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	1.01
Maximum	2.79
Minimum	0.26
Avg/Min	3.88
Max/Min	10.73

Ramp - Isolated

Project: Project_1
Polygon
Coordinates in Feet

Point Spacing L-R	3
Point Spacing T-B	3
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	0.80
Maximum	2.08
Minimum	0.38
Avg/Min	2.11
Max/Min	5.47

Sidewalk

Project: Project_1
Polygon



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Calculation Summary - Cont.

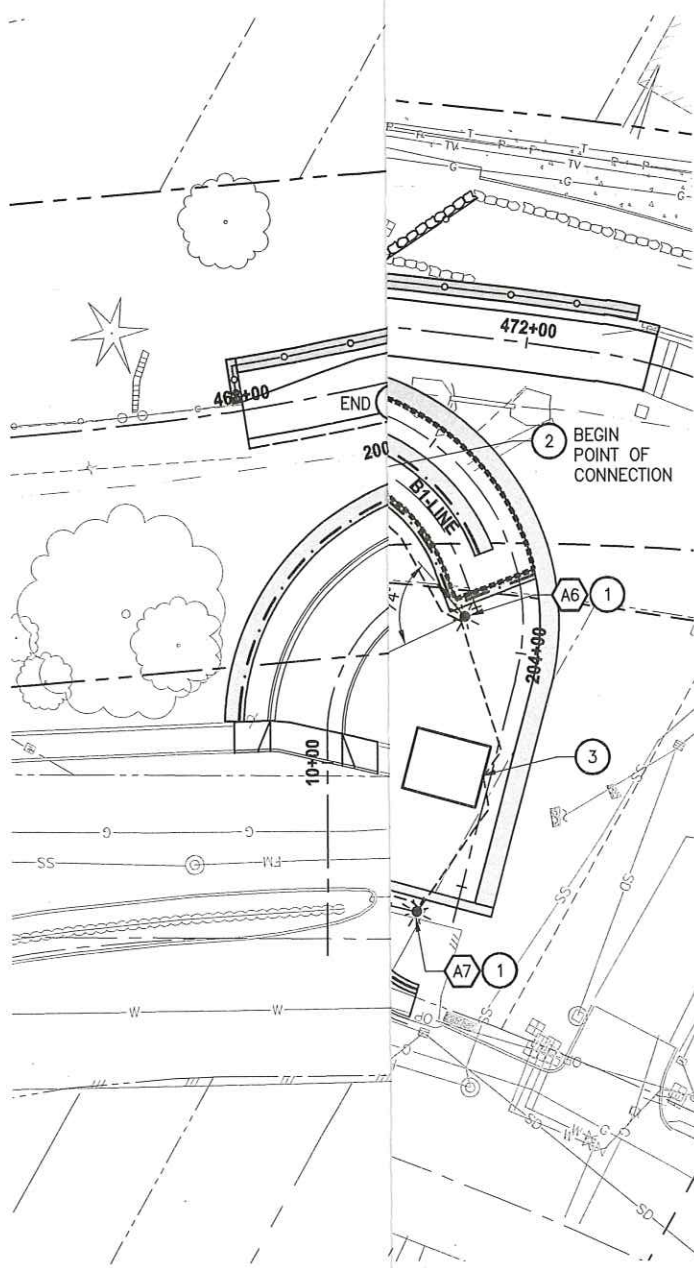
Coordinates in Feet

Point Spacing L-R	3
Point Spacing T-B	3
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)

Average	0.89
Maximum	2.72
Minimum	0.28
Avg/Min	3.18
Max/Min	9.71

LAYOUT: IL1
 PATH: U:\PSO\Projects\Clients\1521-KingCo\554-1921-075-ELST\995svos\CADD\Phase 21\103\DWG\
 PLOTTED BY: kendamar DATE: Friday, November 18, 2016 9:53:14 AM



ILLUMINATION NOTES:

- 1 FURNISH AND INSTALL DECORATIVE LIGHT STANDARD, DIRECT BURY, PER LUMINAIRE SCHEDULE. FURNISH AND INSTALL LUMINAIRE ON LIGHT STANDARD PER LUMINAIRE SCHEDULE.
- 2 FURNISH AND INSTALL LEDPOD 50 LIGHTS AND CONTROLS IN GRIPPING RAIL OF METAL HANDRAIL AT LOCATION SHOWN. INSTALL LIGHTS AT 8 FT SPACING, TILTED 30° FROM GROUND, TOWARD THE CENTER OF THE RAMP.
- 3 PROPOSED POWER SOURCE FOR ILLUMINATION TO BE 15A BREAKER IN BATHROOM ELECTRICAL PANEL. EXACT LOCATION AND REQUIREMENTS TO BE DETERMINED PRIOR TO 90% SUBMITTAL.

GENERAL NOTES:

1. ALL CONDUIT ON ILLUMINATION CIRCUIT SHALL BE 2" PVC SCH 80. LOCATIONS OF CONDUIT RUNS SHOWN ON PLANS ARE SCHEMATIC AND THE ENGINEER WILL CONFIRM EXACT LOCATIONS.
2. ILLUMINATION CIRCUIT CONDUCTORS SHALL BE #8 AWG AND SHALL ALSO INCLUDE ONE #8 AWG GROUND WIRE.
3. ALL EQUIPMENT AND CONDUIT SHALL BE GROUNDED PER NEC REQUIREMENTS.
4. LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION AND PROTECTION THROUGHOUT CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONFLICTS ARE TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION.

LEGEND:

- DECORATIVE LIGHT STANDARD W/ OPTIC ORIENTATION
- CONDUIT WITH ILLUMINATION CONDUCTORS
- GRIPPING RAIL LIGHTING
- LUMINAIRE ID

POWER:

PHOTOCELLS ON EACH
 END? OR A PHOTOCELL
 WITH A CONTACTOR
 PANEL?

LUMINAIRE ID	CIRCUIT	CENTERLINE	STATION	OFFSET	FIXTURE TYPE
A1	A	C-LINE	10+33.9	16.4' RT	(1A)
A2	A	C-LINE	11+24.3	15.0' LT	(1B)
A3	A	C-LINE	12+14.7	24.2' LT	(1B)
A4	A	C-LINE	13+04.3	15.4' LT	(1B)
A5	A	C-LINE	13+69.1	25.8' RT	(1A)
A6	A	C-LINE	13+57.4	51.7' LT	(1C)
A7	A	C-LINE	13+90.5	34.3' LT	(1B)

CITY OF SAMMAMISH APPROVAL	
City Engineer _____	Date _____
Community Development _____	Date _____

NOT FOR CONSTRUCTION

REVISIONS	DATE	BY	DESIGNED
			M. KENDALL
			M. KENDALL
			C. SCHOTT
			APPROVED

ILLUMINATION PLAN

SHEET NO.
 X OF 27

IL1

Providence® MicroCore™ – Large Housing PROL

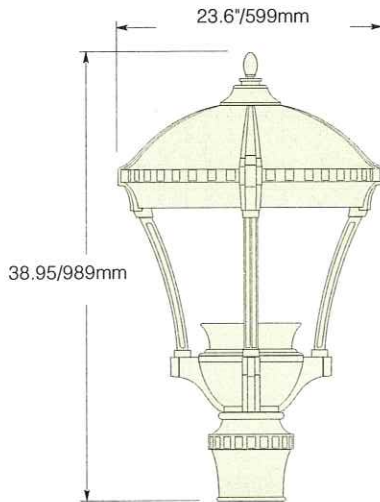
TYPE

FEATURES

- DLC Qualified
- Reliable, uniform, glare free illumination
- Types II, III, IV, V and custom distributions
- 3000K, 4000K, 5000K CCT
- 0-10V dimming ready
- Integral surge suppression
- LifeShield™ thermal protection
- 13 standard powder coat finishes
- Upgrade Kits



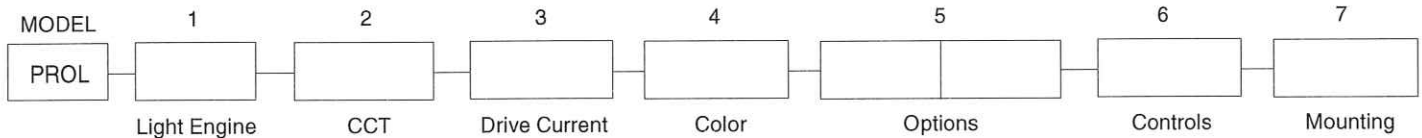
SPECIFICATIONS



- Diameter: 23.6" / 599 mm
- Height: 38.95" / 989 mm
- Weight: 47 lbs
- EPA: 1.33
- IP Rating: 65



ORDERING INFORMATION



1. LIGHT ENGINE

MicroCore Precision aimed optics

- T2-56LED
- T3-56LED
- T4-56LED
- T5-56LED
- TL-56LED
- TR-56LED

2. COLOR TEMPERATURE

- 3K
- 4K
- 5K

3. DRIVE CURRENT

- 700
- 450

4. COLOR

- | | |
|----------------------|---------------------------|
| WH Arctic White | VBU Verde Blue |
| BL Black | CRT Corten |
| BLT Matte Black | MAL Matte Aluminum |
| DB Dark Bronze | MG Medium Grey |
| DGN Dark Green | AGN Antique Green |
| TT Titanium | LG Light Grey |
| WDB Weathered Bronze | RAL Premium Color |
| MDB Bronze Metallic | CUSTOM ** Contact Factory |

5. OPTIONS

- SPK (Decorative spike)
- BPS (Struts painted brass)
- LDL (Lightly diffused lens.)
- CLR (Clear flat lens)
- HSS (House Side shield for Type 4)
- PFN (Finial painted brass)
- EPA-C (Egress-Contemporary)
- EPA-T (Egress-Traditional)
- PT4 (Post top fitter for a 4"/100mm O.D. pole)
- PT23 (Slips Over A 2 3/8"OD Tenon)
- PT3 (Slips Over A 3"OD Tenon)

6. CONTROL

- PCA-C (Rotatable photocell-Contemporary)
- PCA-T (Rotatable photocell-Traditional)

SCP (Sensor Control Programmable) pole accessory is available to provide occupancy detection for outdoor applications meeting California Title 24. For complete spec sheet and ordering information, visit www.aal.net/products/sensor_control_programmable/

7. MOUNTING

Standard configuration slips over a 5" DIA open top pole or may choose one.

Wall Mount Arm

- | | |
|-------|-------|
| WMA55 | WMA56 |
|-------|-------|

Pole Mount Arm

- | | |
|-------|--------|
| TRA55 | SLA1 |
| TRA56 | SLA1-2 |

Pier Mount

- | | | |
|-----|-----|-----|
| PM1 | PM2 | PM3 |
|-----|-----|-----|



ARCHITECTURAL AREA LIGHTING
16555 East Gale Ave. | City of Industry | CA 91745
P 626.968.5666 | F 626.369.2695 | www.aal.net
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JOB	_____
TYPE	_____
NOTES	_____

LUMINAIRE PERFORMANCE

Optical System	Secondary Lens or Shield	Distribution	Light Engine	Ordering Code												Drive Current	System Watts			
				3K (WW)			4K (NW)			5K (BW)										
				Delivered Lumens	Efficacy (Lm/W)	BUG Rating	Delivered Lumens	Efficacy (Lm/W)	BUG Rating	Delivered Lumens	Efficacy (Lm/W)	BUG Rating								
MicroCore	No Lens (Standard)	TYPE 2	T2-56LED	6556	50	2	0	2	8283	63	2	0	2	8860	67	2	0	2	700	132
		TYPE 3	T3-56LED	6591	50	2	0	2	8240	62	2	0	2	8907	67	2	0	2		
		TYPE 4	T4-56LED	6370	48	1	0	2	8048	61	1	0	2	8603	65	1	0	2		
		TYPE 5	T5-56LED	6620	50	3	0	1	8318	63	3	0	1	8945	63	3	0	G		
		45° Left	TL-56LED	6048	46	1	0	2	7163	54	1	0	2	7959	60	1	0	2		
		45° Right	TR-56LED	6048	46	1	0	2	7163	54	1	0	2	7959	60	1	0	2		
	HSS	TYPE 4	T3-56LED	5275	40	0	0	2	6316	48	0	0	2	6687	51	0	0	2	450	85
	No Lens (Standard)	TYPE 2	T2-56LED	4196	49	1	0	1	5273	62	2	0	2	5670	67	2	0	2		
		TYPE 3	T3-56LED	4218	50	1	0	1	5301	62	1	0	1	5700	67	1	0	2		
		TYPE 4	T4-56LED	4077	48	0	0	1	5151	61	1	0	2	5506	65	1	0	2		
		TYPE 5	T5-56LED	4236	50	2	0	1	5324	63	3	0	1	5275	62	3	0	1		
		45° Left	TL-56LED	3871	46	1	0	1	4584	54	1	0	2	5094	60	1	0	2		
		45° Right	TR-56LED	3871	46	1	0	1	4584	54	1	0	2	5094	60	1	0	2		
	HSS	TYPE 4	T4-56LED	3376	40	0	0	2	4042	48	0	0	2	4280	50	0	0	2		

* DesignLights Consortium® Qualified Product



ELECTRICAL CHARACTERISTICS

Optical System	Ordering Code	LED Drive mA	System Watts	Driver						Dimming							
				Line Voltage		Amps AC		Min. Power Factor	Max THD (%)	Operating Temp. Range	Dimming Range	Source current out of 0-10V purple wire			Absolute voltage range on 0-10V (+) purple wire		
				VAC	HZ	120	277					Min	Typical	Max	Min	Typical	Max
MicroCore	56LED	700	132	120-277	50/60	1.1	0.5	≥9	20	-30°C TO +40°C	10% TO 100%	0 MA	-	2 MA	-2.0 V	-	+15 V
		450	85			0.7	0.3										

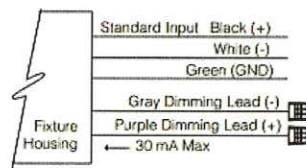
LED COLOR

Consult factory for Amber, Turtle Friendly, Gulf Coast and Observatory applications.

	Ordering Code		
	3K	4K	5K
CCT Average	3000K	4000K	5000K
CRI Minimum	≥ 80	≥ 70	≥ 70

WIRING LEADS

Luminaires not configured with wiHUBB or photo-control shall be provided with 0-10 purple and gray dimming leads.



TM-21 LIFETIME CALCULATION

Optical System	Ordering Code	Ambient Environment °C	Projected Lumen Maintenance (% vs. Khrs)					Reported L70
			15	25	50	TM-21* 60	100	
MicroCore	56LED	15	95	93	88	86	80	≥ 60
		25	93	91	97	85	79	
		40	93	91	87	85	78	



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 P 626.968.5666 | F 626.369.2695 | www.aal.net
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JOB _____
 TYPE _____
 NOTES _____

SPECIFICATIONS

HOUSING

- Luminaire shall have discrete optical and gear compartments that do not share any physical housings.
- All housing components shall be die-cast aluminum, sealed with continuous silicone rubber gaskets.
- Standard configurations do not require a flat lens, optional lenses shall be tempered glass
- All internal and external hardware shall be stainless steel.
- Optical bezel finish shall match the luminaire housing.

OPTICAL

- Patent pending MicroCore™ LED modules shall independently aim each light emitting diode (LED) in both horizontal rotation and vertical tilt angle.
- LEDs shall be mounted to a metal printed circuit board assembly (PCBA) with a uniform conformal coating over the panel surface and electrical features.
- LED optics shall be clear injection molded PMMA acrylic.
- MicroCore™ PCBA and optic shall be sealed to a die-cast anodized aluminum heat sink with an injection molded silicone rubber gasket. IP66.
- Type 4 distribution with optional House Side Shield not available with clear or diffused glass lenses. Factory installed House Side Shield is optimized for Type 4 distribution and not recommended for use with Type 2 or 3 distribution and not available with type 5 distribution.

ELECTRICAL

- Luminaires shall have integral surge protection that shall be U.L. recognized and have a surge current rating of 10,000 Amps using the industry standard 8/20uSec wave and surge rating of 372J.
- Drivers shall be U.L. recognized with an inrush current maximum of <20.0 Amps maximum at 230VAC.
- Drivers shall not be compatible with current sourcing dimmers, consult factory for current list of known compatible dimming systems, approved dimmers include Lutron Diva AVTV, Lutron Nova NFTV and NTFTV.
- LifeShield™ shall be provided with all configurations for added protection in the event of abnormally excessive high ambient temperature conditions.

CONTROLS

- SCP shall have an integral surge protection device with a current rating of 10,000 Amps using the industry standard 8/20uSec wave and surge rating of 372J
- Sensor not intended for use with additional photo-control, wireless control or dimming systems.

PHOTOCELL / EGRESS ADAPTERS

- Adapter(s) shall slip over a 4"/100mm DIA. pole with the luminaire or arm slipping over the adapter to add a total of 4.5"/114mm to the overall height. Adapter(s) shall be prewired, independently rotatable 359°, and have a cast access cover with an integral lens and lanyard.
- Photocell adapter shall include an internal twist lock receptacle. Photocell by others.
- Egress adapter shall require an auxiliary 120 volt supply for operation of an integral MR16 lamp in the event of emergency. The lamp may be aimed and locked into position with an adjustment range of 15°-45°. Adapter shall have a socket that accepts miniature bi-pin MR16 lamps up to 50 watts, lamp by others.

SERVICING

- Luminaire shall have tool-less service access to the gear compartment. Driver and surge suppressor shall be mounted to a prewired tray with quick disconnects that may be removed from the gear compartment.

ARM MOUNTING

- Luminaire shall slip over mounting arm and secured with three stainless steel 5/16-18 set screws.

FINISH

- Luminaire finish shall consist of a five stage pretreatment regimen with a polymer primer sealer, oven dry off, and top coated with a thermoset super TGIC polyester powder coat finish.
- Luminaire finish shall meet the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance.

CERTIFICATION

- Luminaire shall be listed with ETL for outdoor, wet location use, UL1598, UL 8750 and Canadian CSA Std. C22.2 no.250.

WARRANTY / TERMS AND CONDITIONS OF SALE

Download:

<http://www.hubbellighting.com/resources/warranty/>

LED lighting facts
Architectural Area Lighting
A Program of the IES ETL

Light Output (Lumens)	8043
Watts	131.09
Lumens per Watt (Efficacy)	61
Color Accuracy Color Rendering Index (CRI)	74
Light Color Correlated Color Temperature (CCT)	4155 (Bright White)

2700K 3000K 4500K 6500K

All results are according to IESNA E-19-006 Approved Method for the Evaluation and Photometric Rating of 2400 Series Lighting. The U.S. Department of Energy (DOE) will use product test data and results.

Visit www.lightingfacts.com for the Label Reference Guide.

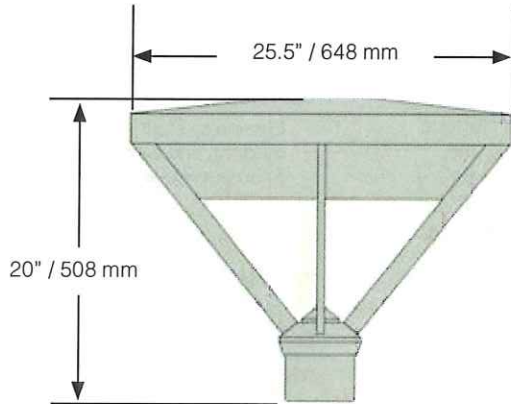
Registration Number: 2P214-713618-00202110
Model Number: P113-71-16-LED-44-101
Type: Luminaire - Area/Retrofitter

FEATURES

- DLC Qualified
- Reliable, uniform, glare free illumination
- Types II, III, IV, V and custom distributions
- 3000K, 4000K, 5000K CCT
- 0-10V dimming ready
- Integral surge suppression
- LifeShield™ thermal protection
- 13 standard powder coat finishes
- LED upgrade Kits also available



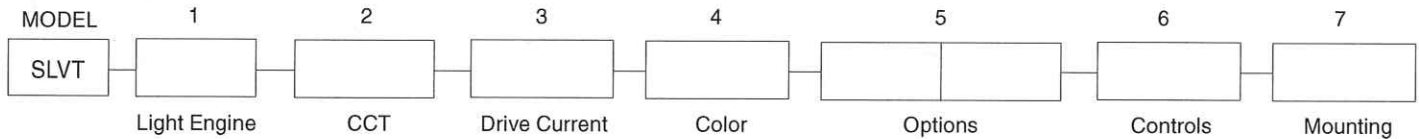
SPECIFICATIONS



- Diameter: 25.5" / 648 mm
- Height: 20" / 508 mm
- Weight: 27 lbs
- EPA: 0.8v
- IP Rating: 66



ORDERING INFORMATION



1. LIGHT ENGINE

MicroCore Precision aimed optics

- T2-56LED
- T3-56LED
- T4-56LED
- T5-56LED
- TL-56LED
- TR-56LED

2. COLOR TEMPERATURE

- 3K 4K 5K

3. DRIVE CURRENT

- 700 450

4. COLOR

- | | |
|----------------------|---------------------------|
| WH Arctic White | VBU Verde Blue |
| BL Black | CRT Corten |
| BLT Matte Black | MAL Matte Aluminum |
| DB Dark Bronze | MG Medium Grey |
| DGN Dark Green | AGN Antique Green |
| TT Titanium | LG Light Grey |
| WDB Weathered Bronze | RAL Premium Color |
| MDB Bronze Metallic | CUSTOM ** Contact Factory |

5. OPTIONS

- CLR (Clear secondary lens)
- LDL (Frosted Secondary Lens)
- HSS (House Side shield for Type 4)
- EPA-C (Egress in-line adapter)
- PT23 (Slips Over A 2 3/8"OD Tenon)
- PT3 (Slips Over A 3"OD Tenon)

6. CONTROLS

- PCA-C (Rotatable photocell-Contemporary)
- SCP (Sensor Control Programmable) pole accessory is available to provide occupancy detection for outdoor applications meeting California Title 24. For complete spec sheet and ordering information, visit www.aal.net/products/sensor_control_programmable/

7. MOUNTING

Fixture slips over a 4"/100mm or into 5"/127mm O.D. pole. (Required .188" thick wall for 5"/127mm O.D. pole. Secured with three S/S 3/8-16x3/8" set screws)

Wall Mount Arm

- | | |
|--------|--------|
| WMA35U | WMA9D |
| WMA36U | WMA9U |
| WMA7 | WMA22U |

Pole Mount Arm

- | | |
|-------|--------|
| TRA5U | SLA1-2 |
| TRA6U | SLA8U |
| SLA1 | SLA22U |

Pier Mount

- | | | |
|-----|-----|-----|
| PM1 | PM2 | PM3 |
|-----|-----|-----|



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JOB	_____
TYPE	_____
NOTES	_____

LUMINAIRE PERFORMANCE

Optical System	Secondary Lens or Shield	Distribution	Light Engine	Ordering Code												Drive Current	System Watts			
				3K			4K			5K										
				Delivered Lumens	Efficacy (Lm/W)	BUG Rating	Delivered Lumens	Efficacy (Lm/W)	BUG Rating	Delivered Lumens	Efficacy (Lm/W)	BUG Rating								
MicroCore	No Lens (Standard)	TYPE 2	T2-56LED	6697	52	2	0	2	8236	64	2	0	2	9051	70	2	0	2	700	129
		TYPE 3	T3-56LED	6737	52	2	0	2	8285	64	2	0	2	9104	71	2	0	2		
		TYPE 4	T4-56LED	6385	50	1	0	2	7858	61	1	0	2	8707	68	1	0	2		
		TYPE 5	T5-56LED	6648	52	3	0	1	8176	63	3	0	2	8985	70	3	0	2		
		45° Left	TL-56LED	6074	47	1	0	2	7184	56	1	0	2	7985	61	1	0	2		
		45° Right	TR-56LED	6074	47	1	0	2	7184	56	1	0	2	7895	61	1	0	2		
	HSS	TYPE 4	T3-56LED	5124	40	0	0	2	6135	48	0	0	2	6741	52	0	0	2	450	83
	No Lens (Standard)	TYPE 2	T2-56LED	4693	57	1	0	1	5558	67	2	0	2	6172	75	2	0	2		
		TYPE 3	T3-56LED	4733	57	1	0	2	5604	68	1	0	2	6227	75	1	0	2		
		TYPE 4	T4-56LED	4792	58	1	0	2	5675	69	1	0	2	6305	76	1	0	2		
		TYPE 5	T5-56LED	4970	60	3	0	3	5885	71	3	0	3	6539	79	3	0	3		
		45° Left	TL-56LED	4379	53	1	0	1	5180	63	1	0	2	5692	69	1	0	2		
		45° Right	TR-56LED	4379	53	1	0	1	5180	63	1	0	2	5692	69	1	0	2		
	HSS	TYPE 4	T4-56LED	3710	45	0	0	2	4442	54	0	0	2	4881	59	0	0	2		

*.DesignLights Consortium® Qualified Product



ELECTRICAL CHARACTERISTICS

Optical System	Ordering Code	Driver									Dimming						
		LED Drive mA	System Watts	Line Voltage		Amps AC		Min. Power Factor	Max THD (%)	Operating Temp. Range	Dimming Range	Source current out of 0-10V purple wire			Absolute voltage range on 0-10V (+) purple wire		
				VAC	HZ	120	277					Min	Typical	Max	Min	Typical	Max
MicroCore	56LED	700	129	120-277	50/60	1.1	0.5	≥9	20	-30°C TO +40°C	10% TO 100%	0 mA	-	2 mA	-2.0 V	-	+15 V
		450	83			0.7	0.3										

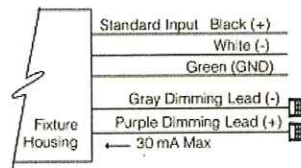
LED COLOR

Consult factory for Amber, Turtle Friendly, Gulf Coast and Observatory applications.

	Ordering Code		
	3K	4K	5K
CCT Average	3000K	4000K	5000K
CRI Minimum	≥ 80	≥ 70	≥ 70

WIRING LEADS

Luminaires not configured with wiHUBB or photo-control shall be provided with 0-10 purple and gray dimming leads.



TM-21 LIFETIME CALCULATION

Optical System	Ordering Code	Ambient Environment °C	Projected Lumen Maintenance (% vs. Khrs)					Reported L70
			15	25	50	TM-21* 60	100	
MicroCore	56LED	15	98	98	97	96	94	>60Khrs
		25	98	97	96	95	93	
		40	96	95	93	92	89	



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JOB _____
 TYPE _____
 NOTES _____

SPECIFICATIONS

HOUSING

- Luminaire housing and lens frame shall be spun aluminum, sealed with continuous silicone rubber gaskets.
- Standard configurations do not require a flat lens, optional lenses shall be tempered glass
- All internal and external hardware shall be stainless steel.
- Optical bezel finish shall match the luminaire housing.

OPTICAL

- Patent pending MicroCore™ LED modules shall independently aim each light emitting diode (LED) in both horizontal rotation and vertical tilt angle.
- LEDs shall be mounted to a metal printed circuit board assembly (PCBA) with a uniform conformal coating over the panel surface and electrical features.
- LED optics shall be clear injection molded PMMA acrylic.
- MicroCore™ PCBA and optic shall be sealed to a die-cast anodized aluminum heat sink with an injection molded silicone rubber gasket. IP66.

ELECTRICAL

- Luminaires shall have integral surge protection that shall be U.L. recognized and have a surge current rating of 10,000 Amps using the industry standard 8/20uSec wave and surge rating of 372J.
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- Photocell adapter shall include an internal twist lock receptacle. Photocell by others.
- Egress adapter shall require an auxiliary 120 volt supply for operation of an integral MR16 lamp in the event of emergency. The lamp may be aimed and locked into position with an adjustment range of 15°-45°. Adapter shall have a socket that accepts miniature bi-pin MR16 lamps up to 50 watts, lamp by others.

SERVICING

- Electrical assembly shall be mounted to a prewired internal service tray.

ARM MOUNTING

- Luminaire shall slip over mounting arm and secured with three stainless steel 1/4-20 screws.

FINISH

- Luminaire finish shall consist of a five stage pretreatment regimen with a polymer primer sealer, oven dry off, and top coated with a thermoset super TGIC polyester powder coat finish.
- Luminaire finish shall meet the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance.

CERTIFICATION

- Luminaire shall be listed with ETL for outdoor, wet location use, UL1598, UL 8750 and Canadian CSA Std. C22.2 no.250.

WARRANTY / TERMS AND CONDITIONS OF SALE

Download:

<http://www.hubbelling.com/resources/warranty/>

Lighting Facts
A Program of the U.S. DOE

Light Output (Lumens)	7958
Watts	127.14
Lumens per Watt (Efficacy)	63
Color Accuracy Color Rendering Index (CRI)	75
Light Color Correlated Color Temperature (CCT)	4183 (Bright White)

Color Temperature Scale: Warm White (2700K), 3000K, Bright White (4183K), Daylight (5000K), 6000K

All metrics are according to IESNA LM-79-07 (08) Approved Method for the Electrical and Photometric Rating of Solid State Lighting. The U.S. Department of Energy (DOE) defines color test area and beam.

Visit www.lightingfacts.com for the Label Reference Guide.

Registration Number: 2013K14030-1109102114
Model Number: SLVT-T4-30-ED-44-750
Type Location: Downcove

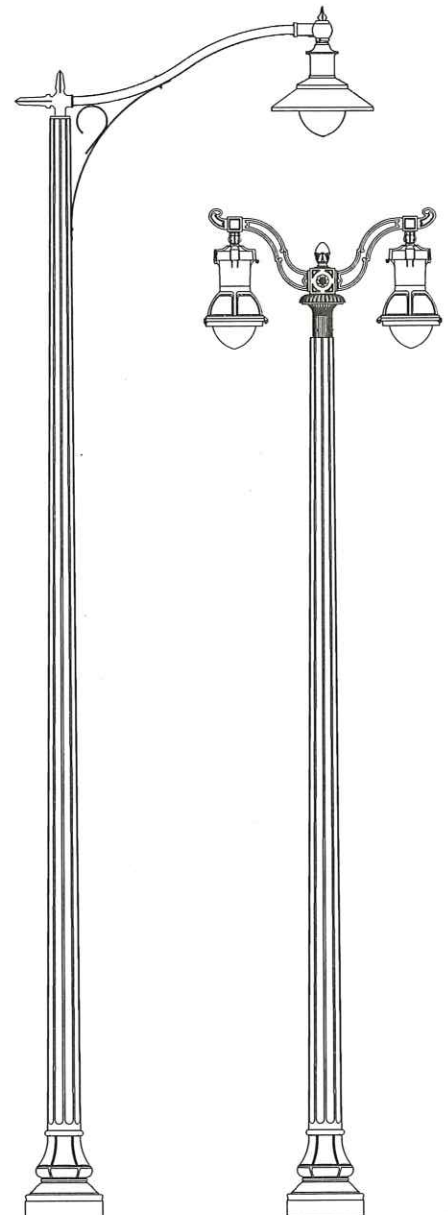
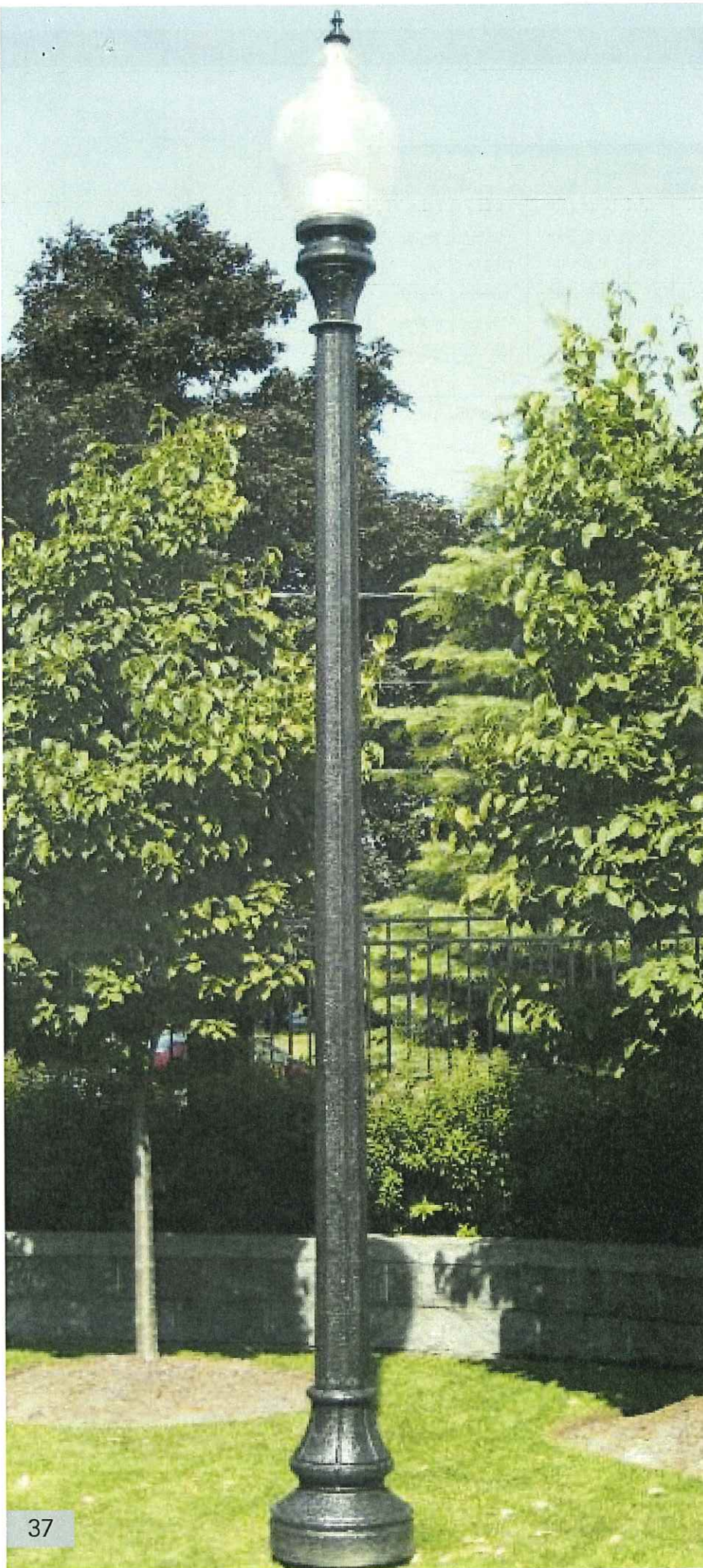


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JOB _____
TYPE _____
NOTES _____

THE WASHINGTON

The Washington design has a long history. Originally installed around the Capital Hill & White House grounds in 1910, it is now widely used throughout the DC area and has become extremely popular across the country. StressCrete is proud to introduce a spun concrete 10 fluted version of this historic design. It is available in heights from 5' to 30' as well as a lighted and nonlighted bollard.



Specification Details*

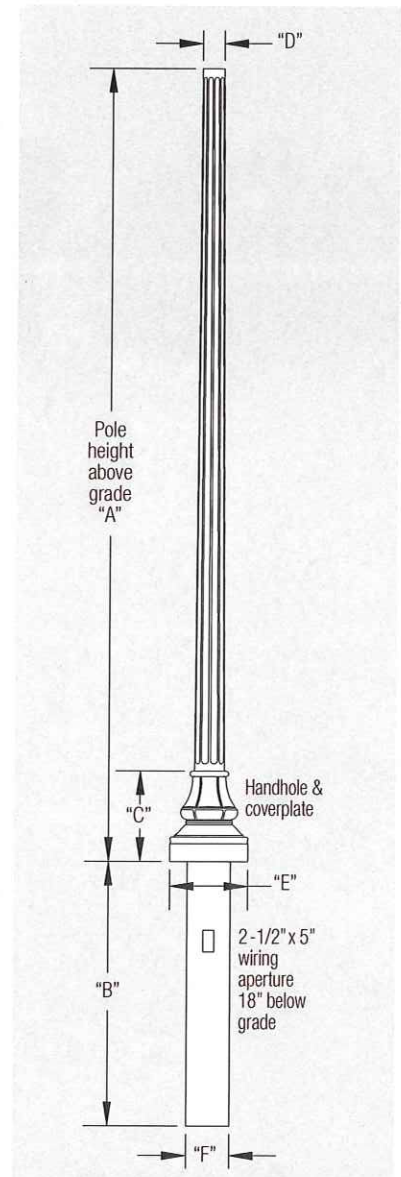
Description	Catalog Number	"A" Pole Height Above Grade	"D" Tip Dimension	"C" Stepped Section Height	"E" Flare	"B" Direct Burial Length & "F" Dia.	Pole Weight Direct Burial	Pole Weight Base Plate
Washington 10'	KWC10	10' 0"	5 3/4"	20 1/2"	18"	4' 6" x 10"	860 lbs	655 lbs
Washington 13'	KWC13	13' 0"	5 1/4"	20 1/2"	18"	4' 6" x 10"	925 lbs	720 lbs
Washington 15'	KWC15	15' 0"	5"	20 1/2"	18"	4' 6" x 10"	1100 lbs	895 lbs
Washington 18'	KWH18	18' 0"	6 3/4"	24"	21"	5' 0" x 12"	1660 lbs	1390 lbs
Washington 20'	KWH20	20' 0"	6 3/8"	24"	21"	5' 0" x 12"	1750 lbs	1480 lbs
Washington 25'	KWH25	25' 0"	5 3/4"	24"	21"	5' 0" x 12"	1900 lbs	1630 lbs
Washington 30'	KWH30	30' 0"	5"	24"	21"	5' 0" x 12"	2140 lbs	1870 lbs

* For bollard catalog information please see the bollard section in the King Luminaire catalog or visit our website at www.StressCreteGroup.com

How to Catalog for Washington Concrete Pole

Pole Style	Finish	Footing Details	Coating
KWC KWH	E - Etched Finish	DB - Direct Buried FBP - Flush Baseplate SBP - Stub Baseplate	NA - Non Acrylic A - Acrylic AG - Anti Graffiti Coating***
KWH 30'	E 40	DB 140 30/30	GFI NA
Height 5' - 30'	Color** 10 - Midnight Lace 11 - Eclipse Black 30 - Salt & Pepper 40 - Pearl Gray 90 - Saluki bronze	Tenon (Post Top Mount) Specify Tenon Size For example 140 30/30 = 2 7/8" OD & 3" long	Options* DR - Duplex Receptacle GFI - Ground Fault Duplex Receptacle SR - 1 Outlet LRN - Ladder Rest BPC - Base Plate Cover AB - Anchor Bolts BA - Banner Arms FH - Flag Holders

* Consult website for full listings. ** See decor colors on page 2 for full selection of colors.
***Anti Graffiti Coating is extra, consult factory for more details.

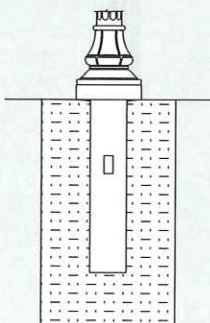


Footing Details

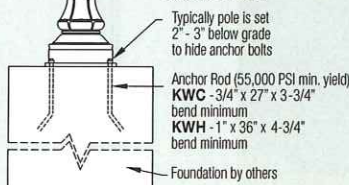
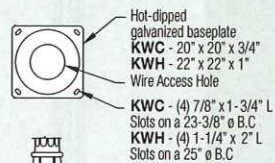
Direct Buried

(Simple and Cost Effective)

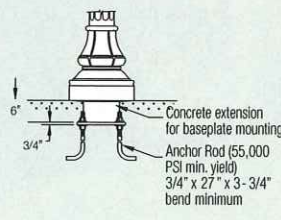
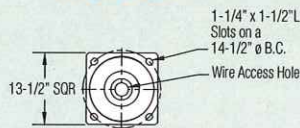
1. Auger the setting hole.
2. Set pole in hole and plumb straight.
3. Backfill* with required backfill tamping every 4" to 6".



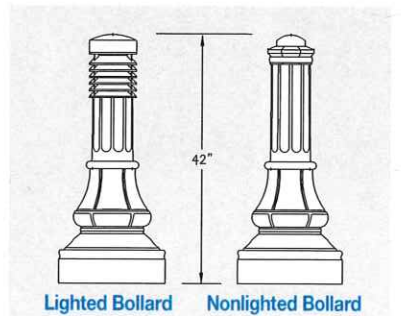
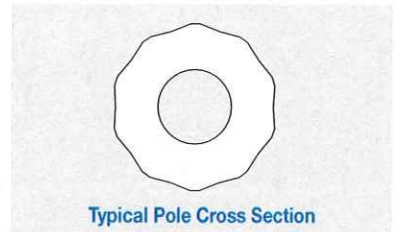
Baseplate Option 1: FBP

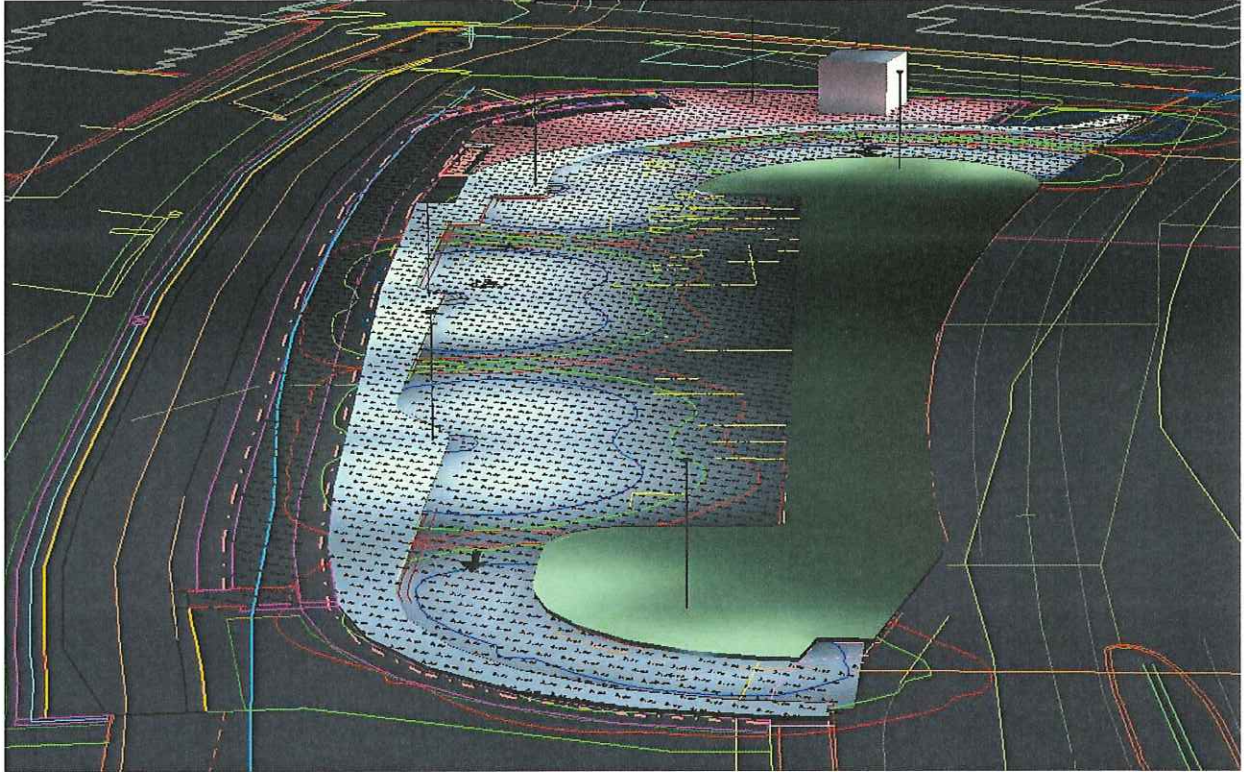


Baseplate Option 2: SBP

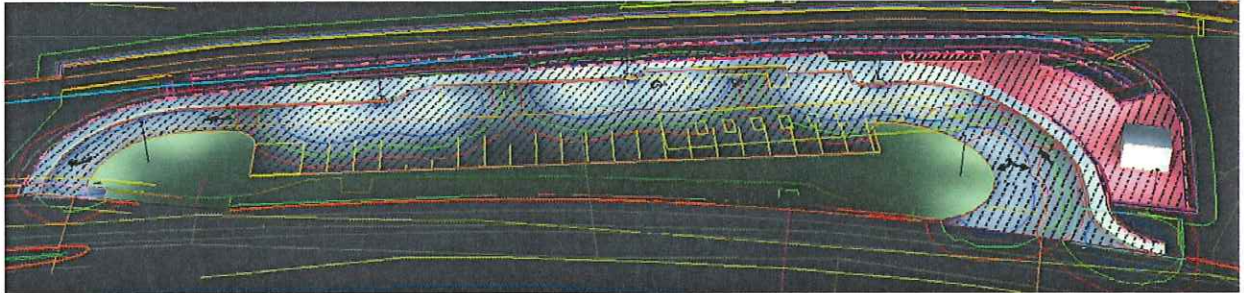


* Generally the excavated material can be used for backfill, in some situations better backfill may be required.





Parking Lot Illumination Rendering – Facing North



Parking Lot Illumination Rendering – Facing West

