

TECHNICAL MEMORANDUM

DATE: June 16, 2017
TO: Don Proctor
FROM: Marc Kendall
SUBJECT: Illumination Technical Memo (100% Submittal)
PROJECT NUMBER: 554-1521-075
PROJECT NAME: East Lake Sammamish Trail - Inglewood Hill Parking Lot

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, light trespass and glare 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 (SMC) Section 21A.30.230(3)(b)(i), 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) Largent fixture was selected because it is typically used in similar applications as the acorn, has no up-light and minimal light trespass.

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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) (PWS)
- City of Sammamish Municipal Code (SMC)
- City of Sammamish Public Works Standards 2016 – Draft
- Illumination Engineering Society (IES) Roadway Lighting Recommended Practice (IESNA RP-8-14)
- Washington State Department of Transportation (WSDOT) Design Manual (DM), Chapter 1040 (July 2014)

Design Parameters

The lighting design areas have been determined using SMC 21A.40.110(7) and WSDOT DM standards. 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.30.230(3)(b)(ii)).

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 uses LED light sources. The proposed parking lot fixtures are full cutoff and light trespass has been minimized by locating and aiming fixtures to efficiently distribute light where it is desired and minimized outside of the design areas. Where possible, poles have been located away from the steep embankment on the west side of the proposed parking lot to minimize the light and glare reaching Lake Sammamish and adjacent residences. These design decisions have been made to address SMC 25.06.020(6), SMC 21A.30.230(3)(b)(iv), and SMC 21A.40.110(7)).

SMC 21A.30.230(3)(b) also encourages solar-powered, high-energy-efficient and motion-sensing lighting. The proposed LED lighting currently the most widely used form of high-energy-efficient lighting and will be utilized on this project. Solar-powered lighting is a developing technology that has limitations in northern latitudes so it is not considered a viable option at this location. Motion-sensing lighting is also not recommended because it would likely be considered a nuisance by nearby residences that would see changes in brightness throughout dark hours as opposed to a consistent light level.

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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 AAL Largent 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.

Per current standards, light poles are to be 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. The shorter pole also helps minimize light-trespass and glare.

In addition to decorative fixtures, Kliksystems Asymmetric LEDpod 50 gripping handrail 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	1.11	1.81	0.67	1.66	2.70
Parking Entrance - South	Illuminance	Fc	0.83	1.63	0.21	3.95	7.76
Plaza	Illuminance	Fc	1.04	1.96	0.26	4.00	7.54
Ramp - Isolated	Illuminance	Fc	1.03	3.22	0.30	3.43	10.73
Sidewalk	Illuminance	Fc	0.80	2.08	0.20	4.00	10.40

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

Attachments

- AGi32 – Report
- Preliminary Plan Sheet IL1
- Photometric Plan
- Product Sheets for AAL Largent Fixture and LEDPOD Gripping Rail Lights

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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 : Illum90pct - Largent.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 : 6/15/2017 9:55:55 AM
Modified Version : 17.4.3
Total Time (Hrs) : 36.95
Description :

Information :

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Luminaire Definition(s)

LEDPOD50-2W-500-3000K-Asym

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

Filename	LPOD50-PCLens-direct-WhiteAsymRef-2W-LED-500mA-LEDPOD-
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

SLVT-T2-56LED-3K-700

SLVT-T2-56LED-3K-700

Filename	SLVT-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	6697
Luminaire Lumens	6697
Luminaire Efficiency (%)	N.A.
Lamp Lumen Depreciation (LLD)	0.900
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.765
Luminaire Watts	126.9
Arrangement Watts	126.9
Arrangement	SINGLE
Arm Length	0
Offset	0
Pole Mounted	
Road Classification	Type III, Short, N.A. (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	179.7	N.A.	2.7
LCS-FM	2296.6	N.A.	34.3
LCS-FH	2459.9	N.A.	36.7
LCS-FVH	116.8	N.A.	1.7

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Luminaire Definition(s) - Cont.

LCS-BL	131.1	N.A.	2.0
LCS-BM	800.3	N.A.	12.0
LCS-BH	660.5	N.A.	9.9
LCS-BVH	52.1	N.A.	0.8
LCS-UL	0.0	N.A.	0.0
LCS-UH	0.0	N.A.	0.0
Total	6697.0	N.A.	100.0
BUG Rating	B2-U0-G2		
Indoor Classification	Direct		
LER	53		

SLVT-T4-56LED-3K-700

SLVT-T4-56LED-3K-700

Filename	SLVT-T4-56LED-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	6385		
Luminaire Lumens	6385		
Luminaire Efficiency (%)	N.A.		
Lamp Lumen Depreciation (LLD)	0.900		
Luminaire Dirt Depreciation (LDD)	0.850		
Total Light Loss Factor	0.765		
Luminaire Watts	129.2		
Arrangement Watts	129.2		
Arrangement	SINGLE		
Arm Length	0		
Offset	0		
Pole Mounted			
Road Classification	Type IV, Very Short, N.A. (deprecated)		
Upward Waste Light Ratio	0.00		

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	180.4	N.A.	2.8
LCS-FM	2671.7	N.A.	41.8
LCS-FH	2837.9	N.A.	44.4
LCS-FVH	112.6	N.A.	1.8
LCS-BL	110.7	N.A.	1.7
LCS-BM	321.7	N.A.	5.0
LCS-BH	131.7	N.A.	2.1
LCS-BVH	18.1	N.A.	0.3
LCS-UL	0.0	N.A.	0.0
LCS-UH	0.0	N.A.	0.0
Total	6384.8	N.A.	100.0
BUG Rating	B1-U0-G2		
Indoor Classification	Direct		
LER	49		

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Luminaire Definition(s) - Cont.

SLVT-T2-56LED-3K-450

SLVT-T2-56LED-3K-450

Filename	SLVT-T2-56LED-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	4693
Luminaire Lumens	4693
Luminaire Efficiency (%)	N.A.
Lamp Lumen Depreciation (LLD)	0.900
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.765
Luminaire Watts	81.5
Arrangement Watts	81.5
Arrangement	SINGLE
Arm Length	0
Offset	0
Pole Mounted	
Road Classification	Type III, Short, N.A. (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	121.1	N.A.	2.6
LCS-FM	1671.5	N.A.	35.6
LCS-FH	1691.3	N.A.	36.0
LCS-FVH	90.4	N.A.	1.9
LCS-BL	86.6	N.A.	1.8
LCS-BM	557.0	N.A.	11.9
LCS-BH	437.9	N.A.	9.3
LCS-BVH	37.3	N.A.	0.8
LCS-UL	0.0	N.A.	0.0
LCS-UH	0.0	N.A.	0.0
Total	4693.1	N.A.	100.0
BUG Rating	B1-U0-G1		
Indoor Classification	Direct		
LER	58		

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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 1.11
Maximum 1.81
Minimum 0.67
Avg/Min 1.66
Max/Min 2.70

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 0.83
Maximum 1.63
Minimum 0.21
Avg/Min 3.95
Max/Min 7.76

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

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Calculation Summary - Cont.

Illuminance (Fc)

Average	1.04
Maximum	1.96
Minimum	0.26
Avg/Min	4.00
Max/Min	7.54

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	1.03
Maximum	3.22
Minimum	0.30
Avg/Min	3.43
Max/Min	10.73

Sidewalk

Project: Project_1
 Polygon
 Coordinates in Feet

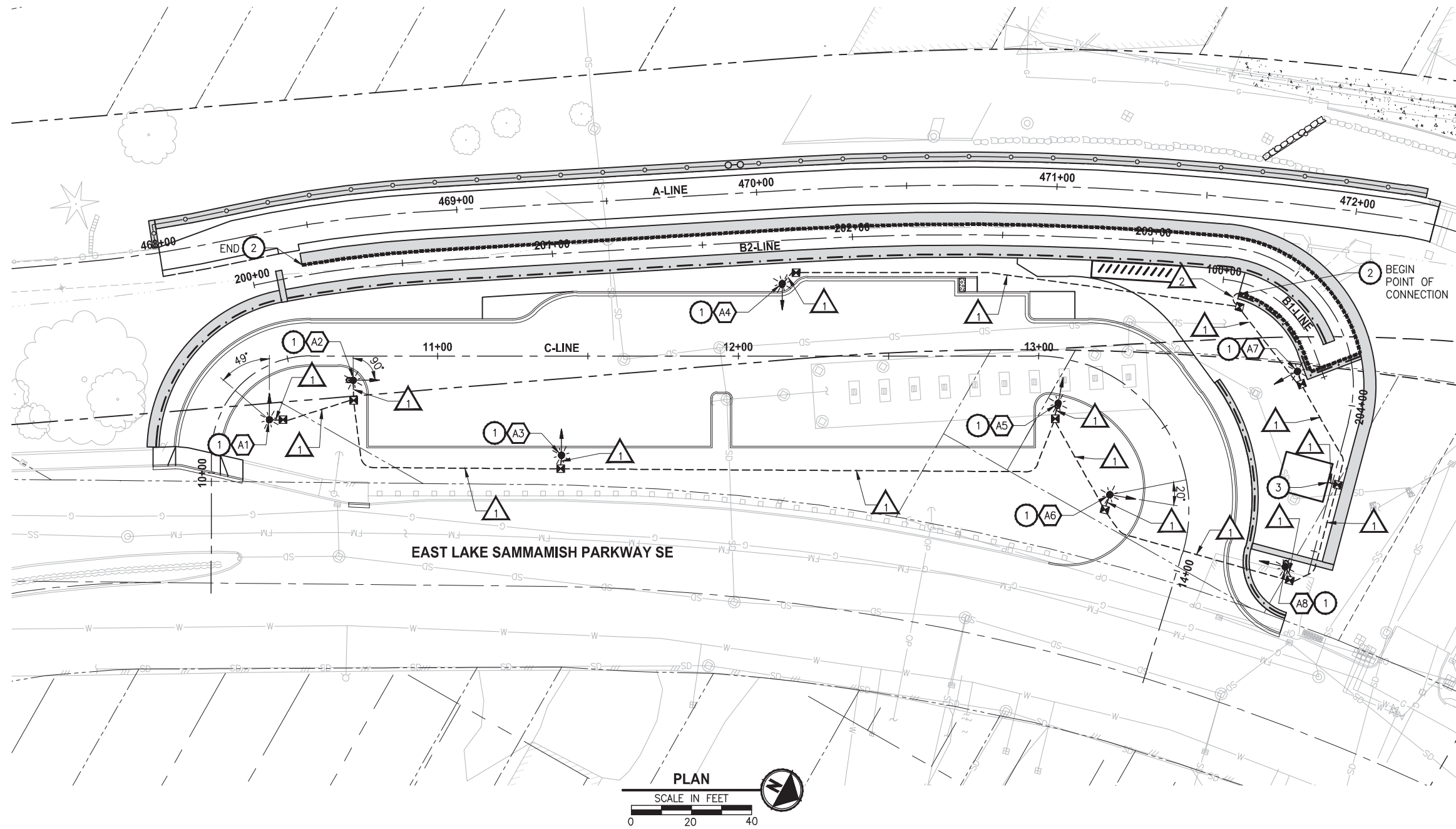
Point Spacing L-R	3
Point Spacing T-B	3
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)

Average	0.80
Maximum	2.08
Minimum	0.20
Avg/Min	4.00
Max/Min	10.40

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PATH: U:\P50\Projects\Clients\1521-075-ELT\995\cs\CAD\Phase 2\103.Dwg\ PLOTTED BY: kendall DATE: Thursday, June 15, 2017 10:28:23 AM
 LAYOUT: IL1



- ILLUMINATION NOTES:**
1. INSTALL DECORATIVE LIGHT STANDARD, DIRECT BURY, PER LUMINAIRE SCHEDULE. INSTALL LUMINAIRE ON LIGHT STANDARD PER LUMINAIRE SCHEDULE. INSTALL TYPE 1 JUNCTION BOX WITHIN 5 FT OF LIGHT STANDARD, PER WSDOT STD PLAN J-40.10-04.
 2. FURNISH AND INSTALL ASYMMETRIC LEDPOD 50 LIGHTS AND CONTROLS IN GRIPPING RAIL OF METAL HANDRAIL AT LOCATION SHOWN. INSTALL LIGHTS AT 8 FT SPACING. SEE SHEET IL2 FOR DETAILS.
 3. PROPOSED POWER SOURCE FOR ILLUMINATION TO BE 15A BREAKER IN BATHROOM ELECTRICAL PANEL. INCLUDE PHOTOCELL AT PANEL. EXACT LOCATION AND REQUIREMENTS TO BE DETERMINED PRIOR TO 90% SUBMITTAL.

- GENERAL NOTES:**
1. LOCATIONS OF CONDUIT RUNS SHOWN ON PLANS ARE SCHEMATIC AND THE ENGINEER WILL CONFIRM EXACT LOCATIONS.
 2. ALL EQUIPMENT AND CONDUIT SHALL BE GROUNDED PER NEC REQUIREMENTS.
 3. 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
 - TYPE 1 JUNCTION BOX
 - CONDUIT WITH ILLUMINATION CONDUCTORS
 - GRIPPING RAIL LIGHTING
 - LUMINAIRE ID
 - CONDUIT RUN ID

LUMINAIRE SCHEDULE									
LUMINAIRE ID	CIRCUIT	CENTERLINE	STATION	OFFSET	FIXTURE TYPE	POLE HEIGHT	POLE/BASE TYPE	FOUNDATION	OPTIC ORIENTATION (3)
A1	A	C-LINE	10+29	14.8' RT	(1A)	15'	(2)	DIRECT BURY	49°
A2	A	C-LINE	10+72	8.1' RT	(1B)	15'	(2)	DIRECT BURY	90°
A3	A	C-LINE	11+41	33.0' RT	(1B)	15'	(2)	DIRECT BURY	0°
A4	A	C-LINE	12+15	24.2' LT	(1A)	15'	(2)	DIRECT BURY	0°
A5	A	C-LINE	13+10	14.9' RT	(1B)	15'	(2)	DIRECT BURY	0°
A6	A	C-LINE	13+69	25.8' RT	(1C)	15'	(2)	DIRECT BURY	20°
A7	A	C-LINE	13+54	47.5' LT	(1C)	15'	(2)	DIRECT BURY	0°
A8	A	C-LINE	13+91	34.3' LT	(1C)	15'	(2)	DIRECT BURY	0°

- LUMINAIRE SCHEDULE NOTES:**
1. ARCHITECTURAL AREA LIGHTING, LARGENT MICROCORE-SLVT
 A. SVLT-T2-56LED-3K-700-BL
 B. SVLT-T4-56LED-3K-700-BL
 C. SVLT-T2-56LED-3K-450-BL
 2. CONCRETE POLE, DIRECT BURY. STRESSCRETE GROUP MODEL WASHINGTON KWC-15'-E-11-DB-XXX-XX/XX-AG. DIRECT BURY CONCRETE POLE PER MANUFACTURER'S RECOMMENDATIONS. BACKFILL WITH NATIVE BACKFILL. INSTALL CENTER OF CONCRETE POLE A MINIMUM OF 3 FT BEHIND FACE OF CURB WHERE APPLICABLE.
 3. OPTIC ORIENTATION IS RELATIVE TO THE C-LINE. 0° IS AIMED DIRECTLY AT C-LINE. ORIENTATION MEASURED CLOCKWISE ABOUT THE CENTER OF THE POLE.

CONDUIT / WIRE SCHEDULE			
RUN	CONDUIT SIZE	CONDUIT TYPE	CONDUCTORS
1	2"	PVC SCH 80	2-#8, 1-#8 GROUND
2	1.5"	RIGID METAL	LEDPOD WIRE

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

Exhibit 53
 NOT FOR CONSTRUCTION
SSDP2016-00414
001904

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

ONE INCH AT FULL SCALE, IF NOT, SCALE ACCORDINGLY
 FILE NAME: BL1521075P21T03IL-01
 JOB No: 554-1521-075 P21T03
 DATE: OCTOBER 2016

PRELIMINARY

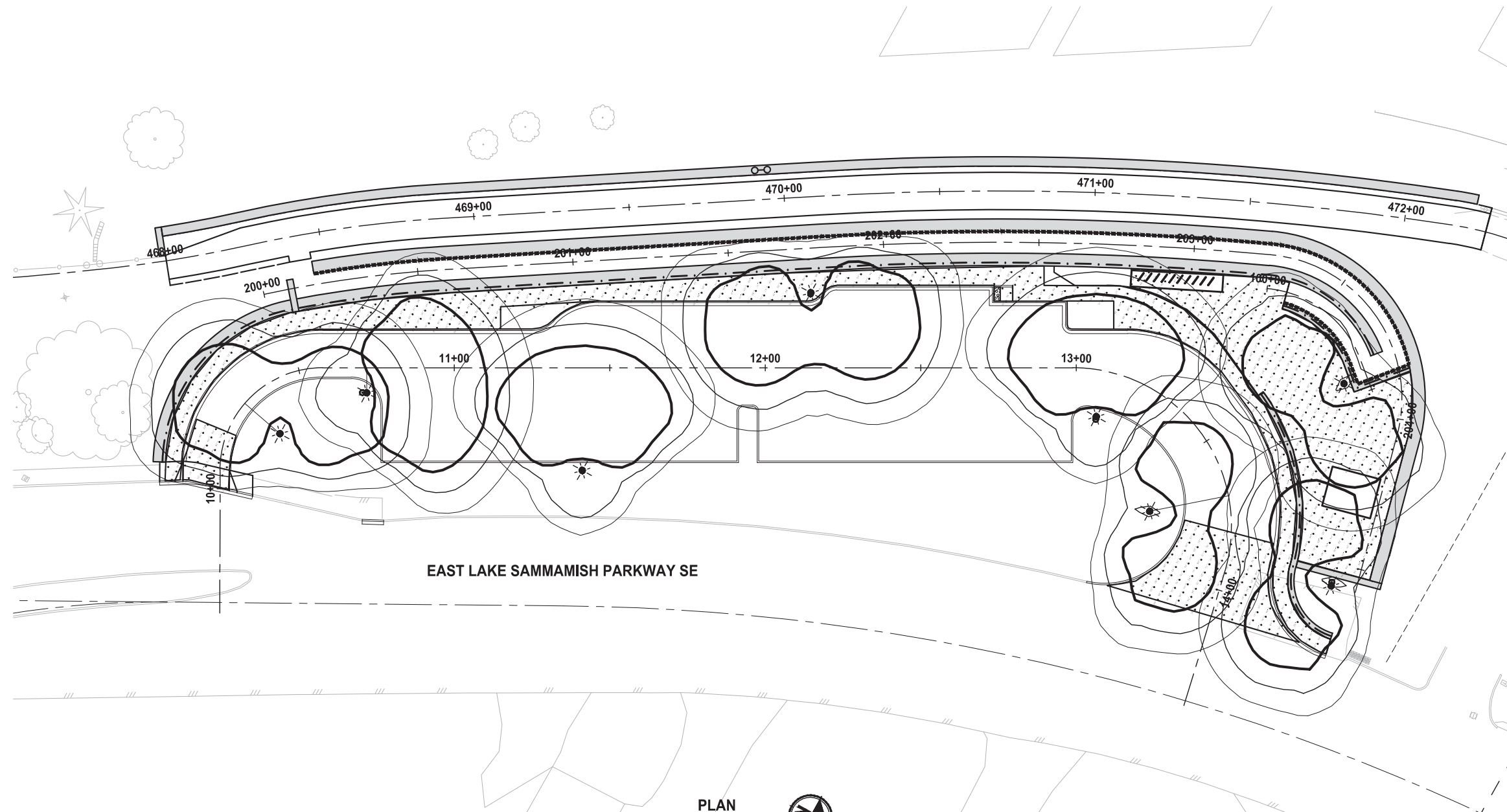
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 719 2ND AVENUE, SUITE 200 | SEATTLE, WA 98104
 P 206.394.3700
 WWW.PARAMETRIX.COM

PROJECT NAME
EAST LAKE SAMMAMISH MASTER PLAN TRAIL INGLEWOOD HILL ROAD PARKING LOT
 SAMMAMISH, WA

ILLUMINATION PLAN

SHEET NO.
 1 OF 1
IL1

LAYOUT: PHOTOMETRICS PATH: U:\PSO\Projects\Clients\1521-075-ELST\95\Sites\CADD\Phase 21\T03\Draw\ PLOTTED BY: hendemar DATE: Thursday, June 15, 2017 2:33:48 PM



EAST LAKE SAMMAMISH PARKWAY SE



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

Exhibit 53
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001905

REVISIONS	DATE	BY	DESIGNED
			M. KENDALL
			DRAWN
			M. KENDALL
			CHECKED
			APPROVED

**ONE INCH AT FULL SCALE.
 IF NOT, SCALE ACCORDINGLY**
 FILE NAME
 BL1521075P21T03IL-01
 JOB No.
 554-1521-075 P21T03
 DATE
 OCTOBER 2016

PRELIMINARY

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 P 206.394.3700
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PROJECT NAME
**EAST LAKE SAMMAMISH
 MASTER PLAN TRAIL
 INGLEWOOD HILL ROAD PARKING LOT**
 SAMMAMISH, WA

**PHOTOMETRICS
 PLAN**

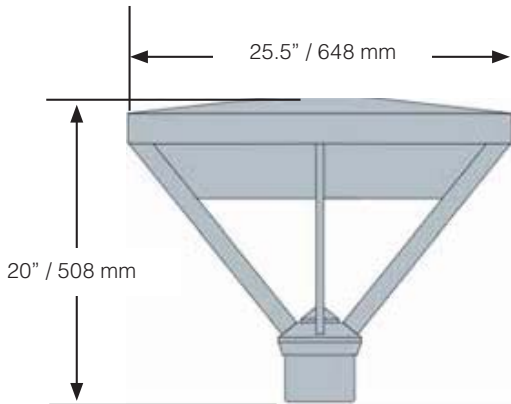
SHEET NO.
 1 OF 27
 -

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



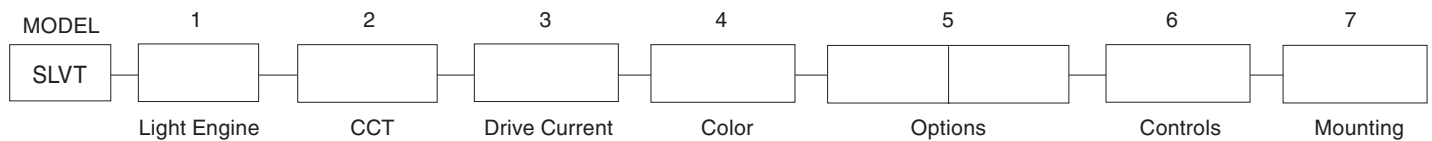
SPECIFICATIONS



- 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
- WMA36U
- WMA7
- WMA9D
- WMA9U
- WMA22U

Pole Mount Arm

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

Pier Mount

- PM1
- PM2
- PM3

Exhibit 53
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ARCHITECTURAL AREA LIGHTING
16555 East Gale Ave. | City of Industry | CA 91745
P 626.968.5666 | F 626.369.2695 | www.aal.net
Copyright © 2014 | Rev 5.15

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	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	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	450	83			0.7	0.3					0 mA	-	2 mA	-2.0 V	-	+15 V

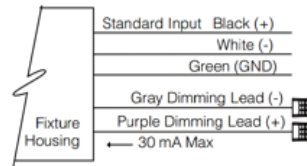
LED COLOR

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.
- 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
- 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.

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

- 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 ¼"-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/>

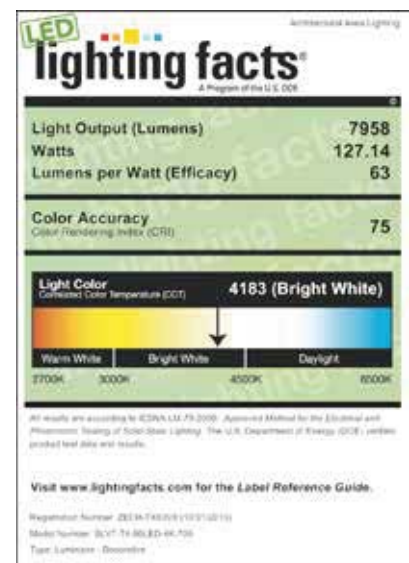


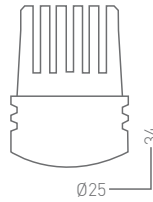
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JOB	_____
TYPE	_____
NOTES	_____

DATASHEET



KLIKLED[®] LEDPOD

Optics				Reflector	
Beam Angle				Symmetrical	
LOR defined by optics				76	
				Asymmetrical	
				68	
lm	W	mA	V	System Lumens	
120	1.4	350	3	92	
162	1.9	500	3	124	
				82	
				111	

Colour	3000K · 4000K · 5000K · Red · Green · Blue · Amber
CRI	80-85
Binning	2 McAdam Step
Driver	350 - 500mA Constant Current
Control	DALI · DSI · DMX · DMX-RDM · 0-10V · SWITCH DIM
Distribution	Symmetrical · Asymmetrical
Tube Size	Ø 48-65mm, Max. wall 5.5mm †
Cut Out	25mm
Weight	0.074kg

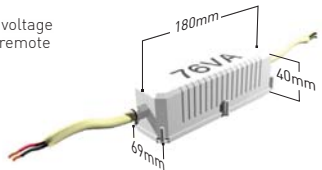
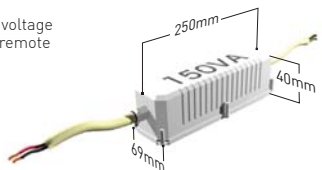
* All IP rated luminaires tested to AS60529-2004 Degrees of protection provided by enclosures (IP Code)
 † Others sizes available upon request

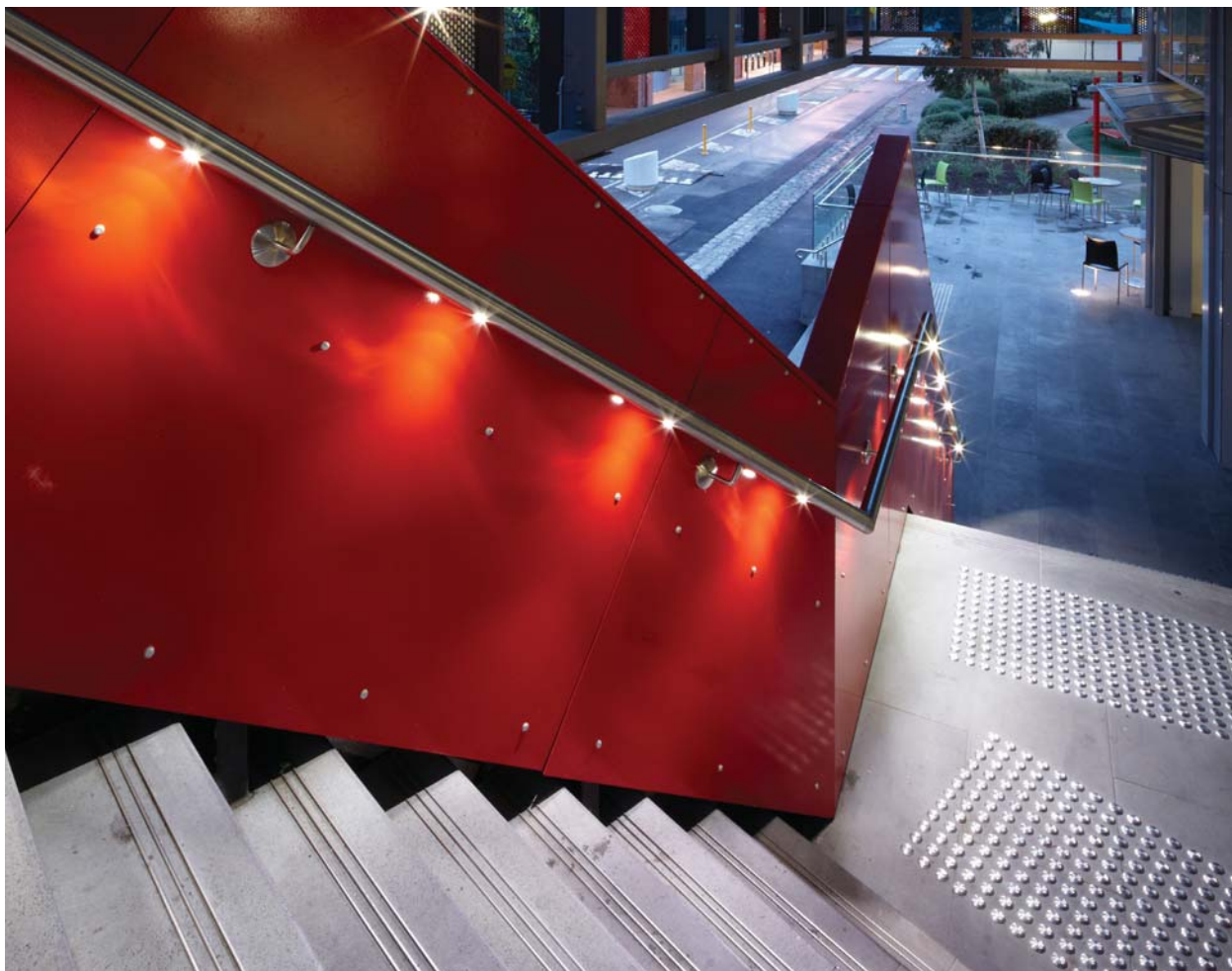


Eastern Busway, Brisbane · Lighting Design: Aecom

Exhibit 53
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001909

DATASHEET

convertors 24V*	driver	spacing	maximum ledpods
mains voltage 240V* remote  remotely mounted custom dimming control available *other voltages available on request	350mA	600mm	38
	500mA	600mm	30
mains voltage 240V* remote  remotely mounted custom dimming control available *other voltages available on request	350mA	600mm	75
	500mA	600mm	60



Swinburne University, Melbourne · Lighting Design: HR Consulting Engineers

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