

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 has minimal light trespass.

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.

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



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 | LPD50-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

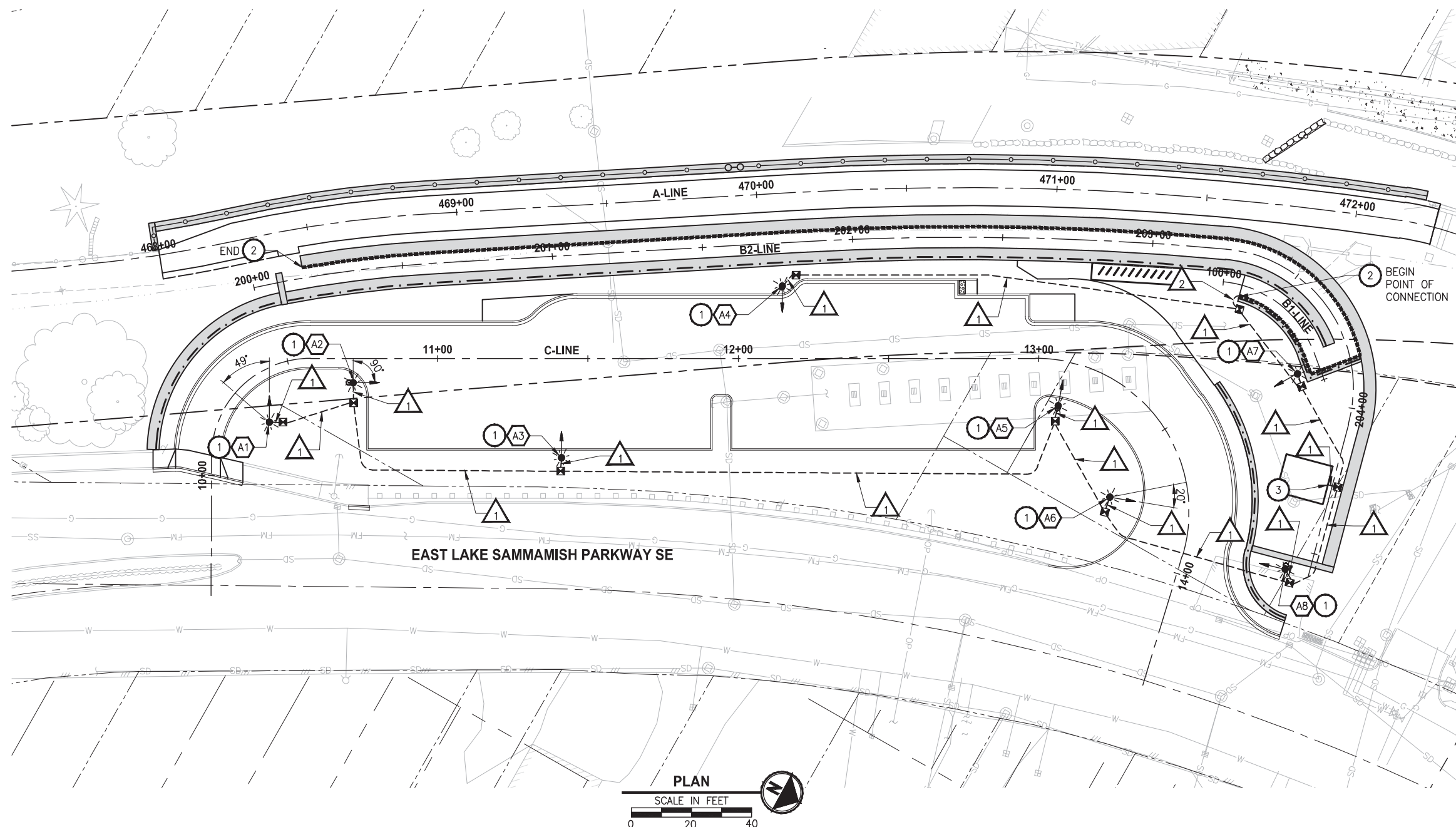
Project: Project_1
Polygon
Coordinates in Feet

| | |
|-------------------|------------|
| 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 |

PATH: U:\P50\Projects\Clients\1521-075-ELST\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 _____ |

NOT FOR CONSTRUCTION

| 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

Parametrix
 ENGINEERING · PLANNING · ENVIRONMENTAL SCIENCES
 719 2ND AVENUE, SUITE 200 | SEATTLE, WA 98104
 P 206.394.3700
 WWW.PARAMETRIX.COM

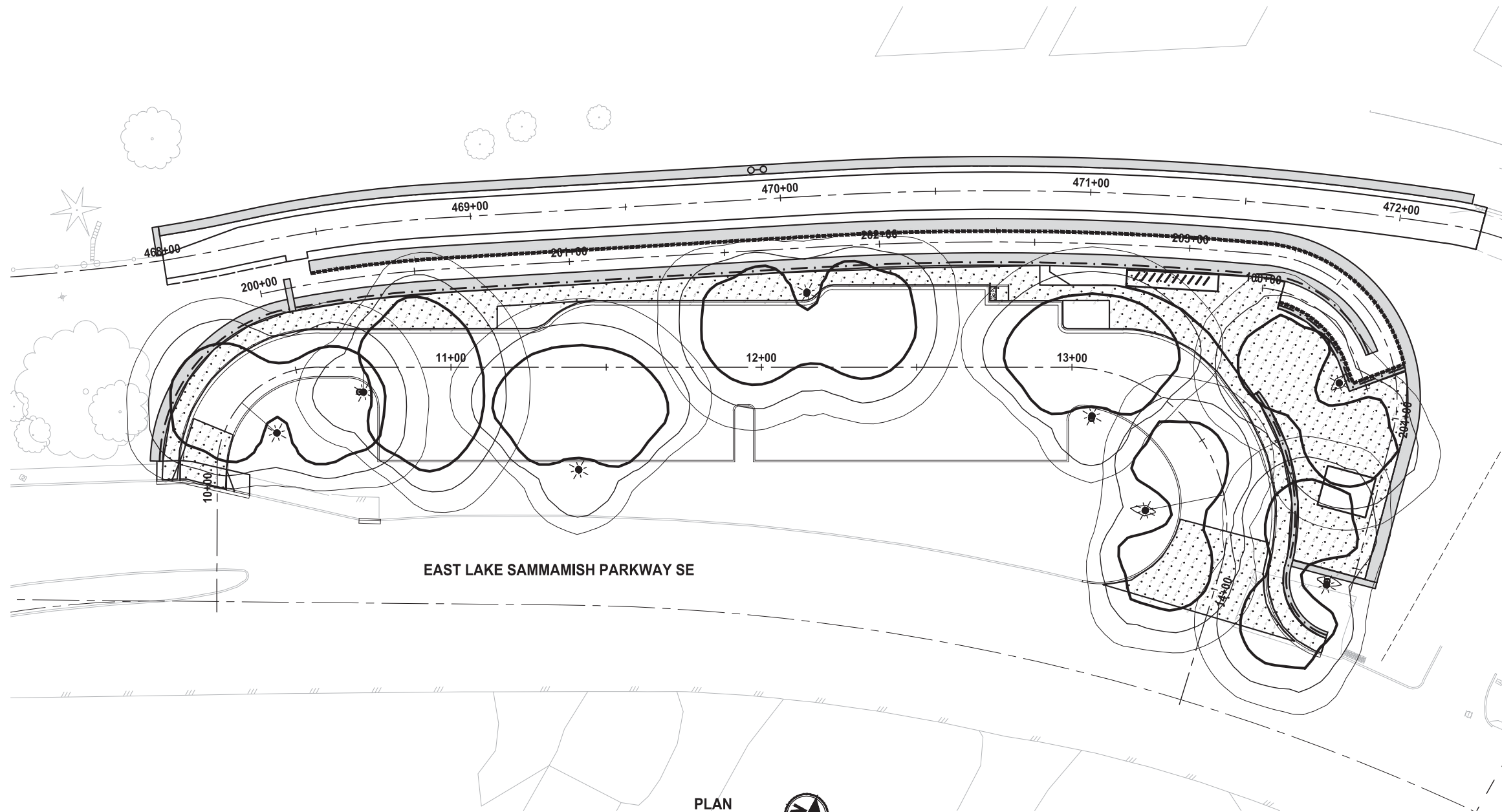
PROJECT NAME
EAST LAKE SAMMAMISH MASTER PLAN TRAIL INGLEWOOD HILL ROAD PARKING LOT
 SAMMAMISH, WA

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: hendomar DATE: Thursday, June 15, 2017 2:33:48 PM



EAST LAKE SAMMAMISH PARKWAY SE



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

NOT FOR CONSTRUCTION

| 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

Parametrix
 ENGINEERING · PLANNING · ENVIRONMENTAL SCIENCES
 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

**PHOTOMETRICS
 PLAN**

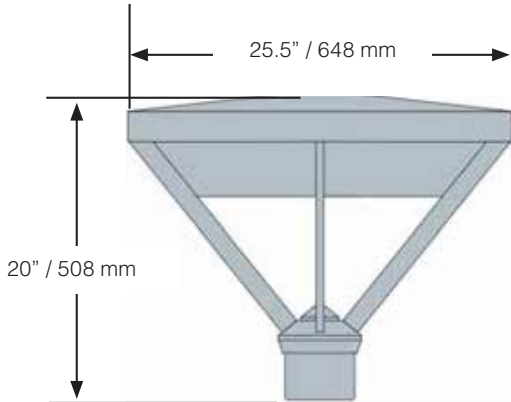
SHEET NO.
 1 OF 27
 -

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



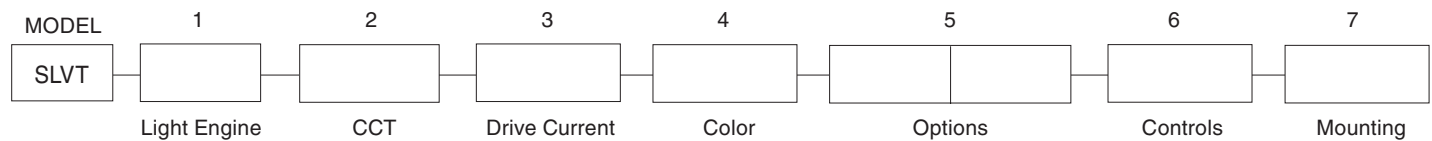
SPECIFICATIONS



- 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 | 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 | 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 |

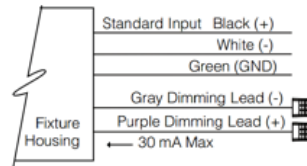
LED COLOR

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

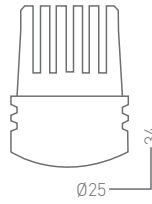
Download: <http://www.hubbellighting.com/resources/warranty/>



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JOB _____
TYPE _____
NOTES _____

DATASHEET



KLIKLED® LEDPOD

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

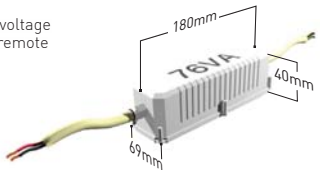
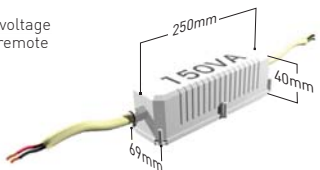
| | |
|---------------------|--|
| Colour | 3000K · 4000K · 5000K · Red · Green · Blue · Amber |
| CRI | 80-85 |
| Binning | 2 McAdam Step |
| Driver | 350 - 500mA Constant Current |
| Control | DALI · DSI · DMX · DMX-RDM · 0-10V · SWITCH DIM |
| Distribution | Symmetrical · Asymmetrical |
| Tube Size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

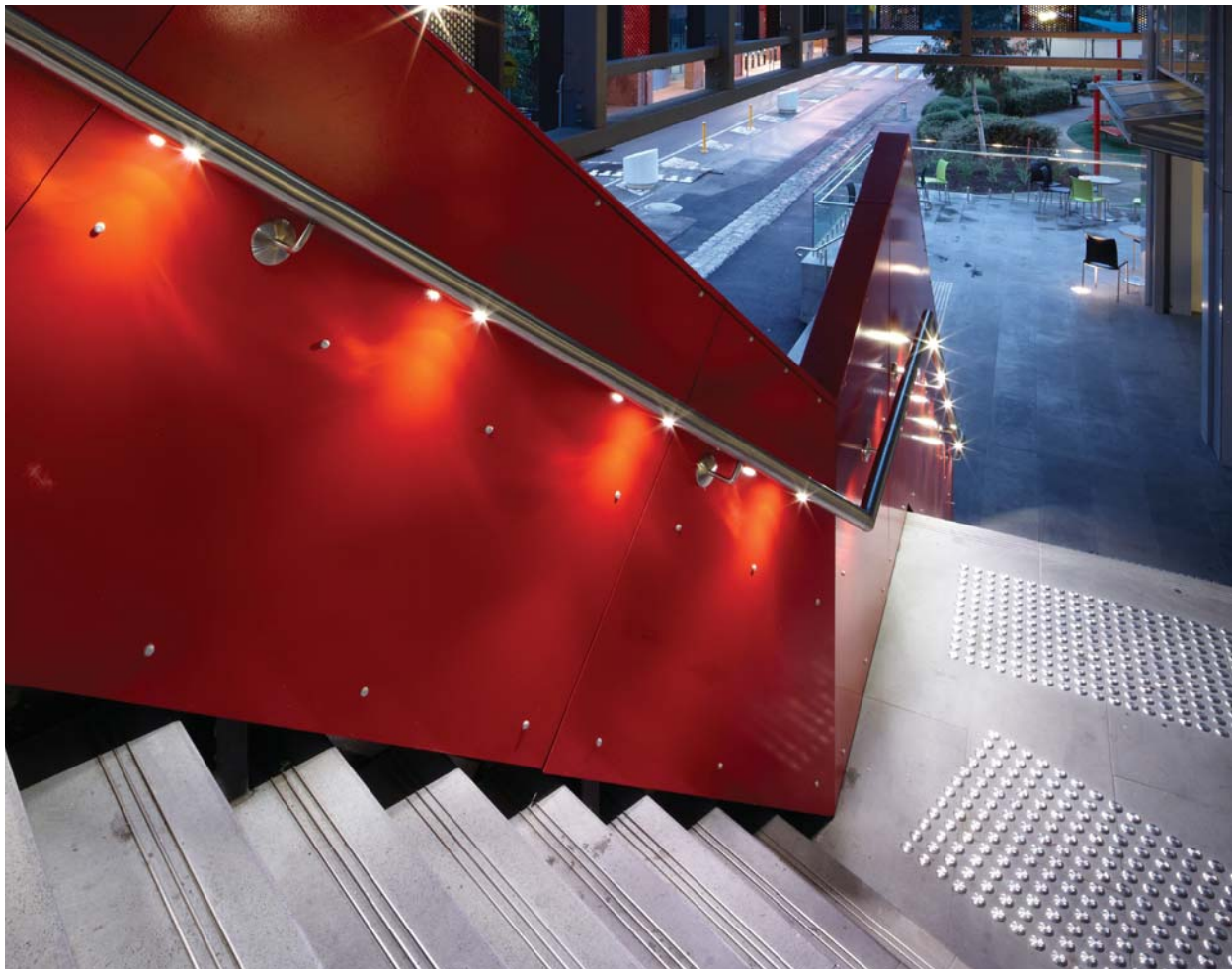
* All IP rated luminaires tested to AS60529-2004 Degrees of protection provided by enclosures (IP Code)
 † Others sizes available upon request



Eastern Busway, Brisbane · Lighting Design: Aecom

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

