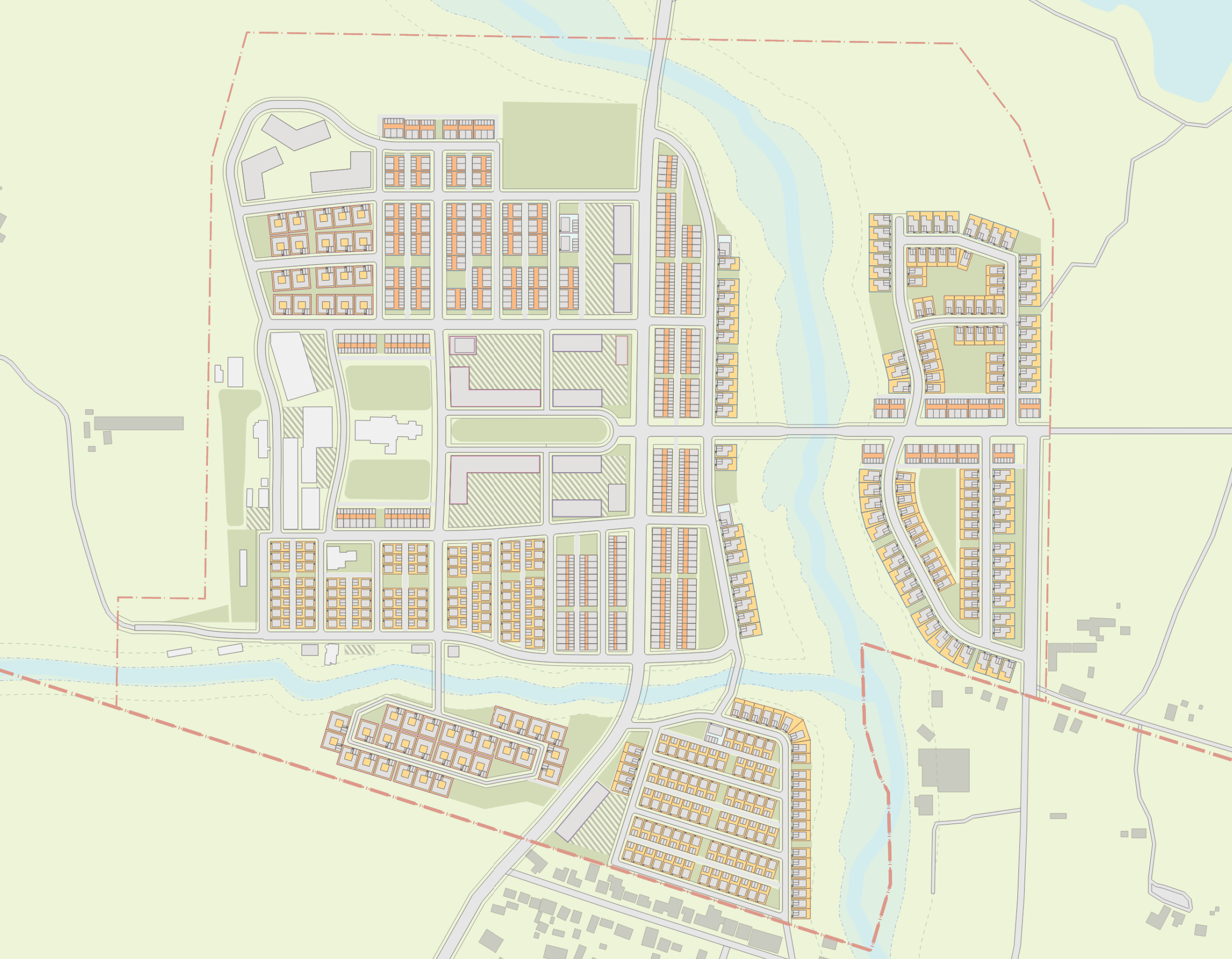


PJR 128 | 10 - PRELIMINARY LIGHTING PLANS



Sonoma Developmental Center

240045.000

SB 330 Application

12 February 2024

Table of Contents

- 01 Introduction
- 02 Lighting Classification Diagram
- 03 Luminaire Family Diagram
- 04 Prototypical Street Sections & Layouts

Public Realm Lighting Design

INTRODUCTION

The overall goal of establishing public realm lighting standards for Sonoma Developmental Center is to create a unified experience as a person travels through the development, establishing organized zones of lighting language and treatments to assist with nighttime identity as well as wayfinding. This document covers the public realm lighting for the entire project site.

This document specifies illuminance levels and uniformity criteria, and provides guidance on acceptable luminaire selections. Also included are general guidelines for creating a cohesive exterior lighting design.

Public Realm Lighting Goals and Guidelines

Light will be utilized to create areas of visual hierarchy and interest. Unique lighting zones will be created with varying lighting approaches. In doing so, the development will become easier to navigate during the nighttime hours.

Safety and Comfort

- Improve public safety by utilizing high color rendering sources for better visibility. Lighting sources shall have a Color Rendering Index (CRI) of 80 or better.
- Add visual interest to the site including accentuating key landscape and architectural features.
- Improve consistency of lighting appearance by utilizing organized luminaire families.
- Assist wayfinding by creating a visual hierarchy between different site zones.
- Support the gathering of residents and guests with a welcoming environment in parks and plazas.
- Encourage unique lighting expressions in parks and plazas to create intimate spaces within the site.
- Differentiate primary streets from minor ones to organize vehicular and pedestrian circulation patterns across the project.

Sustainability

- Lighting systems shall be designed to comply with all applicable energy code requirements and project energy goals. Additional lighting energy reduction should be pursued where practical.
- Utilize energy efficient LED sources.
- Minimize light trespass, glare, and uplight as required; comply with Title 24 CalGreen BUG (Backlight Uplight Glare) ratings.
- Meet any additional energy efficiency and light pollution requirements based on applicable Codes and Standards including but not limited to Title 24, CalGreen, and LEED Recommended Practice Guidelines.

Luminaires

- LED technology shall be utilized as the primary lighting source. As lighting technology evolves, other light sources with greater efficiency and lumen output may become available and should be considered.
- Where LED luminaires are used, those with field-replaceable modules shall be used to reduce the cost of future replacements/ maintenance.
- Provide a consistent and pleasant lighting appearance by utilizing sources with color temperatures (CCT) of 3000K.
- Luminaires shall coordinate with the aesthetics of the adjacent architectural and landscape elements.

Lighting Controls

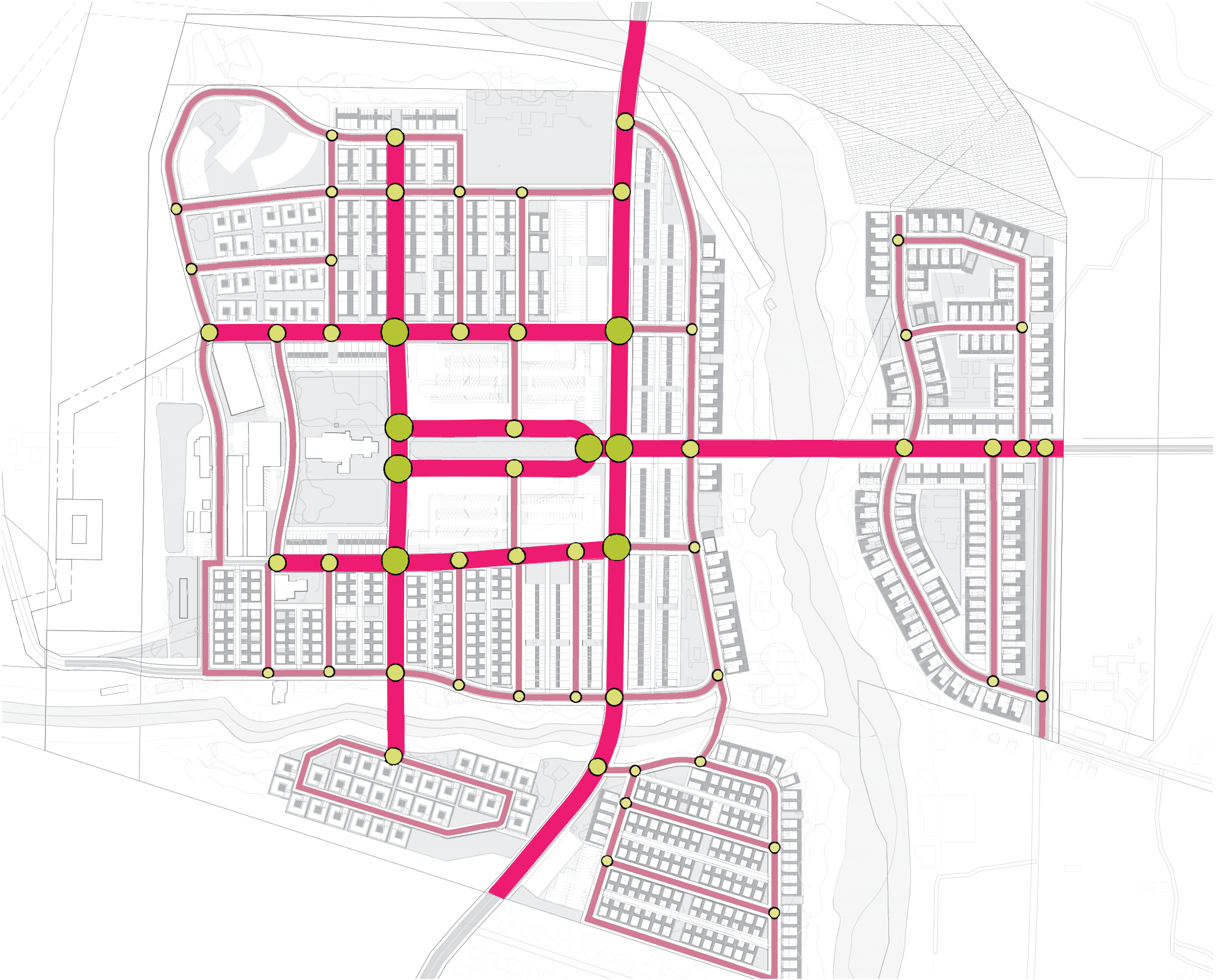
- Exterior lighting control system shall be comprised of photocells, and programmable lighting controls either via local controls on luminaires or main lighting control system to provide time control of lighting as required based on program requirements and State and local energy Code requirements.
- Motion sensors shall be provided as required and for areas where reduced levels may be desirable.

Illuminance Guidelines

- Meet or exceed the lighting level and uniformity recommendations outlined in the following sections based on the Illuminating & Engineering Society (IES) Lighting Library (ANSI/IES RP 8-14 & ANSI/IES RP 43-22) and all relevant IES Recommended Practice Guidelines.

Public Realm Lighting Design

LIGHTING CLASSIFICATION DIAGRAM



Illuminating Engineering Society (IES) Road Type Definitions

(IES) COLLECTOR ROADWAY
Roadways servicing traffic between major and local streets. These are streets used mainly for traffic movements within residential, commercial and industrial areas. They do not handle long, through trips. Collector streets may be used for truck or bus movements and give direct service to abutting properties.

(IES) LOCAL ROADWAY
Local streets are used primarily for direct access to residential, commercial, industrial or other abutting property. They make up a large percentage of the total street system, but carry a small proportion of vehicular traffic.

LEGEND

- Collector / Collector Intersection
- Collector / Local Intersection
- Local / Local Intersection
- Collector Road
- Local Road

Public Realm Lighting Design

LIGHTING CRITERIA

A summary of the recommended lighting levels for the public realm of the Sonoma Developmental Center based on the Illuminating Engineering Society (IES) Lighting Library (ANSI/IES RP 8-14 & ANSI/IES RP 43-22). Project must also comply with all applicable codes.

Maintained Illuminance Values for Roadways (fc)			
IES Road Classification	Pedestrian Conflict Area	Target Illuminance R2 & R3 Pavement Classification Type (fc)	Uniformity Ratio Eavg/Emin
Collector	Medium	0.9	3.5:1
Local	Medium	0.7	6:1

Maintained Illuminance Values for Walkways (fc)		
Pedestrian Conflict Area	Target Illuminance (fc)	Uniformity Ratio Eavg/Emin
Medium	0.5-1.0	4:1

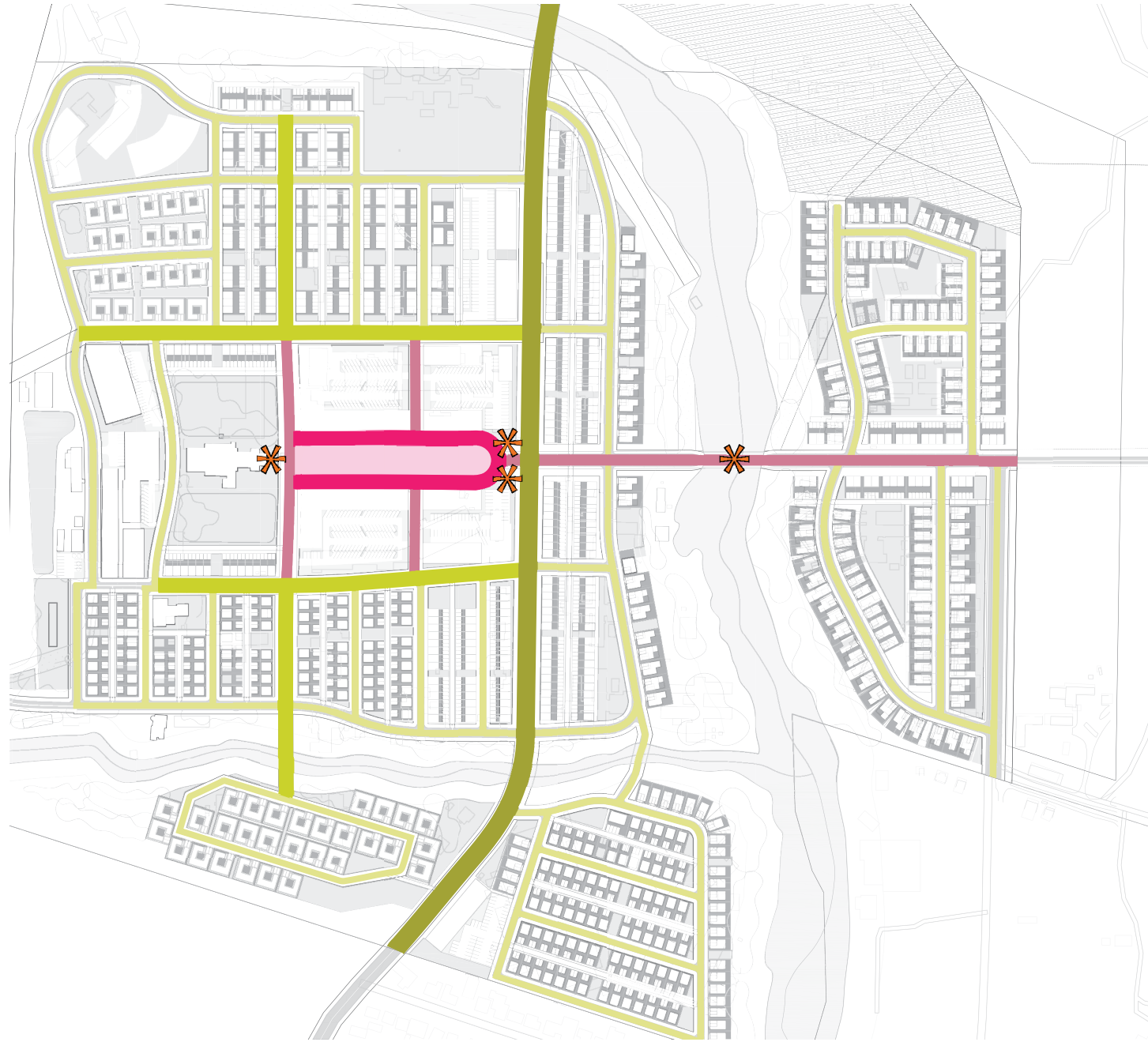
Maintained Illuminance Values for Intersections (fc)			
IES Road Classification	Pedestrian Conflict Area	Average Illuminance at Pavement (fc)	Uniformity Ratio Eavg/Emin
Collector / Collector Intersection	Medium	1.8	4.0
Collector / Local Intersection	Medium	1.6	4.0
Local / Local Intersection	Medium	1.4	6.0

Maintained Illuminance Values for Areas/ Site			
Space Type	Target Illuminance (fc)	2022 Building Energy Efficiency Standards (Title 24, Part 6)	Controls Required
Plazas/ Pedestrian Hardscape	0.5-1fc horizontal @grade 0.2-0.4fc vertical @5' AFG 4:1 avg:min	General Hardscape Lighting Allowances Area Allowance: 0.021w/sq.ft. Linear Allowance: 0.2w/ linear ft. Initial Wattage Allowance: 250w Hardscape Ornamental Lighting: 0.013w/sq.ft. Special security lighting for pedestrian hardscape: 0.01w/sq.ft.	Automated controls, astronomic clocks, intelligent motion sensors, and/or partial or full range dimming from 50% to 90% required based on a number of factors including location, light source, fixture wattage, and height of fixture above grade.
Landscape Features	0.2-2.0fc vertical @landscape	Per Section 140.7(a) Exception 9, Landscape lighting is exempt.	Automated controls, astronomic clocks, intelligent motion sensors, and/or partial or full range dimming from 50% to 90% required based on a number of factors including location, light source, fixture wattage, and height of fixture above grade.
Path of Egress	1.0fc minimum horizontal @grade		

- Notes:**
- Illuminance levels are based on the Illuminating Engineering Society (IES) Guidelines for ages 25-65. Values are measured in footcandles and are average maintained levels.
 - LPD Allowance shown in this column are based on the values for Outdoor Lighting Zone 3 (Urban Area) Per definitions in Table 140.7-A of the 2022 Building Energy Efficiency Standards (Title 24, Part 6).
 - Control methods shown are based on requirements included in the 2022 Building Energy Efficiency Standards (Title 24, Part 6), but level of control beyond this base level may be open for discussions. Electrical Engineer to review proposed control approach and comment. Code required controls to be as specified by Electrical Engineer.

Public Realm Lighting Design

CONCEPTUAL LUMINAIRE FAMILY & HIERARCHY



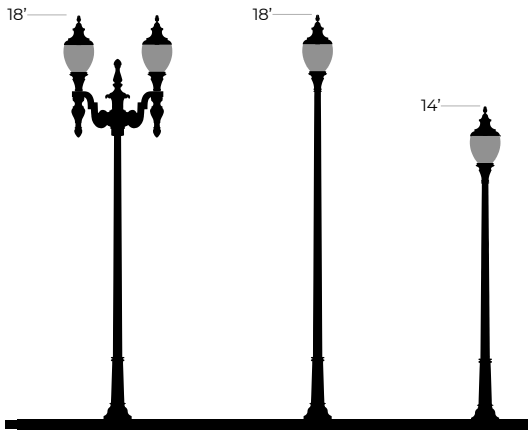
Examples of Potential Luminaires



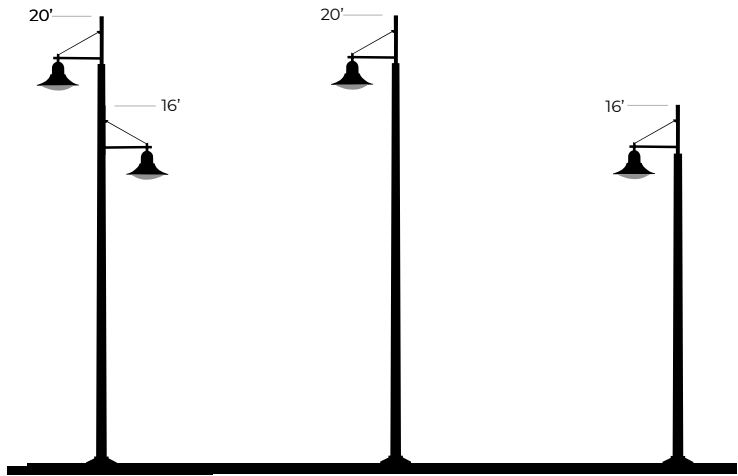
Acorn - Single Head



Acorn - Double Head



Contemporary Shade

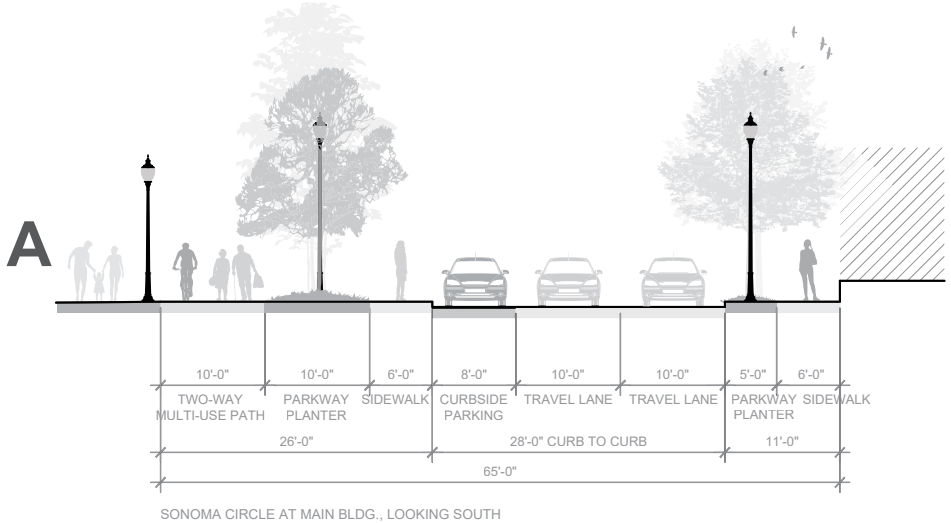


LEGEND

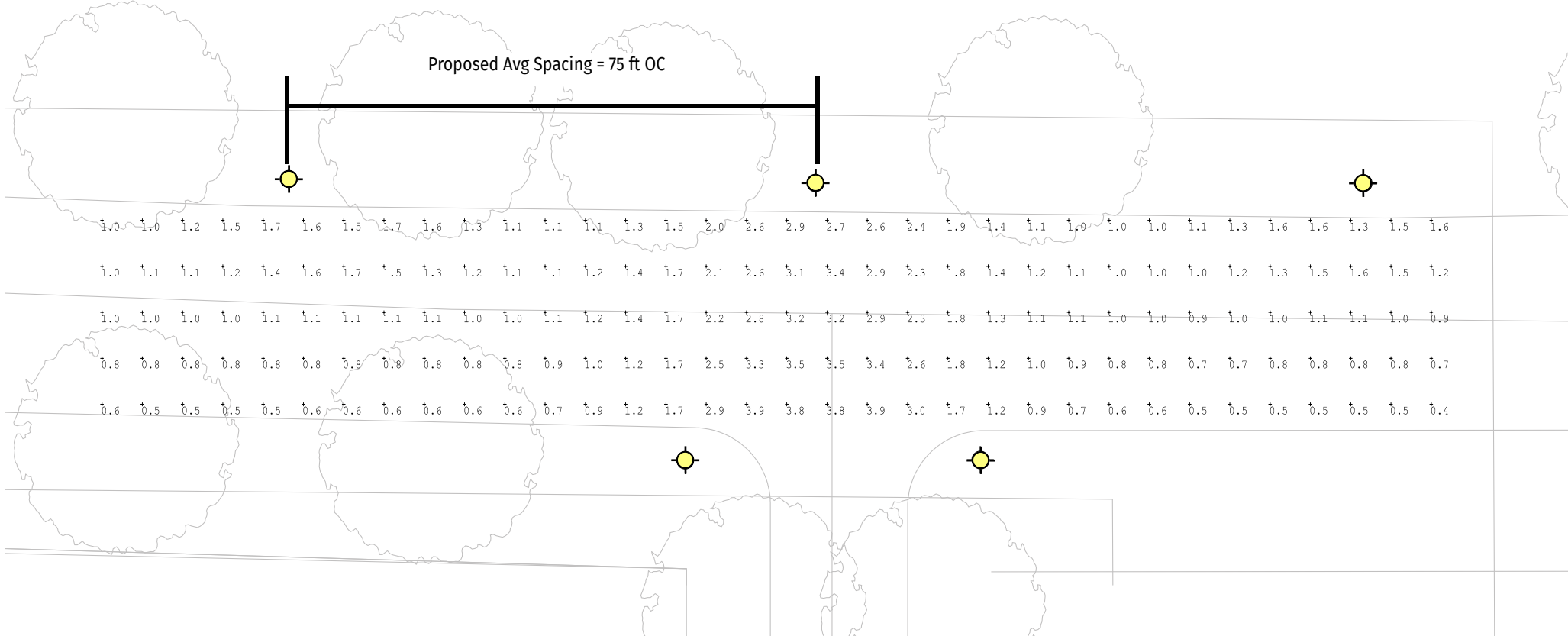
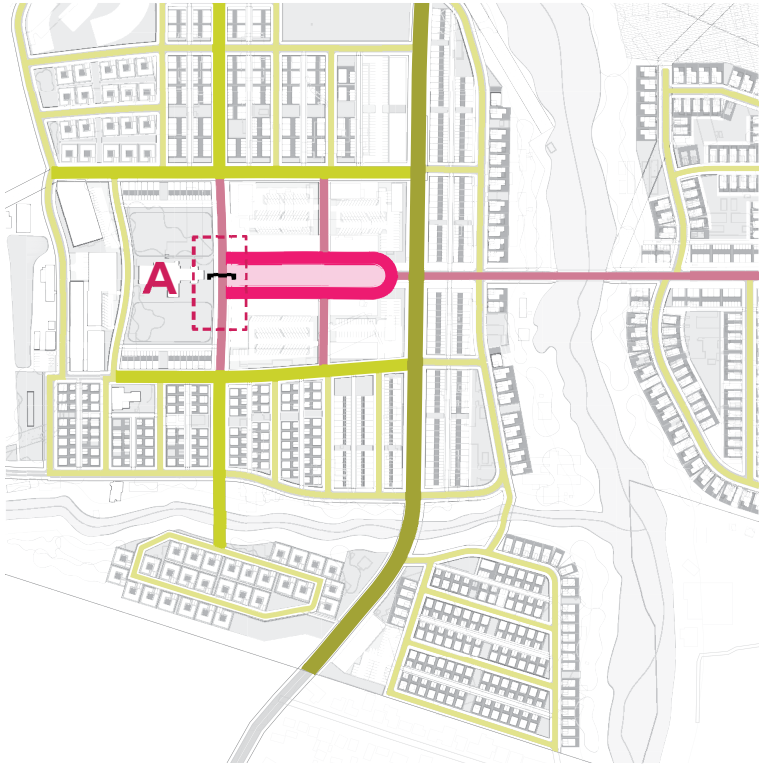
- 18' Acorn - Double Head
- 18' Acorn - Single Head
- 14' Historic Acorn - Single Head
- 20' Contemporary Shade - Double Head
- 20' Contemporary Shade - Single Head
- 16' Contemporary Shade - Single Head
- ✱ Unique Feature / Lighting Opportunity

Public Realm Lighting Design

PROTOTYPICAL STREET SECTION A - SONOMA CIRCLE AT MAIN BLDG.



KEY PLAN



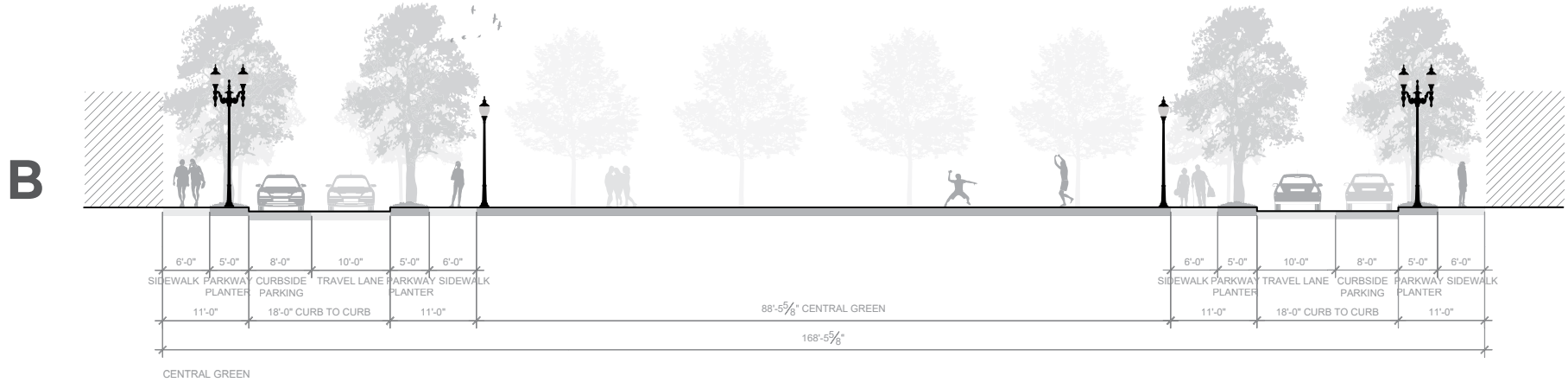
Lighting Analysis Results

AVG (Fc)	MAX (Fc)	MIN (Fc)	AVG/MIN
1.08	1.8	0.5	2.16:1

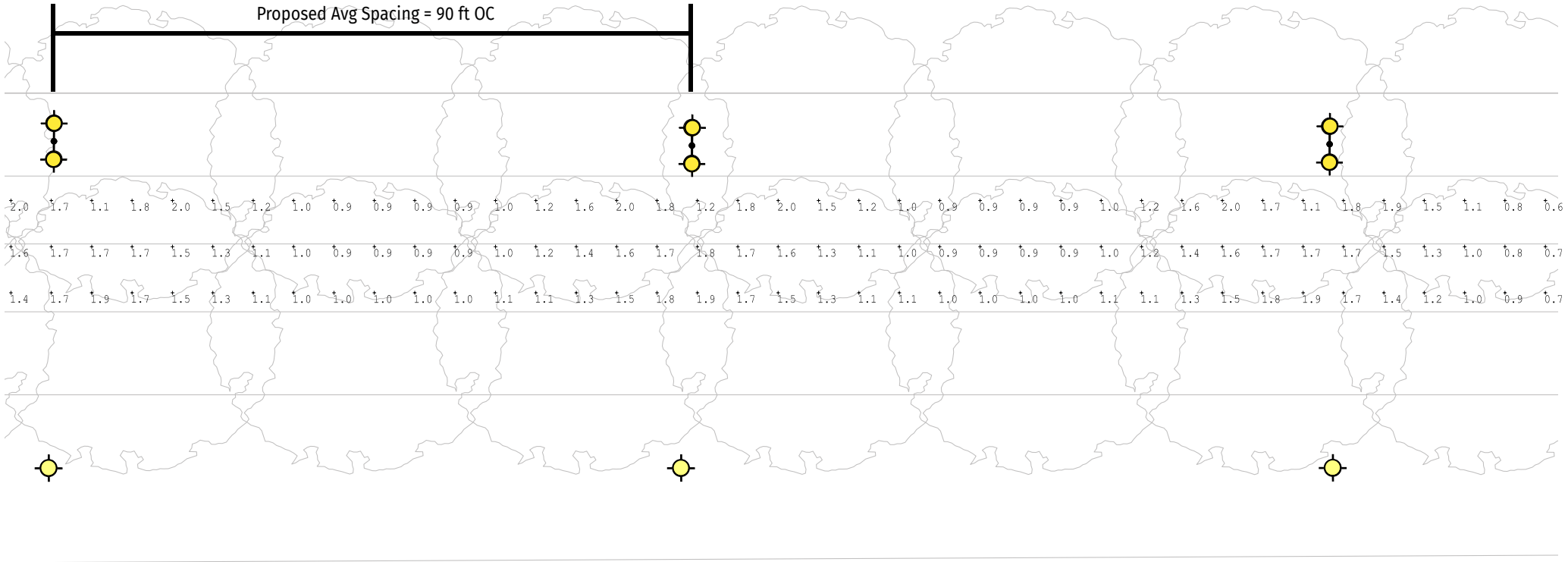
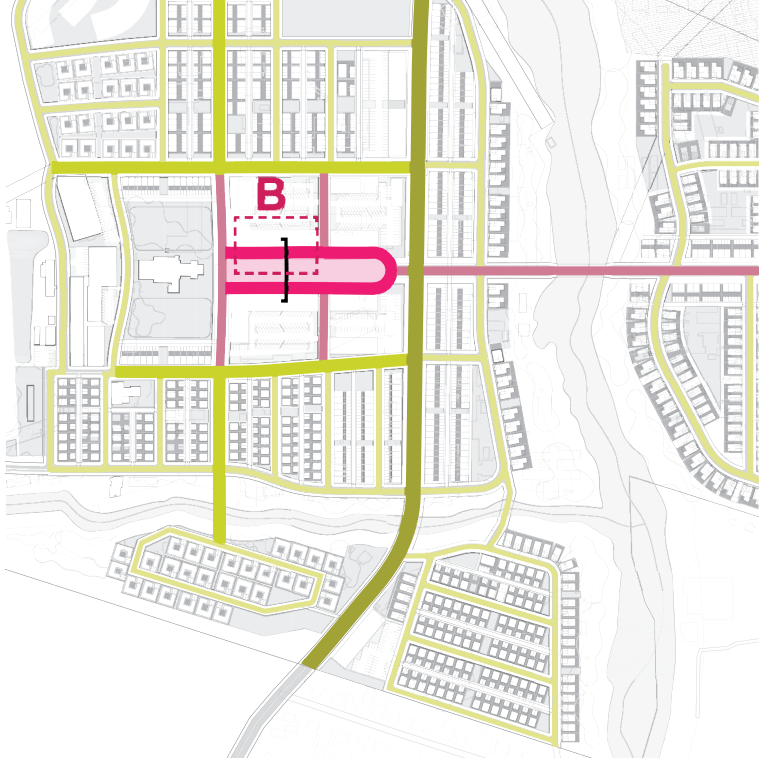
IES Target: Avg 0.9Fc; Avg/Min 3.5:1

Public Realm Lighting Design

PROTOTYPICAL STREET SECTION B - CENTRAL GARDEN



KEY PLAN



Lighting Analysis Results

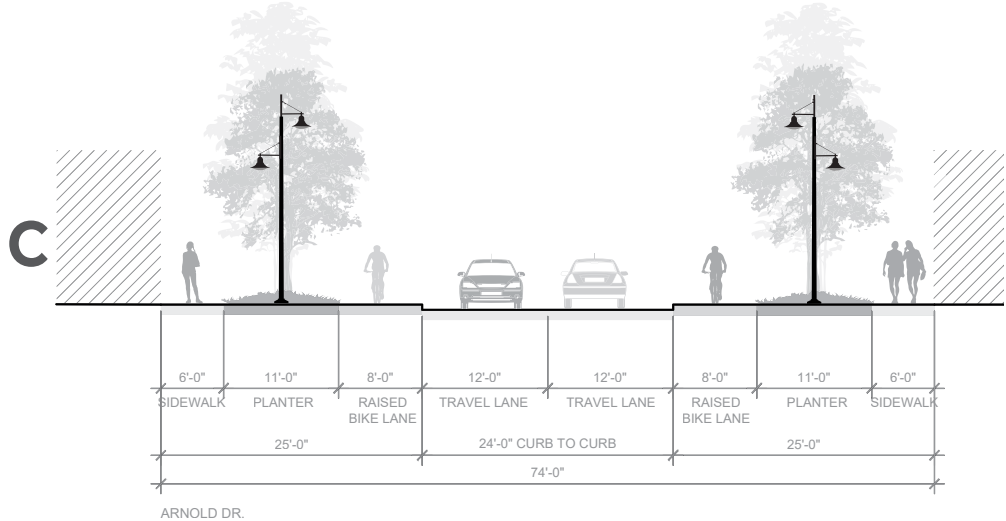
AVG (Fc)	MAX (Fc)	MIN (Fc)	AVG/MIN
1.31	2.1	0.6	2.18:1

IES Target: Avg 0.9Fc; Avg/Min 3.5:1

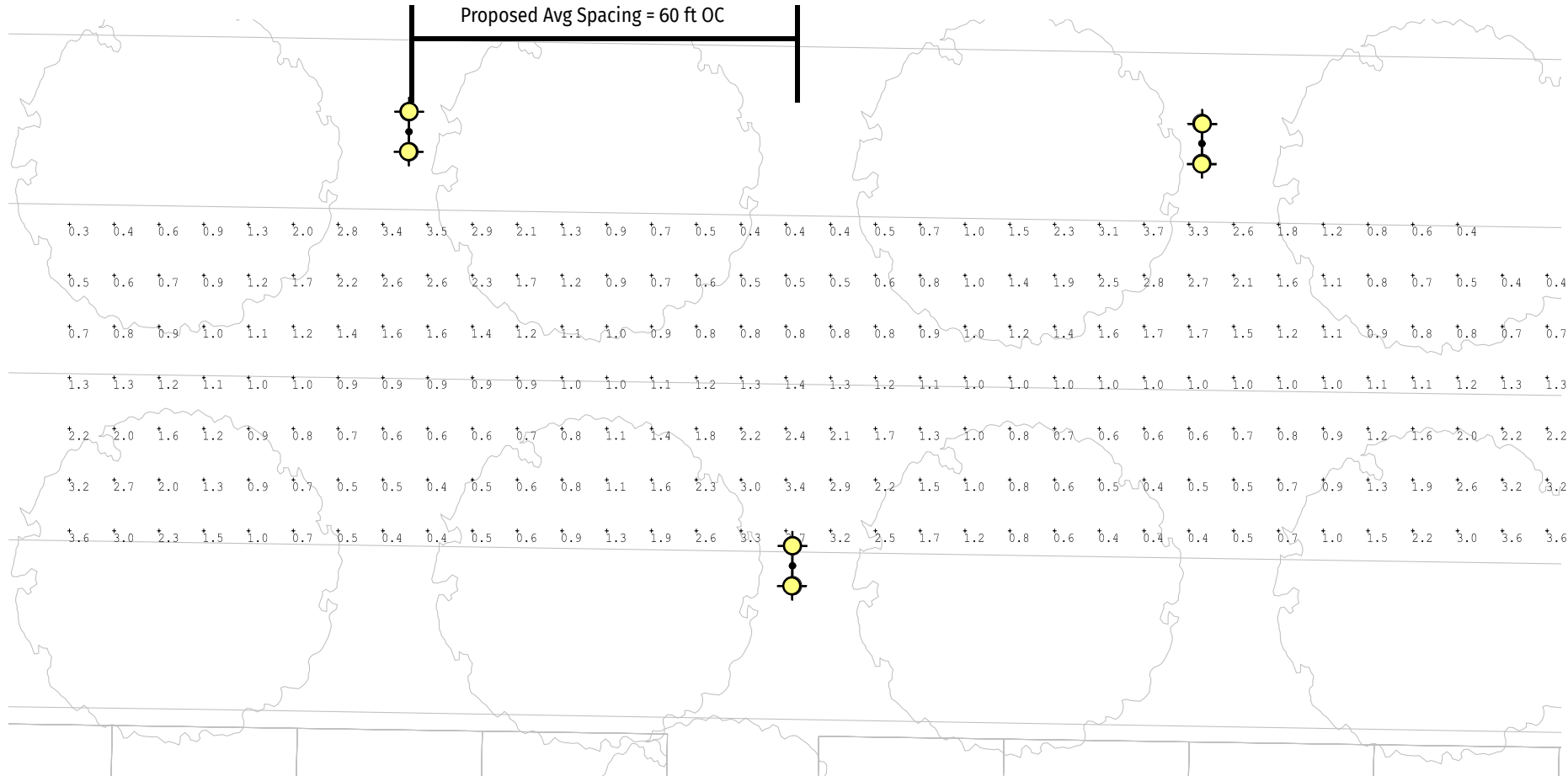
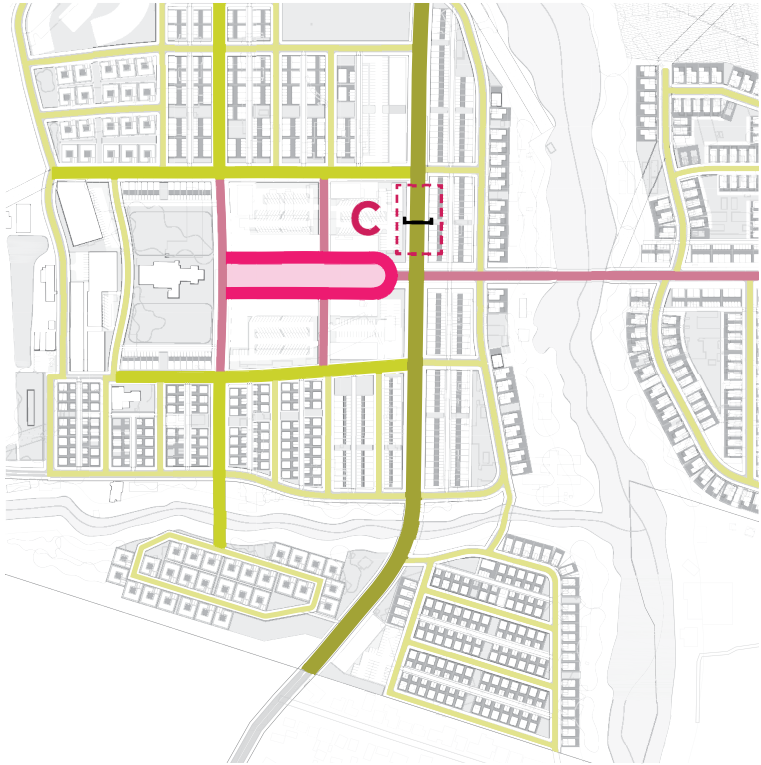


Public Realm Lighting Design

PROTOTYPICAL STREET SECTION C - ARNOLD DR.



KEY PLAN



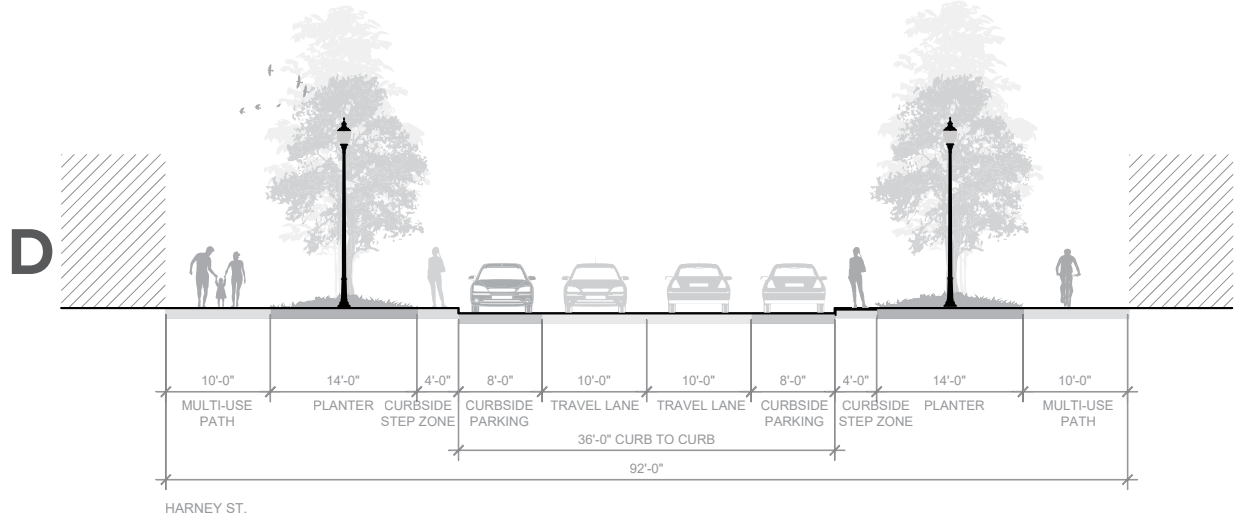
Lighting Analysis Results

AVG (Fc)	MAX (Fc)	MIN (Fc)	AVG/MIN
1.2	4.2	0.4	3.53:1

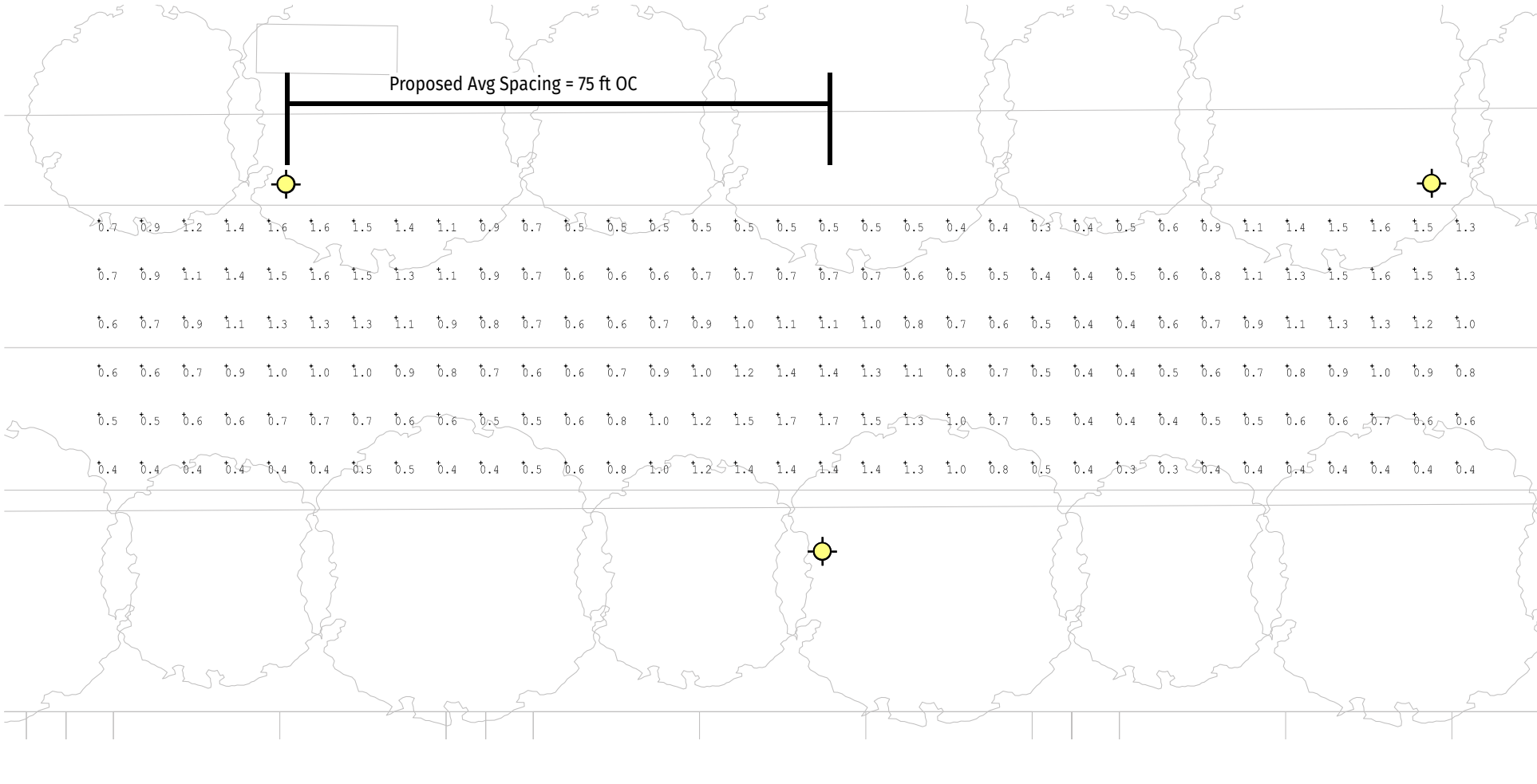
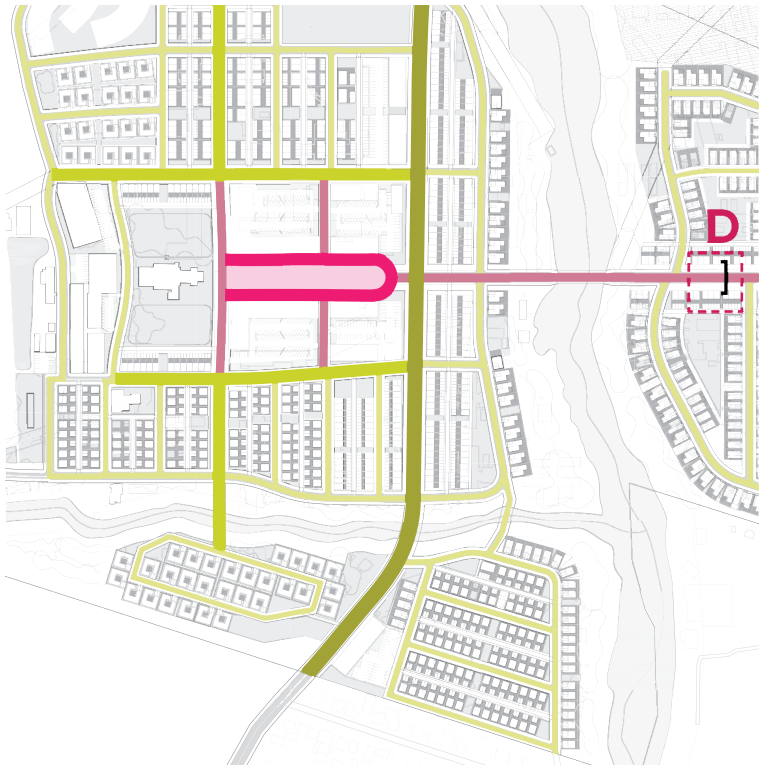
IES Target: Avg 0.9Fc; Avg/Min 3.5:1

Public Realm Lighting Design

PROTOTYPICAL STREET SECTION D - HARNEY ST.



KEY PLAN



Lighting Analysis Results

AVG (Fc)	MAX (Fc)	MIN (Fc)	AVG/MIN
0.81	1.7	0.3	2.70

IES Target: Avg 0.9Fc; Avg/Min 3.5:1

Illuminance Calculation Disclaimer and Assumptions

Illuminance Calculations Assumptions:

GROUND REFLECTANCE: Asphalt Type R3 (7%)

CALCULATION POINTS LOCATED: 0'-0" Above Finished Grade

CALCULATION GRID: 5' x 5'

LIGHT LOSS FACTOR: 0.81

Illuminance Calculations Disclaimer:

Illuminance calculations are for lighting design aid purposes only. All calculations performed by Horton Lees Brogden Lighting Design Inc (HLB) are based on published methods and recommendations of the Illuminating Engineering Society of North America (IESNA). Calculation accuracy is highly dependent upon the input data utilized in the calculations and variances greater than 20% may occur if there are variations in the input data or if equipment does not perform as published in IES Photometric files. Some input data is provided by others (e.g. manufacturer's photometric reports, lamp lumen ratings, ballast factors, surface materials and or reflectances) and not all report data is available for the exact luminaire characteristics specified. Some information is derived by HLB from industry standard methods (e.g. luminaire dirt depreciation factors). Some information is not available for conditions outside of the norm, like variations in temperature, humidity, snow cover, vibration or non-standard mounting conditions. HLB has made every effort to endure the reliability of all data, but is not responsible for errors in data that is received from others, is unavailable, or for equipment that does not perform as published. Field measurements may vary as much as 10%-20% from calculation results due to the limitations associated with the calculation procedures utilized and referenced by the IESNA. High amounts of variation can occur from the use of non-professional grade illuminance meters or meters that are not in perfect calibration. HLB includes a listing of all input values as part of the calculation submission. Please review these input values and notify HLB immediately if any inconsistencies or inaccuracies are noted. Further, the Calculation results provided herein are without warranty of any kind as related to compliance with any local or state emergency or egress code requirements. Use of the Calculations for these purposes is at sole risk of the user and without liability of legal exposure to HLB. User agrees that they shall waive any and all claims against HLB arising out of or resulting from use of the Calculations for these purposes.

we

believe

in the

power

of light

HLB Lighting Design

info@HLBLighting.com

HLBLighting.com

