Agenda
Planning Commission Workshop
Wednesday, August 12, 2020
via Zoom
(888)788-0099 (Toll Free) or (877)853-5247 (Toll Free) Meeting ID 991 6293 8411

Pursuant to Resolution No. 100-20, this meeting will be conducted remotely via Zoom. The public may attend remotely by calling one of the numbers listed above.

Commission Members: Chair Palmer, Vice-Chair Maier, and Commissioners Boring, Eadie, Mealer, Smith and Townsend

Liaisons: Council Liaison Alvarez
Staff Liaison: Planning Manager Stevens

Regular Workshop - 6:00 p.m.

Call to Order/Attendance:

Agenda Items:

1. Street Light Study
   - Julie West, Transportation and Development Manager

Adjournment

The next Planning Commission Workshop is September 9, 2020

The next Planning Commission Meeting is August 26, 2020

Richland City Hall is ADA accessible. Requests for sign interpreters, audio equipment, and/or other special services must be received 48 hours prior to the meeting by calling the City Clerk's Office at 942-7389.

PLANNING COMMISSION AGENDA ITEM COVERSHEET

Meeting Date: 8/12/2020 Agenda Category: Agenda Items

Prepared By: Julie West, Transportation and Development Manager

Subject:
Street Light Study

Request:
Core Focus Area 2 - Manage & Maintain Infrastructure & Facilities

Recommended Motion:

Summary:
The purpose of this workshop session to provide the Planning Commission with the preliminary findings and recommendations coming out of the Street Lighting Standards and Retrofit Study.

The Study's objectives are to update the City's comprehensive street lighting policy and to prepare a plan for converting all street lights in the City to Light Emitting Diode (LED) technology. The conversion is intended to take advantage of the energy conservation, improved reliability, reduced maintenance burden, improved community safety, and adjustable nature of the LED technology. The City first implemented Light Emitting Diode (LED) street lighting standards back in 2014, that most recent time that the street light policy and standards were updated. Since the 2014 work the City has been installing LEDs on all new light installations and for maintenance replacements. Approximately 30 percent of the existing street light inventory use LED technology. The community's experience of LED lights installed under the 2014 policy has provided valuable feedback to City staff.

Council approved a 2020 budget allocation to enable this Study as part of its Strategic Plan objectives to achieve improve efficiency and safety. Public Works and its consultant will present the outcome of a recent public survey and draft policy document under development. The workshop will allow the Planning Commission to become familiar with the Study and key questions to answer to shape the City's policy. Staff intends to return to the Planning Commission's public business meeting later this month to seek a recommendation to the City Council regarding the policy.

Attachments:
1. Draft Street Lighting Policy_2020-08-05

City of Richland

Street Lighting Policy

Prepared by

DOWL

July 2020

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EXECUTIVE SUMMARY

This report serves as a policy-level document for the City of Richland on light levels for all street classifications based on performance, aesthetics, brightness, and color. The policy is intended to provide a quick reference on how, and where the City of Richland will construct, operate, and maintain public street lighting. This policy will be broken down into 3 key sections:

- Background and Prior Policy
- Street Lighting Policy
- Technical Specifications

BACKGROUND AND PRIOR POLICY

Prior to 2014, the City of Richland maintained a typical street lighting standard that focused on High Pressure Sodium (HPS) lighting with light levels structured around land use and roadway functional classification. General land use designations included in the lighting standard were commercial, intermediate, or residential. The standard included the IESNA RP-8-00 recommendations for roadways as well as intersections based on an illuminance method calculation.

In 2014, the City of Richland updated their lighting standards with LED luminaires and pedestrian activity level was added to the standards criteria, consistent with IESNA RP-8-00 and RP-8-14.[1] The roadway calculations were updated to reflect a luminance method calculation which places focus on the amount of light on the road from an observer (driver) position upstream of the measured location. Intersection calculations were maintained under the illuminance calculation method.

This update set in place a new standard for LED installation and maintenance replacements. Current GIS data provided by City staff indicates approximately 30% of Richland's streetlights are LED in 2020, which has largely occurred with new installations and ongoing maintenance replacements for the city. Table 1 shows the current breakdown of existing streetlight types. As shown, the HPS technology still represents the majority of light installations. Of these, the City maintains three basic light output levels (100W, 200W, and 400W) for varying roadway classifications.

Table 1: Street Light Type Summary[2]

Street Light Type	Number of lights
High Pressure Sodium (HPS)	
100W/150W	2,496
200W/250W	777
310W/400W	490
Unknown/Decorative	149
Light Emitting Diode (LED)	
20-60W	683
70-160W	695
170-210W	205
Unknown/Decorative	148
Total	**5,643**

[1] ANSI/IES RP-8-14 Roadway Lighting, Illuminating Engineering Society of North America (IESNA), 2014.
[2] Based on 2020 GIS Data provided by City of Richland.

Figure 1. City of Richland Street Light Examples
(Google Earth Street View Imagery, 2020)

Typical Materials

The City material specification required luminaires be of the general "cobra-head" style and designed/constructed to meet the requirements of ANSI C136.37. Light Emitting Diode (LED) luminaires have been required since 2014 with expected LED life of 20+ years[3,4], and a minimum 10-year warranty.

Street lighting is installed on wood poles, concrete poles, and galvanized steel poles as listed in the City of Richland's standard drawings and street lighting material specification. The street lighting system is owned by the city's Public Works Department and is maintained by the Energy Services Department. Approved pole dimensions by Public Works are 30ft to 40ft in height with an arm length of 6ft to 12 ft with a concrete base on collectors and arterials, and a direct bury base for local streets. Steel Poles shall be galvanized steel (Round Tapered), and all fasteners and non-aluminum attaching devices shall be galvanized in accordance with ASTM designation A153.[5,6]

[3] City of Richland, Public Works Material Specification for Street Lighting, 2019.
[4] Service life was calculated assuming a 100,000-hour expected LED life, average 10 hours of evening use, and 365 days in a year.
[5] City of Richland, Public Works Material Specification for Street Lighting, 2019.
[6] City of Richland Street Lighting Details, SL-1, SL-3, SL-4, 2015.

STREET LIGHTING POLICY

The goal of this section is to cover all the major lit environments within the city of Richland's right of way with a policy that accounts for the primary end-user and city residents. Generally speaking, a lighting policy has two typical end-users: vehicles and pedestrian/bicyclists. Street lighting is designed for safe driving at night by providing adequate sight distance and object recognition to drivers. Pathway/sidewalk lighting is designed for pedestrian/bicyclists and focuses on visual recognition of other pedestrians and object detection on the sidewalk surface to prevent slips, trips, and falls.

Street Lighting

For this update, the City examined the context of the street environment through the applicable zoning and roadway classification. Studies have shown vehicle headlights can provide adequate illumination for the driving condition at speeds lower than 30 mph with low pedestrian activity.[7] In addition, citizen feedback has indicated a strong desire for lower "yellow" correlated color temperature (CCT) fixtures around 3,000K.[8] Recent studies do indicate there may be a significant benefit in object detection provided by "white" LED light with a CCT of 4,100K.[9] As a result, Richland's street lighting policy seeks to allow lower CCT and less lighting overall in residential zones on lower activity roadways. As the activity of the zone or roadway increases more light is added and a transition to 4,000K CCT light occurs. Table 3 summarizes this policy, and Figure 2 illustrates how this applies throughout the City using existing roadway and zoning classifications.

Table 2: Street Lighting Policy Matrix

Road Classification	Zoning			
	Agriculture/Residential	Commercial	Industrial	Public Facilities
Arterial	4K C	4K C	4K C	4K C
Collector	3K C	4K C	4K NC	3K C
Local	3K NC	4K C	4K NC	3K C

[a] Continuous Lighting = "C"

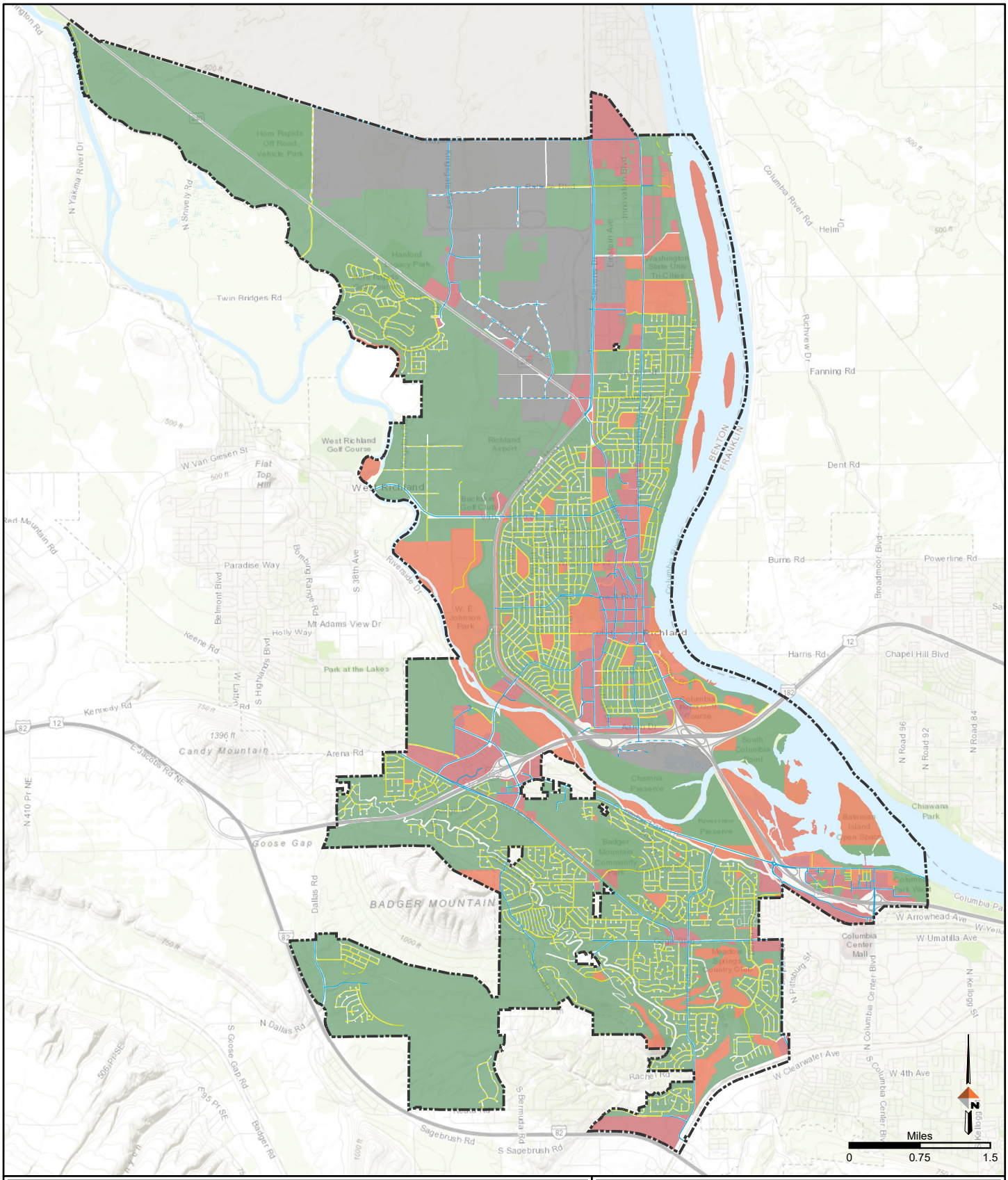
[b] Non-Continuous Lighting = "NC"

Non-Continuous Environments (NC)

In agricultural, residential, and industrial zones local roads are allowed to have non-continuous lighting. The purpose of lighting in this environment is to simply mark the presence of an intersection or provide a mid-block presence for blocks longer than 600 feet. Additional mid-block lights may be installed on long blocks; however, lights shall not be placed less than 300 feet apart.

Lighting shall be provided at dead ends and the ends of cul-de-sacs, unless decided otherwise by the City Engineer.

[7] Section 3.1.8, ANSI/IES Recommended Practice for Roadway and Parking Facility Lighting (RP-8-18), IESNA, 2018.
[8] Residential Street Lighting Demonstration Survey, City of Richland, June 2020.
[9] Section 2.3.4.2, RP-8-18, IESNA, 2018.



Street Light Designation

- 3K Continuous
- 3K Non-Continuous
- 4K Continuous
- 4K Non-Continuous

General Zoning

- Commercial
- Industrial
- Public Facilities
- Residential/ Agriculture

- State Owned Road
- Richland City Limits

Street Lighting Policy Map

Richland Street Lighting Retrofits

DOWL

Date: August 2020

Figure 2

\\red-fs\Red-Projects\38\15052-01\60GIS\Carto\Street Classification & Zoning Map.mxd Aug 05, 2020 9:55:33 AM User: tjameson

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Continuous Environments (C)

A continuously lit environment is recommended for roadway classifications of increased vehicle and pedestrian activity. Roadways in this category should achieve both intersection and roadway lighting metrics provided in Table 3 and Table 4. [10,11] A roadway lighting design layout should be provided to Public Works for approval detailing spacing for lighting. Deviations from the recommended light levels should be approved by Public Works prior to installation.

The luminance method is the preferred analysis method for continuously lit roadway segments. Lighting metrics include the average luminance, average uniformity, maximum uniformity, and maximum veiling luminance ratio. Each metric pertains to its own unique purpose.

- Average Luminance: Is there enough light on the roadway?
- Average Uniformity: Is the light distributed evenly?
- Maximum Uniformity: Are the extremes still within the normal adaptation range of the eye?
- Veiling Luminance Ratio: Is the light source too bright compared to the roadway, creating discomfort glare?

Table 3: Continuous Street Lighting Design Criteria

Street Classification	Pedestrian Activity Classification[a]	Average Luminance $L_{avg}\ (cd/m^2)$	Average Uniformity Ratio L_{avg}/L_{min}	Maximum Uniformity Ratio L_{max}/L_{min}	Maximum Veiling Luminance Ratio $L_{v,max}/L_{avg}$
Arterial	High	1.2	3.0	5.0	0.3
	Medium	0.9	3.0	5.0	0.3
	Low	0.6	3.5	6.0	0.3
Collector	High	0.8	3.0	5.0	0.4
	Medium	0.6	3.5	6.0	0.4
	Low	0.4	4.0	8.0	0.4
Local	High	0.6	6.0	10.0	0.4
	Medium	0.5	6.0	10.0	0.4
	Low	0.3	6.0	10.0	0.4

[a]Pedestrian Activity Classification defined under Intersection Lighting.

[10] Adapted from Table 11-1, RP-8-18, IESNA, 2018.
[11] Adapted from Table 12-1, RP-8-18, IESNA, 2018.

Intersection Lighting

When lighting an intersection in a continuously lit environment, key decision points and conflict points should be illuminated, and crosswalks should be considered part of the intersection.[12] The pedestrian activity level classification should be confirmed with the City Engineer as often times it comes down to an engineering decision, basic guidelines for the pedestrian conflict to peak pedestrian volume[13] are as follows:

- **Low:** Applies to areas where fewer nighttime pedestrians are expected to be crossing the street (local, suburban and rural streets). Typical areas with low pedestrian activity will have 10 or fewer pedestrians over the one-hour period with highest annual nighttime pedestrian volume.

- **Medium:** Applies to the vast majority of urban/suburban arterials and collectors. Areas where a moderate number of pedestrians are expected to be crossing the streets during night hours. Typical areas with medium pedestrian activity will have 10 to 100 pedestrians over the one-hour period with the highest average annual nighttime pedestrian volume.

- **High:** Applies to areas with significant numbers of pedestrians expected to be crossing the street at night (urban cores, downtowns, city or event centers). Typical areas with consistently high pedestrian activity will have 100 or more pedestrians over the one-hour period with the highest average annual nighttime pedestrian volume.

Table 4: Intersection Illuminance Criteria

Illuminance for Intersections				
Functional Classification	**Average Maintained Illuminance in foot-candles (fc) by Pedestrian Activity Level Classification**			**Average Uniformity E_{avg}/E_{min}**
	High	**Medium**	**Low**	
Arterial/Arterial	3.2	2.4	1.7	3.0
Arterial/Collector	2.7	2.0	1.4	3.0
Arterial/Local	2.4	1.9	1.2	3.0
Collector/Collector	2.2	1.7	1.1	4.0
Collector/Local	2.0	1.5	0.9	4.0
Local/Local	1.7	1.3	0.7	6.0

The design area of an intersection should include all marked or unmarked crosswalks and the entire intersection area. Depending on roadway width (intersection legs wider than three lanes) the intersection design area should extend up to 25 feet before the corresponding stop bar, unless decided otherwise by the City Engineer.[14,15]

[12] Section 3.5.6, American Association of State Highway and Transportation Officials (AASHTO) Roadway Lighting Design Guide, 7th edition, 2018.
[13] Adapted from Section 12.1.3, RP-8-18, IESNA, 2018.
[14] Design Manual (M 22-01.18), WSDOT, 2019.
[15] Section 3.5.6, AASHTO Roadway Lighting Design Guide, 7th edition, 2018.

Pedestrian Environments

Pathways, sidewalks, and crosswalks are lit based on two important visual tasks. The first involves navigating the pedestrian environment without slipping, tripping, or falling. This leads to recommendations for horizontal illuminance and uniformity to ensure there is adequate lighting distributed evenly on the pathway. Second, vertical illumination ensures pedestrians are seen by vehicles and each other. This helps with safety and threat detection. Vertical illuminance is typically measured at a point five (5) feet above the road/pathway surface. Table 5 summarizes the pedestrian environment recommendations for various levels of pedestrian activity and potential for interaction with vehicles. [16]

Table 5: Pedestrian Environment Lighting Design Criteria

Maintained Illuminance Values for Pedestrian Only Walkways/Bikeways			
Pedestrian Environment	**Horiz. Illuminance E_{avg} (fc)**	**Horiz. Illuminance Average Uniformity E_{avg}/E_{min}**	**Vertical Illuminance $E_{v,min}$ (fc)**
Mixed-Use ROW (Vehicle and Pedestrian)	2.0	4.0	1.0
Pedestrian Only			
High Activity	1.0	4.0	0.5
Med Activity	0.5	4.0	0.2
Low Activity	0.5	5.0	-
Mid-Bock Pedestrian Crossing	---	---	
High Activity			4.0
Med Activity			3.0
Low Activity			2.0

[16] Adapted from Table 16-1, Table 16-2, and Section 12.6, RP-8-18, IESNA, 2018.

TECHNICAL SPECIFICATIONS

Poles and fixtures used shall be chosen from the pre-approved list of manufactures found in the City of Richland, Public Works "Material Specification for Street lighting" document or be approved separately by city staff.

Street Lighting

LED cobra-head fixtures shall meet the following technical requirements:

- All roadway luminaires shall be a Type II or Type III distribution, IP66 rated or better, and be fitted with a 7-pin photocell receptacle.
- The appropriate CCT will be selected based on the Street Lighting Policy Matrix (See Table 2) and Street Lighting Policy Map (See Figure 2). All luminaires shall have a CCT within ±200K of the selected CCT.
- Manufacturers not listed on the pre-approved list shall submit fixture LM-79 and LM-80 reports in conjunction with the luminaire cut sheet. Luminaires shall meet or exceed the efficiency and longevity benchmarks shown in Table 6.

Table 6: LED Luminaire Efficiency and Longevity Benchmarks

Minimum Luminous Efficacy	Minimum Expected Lamp Life (hours)	Minimum Lumen Maintenance Factor (25°C) @ 50,000 hours
100 lumens/Watt	100,000	0.90

BUG Rating (Maximum)		
B: 2	U: 0	G: 3

- For non-continuous lighting, a lumen output of approximately 5,000 lumens is expected. Continuous lighting applications should include luminaires with a lumen output of approximately 11,000-13,000 lumens.

The City of Richland Standard Plans specify approved pole type, mounting height, and luminaire arm configurations. For utility, wood pole mounted luminaires the typical installation shall be a 30' mounting height with 6' luminaire arm. Installed mounting height and arm length will vary based on pedestrian environment/activity level, and clearance to overhead power lines.

Lighting Controls

The City of Richland is currently in the process of evaluating a comprehensive street lighting controls system for the purpose of improved maintenance and streetlight dimming capability. This section will be updated once a selection has been made.

Existing streetlights are controlled with individual, long-life 3-pin photocells.