



DMA

DAVE MURPHY & ASSOCIATES

PUBLIC SPACES.

INTEGRATED SOLUTIONS.

Dave Murphy & Associates (DMA) is an industry leader in streetscape and roadway lighting, with expertise in telecom and smart technology solutions to meet the demands of today's public spaces. We connect world class outdoor lighting and infrastructure manufacturers with utilities, municipalities, and transportation agencies.



DMA
DAVE MURPHY & ASSOCIATES, LLC

ABOUT US

Longevity

- Founded by Dave Murphy, Sr. in 1972
- Over 50 Years of Experience in Outdoor Lighting

Public Sector Focus

- Municipal
- Utility
- Transportation
- Small Cell and Telecom Integration
- EV Charging

Expansions

- Expanded Transportation Segment in 2022
- Growing with Partners and Expanding their Reach
- Recent Territory Expansion
- Connect World Class Lighting & Infrastructure Manufacturers with Our Marketplace



REGIONS WE SERVE & OUR EXPERTISE

- DMA's market spans the entire mid-Atlantic region from New York to Virginia.
- The Single Point of Contact for End-to-End Support
- Technological Expertise for Comprehensive Specification Development
- Liaison for Public Infrastructure between Engineers, Architects, Distributors, Manufacturers & End Users
- Simplifying Offerings with Thoughtful, Integrable Solutions

OUR SERVICES



Outdoor Lighting
Decorative & Roadway
Solutions



Small Cell & Telecom
Integrated Streetscape Solutions
Private Networks



Solar
Off-Grid Solutions
Lighting, Telecom &
Smart Poles



Traffic & DOT
Standards & Decorative



IoT
EV Charging Stations
Smart Pole Integrations



Lighting Controls
Asset Management
Sensor-Enhanced Luminaires
Anti-Theft Circuit Monitoring



Municipal Gateways
Color Enhancing Luminaires
Space Defining, Unique Lighting
Standards

AGENDA

- **GOOD LIGHTING & GUIDELINES**
- **TRENDS IN LIGHTING**
 - **DARK SKY COMPLAINTS**
 - **CONTROLS**

Purpose of Roadway Lighting



- Help motorists identify obstacles
- Provide adequate visibility of and to pedestrians and cyclists
- Assist in visual search tasks — both on and adjacent to the street



Pedestrian Safety and Security

In residential areas it may be desirable or necessary to provide safety and/or security lighting. Safety lighting refers to that which is required for **avoiding injury on streets, bikeways, and pedestrian walkways.**

Lighting may not ensure security but provides a **sense of security for some people.**

In addition, lighting can be used to lessen the likelihood of crime in areas where security is a particular issue.

GOOD LIGHTING

Lighting is “good” when it is economical in equipment, energy and maintenance costs, and meets a proven or reasonably predictable need with minimum adverse effects.

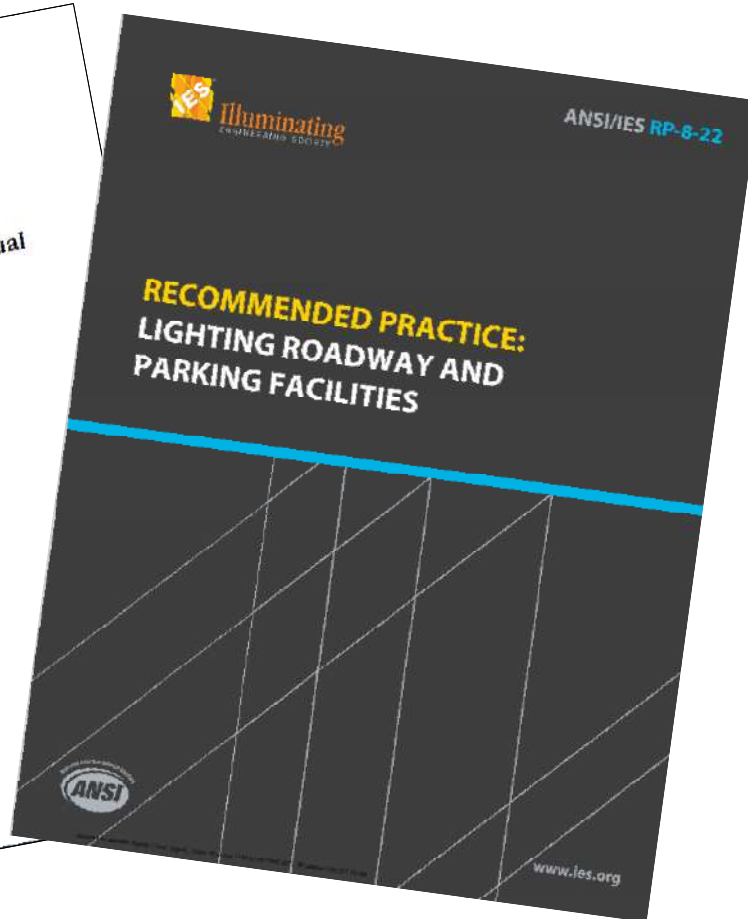
Good Lighting Guidelines

Lighting terms and classifications different due to zoning bylaws, building codes, agency memorandum

Lighting design classifications for an area or roadway should best fit the descriptions RP-8-22 put forth by IESNA

RP-8 Defines

- Major Roads
- Collector Roads
- Local Roads & Alleys
- Pedestrian Activity Guidelines



RP-8 Lighting Criteria

Street Classification	Pedestrian Activity Classification*	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 $L_{v,max}/L_{avg}$
Major	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

Table Notes:

* Pedestrian Activity Classifications are defined in Section 11.3.3.

L_{avg} : Maintained average pavement luminance

L_{min} : Minimum pavement luminance

$L_{v,max}$: Maximum veiling luminance

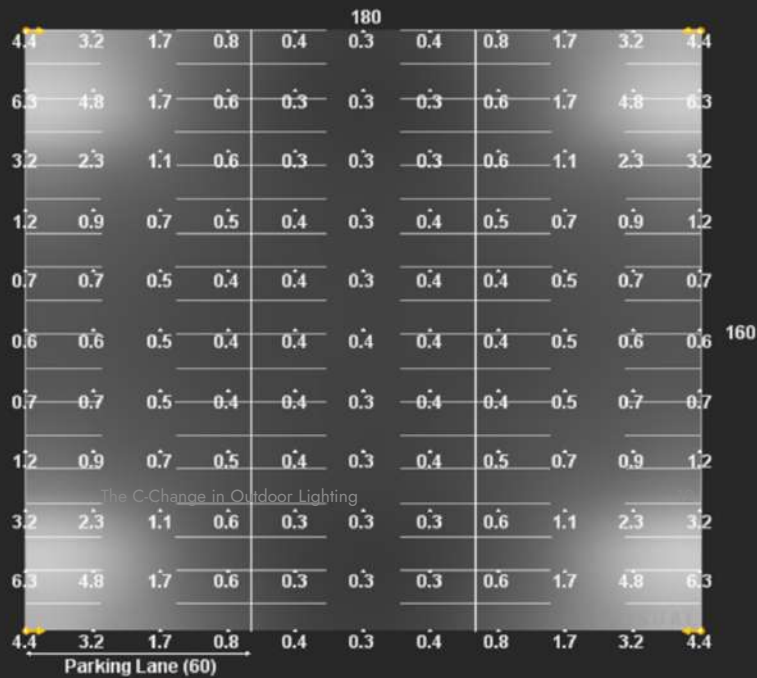
Uniformity

1 Maximum

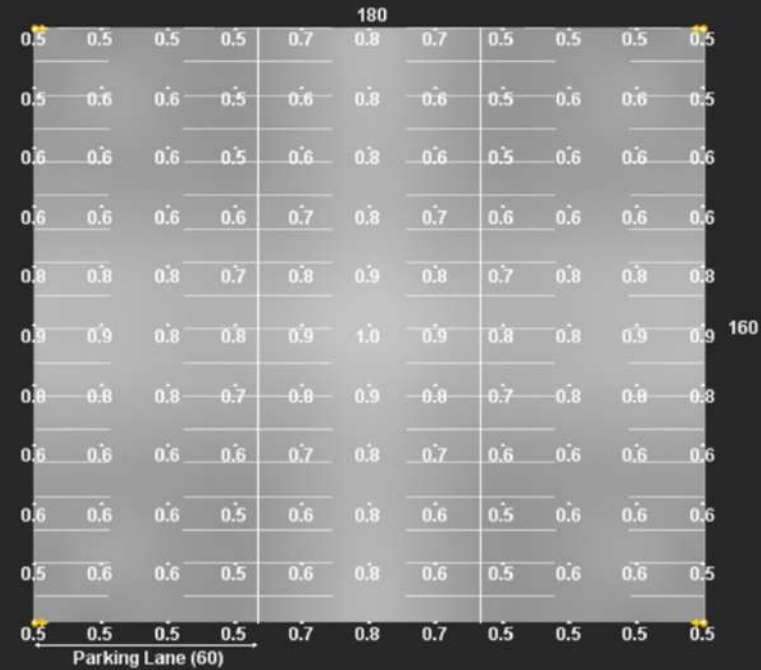
2 Minimum



Uniformity



Lamp/Faceted Reflector (HID)
 458 watts/ luminaire
 1.3 FC average
 24.2:1 max/min



Integral Array/Optics (LED)
 206 watts/ luminaire
 0.7 FC average
 2.1:1 max/min

A nighttime photograph of a street with sparse streetlights, illustrating poor uniformity in lighting. The scene is dark, with a few bright streetlights creating a stark contrast. The text 'POOR UNIFORMITY' and 'Non-compliant Pole Spacing' is overlaid on the image.

POOR UNIFORMITY

Non-compliant Pole Spacing

Vision is a complex process that is largely a function of light. Under certain conditions, this relationship can be asymptotical in nature rather than linear, which means that **a very minor change in the lighting conditions can result in a significant reduction in visibility.**

Some municipal regulations allow streetlights for new subdivision developments to be spaced two to three times further apart than the distance needed to meet the recommended uniformity ratios - this is sometimes referred to as “half code” lighting.

POOR UNIFORMITY

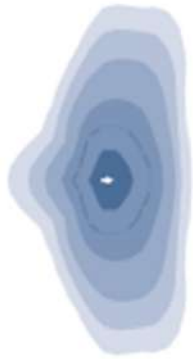


Any street lighting practice that fails to use the necessary spacing and throw patterns to achieve recommended illuminance levels and uniformity ratios will inevitably result in mediocre to adverse lighting conditions, **forcing the eye to adapt** to very pronounced shadows and very high contrast ratios in the field of view.

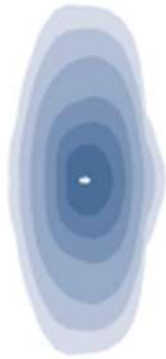
Not meeting the light levels and uniformity, or **meeting some of the criteria** and not others, **will not result in "slightly less" visibility.**

Simply put, providing half the criteria will not result in half of the benefit.

EXAMPLES OF DISTRIBUTION OPTIONS



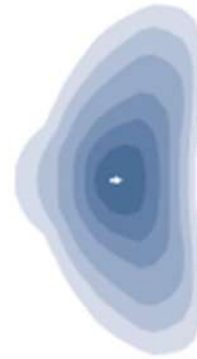
Type R2M



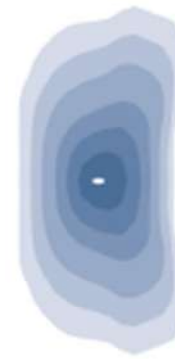
Type R2MB



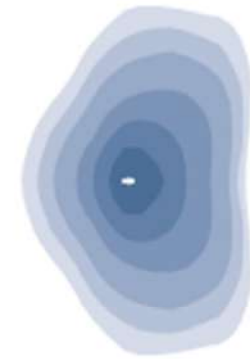
Type R2S



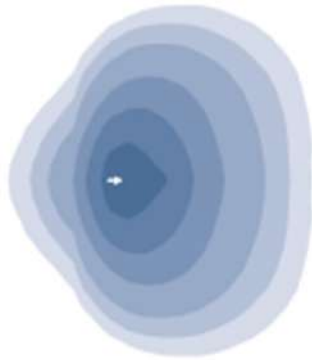
Type R3M



Type R3MB



Type R3S



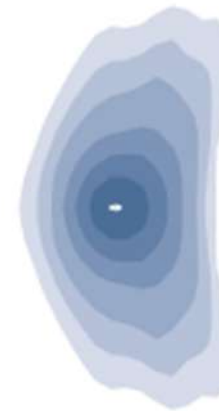
Type 4



Type 5

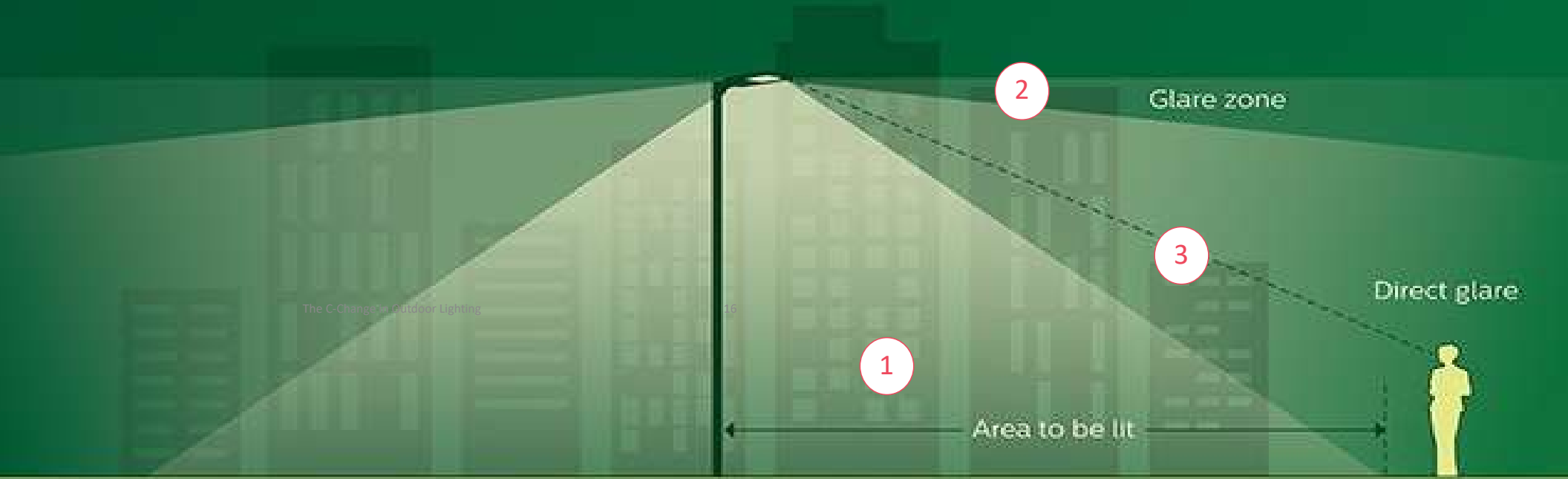


R2MHE



R3MHE

Issues with Glare



The C-Change in Outdoor Lighting

16

Area to be lit

Glare zone

Direct glare

1

2

3

TRENDS IN LIGHTING



DarkSky

- WHAT IS IT?
- WHAT IS ITS IMPACT?
- COLOR TEMPERATURES
- CUT OFF FIXTURES

CONTROLS

- DRIVERS
- CONTROL STRATEGIES
- ASSET MANAGEMENT
- OVERLIGHTING & DIMMING

WHAT IS DarkSky

DarkSky is an organization with the goal to limit the impact of nighttime light pollution on wildlife, human well being and enable the view of the nighttime sky by offering guidance on local building code to encourage responsible lighting. Is working with the IESNA.

The **DarkSky Approved** program provides objective, third-party certification for lighting products, lighting designs, and installed lighting projects that [minimize glare, reduce light trespass, and reduce light pollution](#). To be certified, they must:

- Restrict the amount of upward-directed light
- Avoid glare
- Avoid over-lighting
- Utilize dimming and other appropriate lighting controls
- Minimize short-wavelength (bluish) light in the nighttime environment

Five Lighting Principles for Responsible Outdoor Lighting



Responsible outdoor lighting is

1 Useful

Use light only if it is needed

All light should have a clear purpose. Consider how the use of light will impact the area, including wildlife and their habitats.



2 Targeted

Direct light so it falls only where it is needed

Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.



3 Low Level

Light should be no brighter than necessary

Use the lowest light level required. Be mindful of surface conditions, as some surfaces may reflect more light into the night sky than intended.



4 Controlled

Use light only when it is needed

Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.



5 Warm-colored

Use warmer color lights where possible

Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.



HOW IS DarkSky IMPACTING LIGHTING

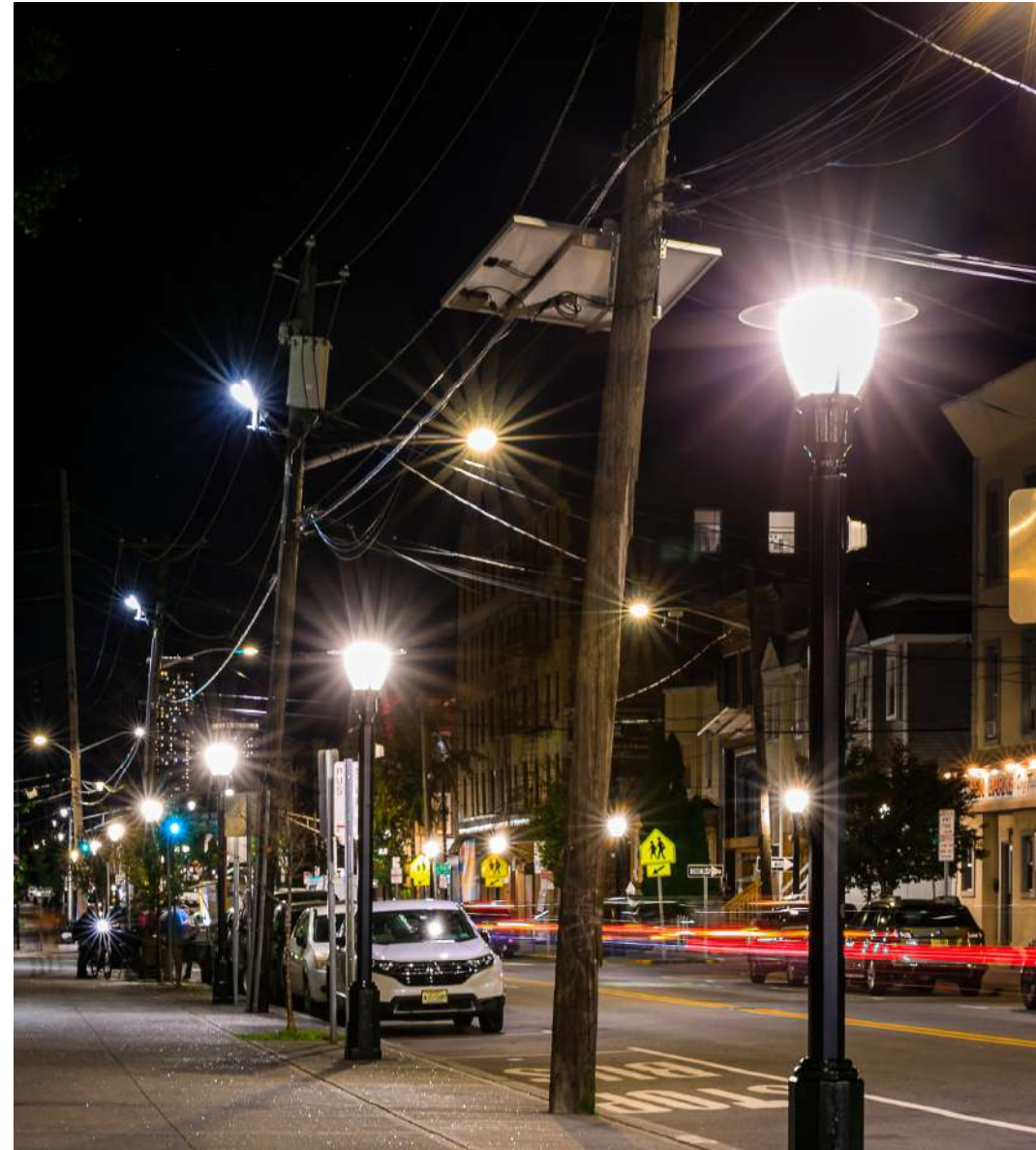
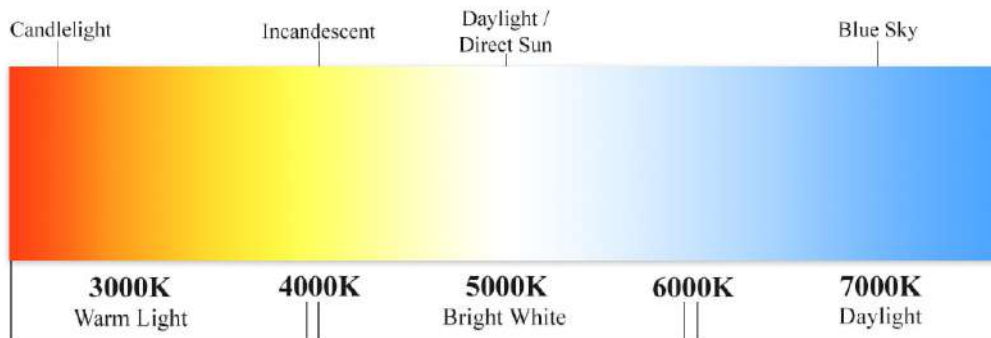
Certification Process is Costly - Most Manufacturers don't certify most of their fixtures, instead opting for "Dark Sky Friendly" Terminology. Anything Custom or Semi Custom, will not typically undergo process to get certified.

Increasingly Towns and Cities, Especially long Estuaries, Rivers and Beaches are Requiring "DARK SKY FRIENDLY" or "FULL CUT OFF FIXTURES" limiting up light.

Towns are requiring lower color temperatures (3000K or Below) on NEW Projects

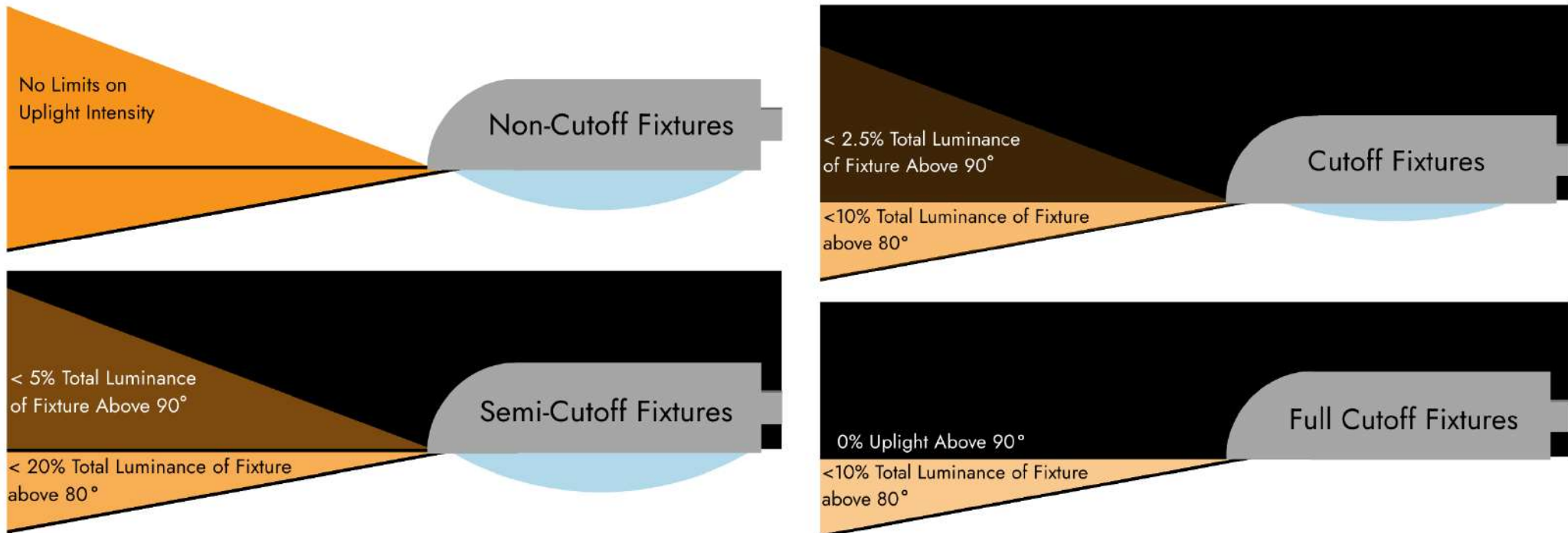
COLOR TEMPERATURES

Color Temperature Scale

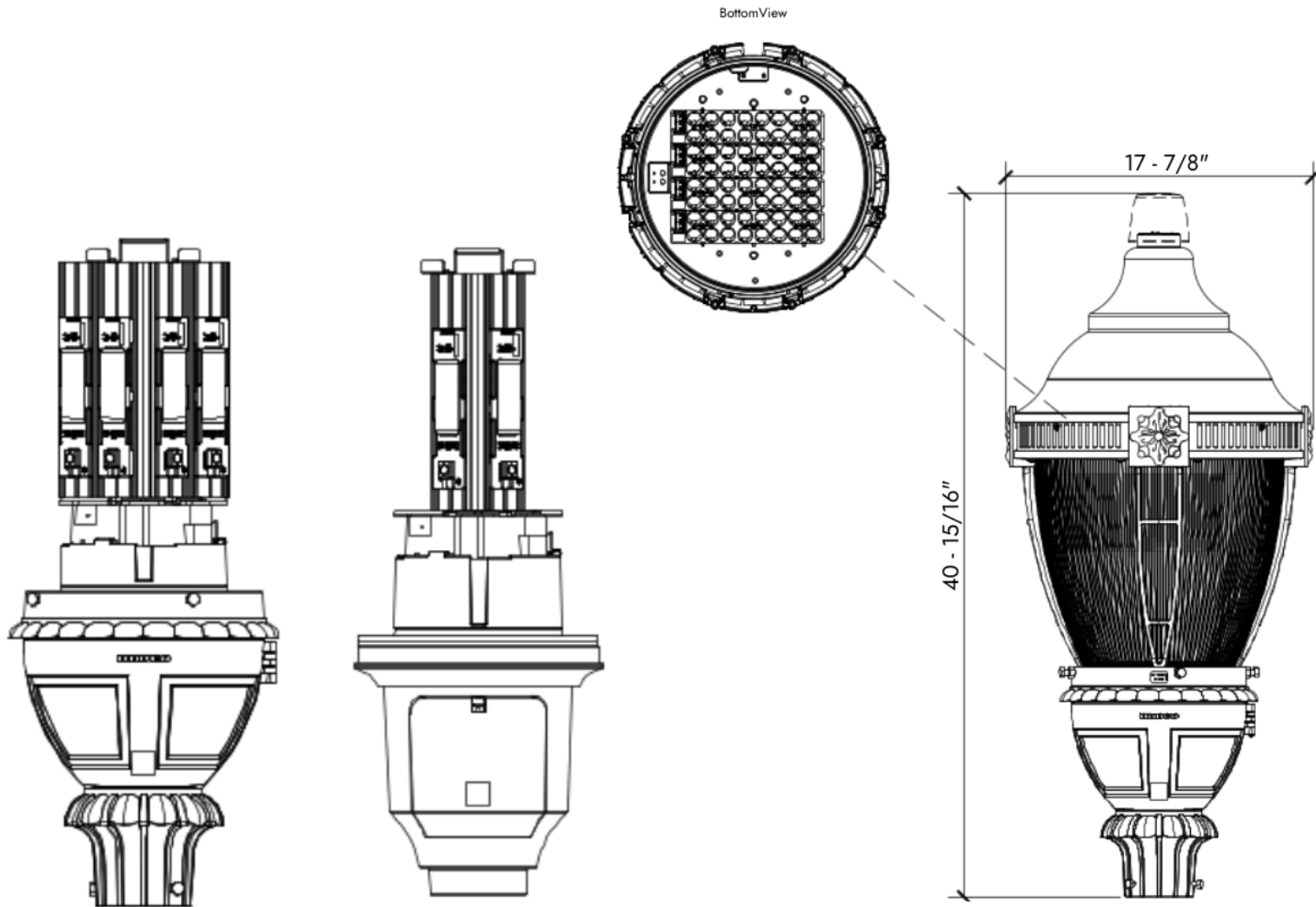


https://commercialledlights.com/blog/lighting-articles/color-temperature/?srltid=AfmBOorIOhCfwsDqSWa3t_9KvPOT5eF67N1dbsUPRWEiSpY7ci-iLYay

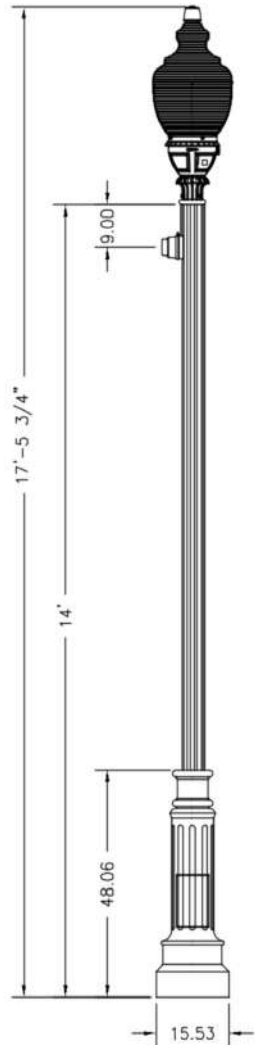
CUTOFF COMPARISONS



VERTICAL AND HORIZONTAL PLATFORMS



NON-CUTOFF



SEMI-CUTOFF



CUTOFF



FULL CUTOFF



NON-CUTOFF



SEMI-CUTOFF



FULL CUTOFF





SHIELDING OPTIONS

Shielding Options and Visual Comfort Diffusers



40LEDs Mini



CUL-DE-SAC SHIELD 40LEDs IP66 (CSS)



FRONT SIDE SHIELD 40LEDs IP66 (FSS)



FRONT SIDE SHIELD 40LEDs IP66 (FSS-4)



HOUSE SIDE SHIELD 40LEDs IP66 (HSS)



HOUSE SIDE SHIELD 40LEDs IP66 (HSS-4)



LEFT SIDE SHIELD 40LEDs IP66 (LSS)



RIGHT SIDE SHIELD 40LEDs IP66 (RSS)

Side-Lighting Optics



Direct View Optics with individual refractor over each LED

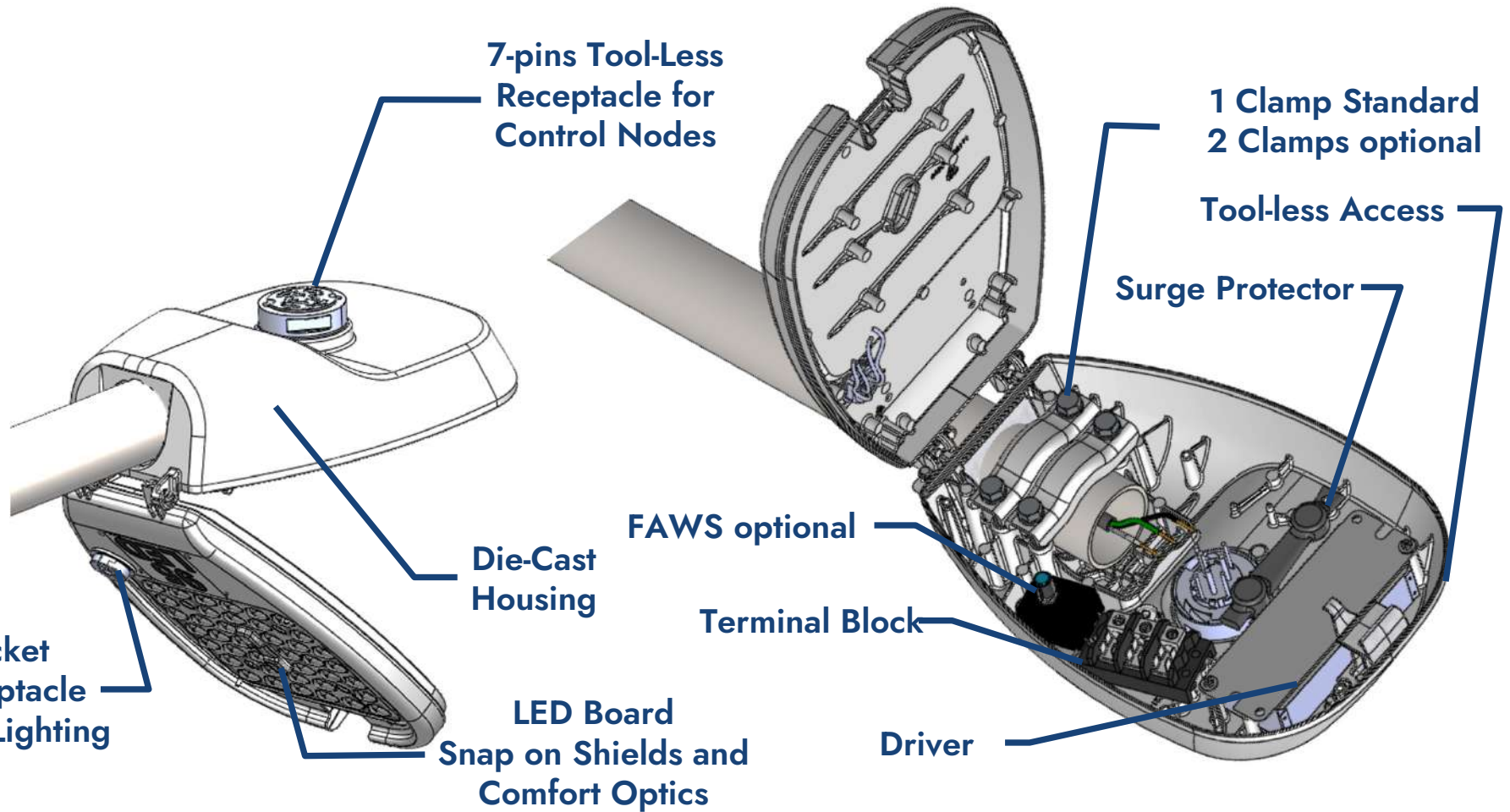


Side-Lighting optics with multi-level diffusing extraction media



CONTROLS

INSIDE A MODERN ROADWAY FIXTURE



DRIVER COMPARISONS

0-10V / DMG

- Older Technology
- Widespread
- Works Like a Dimmer Knob
- Considered “Analog” Dimming
- One Way Communication with Controls









Alliance



- Digital Dimming
- Future of Driver Technology
- Allows Greater variability of Dimming via Lumen Output or Wattage Consumption
- Hardcoding of Luminaire Specific Information into Driver
- Interoperability with Sensors



What?	Icon	Definition
Receptacle		<p>5-pin NEMA (National Electrical Manufacturers Association) receptacle with standard 3 wires connection with an additional 2 contacts on the surface of the receptacle. These contacts will have an additional 2 wires on the reverse side of the receptacle which would typically be can be used for various purposes, such as dimming (0-10V dimming for example), controlling a photocell, or other sensor-based applications.</p>
		<p>A 7-pin NEMA (National Electrical Manufacturers Association) receptacle with standard 3 wires connection with an additional 4 contacts on the surface of the receptacle and in turn 4 wires on the reverse side. This allows connection to 0-10V dimming along with other sensors in a sensor housing. Designed for smart street lighting systems, allowing for advanced control, remote monitoring, and data collection.</p>
		<p>Zhaga Book 18 receptacle is a standardized connector used in outdoor lighting, specifically designed to facilitate the integration of sensors, communication modules, and other smart lighting components with luminaires.</p>
Driver		<p>DALI-2 or Sensor-Ready driver (SR) is a type of LED driver that integrates the functionality for powering and communicating with sensors within the same unit. It builds on DALI architecture. It uses a digital interface to connect the node (sensor) and the SR driver. This interface provides power to the node and digital two-way communication based on DALI-2.</p>
		<p>A D4i driver is an LED driver certified by the Digital Illumination Interface Alliance (DiiA) that follows the DALI-2 standard but with added capabilities for intra-luminaire plug-and-play connectivity and data reporting. It's essentially a DALI-2 driver enhanced for smart lighting applications, allowing for seamless integration of sensors, controls, and communication within the luminaire.</p>
Luminaire		<p>Zhaga-D4i certified luminaire is an LED lighting fixture that is specifically designed to be easily integrated with sensors and communication devices, ensuring "plug-and-play" interoperability with other certified devices from different manufacturers. It uses the Zhaga and D4i standards to achieve this, allowing for future-proofing and a smart, connected lighting experience.</p>

DIMMING

Dimming by power (IAC default)

Dim 50% of max
driver current

Apply manual override to 1 streetlight

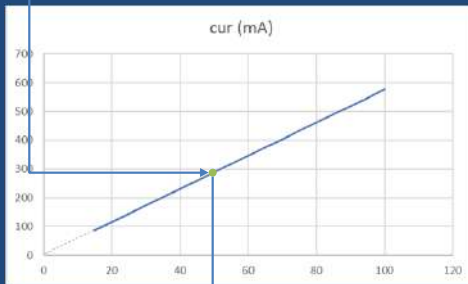
DLCs (1 of 1) [Select](#)

Dimming level

Resume calendar after
4 h

Hours (0.1-24)

current ↑



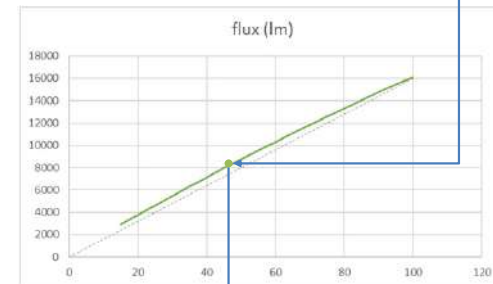
dim → 50% (> 50% luminous flux)
→ 50% energy



Dimming by lumens

Dim 50% of max
luminous flux

lumen ↑



dim → 45% (= 50% luminous flux)
→ < 50% energy



- Reduce the number of fixture SKUs
- Increased energy savings
- Increase lifetime of luminaire

Codes like DARK SKY are Driving Controls

Three Types of Control Systems:

- Luminaire Based
- Site Based
- City Based

Luminaire-Based Control

- Energy Savings**
- Life Management**
- New Luminaires**
- No New Wiring**
- No Connectivity**



Luminaire-Integrated or Augmented Control

Pre-Programmed Driver

- **Sequenced Starting** alternates multiple LED boards for better life management.
- **Constant Light Output** adjusts for lumen depreciation) for level lighting over life
- **End of Life Signals** alerts for adequate illumination and planned maintenance.

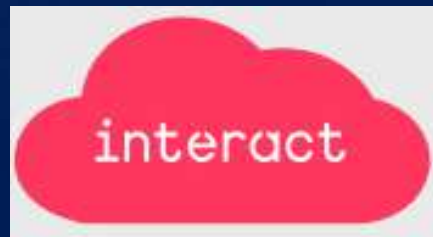
Separate Component

- **Auto Profile Dimming** pre-programmed dimming scenarios for energy conservation.
- **Field Adjustable Wattage Selector** 10 preset steps from 100 to 35% (typical)
- **Motion Response** dimming to 50% of full output with integral (on board) sensor.



LIGHTING CONTROLS & SENSOR

- D4i Driver & zD4i Luminaires
- Zhaga Socket Sensor Ready
- Outdoor Multisensor (OMS)
- Management Platform

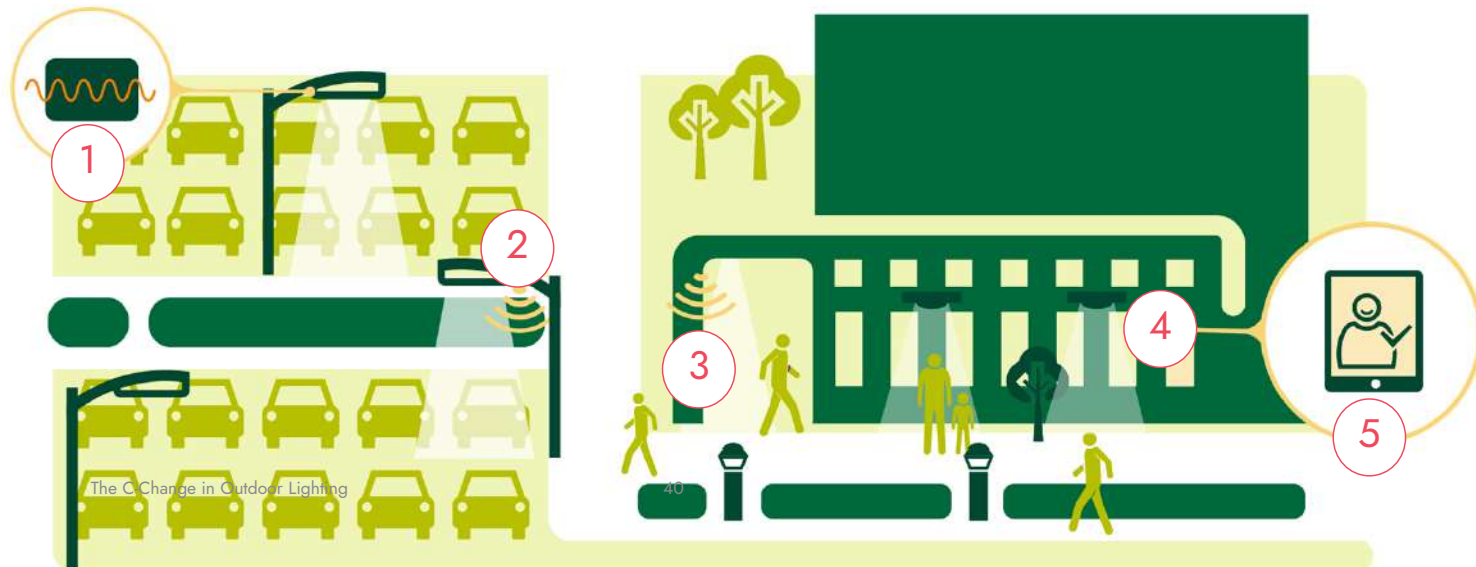


SITE BASED CONTROLS

- **35-50% Energy Savings**
- **Safety and Security**
- **Traffic Interaction**
- **Brightness Adaptation**
- **Wayfinding**
- **Atmosphere**



Site-Based Control for Existing Installations



Receiver in luminaire for schedules

Luminaire-mounted motion sensor for Activity Response

Building-mounted motion sensor for Activity Response

Control panel connected to electrical circuits

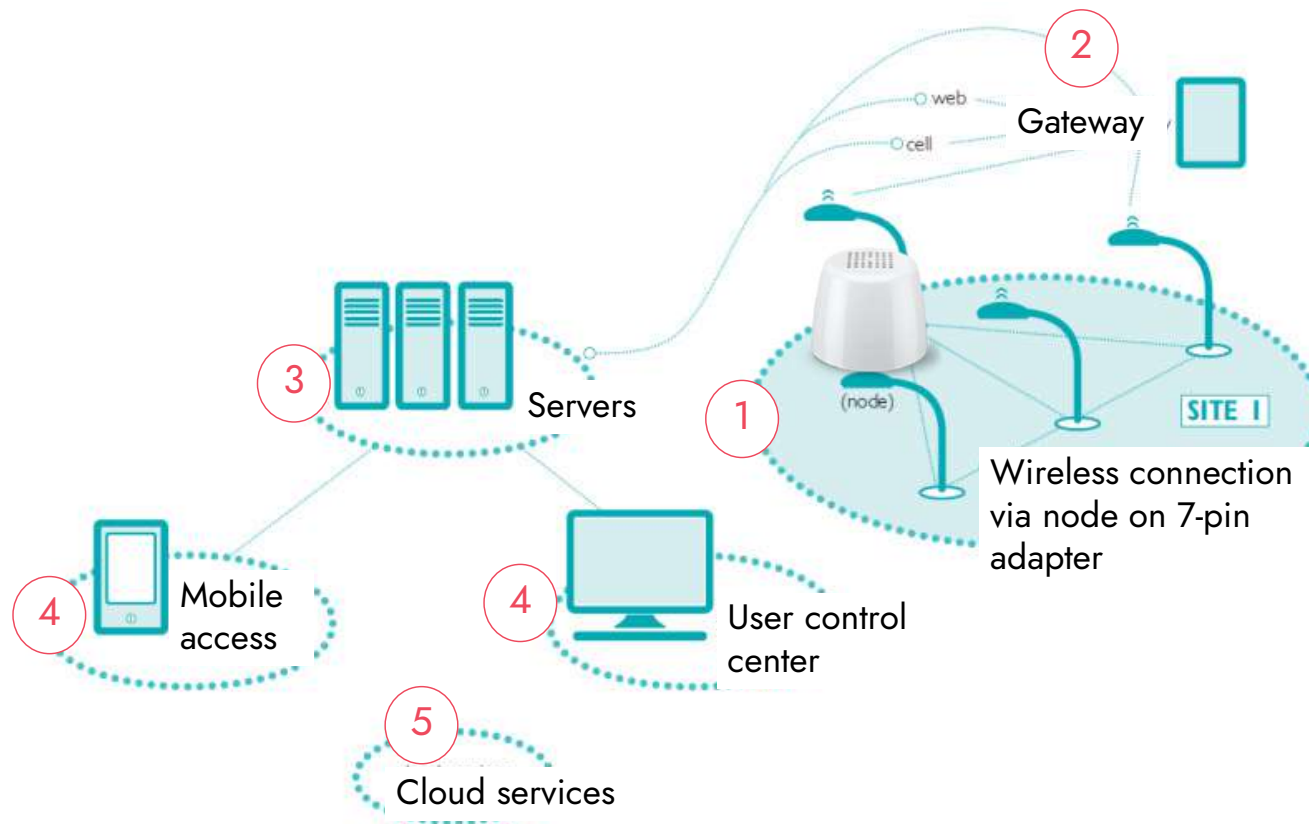
User interface for programming and overrides

City-Based Control System

- **Lighting Management**
- **Asset Management**
- **Improved Efficiency**

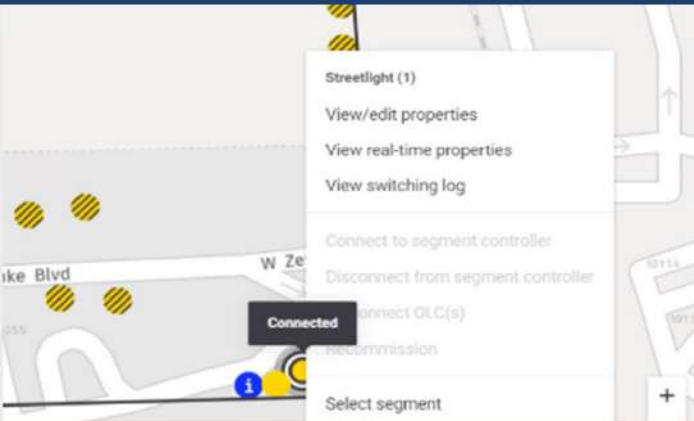


City-Based Lighting Control and Management

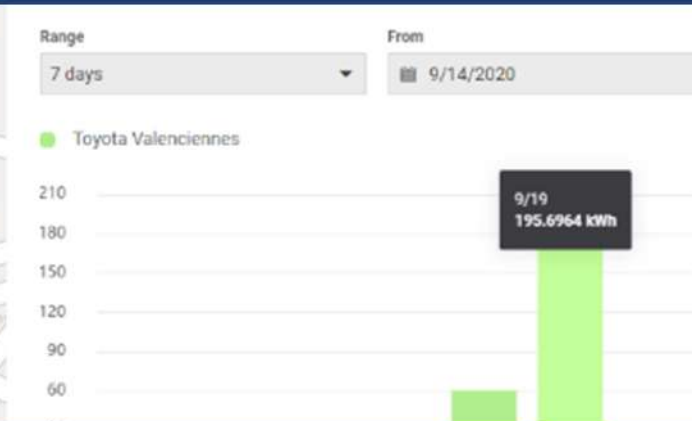


CITY BASED CONTROLS

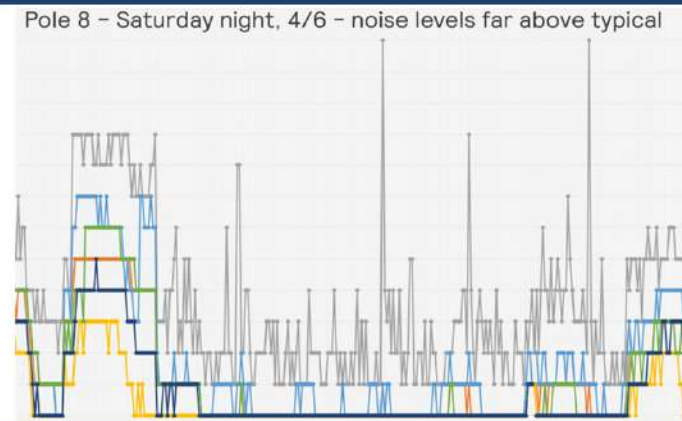
ASSET MANAGEMENT



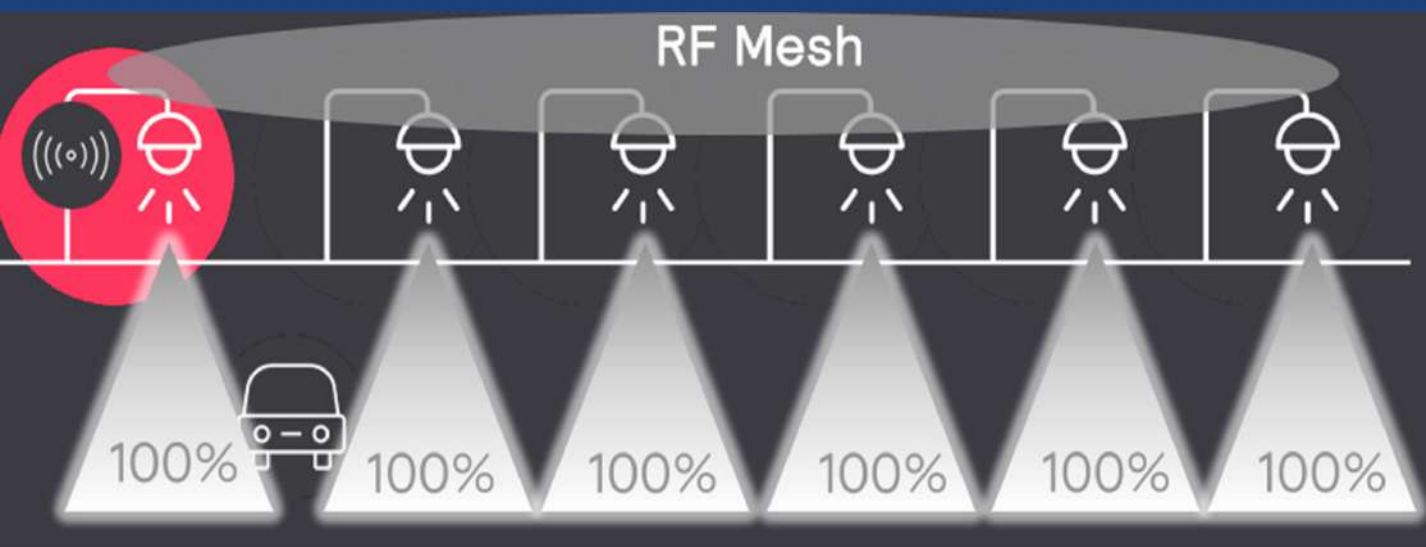
ENERGY MONITORING



NOISE ENFORCEMENT



"FORWARD LOOK" MOTION DIMMING CONTROL



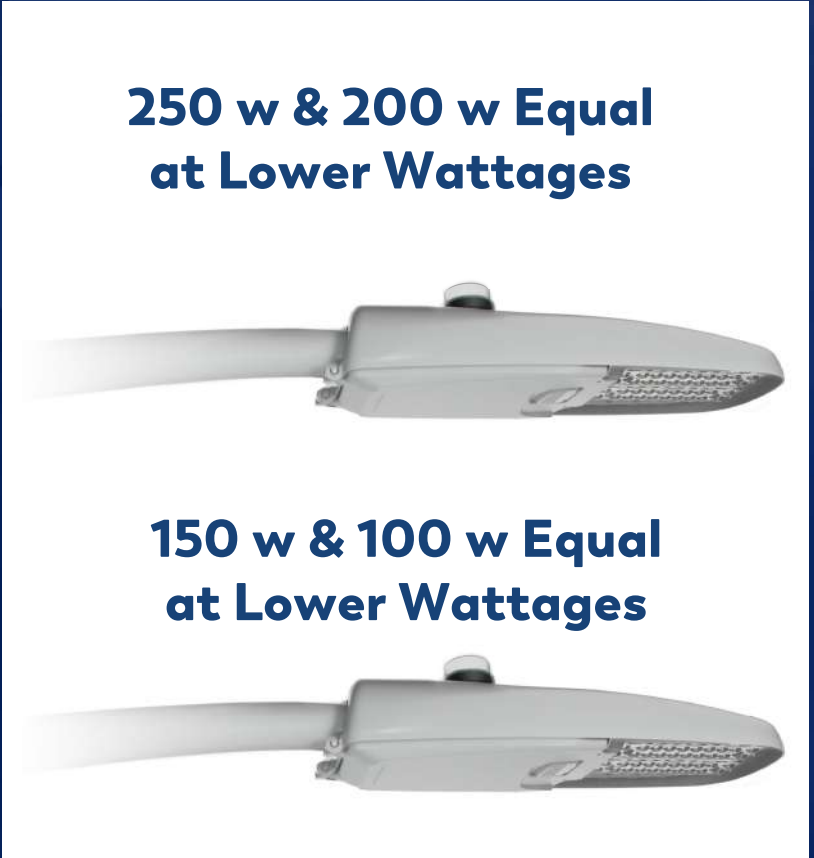
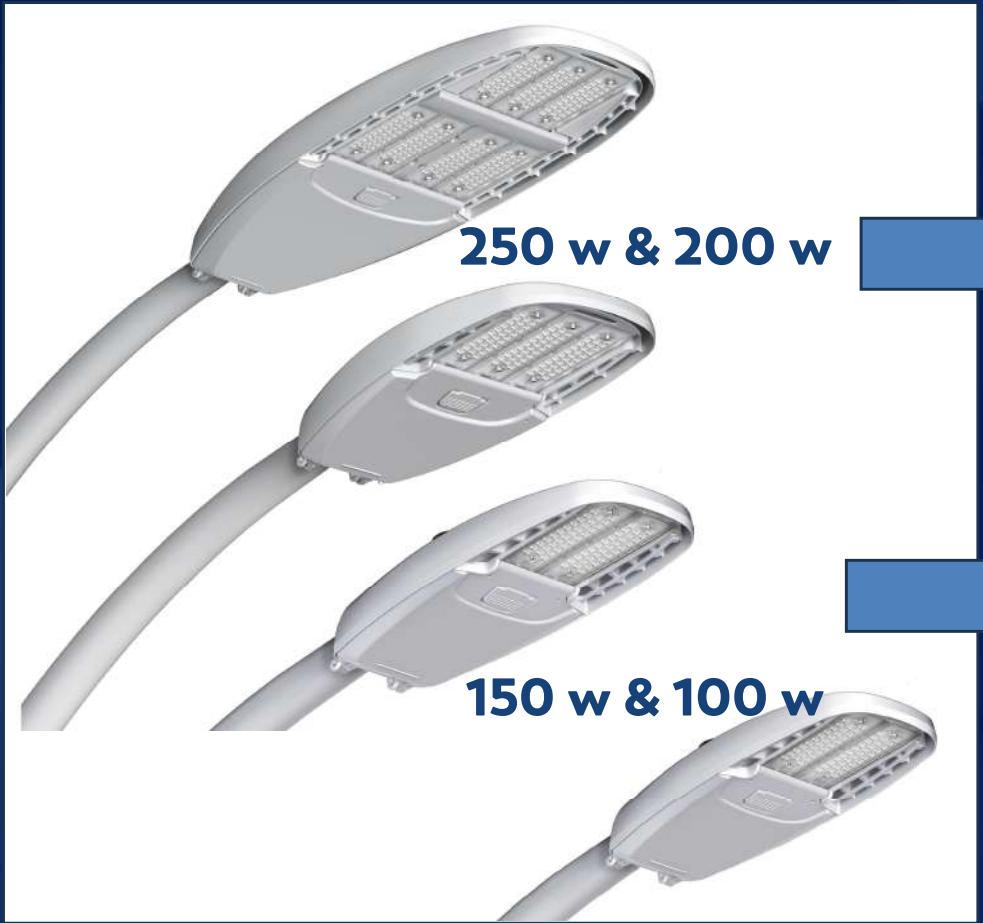
HEAT MAPPING



OVER LIGHTING & DIMMING



CONTROL ENABLED ASSET STRATEGIES



THANK YOU



DMA

DAVE MURPHY & ASSOCIATES

**PUBLIC SPACES.
INTEGRATED SOLUTIONS.**

 DaveMurphy.com



836