

Water and Infrastructure Committee (2025-2027) – Ordinance No. _____, Bill No. 109 CD1 (2025): A BILL FOR AN ORDINANCE AMENDING CHAPTER 20.35, MAUI COUNTY CODE, RELATING TO PROTECTING SEABIRDS FROM OUTDOOR LIGHTING (*Public Safety Amendments*)

RECEIVED AT WAI MEETING ON 09/02/2025



PRIOR LITIGATION: CIVIL CASE No. 19-1-0053(1), SECOND CIRCUIT COURT, STATE OF HAWAII (2019)

- Maui County commenced island-wide replacement of 4,800 obsolete High-Pressure Sodium (“HPS”) streetlights with a **2700K** (*Kelvin = Energy*) / **70 CRI** (*Color Rendering Index*) energy efficient and environmentally adaptable light-emitting diode fixture (“LED”) fixture manufactured by **General Electric**.
- Former Public Works Director had omitted timely exempting the streetlight replacement project from Environmental Assessment.
- Complaint filed by Earthjustice on behalf of Hawai‘i Wildlife Fund and the Conservation Council for Hawai‘i for violations of Haw. Rev. Stat. Chapter 343 [*Environmental Impact Statements*].

Complaint for Declaratory and Injunctive Relief, February 12, 2019

- 1) A declaration that the Maui County violated the Hawai'i Environmental Policy Act (HEPA) by failing to timely exempt the streetlight conversion project from Environment Assessment, and
- 2) An order that an Environmental Assessment be conducted to determine whether the LED fixtures will have a significant impact posing harm alleged to Maui's wildlife, including endemic Hawai'ian seabirds.

Although not specifically pled in the Complaint, 3) the state litigants also moved for a permanent injunction to enjoin any future installation of the **General Electric 2700K / 70 CRI LED fixtures**.

Maui County Initiates Environmental Assessment

- On August 20, 2019, Maui County's Department of Public Works voluntarily initiated the Environmental Assessment prayed for in the state court Complaint.
- Maui County asked the state circuit court to order mediation.
- Earthjustice pursued litigation and eventually sought an order for removal of approximately 1,021 of the **General Electric 2700K / 70 CRI LED fixtures** that had been converted.
 - *Argued the LED fixtures emit spectral blue light content harmful to endemic Hawai'ian seabirds and turtles.*

Mediation and Settlement of Civil Case No. 19-1-0053(1)

- Second Circuit Court, J. Cardoza ruled:
 - 1) The failure to exempt the streetlight replacement project violated Haw. Rev. Stat. Chapter 343;
 - 2) DENIED the request for an injunction based on the theory that “blue light content” caused harm endemic Hawai‘ian species, and
 - 3) ORDERED the parties to mediation at Maui County’s request.

Communications from Earthjustice's Biologist

-----Original Message-----

From: Jay Penniman [mailto:jayfp@hawaii.edu]
Sent: Tuesday, April 12, 2016 8:54 AM
To: Tsukiyama, Kurt; David Goode
Subject: Maui Street Lighting

Hi Kurt & David,

Thank you for speaking with me last week about our street lighting options and the need to recognize wildlife issues along with our human needs for night time lighting.

I had a communication from Bob Adams in which he reflected that you had the impression that I felt that spectral content in lighting is less important than shielding and direction of light fixture. There is literature documenting that shielding and direction can be effective in reducing seabird fallout from light distraction and there is no research as yet documenting one wave length as less distracting to seabirds than another. However, there is good evidence that long wave length lighting is less disrupting to many other species - turtles, insects, fish..... And, if seabirds, especially fledglings, are instinctively drawn to the short (blue/blue-green) wave length light of bio luminescent prey, it may be that eliminating the short wave length light from our street lighting, and other lights, will reduce or eliminate seabird fallout. This is research I will promote at the DOE Solid State Lighting Roundtable Meeting I am going to next week.

Just wanted to clarify that I do want spectral content of our lighting to be less than 2% "blue", in addition to minimizing, directing and shielding.

Cheers,

Jay

From: Jay F. Penniman <jayfp@hawaii.edu>

Sent: Wednesday, May 17, 2017 9:27:12 AM

To: Fern Duvall; Marie VanZandt; Emily Severson; Lynx Gallagher; Che Frausto; Becca Pederson; Jenni Learned; Adams, Josh; Hanna Mounce; Hannah Nevins; Morgan Pattison; Lindsay Young; Eric VanderWerf; Katherine E Cullison; Swindle, Keith; Victoria Owens; Jennifer Roth; Jenny Hoskins; Michelle Bogardus; Megan Laut; Bailey, Cathleen; Kathleen Misajon; Hu, Darcy; David Duffy; David Ainley; Siddiqi, Afsheen A; Jeffrey Kermode; Kurt Tsukiyama; Brittani Capps-Balinbin; Joy Tamayose (joy_tamayose@nps.gov); Raina Kaholoaa; Carl Schwarz; Medeiros, John S; Franklin, Stephanie D; John Tryggestad; Scott Fretz, PhD; Scott Hall; 'Scott Fisher'; Moura, Sean; Brad Keitt; Bradley Bales; J. Rubey; David Hyrenbach, Ph.D.; David Goode; David Henkin; Bob Adams; Eric Adams; Joelle Gehring; Mark Rauzon
Subject: Seabird mortality induced by land-based artificial lights

Aloha No,

Here is the latest contribution documenting the impacts of anthropogenic light at night on seabirds worldwide. If anyone knows of locations where light induced seabird fallout is documented, where we could change out lights to low blue content LED luminaires, please be in contact. There is a real need to answer the question of whether or not eliminating as much blue content of nighttime lighting as possible will reduce or eliminate distraction of seabirds. Lighting with minimized blue content has been demonstrated to eliminate turtle distraction. There are numerous studies documenting the negative impacts of blue light at night on astronomy and other species; salmon, soy beans, humans, etc. We need to answer the question for seabirds.

Cheers,

Jay



Kauai Seabird Habitat Conservation Plan

Kaua'i Seabird Habitat Conservation Plan

State of Hawai'i
Department of Land and Natural Resources,
Division of Forestry and Wildlife

May 20, 2020

5.3.1 ADJUSTING LIGHTING AT FACILITIES

Appendix E: Guidelines for Adjusting Lighting at Facilities includes the following measures to avoid and minimize take impacts to Covered Seabirds:

- Deactivate non-essential lights
- Install full cut-off light fixtures
- Shield light fixtures
- Angle lights downward
- Place lights under eaves
- Shift lighting according to moon phase (during the fall-out period)
- Install motion sensors for motion-activated lighting
- Decrease lighting levels
- Decrease visibility of interior lights
- Use light-less technologies
- Plant vegetation around lights to reduce light visibility
- Lower height of lights
- Use longer light wavelengths

These guidelines are intended to be used in individual PIPs submitted to the USFWS and DLNR as part of the application process. Under the KSHCP, all minimization measures must be implemented within Year 1 of an ITP/ITL and maintained throughout the life of the permit/license. Compliance with the avoidance and minimization measures in PIPs will be monitored and reported at the onset of the KSHCP, and annually thereafter (see [Section 6.8.1](#)). New facilities or expansion of existing facilities identified in PIPs shall use, as appropriate, the avoidance and minimization measures described in this section.

The installation of "new" lights (those that are proposed or planned but do not exist at the time of the application for take permit/license) has the potential to exacerbate existing adverse light attraction impacts on Covered Seabirds and cause fallout (i.e. take) of seabirds. Participants in the KSHCP shall consult with the USFWS and the DLNR in advance on their plans to install new lights at existing facilities or to construct new facilities to determine the required avoidance and minimization measures. Depending on their potential impact, installation of new lights at an existing Participant's facility may require an amendment to a PIP and the permit that has been issued to a Participant.

These recommendations for light minimization are based on current published scientific literature and represents the best available science available. However, the best available science regarding light attraction behavior and the variations between the Covered Species' sensitivity to light color and intensity remains extremely limited. As new information becomes available regarding new technologies, different lighting designs, and/or identifying appropriate light attraction minimization measures, they will be incorporated into the KSHCP as practicable. Adaptive management will be recommended to incorporate these minimization measures as part of each Permitted Participant's annual review.

Research Paper/Study cited Earthjustice's Biologist

3. In his April 20, 2020 letter report Jay Penniman refers to a paper – i.e., *Rapid Assessment of lamp spectrum to quantify ecological effects of light at night*. Figure 2 and Table 3 in the paper present data purporting to show species response to light spectra. Figure 2 shows response curves of various species to the visible light spectrum. Table 3 includes data purporting to show species response to various types of lighting. Are the figure and table consistent with Jay Penniman's assumption that "due to their higher blue-light content, the new LED streetlight fixtures pose greater harm to imperiled seabirds than the HPS fixtures they have replaced?"

They are not. Examining the data provided in Penniman's reference, I find his conclusion that the new LED streetlight fixtures "pose greater harm to imperiled seabirds than the HPS fixtures they have replaced" perplexing. Figure 3 has been pulled from the paper *Rapid Assessment of Lamp Spectrum to Quantify Ecological Effects of Light at Night*³, that Penniman references. Note that extraneous plots have been removed to allow the axes to be displayed next to the Shearwater curve. From the curve I conclude that the Shearwater eye response is more sensitive in the yellow region than in the blue. The peak response looks to be approximately at around 565nm. Based on that curve, if I wanted to minimize the optical response of the Newell's Shearwater, I would want to remove light in the longer wavelengths not the shorter ones, since that is where the greater response occurs.

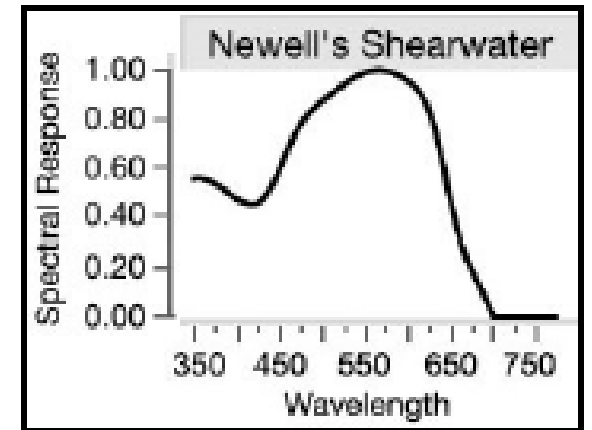


Figure 4- Spectral Response of Newell's Shearwater vs. Wavelength

Settlement of Civil No. 19-1-0053(1), April 2021 – Principal Terms

- Maui County's Department of Public Works agreed to Complete the Environmental Assessment it voluntarily commenced in August 2020;
- Maui County agreed to dim the installed 1,021 LED fixtures to 80% of lumen output pending completion of the Environmental Assessment;
- Joint Press Release:

“The agreement resolves a lawsuit filed in February 2019 by Earthjustice on behalf of Hawaii Wildlife Fund and Conservation Council for Hawaii. The lawsuit alleged the County failed to comply with HEPA for the streetlight project. ***The community groups claim LED streetlight fixtures emit high levels of blue light that may attract sea turtles and certain species of imperiled seabirds including the Hawaiian petrel, Newell's shearwater, and Wedge-tailed shearwater. The environmental review initiated by the County is intended to evaluate any science underlying this claim.***” (emphasis added).

Draft of Environmental Assessment Published Finding of No Significant Impact (General Electric 2700K / 70 CRI LED Fixture) – July 2022

DRAFT ENVIRONMENTAL ASSESSMENT & ANTICIPATED FINDING OF NO SIGNIFICANT IMPACT, MAUI COUNTY STREETLIGHT CONVERSION PROJECT

PREPARED FOR:
County of Maui
Department of Public Works



JULY 2022

Draft Environmental Assessment

Maui County Streetlight Conversion Project
Existing Environment and Potential Impacts

3.2.3.2.2 Conclusions

The most relevant considerations when assessing the impact of the Proposed Action on seabirds are:

- Seabirds will not be adversely affected during short-term construction and maintenance activities.
- The selected LED fixture complies with more of the relevant wildlife guidelines than the HPS fixture (Section 3.2.3.1). The selected LED fixture is a full cut-off light, resulting in less light trespass than HPS, and would be controlled in a manner intended to avoid wildlife impacts.
- In the vast majority of the conversions (over 4,000 cases), 150W HPS will be converted to ERL1-0-06 2700K LED resulting in substantially less light energy being emitted (RPD = 49 percent) and seabirds will perceive the light as substantially dimmer (RPD = 51.2 percent). In all other cases, seabirds will perceive the LED to be essentially identical to or dimmer than the HPS it replaces.
- During the seabird fledging season, when the greatest impacts associated with artificial light occur, the LEDs will be dimmed 20 percent (Section 2.1.5.1) using the wireless adaptive control system which will allow the streetlight infrastructure to be remotely controlled in real time. This will further reduce the amount of artificial light energy in the environment.
- On O'ahu, where the State of Hawai'i Department of Transportation converted HPS streetlights to LEDs rated at 4000K and 3000K (which have a higher blue light content than the 2700K model selected by the County of Maui and were not dimmed), studies indicated that WTSH fallout did not change after the conversion.

Given these important factors, under the Proposed Action alternative the County-owned streetlight's contribution to seabird fallout, if any, would be expected to decline. The Proposed Action would not have a significant adverse effect on the subject seabirds; it would have a beneficial effect on them.

When considering the potential impact of the No Action alternative, it is recognized that to the extent that some street lights have already been converted to LED (Section 2.1.4), some of the benefits outlined above will be realized until those LED fixtures are returned to HPS. In the long term, the No Action alternative would result in similar artificial light conditions as those that existed in 2018. The County-owned streetlight's contribution to seabird fallout, if any, would not be expected to change.

Draft of Environmental Assessment Published Finding of No Significant Impact (General Electric 2700K / 70 CRI LED Fixture) – July 2022

5.2.9 EFFECTS ON RARE, THREATENED, OR ENDANGERED SPECIES

No rare, threatened, or endangered species will be affected by the proposed conversion of streetlights on Maui, Molokaʻi, and Lānaʻi. In addition, the Proposed Action will not utilize or otherwise affect a resource or habitat needed for the protection of rare, threatened, or endangered species. In fact, as detailed in Section 3.2.3, the Proposed Action will benefit protected species by avoiding and minimizing potential light attraction threats to seabirds and sea turtles.

Earthjustice Lobbies for Amendments Maui County's Outdoor Lighting Code – Ordinance 5435 (October 2022)

D. All outdoor lighting fixtures, except for neon, must limit short wavelength content to ***no more than 2 percent of blue light content***. “Blue light content” means the ratio of the amount of energy emitted by the outdoor light fixture between four hundred and Five hundred nanometers divided by the amount of energy between four hundred and seven hundred nanometers. (emphasis added).
(Compliance by July 1, 2026)

Draft Environmental Assessment and Published Finding of No Significant Impact – July 2022 is rendered MOOT, and Settlement of Civil No. 19-1-0053(1) Undermined Because the General Electric 2700 / 50 CRI LED Streetlight Fixture Cannot Meet The 2% Blue Light Content Restriction.

A Two Percent (2%) Or Less Blue Light Content Streetlight Fixture Is Inadequate for Roadway Applications And Presents Safety Risks to Motorist, Pedestrians, Cyclists, and Visitors

- Limiting the spectral content of roadway lighting to 2% or less greatly reduces the resulting **CRI** (*Color Rendering Index*) of the light source.
- **CRI** is a measure of the spectral content of a light source.
- The higher the **CRI**, the broader the color spectrum of the light source.
- At night, a driver's ability to discern objects depends heavily on contrast sensitivity – the ability to detect differences in luminance and separate an object from its background. Low **CRI** lighting can make objects blend more easily into their surroundings, reducing this contrast.
- Street or roadway lighting with lower **CRI** values reduces the contrast between objects on the roadway ahead and the background. This makes it more difficult for a driver to recognize the object and determine what action should be taken to avoid striking the object. This is particularly critical when it comes to roadway lighting where vehicle speeds are generally higher, necessitating shorter target recognition times in order to avoid striking objects.
- Coastal states generally call for a **minimum of 70 CRI** for roadway applications.

See Letter Report from John “Jack” Curran, PhD., dated August 25, 2025.

A Two Percent (2%) Or Less Blue Light Content Streetlight Fixture Is Inadequate for Roadway Applications And Presents Safety Risks to Motorist, Pedestrians, Cyclists, and Visitors

- Hawaiian Electric Company, Inc. and Maui County have only identified only one fabricated fixture that meets the 2% blue light content restriction.
- The product is a **1900K / 50 CRI** light custom manufactured by **Cree Lighting** as a parking lot light fixture.

Prepared for Maui

Guideway™ Series

Guideway™ LED Street Luminaire featuring Patented NanoComfort™ Technology – Small, Medium & Large

Rev. Date: WL 09/27/2024

Product Description

The new Guideway™ family of roadway lighting is a game-changing solution designed from the ground up, offering a fresh start that brings levels of performance and visual comfort previously out of reach. The Guideway™ Series fundamentally shifts expectations of the standard streetlight – how it performs, its standard features, and most significantly, the degree of visual comfort it provides. With Cree Lighting's new NanoComfort™ Technology, the Guideway Series hits the comfort sweet spot without the prohibitive price tag, providing demonstrably better comfort and performance for the money.

Applications: Residential roads, collector roads, multi-lane freeways, express ways, major roads, parking lots, and general area spaces

Performance Summary

Utilizes Patented NanoComfort™ Technology

Assembled in the USA by Cree Lighting from US and imported parts

Initial Delivered Lumens: 2,980 - 31,900

Efficiency: Up to 160 LPW

CRI: Minimum 70 CRI (2700K, 3000K, 4000K, 5700K); 80 CRI (2200K); **50 CRI (1900K)**

CCT: 1900K, 2200K, 2700K, 3000K, 4000K, 5700K

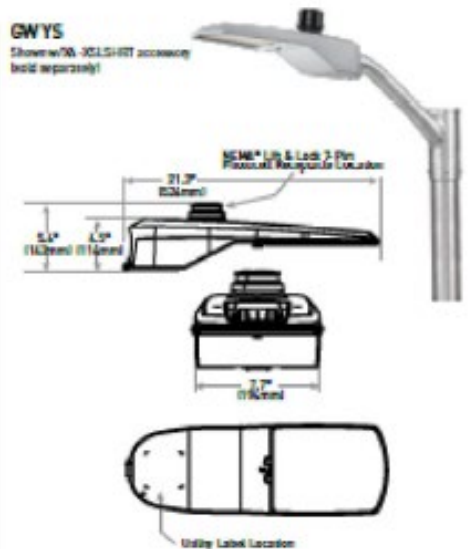
Limited Warranty: 5 years standard for luminaire and finish; optional 10 years for luminaire and finish; 1 year for luminaire accessories

* See <https://www.creeledighting.com/warranty> for warranty terms.

1.74% blue content per Maui/Big Island (400-500nm)/(400-700nm) requirement

GWYS

Shown with 30° tilt accessory (sold separately)



Luminaire	Weight
GWYS	6.2 lbs. (2.7kg)

GWYS/GWYS Luminaire - See page 18 for photos & dimensions.

A Two Percent (2%) Or Less Blue Light Content Streetlight Fixture Is Inadequate for Roadway Applications And Presents Safety Risks to Motorist, Pedestrians, Cyclists, and Visitors

- Cree Lighting as manufacturer does not recommend its own **1900K / 50 CRI** fixture for any roadway applications.
- Cree Lighting's "Roadway Selection Guide" identifies **2700K / 70 CRI** as a minimum for any and all roadway applications.



NAVIGATE THE POSSIBILITIES.

From driveway to highway, Cree Lighting delivers roadway solutions that meet the needs of every application. Our portfolio was designed around visual comfort, durability, and performance to enhance the lighting experience of the people who live and work under them.

Cree Lighting wrote the book on LED street lighting with our first generation of street lights, and we continue to tell the story of where better light can take you.



Residential Collector Roads Major Roads & Highways

DRIVING CHANGE THROUGH BETTER LIGHTING.

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CREE  **LIGHTING**




RESIDENTIAL





COLLECTOR ROADS



MAJOR ROADS & HIGHWAYS

When you want cutting edge LED lighting solutions with visual comfort and state-of-the-art performance.									
	RSW Series (Small)			RSW Series (Medium)		RSW Series (Large or Extra-Large)			
	Lumens	3,000 (3L)	5,000 (5L)	7,000 (7L)	9,000 (9L)	14,000 (14L, LG)	24,000 (24L, XL)	32,000 (32L, XL)	
	Wattages	25W to 29W	40W to 45W	50W to 51W	64W to 76W	108W to 111W	167W to 194W	248W	
	CRI/CCT	70 CRI (TRL, 3000K, 4000K & 5000K); 80 CRI (TRL, 2700K, 3000K & 4000K)			70 CRI (TRL, 3000K, 4000K & 5000K); 80 CRI (TRL, 2700K, 3000K & 4000K)	70 CRI (TRL, 3000K, 4000K, 5000K)			
	Typical Replacement	Replaces up to 150W HPS			Replaces 150W to 200W HPS	Replaces up to 400W HPS			
	Warranty	10-year			10-year	10-year			

When you want utility-grade, advanced LED lighting solutions with market-leading performance.									
	XSP Series (Small)			XSP Series (Medium)		XSP Series (Large)			
	Lumens	5,000 (5L)	8,000 (8L)	12,000 (12L)	18,000 (18L)	24,000 (24L)			
	Wattages	43W to 47W	59W to 69W	95W	135W	184W			
	CRI/CCT	70 CRI (3000K, 4000K, 5000K, 5700K)			70 CRI (3000K, 4000K, 5000K, 5700K)	70 CRI (3000K, 4000K, 5000K, 5700K)			
	Typical Replacement	Replaces up to 150W HPS			Replaces 150W to 250W HPS	Replaces up to 400W HPS			
	Warranty	10-year			10-year	10-year			

When you want reliable, utility and security LED lighting with a low total cost of ownership.	
	RUL Series
	Lumens
	Up to 5,215
	Wattages
	50W
	CRI/CCT
	70 CRI (3000K, 4000K)
	Typical Replacement
	Up to 100W HPS or 17W Mercury Vapor
	Warranty
	5-year on reflector/refractor; 7-year on arm mount; 10 years on luminaire and photocell

NOTE: All products listed above, except the RUL Series, include a 7-pin photocell receptacle making them ready for controls integration. *Turtle-Friendly Amber LEDs (TRL) available on select RSW and Traveyo Series SKUs. Consult spec sheets for TRL performance data.




RESIDENTIAL



COLLECTOR ROADS



MAJOR ROADS & HIGHWAYS

	When you want mainstream LED lighting solutions with best in-category performance.											
	Traveyo Series (Small)				Traveyo Series (Medium)				Traveyo Series (Large)			
	Lumens	2,000 (2L)	4,000 (4L)	5,000 (5L)	8,000 (8L)	10,000 (10L)	13,000 (13L)	16,000 (16L)	20,000 (20L)			
	Wattages	17W	25W	40W	57W	77W	96W	110W	150W			
	CRI/CCT	70 CRI (TRL, *2700K, 3000K, 4000K, 5700K)			70 CRI (TRL, *2700K, 3000K, 4000K, 5700K)		70 CRI (TRL, *2700K, 3000K, 4000K, 5700K)					
	Typical Replacement	Replaces up to 100W HPS			Replaces up to 200W HPS		Up to 400W HPS					
	Warranty	5-year; 10 years optional on luminaire and finish			5-year; 10 years optional on luminaire and finish		5-year; 10 years optional on luminaire and finish					

Traveyo Series (Extra Large)			
22,000 (22L)	25,000 (25L)	27,000 (27L)	30,000 (30L)
148W	183W	182W	219W
70 CRI (TRL, *2700K, 3000K, 4000K, 5700K)			
Up to 400W HPS			
5-year; 10 years optional on luminaire and finish			



NOTE: All products listed above, except the RUL Series, include a 7-pin photocell receptacle making them ready for controls integration. *Turtle-Friendly Amber LEDs (TRL) available on select RSW and Traveyo Series SKUs. Consult spec sheets for TRL performance data.

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Color contrast is important in the detection of objects in the roadway and can add as much as 20% to detection distance.

1.2.1.2 Color Contrast

Color also provides additive contrast benefits. As shown in Figure 8, color contrast can improve the visibility of objects and pedestrians. This effect depends upon the color of the object or clothing and the color rendering ability of the source used for roadway lighting. For example, in the left frame of Figure 8, the pedestrian's red shirt and the red color of the approaching vehicle provide additional visibility via color contrast. However, this effect varies based on the environment. Both the light source spectrum and the spectral reflectivity affect the detection of objects in the roadway, which makes color contrast quite situational and variable. As such, the impact is not easily quantified and is generally not currently built into lighting design standards.



Figure 8. Photos. Effect of color contrast. (Image Credit: WSP)

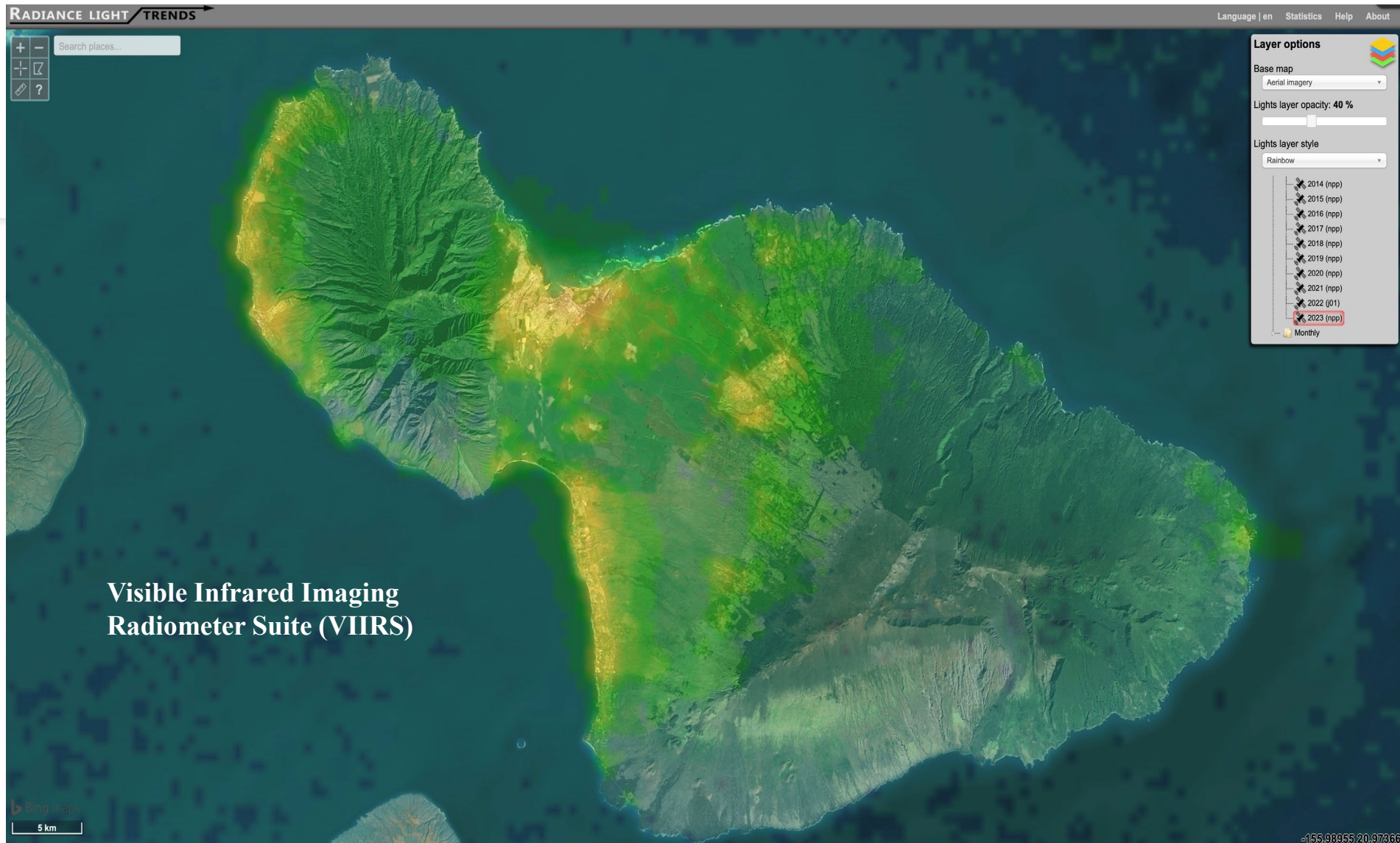
As mentioned, the color of the light source affects the ability to generate color contrast. Light sources such as HPS do not provide a complete spectrum, meaning certain colors are not fully visible. However,

LED sources allow for a more complete spectral output, and color becomes more significant. Research has shown that the selection of a 4000K light source provides an additional benefit over traditional ones through contrast and the balance of the spectrum in terms of red and blue content in the spectral power distribution (SPD).

The impact of contrast design to roadway lighting can be considered first as the position and layout of the luminaires, to provide luminance contrast, and the light source selection, to provide color contrast.



**1900K / 60 CRI Lighting Fixture –
Puunene Shopping Center Parking Lot**



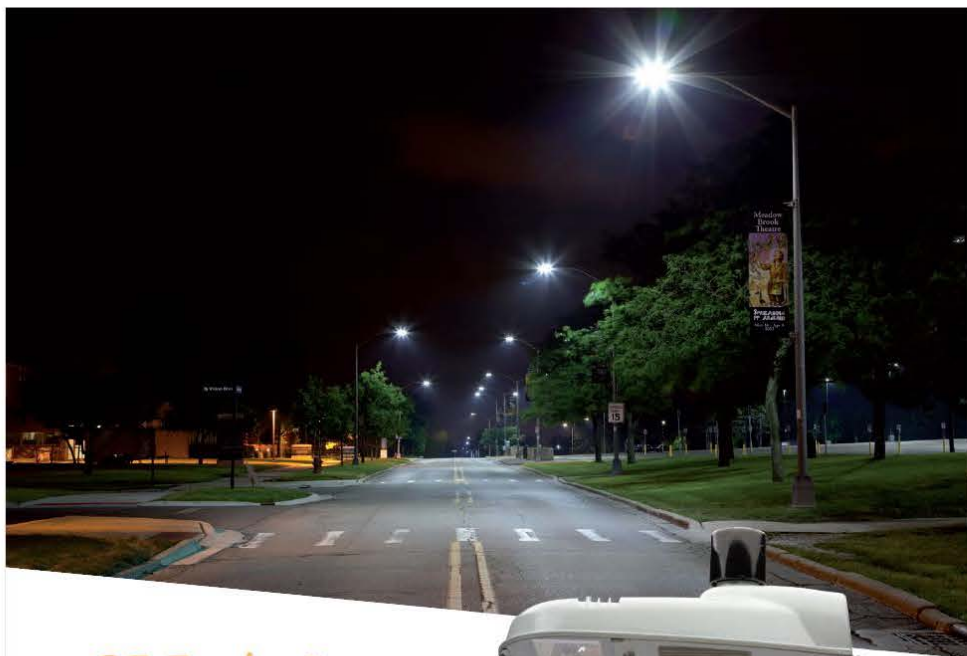
Streetlights owned and operated by HECO/MECO for Maui County are only 5.6 – 11.2% overall skyglow across the island topography.

See Letter Report from Thomas Glesne, PhD., dated August 29, 2025.

A Two Percent (2%) Or Less Blue Light Content Streetlight Fixture Has Virtually No Effect In Reducing Overall Skyglow And Is Outweighed By The Need For Roadway & Public Safety

- Converting all the streetlights on Maui to a 1900K amber LED would decrease the streetlight contribution to skyglow by **2.5 – 5%**, which is *de minimus* and a non-significant change in airglow – primarily because Maui's streetlights average a CCT of 2052K and are not a significant contributor to skyglow.
- If the current baseline for contribution to skyglow from streetlights is **5.6 – 11.2%**, then **88.8 – 94.4%** of all skyglow is from other light sources.
- Exempting streetlights from the 2% restriction and converting to a 2700K fixture means comparatively that skyglow from all other sources of artificial light remains the overwhelming source of potential light attraction at **86.7 - 93.3%**.
- At 3000K, the maximum CCT for roadway lighting allowed by amendment, skyglow from all other sources of artificial light remains at **84.5 – 93.2 %**.

See Letter Report from Thomas Glesne, PhD., dated August 30, 2025.



GE Evolve™ LED Roadway Lighting ERL1-ERLH-ERL2



current
powered by GE



GE Evolve™ LED Roadway Lighting ERL1-ERLH-ERL2



The **Evolve** LED Roadway Luminaire is optimized for customers requiring a LED solution for local, collector and major roadways. GE's unique reflective optics are designed to optimize application efficiency and minimize glare. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life. This reliable unit has a 100,000 hour design life, significantly reducing maintenance needs and expense over the life of the fixture. This efficient solution lowers energy consumption compared to a traditional HID fixture for additional operating cost savings.

Features:

- Optimized roadway photometric distributions
- **Evolve**™ light engine consisting of reflective technology designed to optimize application efficiency and minimize glare
- 70 CRI at 2700K, 3000K and 4000K typical.
- -40°C to 50°C UL Ambient Typical.
- ULOR = 0 (zero uplight)
- Designed & Assembled in USA

Applications:

- Local Roadways
- Collector Roadways
- Major Roadway/Streets



Compatible with **LightGrid**™ Outdoor Wireless Control System



To learn more about GE Evolve LED Roadway Lighting, go to: www.currentbyge.com

Street Light Management



Enabling Smart Cities and Utilities through Intelligent Lighting Management Solutions

The Landis+Gyr Street Light Management Solution enables our customers to monitor and manage street lights — both High Pressure Sodium (HPS) and LED luminaires — on Landis+Gyr's communication network. The controller incorporates Landis+Gyr's Network Node, a fully functional, small IoT RF radio module capable of communicating on Wi-SUN compliant RF Mesh IPv6 or RF Mesh networks. As part of our Gristream® Connect IoT portfolio, Landis+Gyr's Street Light Controller and Management Software serve as a foundation for other smart city applications, while vastly improving energy and operational efficiencies.

ENHANCED SAFETY FEATURES

- Luminaire health monitoring and outage detection
- Supercapacitor support for power outages

IMPROVED OPERATIONAL & ENERGY EFFICIENCIES

- Improved energy and asset management
- GPS location—maps with street light visualization
- Dimming schedule creation
- Constant lumen output: ramp up power over time to maintain lumen efficacy

METROLOGY CAPABILITIES

- Load-side accumulated energy, instantaneous current, voltage, power, and power factor

COMPONENTS

- Landis+Gyr street light controller with integrated Network Node
- Command Center 7.1 MR3 or later
- Street Light Management Software



ENHANCED SAFETY
FEATURES



IMPROVED
OPERATIONAL &
ENERGY EFFICIENCIES



METROLOGY
CAPABILITIES



COMPONENTS

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manage energy better

Street Light Management



ENHANCED
SAFETY
FEATURES



IMPROVED
OPERATIONAL &
ENERGY
EFFICIENCIES



METROLOGY
CAPABILITIES



COMPONENTS

PRODUCT SPECIFICATIONS

FCC Class B Device

CONTROLLER SPECS

Dimensions of Controller	Diameter 3.5" (88mm), Height 3.6" (92mm)
Voltage	120-277V (50-60 Hz)
Material	Lexan™ SLX Polycarbonate
Ingress Protection	IP67, IP66
Temperature Rating	Operational -40°C to 60°C Storage -40°C to 85°C
Compatibility (General)	LED, HPS, and induction to a max load of 6A
Compatibility (Luminaire with ANSI C136.41 standard receptacle)	All Features supported by LED luminaires with 5 and 7 pin All features except dimming is supported on 3 pin HPS luminaires
Dimming Method	Complies with 0-10V DC (IEC60929) and DALI (IEC62386)
Dimming Ramping Process	Dimming in gradual steps every 6 seconds (e.g. 100% to 20% = 102 seconds)
Dimming Schedule	Daily or weekly recurring schedule with ability to schedule a special event, in 1 minute increments with 1% resolutions
On / Off Trigger	Photo sensor for local light detection (selectable) with GPS based astronomical dawn/dusk back up
Dawn / Dusk Levels	On: 2.5 foot candles (fc) Off: 3.9 foot candles (fc) Configurable over the air

This information is provided on an "as is" basis and does not imply any kind of guarantee or warranty, express or implied. Changes may be made to this information.

RADIO SPECS

Frequency Range	902 to 928 MHz
Supported Data Rates	RF Mesh (N500): 9.6, 19.2, 38.4, 115.2 kbps RF Mesh IP (N550): 50, 150, 200 kbps
Output Power	High Min: 25, Typical: 26, Max: 27 dBm
Receiver Sensitivity	9.6 kbps Min: -114, Typical: -112, Max: -110 dBm 19.2 kbps Min: -112, Typical: -110, Max: -108 dBm 38.4 kbps Min: -110, Typical: -108, Max: -106 dBm 115.2 kbps Min: -102, Typical: -100, Max: -98 dBm 50 kbps Min: -107, Typical: -105, Max: -103 dBm 150 kbps Min: -99, Typical: -97, Max: -95 dBm 200 kbps Min: -98, Typical: -96, Max: -94 dBm

GET IN TOUCH

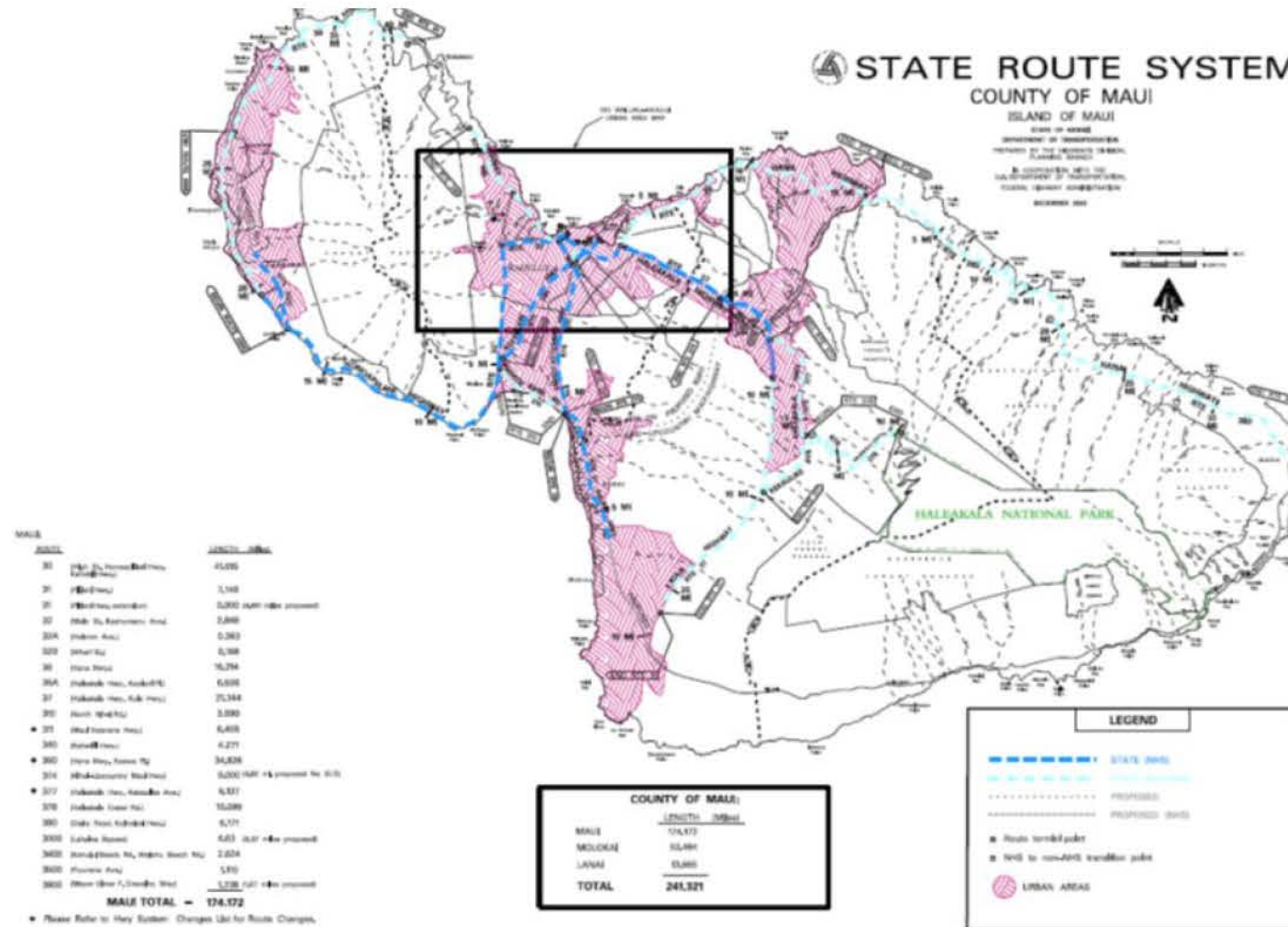
For more information and nationwide warranty terms, visit us at LandisGyr.com or call at 678-258-1500.



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There are streetlights owned and operated on behalf of the State of Hawai‘i at approximately 1,055 locations on the Island of Maui that will not comply with the 2% blue light content restriction.

End

