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Memorandum

TO: Climate Action, Resilience, and Environment Committee

FROM: Keola R. Whittaker, Deputy Corporation Counsel

SUBJECT: Ordinance on Protecting Seabirds from Outdoor Lighting Bill No. 21 CD1 (2022)

For the reasons identified below, our office is unable to approve the subject Bill as to form and legality, as currently constructed. We are working on an alternative version of the Bill which meets the policy goal updating the outdoor lighting ordinance to regulate lighting with high blue light content.

1. The proposed Bill contains conflicting provisions.

The Bill requires that all outdoor lights – both residential and commercial – be "filtered light emitting diode fixtures…" or filtered LED lights. (Section 20.35.060(D)) The ordinance also appears to allow for non-LED lights. (Section 20.25.060(E) (neon) and Section 20.35.090 (low pressure sodium, high pressure sodium, and others)). We request clarification on whether the intent is to ban all non-LED lights.

We are not aware of any state or municipality that requires all outdoor lights to be filtered LED lights. We recommend that the Bill be clarified and conflicting provisions be removed.

2. LED filters are not available on the open market, making compliance difficult to impossible.

As drafted, the Bill would require adding filters to LED lights. However, LED filters are not commonly used and are not available on the open market. Compliance with this requirement would be difficult to impossible.

Requiring the purchase of filters — which we understand is only available from a single vendor — would make it difficult for Maui residents to comply with the ordinance. Moreover, adding a filter to the light may affect the manufacturer's warranties for lights because they would alter the light's intended use. This may

lead to unnecessary legal liabilities for the County, businesses, residents, and anyone who complies with the ordinance.

Furthermore, requiring the use of LED light fixtures that contain high blue light content and then requiring the addition of a filter to reduce blue light is more complex than the simpler solution of requiring use of LEDs with a lower blue light content.

We therefore recommend the Bill remove the requirement to add a filter to all LED lights. We recommend alternative language below.

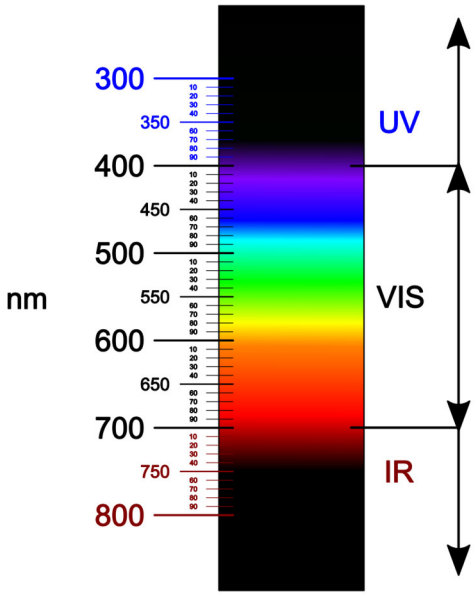
3. The Bill's definition of "blue light" makes it difficult to enforce.

We found no outside support for the definition of "blue light content" contained in the bill. No lightbulb purchased at the store would contain this "blue light content" measurement making it nearly impossible for residents to comply with this requirement.

The bill defines "blue light content" as "the ratio of the amount of energy emitted by the outdoor light fixture between 400 and 500 nm divided by the amount of energy between 400 and 700 nm". The ordinance requires that all outdoor light – including those used in private residential homes – contain "no more than 2 percent of blue light content."

It is our understanding that measuring blue light content using this particular ratio requires equipment and information that is unavailable to most residents. If passed in its current form, residents would not know how to comply with the ordinance and it is not clear how the County would enforce the ordinance.

In addition, this definition of blue light content used in this ordinance has not been adopted by any major agency or organization, and it is not clear why that definition should be used since it would be difficult to measure. According to the U.S. Department of Energy, "blue light" is a term used as shorthand to describe a variety of ranges of wavelengths but there is no consensus definition of blue light; light colors vary along a continuum and there's no single, discrete definition of blue or any other color. Visible light is usually defined as having wavelengths in the range of 400-700 nanometers:



Blue light ranges have been reported by different organizations as 424 nm - 491 nm; 450 nm -500 nm; and 450 nm - 480 nm. The Cégep de Sherbrooke, a Canadian university with a focus on astronomy and atmospheric science, broadly defines the blue range as 405-530 nm and recommends a metric called "% Blue," which sums the radiant power in that range, dividing by the total power emitted between 380 and 780 nm. The definition of "blue light power content" provided in Maui County's current streetlight standards is based on the "International Dark Sky Association's (IDA) definition of blue light content which is the sum of energy between 405-530 nm divided by the sum of energy from 380-730nm times the total power output in watts." It is not clear why the draft bill does not adopt this same definition of "blue light content" and instead uses a measurement without any reference to an outside entity that has adopted such definition.

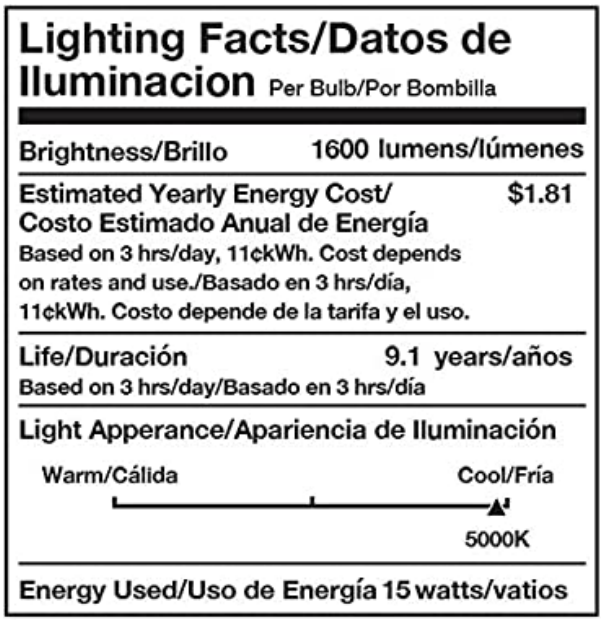
We recommend removing this definition in its entirety and adopting instead the correlated color temperature scale, described below.

4. As an alternative, consider using of the Correlated Color Temperature scale because it used by the lighting industry, and has been used in State of Hawai'i law and the laws of many other jurisdictions.

The lighting industry uses correlated color temperature (CCT), measured in Kelvin to describe the perceived color of a broad-spectrum light source such as LED lights. Color temperatures reaching 5000 Kelvin (K) appear blueish in tone and are typically referred to as "cooler" colors. Kelvins between 2700-3000 (K) are yellowish and are referred to as "warm" colors.

Low CCT generally corresponds to a relatively lower proportion of blue wavelengths in the visible spectrum. As CCT increases, the appearance becomes a cooler blueish-white color.

Many jurisdictions with dark sky laws, including the State of Hawai'i, uses the correlated color temperature measurement. (See, e.g., Section 201-8.5, Hawaii Revised Statutes.). The International Dark-Sky Association estimates that 29 municipalities in the United States use 3000K LEDs are the standard choice for outdoor street lights and that requirement can be expanded to apply to some other outdoor lighting. Our proposed revisions to the bill adopt CCT measurements because that measurement is available on lightbulb packaging and would therefore it would be easier for businesses and residents to comply. The energy use information provided with light blubs indicates the light appearance, in Kelvins, making compliance with the law much easier than using the proposed blue light content measurement.



5. The ordinance has safety implications that should be weighed against its benefits.

According to the U.S. Department of Energy, light with short wavelengths are a fundamental component of the visible spectrum and have safety benefits. "White light sources containing short-wavelength light generally render nighttime colors more similarly to daylight, aiding in identification (e.g., of vehicles, clothing, people) and improving contrast between an object (e.g., road debris) and its surroundings. Short wavelengths are also acknowledged as providing enhanced peripheral vision at the low levels of illuminance typically associated with street lighting. Researchers have found improvements in detection threshold and reaction times in simulated outdoor viewing tasks under light sources with broader spectra and better color rendering properties; these improvements occurred when target light levels were in the mesopic vision range (i.e., at typical street lighting levels)."

It stands to reason that improved visual performance can bring associated safety benefits. Nevertheless, there may be some areas where the benefits of omitting the short wavelengths outweigh the disadvantages. For example, in areas harboring certain endangered species that have been shown to be particularly affected by short wavelengths, regulations on blue light may be net beneficial.

The Committee should consider requesting an analysis of the safety benefits of full-spectrum LED lights to determine what exceptions should be added or included in the Bill.

6. Exceptions to the ordinance should not be eliminated.

The proposed ordinance eliminates a number of essential exceptions already contained in the law. We recommend keeping most or all of those exceptions, especially those detailed below.

The Bill removes the following exemption: "Lighting on federal and State properties and on areas under the jurisdiction of the federal and State government, including, but not limited to Hawaiian home lands, State conservation districts, airports, and harbors." At minimum, the Bill should retain an exemption for airports because regulation of anything related to air safety is preempted by federal law. 8A Am Jur 2d, Aviation § 25 (collecting cases and stating that the federal regulation of airspace management and air safety is so pervasive that preemption is inferred).

The Bill also removes an exemption for temporary lighting used for public safety, road construction or emergency repair. Removing this exemption could have significant safety consequences and may prevent nighttime road

construction or the ability to respond to emergencies. As explained above, light containing short wavelengths provides greater visibility at night and may be necessary on a temporary basis.

We recommend that the Committee consult with the police department, emergency management, and other County departments that may have to respond to emergencies at night before removing this common exemption to outdoor lighting ordinances.

7. The height restrictions are too vague to be enforceable.

Supreme Court precedent recognizes two independent grounds upon which an ordinance's language can be so vague as to deny due process of law. First, a law violates due process "if it fails to provide people of ordinary intelligence a reasonable opportunity to understand what conduct it prohibits." *Hill v. Colorado*, 530 U.S. 703, 732 (2000). Individuals should receive fair notice of what behavior is prohibited. *Smith v. Goguen*, 415 U.S. 566, 572 (1974) ("The doctrine incorporates notions of fair notice or warning."). Second, a law is unconstitutionally vague "if it authorizes or even encourages arbitrary and discriminatory enforcement." *Hill*, 530 U.S. at 732, 120 S.Ct. 2480. Statutes must "provide explicit standards for those who apply" them to avoid "resolution on an ad hoc and subjective basis, with the attendant dangers of arbitrary and discriminatory application." *Grayned v. City of Rockford*, 408 U.S. 104, 108–09 (1972).

The height restrictions contained in Section 20.35.060(E)(3) of the Bill may be unconstitutionally vague for two reasons. First, it does not provide adequate notice. The ordinance requires that light fixtures be mounted "as low as possible with existing lighting and safety standards to limit light trespass and reflection of ground surfaces" but does not reference any specific lighting or safety standards. It is not clear what lighting standards or safety standards should apply and therefore the ordinance does not convey a sufficiently definite warning as to the proscribed conduct when measured by common understandings and practices. Consequently, the Bill not only fails to give specific notice of how an applicant should design light fixtures so that the proposed fixture complies with that restriction, but it also fails to provide an objective standard that the Public Works Department can apply in determining the fixture's compliance once a plan has been submitted and thereafter when an approved project has been built.

Second, the Bill fails to provide explicit standards for those who apply it which could lead to arbitrary enforcement. Since the Bill does not reference any objective safety or lighting standards, it does not provide the Public Works Department with sufficient guidance.

We recommend that the Bill be amended to allow the Director of the Public Works Department to develop administrative rules that sets height restrictions on free-standing luminare and that such rules balance safety concerns and lighting requirements with the goal of reducing light trespass. Those administrative rules, in turn, would provide specific height restrictions providing clear standards to those who need to determine compliance with the law and those enforcing the law.

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For the reasons detailed above, we are unable to sign the Bill in its current form. We are working on alternative legislation that achieves the drafter's aims of reducing blue light content in outdoor lights while resolving these legal concerns.