

March 8, 2023

BY EMAIL

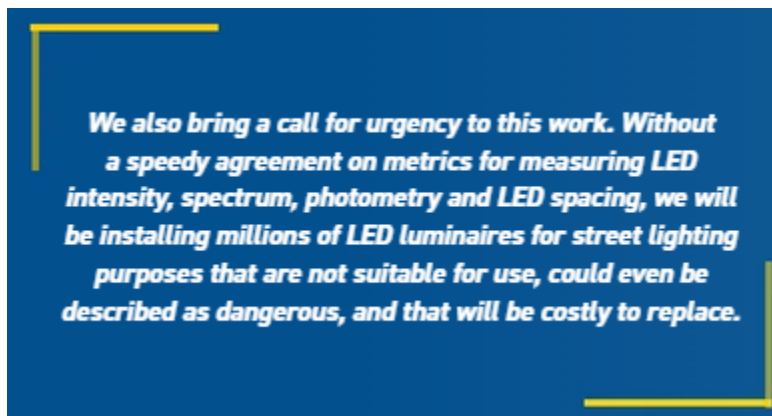
Mark Washington, City Manager
Grand Rapids, Michigan
manager@grcity.us

Re: LED Streetlight Pause

Dear Mark Washington,

The Soft Lights Foundation advocates for the protection of the natural night resource and for the protection of citizens from the harms of Light Emitting Diode visible radiation. We are writing to you now to alert your office of the need to stop the LED streetlight conversion project in Grand Rapids due to fundamental safety and federal legal issues.

In December 2021, Cree Lighting published a white paper that alerts government officials to the fact that *"None of the existing metrics [for LED street lighting] takes into account the non-uniform emitting surface of a LED luminaire."*¹ Cree went on to say that LED streetlights are dangerous. Thus, the installation of LED streetlights poses a liability for Grand Rapids.



In March 2022, the US Department of Energy signed a Memorandum of Understanding with the Illuminating Engineering Society to develop *"needed metrics and standards for solid-state lighting (SSL)*

¹ <https://online.flippingbook.com/view/702884488/>

*technology.*² The IES standard for street lighting IES RP-8-18 is not applicable to LED street lights, and thus cannot be used by Grand Rapids to ensure safe, uniform illumination patterns for LED street lights.

LEDs emit an unnatural type of visible radiation with spatial, spectral, and temporal properties that are known to be hazardous to human health.^{3,4} The Food and Drug Administration is the sole agency with regulatory authority for LED products. This authority was vested in the FDA by the 1968 Radiation Control for Health and Safety Act. No other federal agency has regulatory authority for LED products, including LED streetlights. The FDA has confirmed that they have this regulatory authority.⁵ To date, the FDA has not published the necessary comfort, health, or safety standards for any LED product and has not vetted LED streetlights. Thus, Grand Rapids has no regulatory authority to install or operate LED streetlights, which creates a significant liability and economic risk for Grand Rapids due to the known hazards of LED visible radiation.

The Americans with Disabilities Act prohibits discrimination and requires equal access to city services. LED streetlights create discriminatory conditions for the class of individuals who cannot neurologically tolerate flat surface, directed energy LED visible radiation. LED street lights have been documented to trigger photosensitive seizures, debilitating migraines, anxiety, nausea, and numerous other adverse neurological reactions.⁶ Because the FDA has not vetted LED streetlights and their impacts on the disability community, there are no existing federal guidelines or requirements that Grand Rapids can refer to. Since LED streetlights have been proven to be dangerous and discriminatory for certain individuals, Grand Rapids is required by the ADA to remove the barriers to access created by the LED streetlights. The undue burden and reasonable accommodation claim typically used by cities cannot be used in this situation because the installation of LED streetlights is a modification of an existing program, and this modification did not receive approval from the FDA.

In addition to the major legal obstacles discussed above, recent research proves that the switch to LED lighting has drastically increased light pollution due to the directed energy nature of the LED light source, and due to the use of high energy blue wavelength light.⁷ Due to the rollout of LEDs, light pollution is now increasing at a rate of 10% per year, up from the previous 2% per year. Artificial light at night is a major contributor to risk of human diseases such as prostate cancer, breast cancer, mood disorders, and premature births.⁸

There are multiple errors and issues in the Grand Rapids document titled, City of Grand Rapids LED color temperature selection process fact sheet that must be addressed.

- a) Page 1: The evaluation of color temperature was done without consulting with health professionals. Health professionals would explain to Grand Rapids staff that blue wavelength light is a significant health hazard and that switching from 2200 Kelvin High-

² <https://www.energy.gov/eere/ssl/us-department-energy-and-illuminating-engineering-society-partner-advance-industry>

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9420367/>

⁴ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7830240/>

⁵ <https://content.govdelivery.com/accounts/USDHSCBP/bulletins/1a00f8a>

⁶ <http://www.softlights.org/stories/>

⁷ <https://www.science.org/doi/10.1126/science.abq7781>

⁸ <http://www.softlights.org/human-health/>

Pressure Sodium to 3000K or 4000K LED will greatly increase the amount of hazardous blue wavelength light which is unsafe for residents.

- b) Page 2 Quote: “1 foot-candle of luminance”. This is an incorrect and invalid statement. Foot-candles is an outdated unit of measure for the metric “illuminance” which is the amount of light falling onto a surface. “Luminance”, on the other hand, is the density of the light emitted by or reflected from a flat surface and has the units of measure of candela per square meter, often referred to a “nits”.

LEDs emit a directed energy beam that has little dispersion and non-uniform spread, so “illuminance” cannot be used to measure LED light. An LED street light will likely emit 200,000+ candela per square meter of peak luminance, exceeding the maximum human threshold of 50,000 candela per square meter, and far exceeding maximum human comfort level of 300 candela per square meter.

The use of the graphic on Page 2 and the implications of greater stopping distance cannot be used for flat surface LED streetlights and a liability is created by relying on this invalid information.

- c) Page 3: The image caption states unequivocally, “In the absence of an established metric for SPD [Spectral Power Distribution]...” This statement supports the notion that LED street lights have not been vetted and no metrics for LED visible radiation have been established and Grand Rapids has no standards or regulations to follow. This is an unsafe situation.

The images do not show “crisp visibility” with higher color temperatures. Instead, the images show the harsh light emitted by 4000K LED street lights which create dangerous glare that exhausts the eyes due to the contrast with the surrounding darkness. As the driver enters and exits the LED light beam, the pupils will dilate and constrict, which is an unwanted and unsafe condition. The 2200K amber street light has far less high energy blue wavelength light, and thus has less glare, and is safer for drivers and pedestrians.

- d) Page 4: The luminous efficacy of Low-Pressure Sodium is nearly 200 lumens per watt, which is close to twice the efficacy of LED streetlights but without the hazardous blue wavelength, and without the spatially non-uniform directed energy beam of LED streetlights. LPS is the safest, most cost-effective light source for street lighting.

The chart shows 118-Watts of power consumption for approximately 13,000 lumens, even for these LED street lights. This is an excessively high amount of power and lumens. This type of high power, high intensity light is dangerous and puts public health and safety at risk. For safety, any artificial light pollution added to the environment must be kept at a minimum, giving just enough light to see, but never more than that because of glare and contrast issues, and because of the significant adverse health effects caused by light pollution.

As per the chart, the luminous efficacy difference between 2700K versus 5000K is trivial and would be a non-factor for decision making. To make a 50% savings, the lumen output could be cut in half, and switching to LPS would double the savings again. The use of LED street lights compared to LPS, or even to HPS, on an energy consumption basis cannot be justified.

- e) Page 4, Inventory Standardization: Selecting 4000K LED streetlights for all locations to reduce inventory costs does not account for the significant health risks and excessive glare caused by using 4000K LED streetlights, and does not include the costs for health care and liability costs associated with high blue content LED street lights. Stocking HPS or LPS streetlights is the proper way to standardize inventory, and even though the utility companies will complain that HPS or LPS are no longer available, that is a conundrum of their own making in their quest for higher profits. If Grand Rapids specifies HPS or LPS, the utility will certainly be able to provide the sodium street light.
- f) Page 5: These photos are vivid reminders of the light pollution and excessive glare created by 4000K CCT and 200,000+ peak luminance LED street lights, versus the soft, gentle, amber, uniform illumination provided by HPS. Grand Rapids must not repeat the same error in selection of 4000K LED street lights as made by Kentwood, Holland, Detroit, and other cities.
- g) Pages 6 and 7: It appears that the survey does not include references to HPS or LPS street lights, so the citizens were only allowed to give input on two bad choices. This is an unacceptable method for performing a survey intended to provide usable results. In addition, there is no indication that the viewers involved in the survey were told about the significant health impacts of LED street lights. Would people have selected any of these street lights knowing that they greatly increase the risk of thyroid and breast cancer, mood disorders, and premature births?
- h) Page 8: The American Medical Association published an important study in 2016 about the hazards of blue wavelength light. The AMA, at that time, was the first US organization to alert the public to the serious health effects of blue wavelength light. The AMA recommended a MAXIMUM of 3000K at that time. Since the release of that 2016 report, hundreds of additional studies have been published, not only confirming that blue wavelength light is hazardous, but far more hazardous than even the AMA realized in 2016.⁹

Despite this information, Grand Rapids states, “Based on reviewing the various publications, it doesn’t appear there is a significant difference between 3000K and 4000K streetlighting LED’s.” This conclusion is unjustifiable. Today, the maximum recommend color temperature by the United Nations is 2200K. Dr. Mario Motta, the lead author of the 2016 AMA study, was on the United Nations panel that selected 2200K as the maximum safe color temperature.

The decision by Grand Rapids to select 4000K is unjustifiable from a health and safety perspective.

- i) Page 8: The case study of Lake Drive in East Town is not a valid case study because there are no available photometric standards and no photometric software for LED streetlights that correctly account for the spatial non-uniformity of LED visible radiation. As noted earlier in this document, Cree Lighting has notified all government officials that there are no metrics that account for LED luminance, and because of this, LED street lights are dangerous.

⁹ <http://www.softlights.org/human-health/>

- j) Page 9: Quote: “The 4000K is very similar to moonlight...” This is an exceedingly misleading statement that misinforms the public. The moon is a surface which reflects natural sunlight and is very far away. The moon goes through phases where there are periods of almost no reflected light, half reflected light, and fully reflected light. These cycles are of critical importance to biological functioning. An additional cycle is the location of the moon through the night. There is a single moon for planet earth and adding additional “moons” every 100 feet along roadways at vertical distances of 10 to 15 feet is a catastrophic interference with natural processes.

An LED street light will place 200,000+ candela per square meter peak luminance onto the roadway and into citizen’s eyes. The full moon provides about 0.1 lux of illumination, whereas an LED streetlight will be 100 times that bright. This is dangerously bright light, and yet Grand Rapids intends on installing these dangerous lights about every 100 feet.

The conclusion states that LED street lights will make residents “feel safer”, but the research shows clearly that safety is not improved by street lighting, and property crimes increase due to street lighting.¹⁰ The conclusion also ignores the significant and serious adverse health impacts of LED street lighting. Thus, since LED street lights do not improve safety, but do harm public health, LED street lights must not be used.

In our experience, cities are most sensitive to cost issues and liability issues. To avoid additional expense and significant future liability, we urge Grand Rapids to stop the current LED streetlight conversion until the city receives federal regulatory approval from the FDA. The Soft Lights Foundation petitioned the FDA to regulate LED products on June 12, 2022, and this petition is currently under review.¹¹ Once the FDA publishes the necessary regulations for LED street lights, Grand Rapids might then be able to restart the conversion in a legal, safe, nondiscriminatory manner. However, it is also possible that the FDA will conclude that LED visible radiation is too hazardous to be used for street lighting and that all existing LED street lights would need to be removed to protect public comfort, health, and safety.

Protecting the natural night as a resource is a critical function of city government. We urge Grand Rapids to re-assess this entire situation with the goal of protecting starlight, moonlight, and human and ecosystem health.

Sincerely,

/s/ Mark Baker

President

Soft Lights Foundation

mbaker@softlights.org

¹⁰ <http://www.softlights.org/crime-and-safety/>

¹¹ <https://www.regulations.gov/document/FDA-2022-P-1151-0001>