Soft Lights Foundation

9450 SW Gemini Drive
PMB 44671
Beaverton, OR 97008
www.softlights.org

August 26, 2023

BY EMAIL

Sachin Pavithran, Executive Director
Access Board
pavithran@access-board.gov

Re: Petition to Amend Rule ATBCB 2011-0004 To Remove RRFBs

Dear Sachin Pavithran,

Pursuant to 5 USC 553(e) Rulemaking, the Soft Lights Foundation hereby submits this petition requesting that the Access Board amend Rule ARBCB 2011-0004 and eliminate the recommendation and promotion of Rectangular Rapid Flashing Beacons because RRFBs use unregulated and discriminatory Light Emitting Diodes which deny equal access for individuals with disabilities to programs, services, and activities covered under Title I, Title II, and Title III of the Americans with Disabilities Act. The petition is contained in the following pages.

Sincerely,

Mark Baker

Mark Baker
President
Soft Lights Foundation
mbaker@softlights.org

Petition To Amend Rule ARBCB 2011-0004 and Eliminate References to Rectangular Rapid Flashing Beacons

I. Introduction

On August 8, 2023, the Access Board published Final Rule ARBCB 2011-0004 - Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way.[1] This rule was initiated in 1999 via the creation of an advisory committee on public rights-of-way. It took the Access Board 24 years to publish this Final Rule.

In 2013, the Access Board published Draft Rules which mentioned the used of a "flashing yellow signal" such as at pedestrian crossings.[2] However, the 2023 Final Rule promotes and recommends the use of Rectangular Rapid Flashing Beacons which were not mentioned in the 2013 Draft Rules.[3]

Rectangular Rapid Flashing Beacons (RRFBs) are known to cause seizures, migraines, panic attacks, eye pain, eye injury, impaired vision, and decreased cognitive functioning. The use of RRFBs creates discriminatory barriers that prevent individuals with neurological disabilities such as epilepsy, migraines, autism and PTSD from accessing the pedestrian rights-of-way safely and without harm. In addition, the Food and Drug Administration has never vetted or approved RRFBs. Thus, the mention of RRFBs never should have been included in Final Rule ARBCB 2011-0004.

II. Regulation of RRFBs

In 1968, Congress passed the Radiation Control for Health and Safety Act. This law is codified in 21 USC Chapter 9, Subchapter V, Part C – Electronic Product Radiation Control (21 U.S.C. 360hh-360ss). The law directs the Secretary of Health and Human Services to develop and publish performance standards for electronic products and to collaborate with other federal agencies in the development of these standards.[4]

Health and Human Services, Food and Drug Administration, and the Access Board have not complied with this statute and have not coordinated to develop and publish performance and accessibility standards for the visible radiation emitted by products using Light Emitting Diodes. There are no published performance standards for LED General Service Lamps, LED streetlights, LED strobe lights, LED lights on signs, LED vehicle headlights, and other types of LED lighting to ensure equal access for those who are neurologically intolerant of LED visible radiation.

[1] https://www.federalregister.gov/documents/2023/08/08/2023-16149/accessibility-guidelines-for-pedestrian-facilities-in-the-public-right-of-way
[2] https://www.access-board.gov/prowag/proposed/chapter-r3-technical-requirements/
[3] https://www.access-board.gov/prowag/complete.html#r306-crosswalks
[4] https://www.law.cornell.edu/uscode/text/21/360ii

The performance standards that are needed for LED devices include restrictions for peak luminance, spatial uniformity, inverse square law dispersion, spectral power distribution, square wave flicker, pulse width modulation, flash characteristics, total exposure, and cumulative exposure.

On June 26, 2022, Mark Baker, MarieAnn Cherry, and Heidi O'Leary submitted a complaint to the Federal Highway Administration to repeal the RRFB Interim Rule because RRFBs violate civil rights laws and create discriminatory barriers.[5] On October 19, 2022, the FHWA denied this request.[6] In the denial letter, FHWA Civil Rights Department ADA Team Leader Sharon Field wrote, "*The allegations you have raised about the health impacts of RRFBs raise complex issues related to the regulation of all Light Emitting Diode (LED) lights, not just those used in RRFBs, that extend beyond FHWA's authority.*"

On November 23, 2022, the Soft Lights Foundation submitted a petition to the FHWA to repeal the RRFB Interim Approval.[7] On December 7, 2022, FHWA Agency Counsel William Winne responded to the Soft Lights Foundation that this petition had been added to the MUTCD Notice of Proposed Amendments FHWA-2020-0001-17270 and will be considered as part of the MUTCD rule making process.

On June 5, 2023, the Soft Lights Foundation petitioned the Access Board to comply with 21 U.S.C. 360ii and liaise with the FDA to develop and publish performance standards for LED products, including RRFBs.[8] On August 21, 2023, the Access Board denied this petition.[9] In the denial letter, Access Board General Counsel Christopher Kuczynski wrote, "*The Access Board must deny this petition as the Board has no authority under 21 U.S.C. §360ii either to initiate rulemaking or to require the FDA, were they to do so, to coordinate with the Access Board.*"

Upon review of these regulatory actions and responses from various federal agencies, its is clear that neither the Access Board nor the FHWA have the power to authorize or recommend the use of RRFBs because the ONLY agency with Congressional authority to approve and regulate RRFBs is the Food and Drug Administration. No company has complied with the Administrative Procedure Act of 1946 and submitted a petition to the FDA for approval to manufacture and sell an RRFB device and the FDA has not vetted or approved any RRFB device and has not declared RRFBs to be safe. Thus, the Access Board's promotion of the RRFBs violates federal regulatory requirements and federal law.

III. Cases of Discrimination

Because LED products have been released into the environment without proper vetting and regulation, there have already been numerous documented cases of discrimination caused by RRFBs. Here are a few documented cases.

A. Individual One – Epilepsy

[5] https://www.softlights.org/wp-content/uploads/2022/06/FHWA-RRFB-Filing_Redacted.pdf
[6] https://www.softlights.org/wp-content/uploads/2022/10/Baker-CL-2022-0375.pdf
[7] https://www.softlights.org/wp-content/uploads/2023/08/Petition-to-Repeal-RRFB.pdf
[8] https://www.softlights.org/wp-content/uploads/2023/06/Access-Board-Petition-to-Collaborate-with-FDA-1.pdf
[9] https://www.softlights.org/wp-content/uploads/2023/08/Response-to-Petition-for-Rulemaking_8-21-23.pdf

Individual One was a passenger in a vehicle in Williamstown, Massachusetts when Individual One was exposed to LED strobe lights from a Rectangular Rapid Flashing Beacon traffic control device. Individual One suffered a grand mal seizure and subsequent concussion from hitting Individual One's head against the window. The concussion resulted in slurred speech and impaired cognitive functioning which lasted for several months. RRFBs create a discriminatory barrier which prevents equal access. Williamstown was notified of the incident, but declined to remove the RRFB, in violation of 42 USC Chapter 126.

B. Individual Two – Autism Spectrum Disorder

The city of Ashland, Oregon has installed RRFB LED strobe light traffic control devices. When subjected to the LED strobe lights from the RRFBs, Individual Two becomes debilitated, suffering panic attacks. Individual Two requested accommodation from the city but was denied on February 14, 2023.[10]

C. Individual Three –Epilepsy

Individual Six was exposed to LED strobe lights from an RRFB in Little Canada, Minnesota which caused Individual Six to suffer nausea, loss of balance, and vomiting. Individual Six requested accommodation from Little Canada but was denied. Individual Six filed case Q# 107420 with the Minnesota Department of Human Rights. On June 15, 2023, the MDHR made a finding involving high-luminance strobing lights on RRFBs and determined that the city of Little Canada discriminated against Individual Three.[11]

IV. Characteristics of LED Visible Radiation

The characteristics of LED visible radiation that require performance standards includes:

- **Peak luminance** – A maximum luminance value in candela per square meter must be set for each LED product to ensure that the light is safe and comfortable for all individuals, especially those who are most sensitive.
- **Inverse Square Law Dispersion** – Since LEDs emit light from a flat surface, the light does not disperse following an inverse square law, by definition. Restrictions must be created to ensure that the light gently and safely disperses.
- **Spatial Uniformity** – The beam of light emitted by an LED is mathematically described as a Lambertian, meaning that the light energy within the beam is not homogeneous. LEDs create a non-uniform illumination pattern that can lead to unsafe conditions and neurological harm. Regulations must ensure uniform illumination from devices that are designed to illuminate a volume of space.

[10] https://www.softlights.org/wp-content/uploads/2023/02/Baker-CoA-Accommodations-Response-Letter_02.14.23_redacted.pdf
[11] https://www.softlights.org/wp-content/uploads/2023/06/74059-6-15-2023-ECP-Memorandum-.pdf

- **Spectral Power Distribution** – LEDs frequently contain a large spike of hazardous blue wavelength light and piecewise spectral power distribution that can cause serious ocular damage which can be permanent. LED products with a high Correlated Color Temperature can cause blinding glare and eye pain. Cumulative exposure to blue wavelength light will likely result in eye cell death, leading to diseases such as macular degeneration. Restrictions must be set to ensure that the spectral power distribution is harmless.
- **Square Wave Flicker** – An LED is a digital device, and the LED requires electronics to cause the LED to emit visible radiation. The square wave flicker can be a health hazard for all individuals, with reactions ranging from mild annoyance to nausea, to migraine, and to seizure. Flicker rates as high as 10,000 Hertz can be neurologically detected. Thus, as per 21 USC Section 360ii, the temporal characteristics of LED visible radiation must be restricted to minimize harm for all individuals, especially those who are most sensitive.
- **Flash Characteristics** – For flashing and strobing LEDs, the square wave on/off is neurologically hazardous because it can change too quickly, and the nerves and brain do not have the necessary capacity to process this type of energy. At a minimum, LED strobe lights are a dangerous distraction, but they also can violate civil rights and trigger agitation, anger, debilitating seizures, and life-threatening seizures. Restrictions must be set on LED strobe lights to ensure that the LED strobe light does not trigger a seizure, migraine, or panic attack, or decrease vision or impair cognitive abilities.
- **Total Visible Radiation** – As the quantity of products in each location emitting LED visible radiation increases, the environment because less safe. Limits must be set on total exposure to LED visible radiation in a location such as a grocery store or at the post office or on a street.
- **Cumulative Radiation Exposure** – The impacts of repeated exposure to LED visible radiation over time can accumulate. Limits must be set for daily and lifetime exposure to LED radiation.

V. Impacts of Flashing Lights on Individuals With Disabilities

As mentioned previously, the 2013 draft for Rule ARBCB 2011-0004 made no mention of Rapid Rectangular Flashing Beacons. It was only during the commenting period from 2013 to 2023 that RRFBs were added to the text of the Final Rule. In the Rule, the Access Board refers to the FHWA report on RRFBs[12] However, the validity of this report is rebutted by the Soft Lights Foundation petition to repeal the Interim Approval of RRFBs.[13] The FHWA made no effort to collaborate with the Access Board to ensure that RRFBs do not trigger seizures, migraines, or panic attacks. No studies were performed to measure the physical, neurological, or psychological reactions to RRFBs by individuals with disabilities.

The US Access Board has published guidelines for the use of flashing lights. While these guidelines are insufficient to protect against the intensity of LED flashing lights, these guidelines are

[12] https://safety.fhwa.dot.gov/intersection/roundabouts/fhwasa15069.pdf
[13] https://www.softlights.org/wp-content/uploads/2023/08/Petition-to-Repeal-RRFB.pdf

instructive when considering the use of LED flashing lights. The Passenger Vessels Advisory Committee report on passenger vessels in section 702.3.1.3 contains an advisory about flashing lights:

> *Advisory 702.3.1.3 - Flash rates that exceed five flashes per second may be disturbing to persons with a photosensitivity, particularly those with certain forms of epilepsy. Multiple, unsynchronized visual signals within a single space may produce a composite flash rate that could trigger a photoconvulsive response in such persons. Therefore, installations that may produce a composite rate in excess of 5 Hz should be avoided by decreasing the number of fixtures and raising the intensity of lamps they contain, by decreasing the flash rate of multiple lamps, or by synchronizing the flash rates of multiple fixtures.*[14]

The Web Accessibility Initiative by the World Wide Web Consortium, which is supported by the Access Board, states, "*The intent of this Success Criterion is to allow users to access the full content of a site without inducing seizures due to photosensitivity.*" and that the Success Criterion is defined as "*Web pages do not contain anything that flashes more than three times in any one second period, or the flash is below the general flash and red flash thresholds.*"

A February 2022 study sponsored by the Epilepsy Foundation shows that a flashing light brighter than 20 candela per square meter is likely to cause an epileptic seizure.[15] RRFBs are likely in excess of 100,000 candela per square meter.

When combined, the recommendations from the Access Board, W3C, and the Epilepsy Foundation study, the restrictions for flashing light in public spaces must be a cumulative total of less than 3 flashes per second and a peak luminance of less the 20 candela per square meter for any light source. A single RRFB exceeds these recommendations. Multiple RRFBs in proximity are even more dangerous. RRFBs must not be used because their use violates 42 U.S.C. Chapter 126.

VI. Requested Action

Petitioner requests that Access Board amend Final Rule ARBCB 2011-0004 to be consistent with its own guidelines on flashing lights and not promote, recommend, authorize, or mention the use of Rapid Rectangular Flashing Beacons because they are hazardous, they are not FDA approved, the Access Board has no authority to recommend such devices, and because they create the very discriminatory barriers that ARBCB 2011-0004 was meant to eliminate. Petitioner requests that any mention of flashing or strobing lights use qualifiers such as "FDA-approved flashing lights" or "Epilepsy and Autism-safe flashing lights."

[14] https://www.access-board.gov/advisory-committee-reports/passenger-vessels/pvaac-report-ch04/
[15] https://onlinelibrary.wiley.com/doi/10.1111/epi.17175