

Date: 2020-09-30

Kera Lagios, LEED AP, Assoc. IALD
2900 Bayview Drive
Alameda, CA 94501

To: San Francisco Planning

Re:

Response to:

“Categorical Exemption Appeal, 2001 37th Avenue/Saint Ignatius Stadium Lighting Project”
and

“SI Response letter 2020 09 25 Final SI BOS Ltr”

Members of my family have lived in San Francisco for generations, some of whom fought the fires in 1906, and I also have relatives that are alumni of SI. My evaluation is impartial, but recognizes the needs of both the school and the residents. It’s disappointing that the school which claims it is a “good neighbor” and the Planning Department of a progressive city like San Francisco, appears not to have read or considered my analysis in seriousness and appears not to care much for the concerns of its residents. SI’s response seems to show they have not read my analysis in any detail as several of the statements in their response avoid addressing the findings and recommendations, or mischaracterize or selectively pick from my analysis. I hope the following response helps to clarify my analysis and recommendation for improvements to the project which will, actually, improve relations with the neighbors rather than simply dismissing them.

Response to:

Categorical Exemption Appeal, 2001 37th Avenue/Saint Ignatius Stadium Lighting Project

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“The proposed lighting design uses a light structure system equipped with total light control for LED fixtures designed and manufactured by Musco Lighting Systems, which requires 36 1,500-watt LED fixtures to achieve the recommended 50 foot-candle (fc) average. The total light control for LED fixtures are designed to concentrate the light on the field area with minimal light emitted outside the targeted areas. The lighting system is capable of being switched to a “dimmed” setting. This feature would allow the lights to be turned down during events not requiring full lighting.”

K. Lagios response:

- According to page 2 of the Planning Response, “The attendance for football games at the stadium typically range between 500 to 1,500 spectators. For one to three times each year, attendance for football games approach 1,500 spectators.”

- As noted in my analysis, the IES RP-6-15 “Sports and Recreational Area Lighting” recommends an **average of 30fc for High school athletics with less than 2,000 spectators.**
- **On this basis alone, the design should be revised to meet the lower light level.**

Regarding the dimming, in no place in the materials or presentation by the school, which claims to be a “good neighbor”, was a schedule for dimming provided or was there any discussion that the maximum light output would only be used for certain games.

In fact, I think it would be the **right solution to dim the lights during uses where spectators are not present to 20fc average**, in addition to reducing the maximum guaranteed light output to 30fc, instead of 50fc as recommended by this class of play by the IES.

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The average spillover immediately adjacent to the light poles (outside of the stadium) would be approximately 14 fc.

K. Lagios response:

14fc at night is extremely high. For reference, most street lighting attains between 1fc and 3fc. With all due respect, the response does not cite any standards or reference points for the acceptability of the light levels cited.

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In addition, glare impacts on adjacent residents would also be considered limited. The glare from the proposed lighting would be approximately 5,000 candela at the residents adjacent to the stadium, which is not substantial.

K. Lagios response:

The IES Manual on Sports and Recreational Area Lighting **references the CIE 150: 2003, which was updated in 2017 (see Section 2.3 Glare in Proposed Design).** The bulk of the analysis in Section 2.3, evaluates glare, exactly on this metric, CIE 150: 2017. **By CIE 150:2017, the limits for the project in Zone E3, are between 845cd and 1245cd (see Table 5). With the values of approximately 5,000 candelas, the project greatly exceeds these levels.**

Response to:

SI Response letter 2020 09 25 Final SI BOS Ltr

p.4 “SINA and its supporters have made it clear that they are not looking for compromise – they insist that no lights be permitted on the field whatsoever.”

K. Lagios response:

This is not my recommendation as the lighting expert. I clearly stated in my evaluation that the project and the relationship with the residential community would benefit from a compromise in which light levels were reduced and further study was done to see if there are other opportunities for ameliorations.

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“The lights being proposed are state of the art. They are designed with shields that direct the light to the field, and only to the field. On the next page is a photograph from another high school football field that Musco Lighting, our contractor, updated. It shows how the lights are targeted on the field and do not spill over to neighboring areas.”

K. Lagios response:

No one is questioning that Musco’s technology is an improvement on older technologies, however, **accepting the technology at face value is not a smart or acceptable approach**, and this does not mean that additional provisions cannot be added to reduce the impacts.

In addition, the **image on page 6 is somewhat misleading**. While it shows Musco’s “TLC LED” at 7 candela, there is no associated information showing even the model number of this fixture, the wattage or even the number of fixtures which would be installed for comparison with the St. Ignatius project. We know from Musco’s own studies that the lights do not produce a mere 7 candela of glare as a whole.

Also, note, the photograph on page 5, was taken from above, not at the level where someone would be standing, viewing the field. In general, non-HDR (high dynamic range) photographs cannot be used to evaluate lighting since they do not take into account human visual adaptation, all view positions and the dynamic range of the eye.

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“For example, Ms. Lagios shifts from one type of lighting standard to another to suit her preconceived outcomes.”

K. Lagios response:

This is incorrect. In all cases, **metrics were based on Musco’s photometric studies unless they proved insufficient in some way**. The BUG rating and LEED metrics were included **after** a lengthy and detailed discussion of glare based on Musco’s proposed metrics, and never formed the main arguments of the evaluation.

The BUG rating was clearly stated in a section “Other glare metrics”, added as an alternate and commonly used metric (Title 24, LEED, etc.). Also incorrect in SI’s response is that BUG ratings are only for non-aimable fixtures. In fact, BUG ratings can be derived for aimed fixtures with the

use of software such as Lighting Analysts Photometric Toolbox, something I have done on many projects.

SI clearly has not done enough research to understand the metric, and it brings into question the validity of their contestation.

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“She asserts that the lights may impact circadian health, but she improperly focuses on only one characteristic of lights that could cause a circadian response: color temperature of the light source. She cites no studies, and the school’s lighting experts are aware of none, that show exposure to sports lighting has any impact on circadian health.”

K. Lagios response:

This is patently false. In 2 places in the analysis, I note that circadian health is affected by multiple factors, including “**quantity, spectrum, timing and duration**” (see sections 1.1.1 and 2.7). I also cite the IES’s report TM-18-18, IES Light and Human Health Committee, *Light and Human Health: An Overview of the Impact of Optical Radiation on Visual, Circadian, Neuroendocrine and Neurobehavioral Responses*, TM-18-18. New York: Illuminating Engineering Society. Furthermore, I couch the impacts on circadian health appropriately in section 1.1.1.

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“she gives data not from the property lines of those homes, but from the property line of the school – across the street from homes.”

K. Lagios response:

Pursuant to the IES, light levels for light trespass are measured at the **property line of the property where the lighting is installed**, not at the property line of the homes. Again, this is something SI apparently does not know and therefore weakens their critique.

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“the IES Manual on Sports and Recreational Area Lighting, and the Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations defines limitations for light source intensity as not to exceed 7,500 candelas for rural areas, 10,000 candelas for suburban areas, and 25,000 candelas for urban areas. The value of 4,748 candelas for the school’s lights at the property line of neighboring homes is dramatically below the threshold for urban areas – even well below the threshold for rural areas.”

K. Lagios response:

The IES Manual on Sports and Recreational Area Lighting **references the CIE 150: 2003, which was updated in 2017.** The bulk of the analysis in Section 2.3, evaluates glare, exactly

on this metric, CIE 150: 2017. **By CIE 150:2017, the limits for the project in Zone E3, are between 845cd and 1245cd (see Section 2.3 and Table 5). By the values of 4,748 candelas which SI's response notes, the project greatly exceeds these levels.**

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"Also, Ms. Lagios uses candela calculations with reference points at 12 feet above grade, but then uses data based on calculations at points three feet above grade. This apples and oranges comparison does not accurately show the impact on neighboring homes. The lights are designed such that more light and glare would be evident at three feet than at 12 feet.

K. Lagios response:

This is a ridiculous statement since **lighting metrics are always taken at different heights and different orientations** based on the viewpoint or the task at hand. Even in Musco's own analysis, light levels are measured at 0'-0" above grade, 3'-0" above grade and on the horizontal and vertical plane. Again, SI's response does not show possession of knowledge to refute the analysis accurately.

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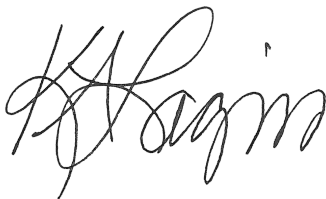
"Importantly, Ms. Lagios ignores one critical fact about the lights: they can, and often will, be dimmed."

K. Lagios response:

To date, no information has been presented that indicates that the lighting would be dimmed except for half an hour after practice or games end in order to allow people to leave and equipment to be put away. In no place in the materials or presentation by the school was a schedule for dimming provided or was there any discussion that the maximum light output would only be used for certain games, and not for regular practices or games with few spectators.

In fact, I think it would be the right solution to dim the lights to 20fc average during uses including practices and games, where either few or no spectators are present, in addition to reducing the maximum guaranteed light output to 30fc as recommended by this class of play by the IES, instead of 50fc. See my analysis in Section 2.5 Sports Field Lighting.

Sincerely,

A handwritten signature in black ink, appearing to read "K. Lagios". The signature is written in a cursive, flowing style with a large initial "K" and "L".

Kera Lagios, LEED AP, Assoc. IALD