



UNIVERSITY  
of HAWAII®  
MĀNOA

December 23, 2021

Via email:

State of Hawai'i, Land Use Commission  
P.O. Box 2359  
Honolulu, HI 96804-2359

Attention: Mr. Dan Orodener ([dbedt.luc.web@hawaii.gov](mailto:dbedt.luc.web@hawaii.gov))

Re: Miki Basin Industrial Park—2nd Draft Environmental Assessment (AFNSI)  
TMK: (2) 4-9-002:061  
Lāna'i District, Lāna'i Island

Dear Mr. Orodener:

Thank you for the opportunity to comment on the 2<sup>nd</sup> draft EA for the proposed Miki Basin Industrial Park project (published November 23, 2021), specifically with respect to issues and concerns regarding light pollution.

The University of Hawai'i Institute for Astronomy (IfA) conducts research in astronomy using telescopes located on Haleakalā and Maunakea and operated by IfA and our partner institutions. Both Haleakalā and Maunakea are among the best sites in the world for astronomical facilities because of their elevation, clear skies, favorable atmospheric conditions, and low levels of light pollution. Hawai'i-based observatories have played major roles in the advancement of astronomy and astrophysics for over 50 years and are well positioned to remain at the forefront of astronomical research for decades to come.

Because of the outstanding quality and productivity of these facilities, IfA is acutely concerned about negative impacts on astronomy from increased light pollution. Our work to combat light pollution has also brought us into contact with others concerned about light pollution for other reasons, including impacts on wildlife (particularly seabirds) and on human health. While IfA's comments focus on the impacts of light pollution on astronomy, appropriate mitigation measures also help to reduce non-astronomy impacts.

With that background, we offer the following comments:

Any new or additional artificial light at night has an adverse effect on astronomical observations by increasing the night sky brightness. All observations performed by the Pan-STARRS observatories, the ATLAS telescopes, and the Faulkes telescope on Haleakalā are sky-background

limited. This means that there is a natural sky brightness coming from airflow and zodiacal light. Artificial light increases the sky brightness, thereby decreasing the sensitivity of the telescopes.

Some of the observations performed by the Air Force telescopes atop Haleakalā are also sky-background limited, so those observations, performed for national defense purposes, will also be adversely affected.

Appropriate steps to further reduce the impact on the observatories would include:

1. The minimum possible amount of outdoor lighting should be used.
2. The planned use of low-pressure sodium (LPS) lighting in place of the more common full-spectrum or high-pressure sodium lighting may not be practical since LPS bulbs are no longer manufactured. Amber LED lights are a suggested substitute.
3. In any event, both fluorescent lights and high-intensity discharge lamps (such as metal halide) must be avoided. Both types of lamps use mercury and emit light at wavelengths that are very damaging to astronomy.
4. Blue light is most harmful to the observatories, so blue-deficient lighting should be exclusively selected and in general the use of blue-wavelength light should be limited as much as possible. The best choices are filtered LED lights, or amber LED lights.
5. White light should be avoided because the blue component of white light is very damaging to astronomy. White light should always have a Correlated Color Temperature of 2700 K or below.

Finally, we note that there is a strong need for further dialog with the University regarding light pollution in Maui County, and a strong need for revision of the present lighting ordinance to properly address the impacts of changes in lighting technology including LED lighting.

Thank you for your consideration of these comments and attention to IfA's concerns. If you have questions or need further detail regarding these comments, please do not hesitate to contact the undersigned or Richard Wainscoat ([rjw@hawaii.edu](mailto:rjw@hawaii.edu)).

Very truly yours,



Doug Simons  
Director

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