

H. CRITERION EIGHT, HAR § 13-5-30(C)(8): "THE PROPOSED LAND USE WIL NOT BE MATERIALLY DETRIMENTAL TO THE PUBLIC HEALTH, SAFETY, AND WELFARE"

990. The eighth criterion of HAR § 13-5-30 states that a proposed land use should not be materially detrimental to the public health, safety, and welfare. It does not require that a proposed land use be affirmatively beneficial to public health, safety, or welfare. Nonetheless, educational, research, and economic benefits to the public are properly part of the consideration for this criterion. Here, there is evidence that several aspects of the TMT Project will be strongly beneficial to the public welfare. Ex. C-2 (WDT Dr. Sanders) at 13-15, 17-19.

991. Petitioners presented the testimony of Dr. Maile Taulii, who has a background in public health, specifically with regards to indigenous communities. Ex. B.04.b; Tr. 1/24/17 at 7:9-23. In her words:

"I, Maile Taulii, holding a doctorate in Health Services, with expertise in public health informatics, epidemiology, genetics and Indigenous health, submit this testimony as a leading expert in health for Native Hawaiians.

The research of myself and my colleagues demonstrate three key findings: 1) desecrating sacred spaces impacts cultural identity and health, 2) participation in traditional practices are protective factors against distress, and 3) health disparities of Native Hawaiians cannot be explained by standard determinants of health (e.g. poverty or low education) and that causes, such as forced assimilation are causal factors in poor health outcomes."

WDT of Dr. Maile Taulii; Ex. B.04a.

992. Dr. Taulii testified that she conducted statistical research, which found that desecration of sacred spaces negatively impacts the cultural identity and health of native Hawaiians. Ex. B.04.a. Dr. Taulii testified that the TMT Project would further contribute to these negative impacts and cause damage to the physical health of native Hawaiians. Tr. 1/24/17 at 11:9-15:22.

993. Dr. Taulii is not a practitioner on the summit area of Mauna Kea. She provided no evidence of how the TMT Project would prevent or halt any of her practices in the vicinity of the TMT Project area. *See generally*, Ex. B.04a (WDT Dr. Taulii).

994. Dr. Taulii's testimony is insufficient to support a finding that the TMT Project will have materially detrimental impacts on the physical health of native Hawaiians, or the general public for the following reasons:

- First, Dr. Taulii's opinion is based on an unproven theory set forth in her unpublished research, which has yet to undergo the peer review process designed to subject such research to scrutiny by other individuals in the field in order to confirm or deny its legitimacy. Tr. 1/24/17 at 36:20-37:5, 48:11-12, 132:20-137:21. Petitioners and Opposing Intervenors did not submit Dr. Taulii's research and resulting report into evidence because it was not public as of the

evidentiary proceeding. Tr. 1/24/17 at 51:18-19, 86:6-11. Accordingly, the Parties and the Hearing Officer were unable to examine the statistics underlying Dr. Taulii's assertions.

- Second, Dr. Taulii's research was limited in scope, and does not address the welfare of the general public. Dr. Taulii's research was confined to a study of the TMT Project's impacts on native Hawaiians who opposed the TMT Project. Tr. 1/24/17 at 77:8-78:14. The research did not account for impacts on the health of native Hawaiians who support the TMT Project, nor did it consider the impacts on general public beyond the native Hawaiian community. Tr. 1/24/17 at 134:3-135:7.
- Third, even if Dr. Taulii's research is accepted as true, it does not establish that the TMT Project alone will be materially detrimental to public health, safety, and welfare. This is because the TMT Project would be one of many factors that ostensibly impacts cultural identity, and therefore, health. Dr. Taulii testified that cultural identity and health are affected by factors such as the destruction of sacred spaces, loss of native language, loss of connection to the land, and environmental deprivation. Ex. B-04.a. Cultural identity and health are also impacted by factors contributing to the colonization, assimilation, and learned helplessness of native Hawaiians. Ex. B-04. a, Tr. 1/24/17 at 12:17-15:22, 23:11-24:15, 46:22-47:11, 61:6-62:12, 96:6-97:4, 113:7-11.
- Finally, Dr. Taulii's personal bias tainted the outcome of her research and opinion. Dr. Taulii initially requested to be a party to this proceeding to oppose the TMT Project. Tr. 1/24/17 at 131:18-132:3. Additionally, Dr. Taulii was not aware of any peer review studies that supported her claims of trauma to native Hawaiians as a result of the TMT Project. Her own study was developed after forming a belief or bias that would oppose the TMT Project so the scientific credibility of her study is unverified. See Tr. 1/24/17 at 132:12-19.

995. Other witnesses who generally testified about the perceived health impacts on native Hawaiians were: Dr. Aluli Meyer, Prof. Osorio, Prof. Kaholokula, Perreira and Teale.

996. Dr. Manulani Aluli Meyer, a witness called by Petitioner Flores-Case `Ohana, who is educated and experienced in the field of Indigenous Epistemology (philosophy of knowledge), testified in opposition to the TMT Project, generally stating that the TMT Project will negatively impact Hawaiian culture and cultural practices on Mauna Kea, as well as public health, safety, and wellness. *See generally*, Ex. B.05a. Here is her story:

"Ke welina mai nei. I am Manulani Aluli Meyer, the fifth daughter of Emma Aluli and Harry Meyer. The Aluli ohana hail from Mokapu, Kailua, Kamamalu, Kohala, Hilo One and Wailuku – Oahu, Hawaii, Maui. I am a 30+ year practitioner of hooponopono [healing process through ritualized communication], and a scholar-practitioner of Hawaiian knowledge working as a Wilderness Instructor and Outdoor Educator for 20+ years, and as a Professor of Education for 15+. My work is in the field of Indigenous Epistemology or Philosophy of Knowledge as it applies to world-wide awakening within

systems [ie: education, economics, evaluation, prison reform, health]. I earned my Doctorate from Harvard University in 1998 on this topic and have taught at the University of Hawaii at Hilo - Education Department; at Te Wananga o Aotearoa - largest Maori University in NZ; and currently as the Director of Indigenous Education at the University of Hawaii West Oahu. I now evaluate Indigenous PhD's from around the globe, and discuss/write about native knowledge systems throughout multiple countries and universities. My job now is to assist the University of Hawaii to become a clearly definitive and inspiring Indigenous serving higher education system."

WDT of Dr. Manulani Aluli Meyer; Ex. B.05a.

Dr. Aluli Meyer's opinion is based on the theory that modern science and academia are unable to capture the intangible features of Hawaiian culture and practices, and that these intangible features will be negatively impacted by the TMT Project. Ex. B.05a; Tr. 1/26/17 at 30:3-39:23.

997. Dr. Aluli Meyer's testimony is that the TMT Project will have a substantial adverse impact on Hawaiian culture and cultural practices or public health, safety, and wellness. Dr. Aluli Meyer's testimony/theory is not supported by any empirical data. Ex. B.05a; Tr. 1/26/17 at 68:20-69:21. Dr. Aluli Meyer did not otherwise establish the validity of her theory. Dr. Aluli Meyer conceded that, under the "one truth epistemology" approach of modern academia, the TMT Project will not be materially detrimental to the public health, safety, and welfare. Tr. 1/26/17 at 88:8-18. Accordingly, there is no persuasive rational basis to accept Dr. Aluli Meyer's theories as factually true. Dr. Aluli Meyer conceded that she did not read the CDUA or related documents. Tr. 1/26/17 at 35:3-7.
998. Prof. Osorio opined that the results of mismanagement have severe cumulative effects on the peoples' trust and faith in government. Tr. 01/12/17 at 117:16-118:5. Even if that were true, the recent 2014 audit shows that the management of Mauna Kea has improved significantly. Moreover, Prof. Osorio presented no evidence that the TMT Project will be mismanaged. To the contrary, Prof. Osorio acknowledged that in terms of the telescopes, there has been a gradual increase in attentiveness to the environment and culture, even though those things may not have been present in the early approval processes. Tr. 01/12/17 at 83:3-7.
999. Professor Joseph Keawe`aimoku Kaholokula, a witness called by Opposing Intervenor Tiffnie Kakalia, is a professor of native Hawaiian health at the John A. Burns School of Medicine, University of Hawai'i at Mānoa. In his words:

"I am the Chair and Professor of Native Hawaiian Health at the John A. Burns School of Medicine, University of Hawaii at Manoa. I hold a PhD in clinical psychology, completed a clinical health psychology post-doctoral fellowship at Tripler Army Medical Center, and hold a license to practice in Hawaii. I have over 20 years of clinical and research experience regarding issues of Native Hawaiian health, to include mental and physical health. I have over 50 scientific publications specific to Native Hawaiian and Pacific Islander health in national and international peer-reviewed journals and provided numerous keynotes, talks, consultations on Native Hawaiian and Pacific Islander health

nationally and internationally. I sit on several boards of organizations whose mission is focused on either Native Hawaiians or public health issues to include Queen's Health Systems and Papa Ola Lokahi Native Hawaiian Health Board. I am also a member of a Native Hawaiian cultural group known as Halemua o Kualii and have been involved in various Hawaiian cultural practices (e.g., hula and lua) throughout my life."

Ex. F-7b (Statement of Prof. Kaholokula).

1000. Prof. Kaholokula offered testimony about the psychological impacts to specific native Hawaiians and testified that the perception of the desecration of Mauna Kea is detrimental to the health and well-being of native Hawaiians. Tr. 2/23/17 at 121:13-123:9. He has not done any research directly targeting the issue of the TMT Project. Tr. 2/23/17 at 143:12-17. Nor is he aware of any studies with regard to partitioning the cause of stress from TMT and Mauna Kea from all other stress-causing factors for native Hawaiians. Tr. 2/23/17 at 175:13-17.
1001. Prof. Kaholokua has not performed clinical examinations upon any of the opponents of the TMT Project and his opinions are not based on any definitive studies or analyses on specific individuals. Tr. 2/23/17 at 175:13-176:5. Prof. Kaholokua is aware of native Hawaiians that support the TMT Project, but has not spoken to either proponents or opponents of the project as part of his research. Tr. 2/23/17 at 143:4-6. Prof. Kaholokula further testified that native Hawaiians, coming from a tradition of seafarers and skilled navigators, can appreciate astronomy's quest to understand the mysteries of the universe and our collective existence in, and connection to, this universe. Ex. O-12 (WDT Prof. Kaholokua). Prof. Kaholokua is familiar with the Native Hawaiian Educational Assistance studies, and confirmed that these studies identified causes of stress in native Hawaiian families, including poverty, single parenthood, parental incarceration, drug abuse, homelessness, intra-family abuse and systemic diseases. He also believes that a history of social displacement impacts the health of native Hawaiians. Tr. 2/23/17 at 164-168. He is not aware of any study that has partitioned the cause of stress from TMT from all other stress causing factors. He has not performed any clinical examination of any of the TMT protesters. Tr. 2/23/17 at 172:21-176:5.
1002. Perreira was a witness for her eldest sibling, Kakalia. Ex. O-14 (WDT Perreira). Perreira testified generally that the TMT Project would affect native Hawaiians psychologically. Tr. 2/23/17 at 191:1-4. Contrary to Kakalia's representation, Perreira does not specialize in trauma care. Tr. 02/23/17 at 197:17-20. Nor is Perreira currently a member of the American Psychotherapists Association. Tr. 2/23/17 at 200:14-16. Perreira testified that her family believes in scientific inquiry, and values education and science, but nonetheless did not support the granting of the CDUA for the TMT Project. Ex. O-14 (WDT Perreira). During her testimony, Perreira admitted that her views only represented those of her family; she was not speaking for the community at large. Tr. 02/23/17 at 199:2-200:10.
1003. Teale holds a Master's Degree in public health from the University of Hawai'i at Mānoa. Ex. B.15a (WDT Teale) at 1; Ex. B.15b. Teale testified that she has worked to gather signatures for a petition to "protect" Mauna Kea from the TMT Project and she assisted

- 125 people in filing complaints of desecration of Mauna Kea with DLNR. Ex. B.15a (WDT Teale) at 4. In terms of public health, Teale testified that the TMT Project is having trauma-related impacts upon the community, including a surge of heart attacks, stroke and other impacts from stress, especially among cultural practitioners associated with Mauna Kea. Ex. B.15a (WDT Teale) at 5.
1004. Kihoi testified that she is a victim of prior domestic violence and suffered physical and emotional trauma, as well as deep psychological and emotional pain from that violence. Ex. F-1 (WDT Mehana Kihoi) at 1. Kihoi was present during the April 2, 2015 and June 24, 2015 protests on Mauna Kea, and admitted to standing in the road to block the TMT vehicles from accessing the site. Tr. 2/14/17 at 78:16-80:12, 99:4-12. Similarly, S. Kihoi testified generally about her daughter's trauma arising from domestic violence and the healing process through Mauna Kea. Ex. F-2 (WDT Sarah Kihoi); Tr. 2/14/17 at 157:11-160:2.
1005. Public opinion surveys referenced in the hearing demonstrated a majority of citizens supported the construction of the TMT Project, notwithstanding the protests of a select few who claim political or other reasons outside the traditional concepts of public health, safety and welfare. *See, e.g.*, Ex. I-1.
1006. Additional considerations designed to impact the concerns of the general public over safety and health concerns were fully considered by the CDUA and its supporting documents, addressed in more detail below.
1007. The TMT Observatory facilities will use a zero-discharge sanitary waste system. All sanitary wastewater will be collected, held in tanks designed for that purpose, and transported off the mountain for treatment and disposal at facilities approved by the State of Hawai'i Department of Health. WDT White at 12; WDT Hayes at 24-25; WDT Nance at 1.
1008. All solid waste will be collected and stored indoors in closed trash containers and will be disposed of appropriately off of Mauna Kea. TIO has committed to developing and implementing a Waste Minimization Plan and Materials Storage/Waste Management Plan and to implementing recycling measures to reduce and appropriately manage solid waste disposal. WDT White at 12; WDT Hayes at 25-26.
1009. In handling all hazardous materials, TIO will comply with existing federal and state laws. Hazardous materials will be stored in areas with secondary containment that will capture any material that may accidentally escape the primary storage unit. The TIO will utilize Environmental Protection Agency-licensed contractors to transport any hazardous waste off of Mauna Kea to be disposed of appropriately. WDT White at 12; WDT Hayes at 24-26.
1010. Although not a hazardous waste, mirror washing wastewater will be treated in a manner similar to hazardous waste, will be stored in units with secondary containment, and will be regularly transported off-site and off the mountain for appropriate treatment and disposal. WDT White at 12-13; WDT Hayes at 24-25; (Dr. Sanders) Tr. 1/3/17 at 75:8-

76:9; Ex. A-3/R-3 at 3-234.

1011. There have been allegations of oil leaks from heavy machinery at the project site by party C. Freitas, and her witnesses, Rosier and Munroe. Dr. Sanders testified that some of the alleged oil leaks were just moisture from condensation. He further testified that all of the alleged leaks were addressed appropriately. A drip pan is placed next to each piece of machinery to catch oil leaks. Any oil that spattered to the ground was removed by removing the material, dirt, and rocks around the drip pan. The amount of material was very small and fit in a Ziploc bag. (Dr. Sanders) Tr. 1/3/17 at 23:22-25:16.
1012. Nanci Munroe, a witness called by Opposing Intervenor C. Freitas, is someone who has joined protectors of Mauna A Wakea. In her words:

"I was born in Portland, Oregon & raised in Tucson, Arizona. I moved to Hawai`i in August 1976 to attend college at the University of Hawaii at Hilo. I enrolled in prerequisite courses for the Dental Hygiene Program at University of Hawai`i at Manoa, as well as classes in Hawaiian language with Pua Kanahale & Hawaiian studies with Auntie Edith Kanaka`ole, who gave me the Hawaiian name of Nohea. I was hired at GTE Hawaiian Telephone Company in Hilo on April 24, 1979. I was accepted into the dental hygiene program in Vancouver, Washington in August of 1979, but declined. I was able to continue attending classes part-time at UH-Hilo from which eventually earned an Associate of Arts degree in Liberal Arts in 1984 at a point for which I would have only required 15 more credit hours to earn a Bachelor's degree. I retired from Hawaiian Telcom in Honolulu on August 10, 2012 with over 33 years of service. Since then I also have done some part-time work for Laulima Title Search & Claims.

* * *

On approximately April 14, 2015 I joined other protectors of Mauna A Wakea at Hale Pōhaku in anticipation of resumption of work for the Thirty Meter Telescope project. I stayed most nights on the Mauna until approximately June 28, 2015. I began to document activities on the Mauna with my cell phone and shared on social media almost daily. I began a routine of regular site visits with others on Monday mornings to the location of the TMT Access Road to monitor any activity for which we may have been unaware of during the previous week. As security guards were always on duty at the top of the TMT Access Road preventing access to walk on the portion of the road which appeared to have been already ripped & graded, we would hike beyond the construction zone delineated by stanchions & wire over difficult terrain of both a`a & pahoehoe types of lava in order to view the equipment which had remained there from the initial attempts to create the road. There were two excavators & two bulldozers on the new TMT Access Road, and I was able to photograph each of these pieces of machinery with evidence of some type of dark, apparently liquid substance leaking from each of them. In addition, there was a large truck with a trailer type of rig on the Mauna Kea road from which the TMT Access Road began which had 2 very large "oil leaks" nearby. It is unknown what type of liquid was leaking from the equipment, whether it was some type of motor oil, transmission oil, or some other oil or fuel used in heavy machinery, I refer to them as "oil leaks". There were no mitigation measures visible. The four machines on the TMT Access Road each had

some type of absorbent pad, or pads, held down with loose rocks, which to me would be best described as looking like training pads for puppies, or incontinence pads used on beds for medical patients. On at least one bulldozer, the pad had been blown loose to the point that it was no longer effective in catching the oil, which then leaked onto the ground. One at least one bulldozer there were pads above the 'tractor' treads as well as below, indicating that the volume of leakage was more than what the upper pad could absorb, so an additional pad was required below. Under one of the excavators was some type of rectangular yellow tray which appeared to me to be similar to what may be used to drain oil into from an automobile during a regular oil change but on a larger scale."

WDT of Nanci Munroe of evidence of oily substance leaking from machinery at the site of the TMT Access Road in May & June of 2016; Ex. S-14.

1013. Munroe took photos related to the purported oil spills and of some absorbent material near heavy machinery which was established to collect oil, but apparently some had missed the pads. *See* Exs. S-14e, S-14f, S.14g, S-10, S-11, S-12; (Munroe) Tr. 02/16/17 at 189:2- 195:17. She could not identify the source of the fluid leak in one of the photos purportedly showing an oil leak (Ex. S-9). (Munroe) Tr. 02/16/17 at 213:24-214:1. Munroe took a sample of the alleged oil spills but never tested the sample. (Munroe) Tr. 02/16/17 at 189:2- 195:17. Munroe further testified that the oil spills were not located on the TMT Project site, but rather on the loop road at the very head of the TMT Access Way. (Munroe) Tr. 02/16/17 at 205:2-14, 206:1; *see* Exs. S-9, S-10, S-14c.
1014. The drip trays and absorbent pads in Ex. S-14e and S-14f are standard construction drip pans and equipment used for heavy equipment. Munroe did not research those equipment prior to making her allegations, but has some knowledge that they are used for that purpose. (Munroe) Tr. 02/16/17 at 214:2-215:17.
1015. OMKM has a set of best management practices for construction activities and as part of the means and methods that the contractors will need to implement during construction. (Munroe) Tr. 02/16/17 at 213:19-23.
1016. Rosier testified that she previously hauled equipment for Goodfellows and is familiar with hydraulic systems. She also testified that Goodfellows is a "really good" company. (Rosier) Tr. 02/16/17 at 244:6-9.
1017. Rosier testified that the aquifer on Mauna Kea is going to be exposed to oil spill if the TMT Project is developed, however she presented no evidence to support that conclusory statement. (Rosier) Tr. 02/16/17 at 223:22-231:3.
1018. The noise generated by the TMT Observatory will be below the daytime Class A allowable limits (55 dBA) at a distance of 270 feet from the heating, ventilation, and air conditioning ("HVAC") system. The sound does not project very far under most conditions. Tr. 10/25/16 at 173:18-25. Anyone standing at least 270 feet from the TMT Observatory HVAC system during the day will not be exposed to noise levels exceeding the Class A daytime standard. WDT Hayes at 27-28; Ex. A-1/R-1 at 4-36; Ex. A-3/R-3 at 3-179.

1019. The noise generated by the TMT Observatory will be below the nighttime Class A allowable limits (45 dBA) at a distance of 850 feet from the HVAC system. Anyone standing at least 850 feet from the TMT Observatory HVAC system during the night will not be exposed to noise levels exceeding the Class A nighttime standard. WDT Hayes at 27-28; Ex. A-3/R-3 at 3-179.
1020. Identified noise-sensitive areas in the summit region, including the trailhead and summit of Pu‘u Wēkiu/Kūkahau‘ula, Lake Waiau, and Pu‘u Līlīnoe, are more than 850 feet from the TMT Observatory HVAC system. WDT Hayes at 28; Ex. A-3/R-3 at 3-179.
1021. Operation of the TMT Project will not contribute to a noticeable increase in noise levels at the identified recreational sites in the surrounding area recognized as sensitive to noise. WDT Hayes at 28. The TMT Project will implement several mitigation measures with regard to noise, including: (1) placing HVAC equipment indoors; and (2) furnishing the openings between the interior of the TMT Observatory and the outdoors, such as air intake locations, with measures like acoustical louvers to reduce noise discharging outside of the Observatory. WDT Hayes at 28; WDT White at 13; Ex. A-3/R-3 at 3-180 to 3-181.
1022. The method used to regulate and mitigate construction noise relies on the State of Hawai‘i Department of Health’s rules and generally accepted standards. (White) Tr. 10/24/16 at 33:4-34:5. There will be a temporary impact to recreational visitors who expect to traverse near the construction site during construction. Tr. 10/25/16 at 175:15-20; Ex. A-3/R-3 at 3-179 to 3-180.
1023. Overall, the TMT Project will not detrimentally affect the ambient noise levels or result in a substantial degradation of environmental quality in noise-sensitive areas, and therefore, any noise impact from the Project will be less than significant. WDT Hayes at 28; Ex. A-3/R-3 at 3-180.
1024. Petitioners and Opposing Intervenors also point to the testimonies of Townsend, Ward, Prof. Fujikane, C. Freitas, and Fergerstrom, in contending that the TMT Project will be materially detrimental to the public health, safety, and welfare.
1025. Townsend testified that during the 2011 site visit, she observed heavy machinery, construction material, the clatter of telescope operations, and trafficked roads. Ex. B.03a (WDT Townsend) at 2. She also testified that she found it challenging to find a place where she was not interrupted by the noise and industrial land uses already on the summit. Ex. B.03a (WDT Townsend) at 2. Ward testified that there has been "intensified industrial land use" at the summit of Mauna Kea, and there currently exists view plane obstructions, and noise at the summit, including sounds from observatory air conditioning, blowers, generators, vehicles and industrial activity. Ex. 17a (WDT Ward) at 2-3.
1026. During the September 2016 site visit, there was little noticeable ambient noise from the existing telescopes. Moreover, other than the participants in the site visit itself, there was minimal traffic on the roads. There were no heavy machinery operations or construction

activity at the TMT Project site at the time of the September 2016 site visit, although some machinery was present but was not being used at the time.

1027. Prof. Fujikane testified that the 5,000-gallon tanks that will be placed underground along with the 2,000-gallon tank that will be used to store fuel are detrimental to public health and that the CDUA's plan regarding the tanks is inadequate. Tr. 1/9/17 at 230:5-230:22.
1028. C. Freitas testified as to the potential dangers of using the Manitowoc 2250 Crane for construction activities on Mauna Kea. C. Freitas testified that the high winds on Mauna Kea may cause the crane to tip, thereby endangering public health, safety, and welfare. Tr. 2/21/17 at 88:22-97:18. However, C. Freitas acknowledged that the cranes come with an anemometer (wind measuring device) and that the Manitowoc 2250 product guide instructs operators to lower and secure the boom when certain wind speeds are exceeded. Tr. 2/21/17 at 139:3-140:16.
1029. C. Freitas also testified as to her general concerns regarding the use of heavy machinery on unpaved roads, and the potential risk for landslides or other damage to the roads. Tr. 2/21/17 at 101:7-102:21.
1030. Fergstrom testified that the TMT Project will cause some underground caves to collapse, but did not provide any credible evidence to support his assertion. Tr. 1/23/17 at 231:6-7.
1031. Certain protestors blocked the access road by standing in the road, placing rocks in the road, and building ahu and rock walls in the road in 2015 for the purpose of halting pre-construction activities and vehicular traffic. *See* Tr. 3/2/17 at 284:5-22; (Prof. Johnson) Tr. 02/16/17 at 92:2-10; (Munroe) Tr. 02/16/17 at 183:12-20; (Prof. Johnson) Tr. 02/16/17 at 94:7-11; Ex. A-157; Ex. A-158; Ex. A-159. W. Freitas admitted that ahu construction on the roadway created a public health and safety issue. Tr. 3/2/17 at 284:11-22. Similarly, Prof. Johnson admitted that persons standing in the middle of the road for the purpose of stopping vehicular traffic posed a health and safety concern. Tr. 2/16/17 at 94:7-11.
1032. The TMT Project will provide long-term employment in Hawai'i County for a wide range of positions including engineers, software and information technology engineers, scientific support, staff to maintain equipment, administrative personnel, and public outreach personnel. It is anticipated that TMT Observatory operations will need up to 140 full-time employees. The TMT Project will also result in the creation of additional employment opportunities by contracting for work and services with local companies, including for services such as web site design and construction of the TMT Project. The TMT Project is committed to hiring as many local staff as possible. Ex. C-2 (WDT Dr. Sanders) at 11; Ex. A-3/R-3 at 3-136. Moreover, the State of Hawai'i will not need to pay for the TMT Project. Rather, there will be income for the State for the duration of the sublease. (White) Tr. 10/20/16 at 109:24-110:6; WDT Dr. Hasinger at 3-4.
1033. The TMT Project is committed to funding a CBP and implementing a WPP. The CBP will be funded by TIO and will be administered via local charitable organizations. The

THINK Fund purposes could include: (1) scholarships and mini-grants; (2) educational programs; (3) college awards; (4) educational programs specific to Hawaiian culture; (5) educational programs specific to astronomy; (6) educational programs specific to math and science; and (7) community outreach. The TMT Project is committed to partnering with UH Hilo, HawCC, and the DOE to help develop, implement, and sustain a comprehensive, proactive, results-oriented WPP that will lead to a highly qualified pool of local workers who could be considered for hiring into most job classes and salary levels. Ex. C-2 (WDT Dr. Sanders) at 13-14; Ex. A-3/R-3 at 3-137 to 3-140; WDT Dr. Hasinger at 5-6.

1034. The TMT Project is participating in a County of Hawai‘i Workforce Investment Board initiative with the Mauna Kea observatories. The purpose of this initiative is to explore opportunities for marshaling existing community resources to introduce focused programs within the Hawai‘i Island community to provide the observatories with a broader and stronger qualified local labor pool, as candidates for careers in the local astronomy enterprise. Ex. C-2 (WDT Dr. Sanders) at 14-15.
1035. The TMT Project has the potential to substantially benefit the public welfare. There will be direct economic benefits through construction contracts, new jobs, incoming research grants, provision of the CBP and WPP, and substantial educational benefits. There is also the less tangible but no less important benefit of increasing humanity’s overall pool of knowledge about the Universe and our origins. *Id.* at 13-15; Ex. A-3/R-3 at 3-135 to 3-140; Ex. A-7/R-7 at 60; WDT Dr. Hasinger at 1-6.
1036. Prof. Fujikane did not agree that the educational and employment opportunities created by the TMT Project would benefit the native Hawaiian community because she believes that the TMT Project will result in physical and emotional trauma. Tr. 1/11/17 at 61:23-62:9. Prof. Fujikane offered no supporting evidence for this assertion. Prof. Fujikane admitted that she had never been to the TMT Project site until the September 2016 site visit. Tr. 1/11/17 at 79:8-79:16.
1037. Overall, the TMT Project will result in a beneficial socioeconomic impact by directly and indirectly generating new revenues for local and state economies, contributing to the State’s gross domestic product, generating new employment opportunities for local residents and the State, and sharing the benefits of astronomy with the larger Hawai‘i County community. Ex. C-2 (WDT Dr. Sanders) at 13-15, 18; Ex. A-3/R-3 at 3- 136.
1038. There are significant educational benefits that will derive from the astronomy programs that utilize the TMT Project. TMT’s advanced capabilities will allow it to observe any class of astronomical objects much farther than current telescopes. TMT will be sensitive enough to see things formed billions of year ago that could never be seen using Keck. (Dr. Stone) Tr. 12/19/16 at 8:9-9:2, 14:3-16:15. TMT’s reach will enable it to essentially look back in time, which will enable astronomers to answer fundamental questions regarding the origins of the universe. TMT will enable discoveries about the nature and origins of the physical world, from the first formation of galaxies in the distant past and distant regions of the Universe to the formation of planets and planetary systems today in the Milky Way Galaxy. (Dr. Stone) Tr. 12/19/16 at 15:23-16:6. TMT may also aid in the

quest to find and study Earth-like planets which are close enough that future generations might be able to fly there. WDT Dr. Hasinger at 2.

1039. Considering all of the evidence, including but not limited to the testimonies of Dr. Taualii, Dr. Aluli Meyer; Prof. Kaholokula, Perreira, Teale, Townsend, Ward, Prof. Fujikane, C. Freitas, Fergerstrom, Munroe, Rosier, Kihoi, White, Hayes, Nance, Dr. Hasinger, and Dr. Sanders, and giving such evidence due weight, Petitioners and Opposing Intervenors have not offered reliable, probative, substantial, or credible evidence, scientific or otherwise, to suggest that the TMT Project will be harmful to the health, safety, and welfare of native Hawaiians or anyone else.
1040. Based on these factual findings, the TMT Project is not materially detrimental to the public health, safety, and welfare. Thus, the TMT Project satisfies HAR § 13- 5-30(c)(8).

V. PETITIONERS' AND OPPOSING INTERVENOR'S ARGUMENTS THAT UHH FAILS TO MEET CRITERIA FOR APPROVAL OF PERMIT

1041. Petitioners and Opposing Intervenors rely on the testimony of Dr. Fujikane in challenging UHH's contention that it meets all eight criteria.
1042. Dr. Fujikane's testimony was made in two parts: the first part focused on a rhetorical problem: the faulty and self-contradictory logic in the TMT's Conservation District Use Application (CDUA) that attempt to make substantial, adverse, and significant impacts "disappear." The second part focused on the cultural value of the integrity of land embodied in mo'o'aina land divisions, where relationships between land forms are inseverable. Vol. 23, Tr. 1/9/17 at 207:15-208:17.
1043. Dr. Fujikane stated that the TMT CDUA cannot fulfill the eight Conservation District Use Criteria because cumulatively, the TMT project would add to the impacts of existing observatories that are "substantial, adverse, and significant." Vol. 23, Tr. 1/9/17 at 209-210.
1044. Dr. Fujikane reaffirmed NASA's 2005 Final Environmental Impact Statement for the Outrigger Telescopes project on Mauna Kea where it concluded that the impact of existing astronomical activities on Mauna Kea has been substantial, adverse and significant: "From a cumulative perspective, the impact of the past, present, and reasonably foreseeable future activities on cultural and biological resources is substantial, adverse and significant" (Ex. 813d at 4-124).
1045. Dr. Fujikane stated that as NASA's FEIS for the Outrigger Telescopes Project indicates, Mauna Kea is already overbuilt. Vol. 23, Tr. 1/9/17at 211.
1046. Dr. Fujikane testified that the TMT's FEIS Vol.1 also acknowledges that cumulatively, the TMT can only add to the substantial, significant and adverse impact on Mauna Kea: "From a cumulative perspective, the impact of past and present actions on cultural, archaeological, and historic resources is substantial, significant, and adverse; these impacts would continue to be substantial, significant, and adverse with the consideration of the Project and other reasonably foreseeable future actions" Ex. 832 at S-8. Vol. 23,