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BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAI'I

IN THE MATTER OF Contested Case Hearing Re Conservation District Use Application (CDUA) HA-3568 for the Thirty Meter Telescope at the Mauna Kea Science Reserve, Ka'ohe Mauka, Hāmakua, Hawai'i, TMK (3) 4-4-015:009	Case No. BLNR-CC-16-002 THE UNIVERSITY OF HAWAI'I AT HILO AND TMT INTERNATIONAL OBSERVATORY, LLC'S JOINT [**PROPOSED**] FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER; APPENDICES A–D; CERTIFICATE OF SERVICE

THE UNIVERSITY OF HAWAIʻI AT HILO AND TMT INTERNATIONAL OBSERVATORY, LLC'S JOINT [PROPOSED] FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER

Pursuant to HAR §13-1-38, and as directed by the Hearing Officer, these [PROPOSED] FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER are jointly submitted by Applicant University of Hawaiʻi Hilo and Intervenor TMT International Observatory, LLC, by and through their respective counsel.

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APPENDICES

[PROPOSED] FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER

This contested case hearing involves Conservation District Use Application HA-3568 ("**CDUA**") for the Thirty Meter Telescope at the Mauna Kea Science Reserve ("**TMT Project**"). The following Findings of Fact ("**FOF**"), Conclusions of Law ("**COL**"), and Decision and Order are based on the records maintained by the Department of Land and Natural Resources ("**DLNR**") on CDUA HA-3568 and the witness testimonies and exhibits, presented during the evidentiary hearing that was held between October 20, 2016 and March 2, 2017, for this matter and which were subsequently accepted into evidence.

If any statement denominated a COL is more properly considered a FOF, then it should be treated as a FOF; and conversely, if any statement denominated as a FOF is more properly considered a COL, then it should be treated as a COL.

Certain facts set forth within specified criteria addressed below may apply to one or more criteria, issue, or legal standard. To the extent such facts or findings are addressed within a particular heading or section below does not limit it to that heading or section, but instead all such facts or findings are incorporated by reference for each applicable criteria section, as if specifically set forth within that heading or section.

The Hearing Officer considered the testimony of all witnesses at the evidentiary hearings and all exhibits received into evidence. The mere fact that a particular witness testimony or exhibit may not be specifically referred to below does not and shall not be construed to mean that said testimony or exhibit was not considered. Rather, specific reference to said witness testimony or exhibit was excluded because, after due consideration of said testimony or exhibit, it was determined to be: (i) immaterial, (ii) irrelevant, (iii) contrary to law, (iv) less credible or persuasive, and/or (v) cumulative of other testimonies or exhibits specifically referred to below.

INTRODUCTION

I. THE PARTIES

1. The University of Hawai‘i ("**University**") was originally established as the state university of the State of Hawai‘i and constitutes a body corporate under Hawai‘i law. The University of Hawai‘i has ten campuses statewide, one of which is the University of Hawai‘i at Hilo ("**UH Hilo**"). The UH Hilo, on behalf of the University, is the Applicant of the CDUA for the TMT Project. The University of Hawai‘i and UH Hilo may be referred to interchangeably, and sometimes collectively, as the "University" herein. During the contested case proceeding, the University was represented by Carlsmith Ball LLP.

2. Mauna Kea Anaina Hou ("**MKAH**") is an unincorporated association that participated in the prior contested case proceeding involving the UH Hilo's CDUA for the TMT Project under DLNR Docket No. HA-11-05 ("**Prior Contested Case**"). From the beginning of the contested case until October 10, 2016, MKAH was represented by Richard

Wurdeman, Esq. ("**Wurdeman**"). From October 11, 2016 until the completion of the contested case, MKAH was represented by non-lawyer Kealoha Pisciotta ("**Pisciotta**"), who is the current president of MKAH. Tr. 10/17/16 at 4.

3. In addition to representing MKAH, Pisciotta represented herself to be a party in her individual capacity in this proceeding, despite never submitting a formal request to intervene. Pisciotta, a native Hawaiian practitioner, did not participate as a party in her individual capacity in the Prior Contested Case. From the beginning of the contested case until October 10, 2016, Pisciotta was represented by Wurdeman. From October 11, 2016 until the completion of the contested case, Pisciotta represented herself *pro se*.

4. Clarence Kukauakahi Ching ("**Ching**") is a native Hawaiian practitioner who participated in the Prior Contested Case. From the beginning of the contested case until October 10, 2016, Ching was represented by Wurdeman. From October 11, 2016, until the completion of the contested case, Ching represented himself *pro se*.

5. The Flores-Case ʻOhana is an unincorporated association consisting of E. Kalani Flores ("**Flores**"), B. Pualani Case ("**Case**"), and their two children, who are native Hawaiian practitioners. The Flores-Case ʻOhana participated in the Prior Contested Case. From the beginning of the contested case until October 10, 2016, the Flores-Case ʻOhana was represented by Wurdeman. From October 11, 2016 until the completion of the contested case, the Flores-Case ʻOhana was represented by Flores and Case.

6. Deborah Ward ("**Ward**") is a recreational user of Mauna Kea lands who participated in the Prior Contested Case. From the beginning of the contested case until October 10, 2016, Ward was represented by Wurdeman. From October 11, 2016 until the completion of the contested case, Ward represented herself *pro se*.

7. Paul Neves ("**Neves**") is a native Hawaiian practitioner who participated in the Prior Contested Case. From the beginning of the contested case until October 10, 2016, Neves was represented by Wurdeman. From October 11, 2016 until the completion of the contested case, Neves was represented by Pisciotta without objection. Notwithstanding the Board of Land and Natural Resources' ("**BLNR**") determination in Minute Order No. 52 [Doc. 650] filed May 26, 2017, at 1 n.1, the Hearing Officer recognizes that no objections were made to Pisciotta's representation of Neves.

8. KAHEA: The Hawaiian Environmental Alliance ("**KAHEA**") is a nonprofit environmental organization that participated in the Prior Contested Case. From the beginning of the contested case until October 10, 2016, KAHEA was represented by Wurdeman. From October 11, 2016 until the completion of the contested case, KAHEA was represented by Yuklin Aluli, Esq. and Dexter Kaiama, Esq.

9. MKAH, Pisciotta, Ching, the Flores-Case ʻOhana, Neves, Ward, and KAHEA are referred to collectively herein as "**Petitioners**."

10. TMT International Observatory, LLC ("**TIO**") is a nonprofit organization comprised of the Regents of the University of California, the California Institute of Technology ("**Caltech**"), the National Institutes of Natural Sciences of Japan, the National

Astronomical Observatories of the Chinese Academy of Sciences, the Department of Science and Technology of India, and the National Research Council of Canada. TIO is a different entity from the TMT Observatory Corporation ("**TMT Corporation**"). During the contested case proceeding, TIO was represented by Watanabe Ing LLP. [Doc. 2].

11. Perpetuating Unique Educational Opportunities, Inc. ("**PUEO**") is a nonprofit educational organization. During the contested case proceeding, PUEO was represented by Torkildson, Katz, Moore, Hetherington & Harris. [Doc. 33].

12. Mehana Kihoi ("**Kihoi**") is a native Hawaiian practitioner. During the contested case proceeding, Kihoi represented herself *pro se*.

13. C.M. Kahoʻokahi Kanuha ("**Kanuha**") is a native Hawaiian practitioner. During the contested case proceeding, Kanuha represented himself *pro se*.

14. Harry Fergerstrom ("**Fergerstrom**") is a native Hawaiian practitioner. During the contested case proceeding, Fergerstrom represented himself *pro se*.

15. Joseph Kualiʻi Lindsey Camara ("**Camara**") is a native Hawaiian practitioner. During the contested case proceeding, Camara represented himself *pro se*.

16. Jennifer Leinaʻala Sleightholm ("**Sleightholm**") is a native Hawaiian practitioner. During the contested case proceeding, Sleightholm represented herself *pro se*.

17. Maelani Lee ("**Maelani Lee**") is a native Hawaiian practitioner. During the contested case proceeding, Lee represented herself pro se. On December 7, 2016, Lee filed a Notice of Withdrawal from this contested case. [Doc. 421].

18. Richard Maele Deleon ("**Deleon**") is a native Hawaiian practitioner. During the contested case proceeding, Deleon represented himself *pro se*. On August 30, 2016 prior to the start of the evidentiary portion of the contested case hearing on October 20, 2016, Deleon filed a Motion to Withdraw from Contested Case. [Doc. 249]. On September 1, 2016, Deleon also filed a Motion to Withdraw Richard Maele Deleon as a Party to the Contested Case and Witness Under my Name. [Doc. 251].

19. Cindy Freitas ("**C. Freitas**") is a native Hawaiian practitioner. During the contested case proceeding, C. Freitas represented herself *pro se*.

20. William Freitas ("**W. Freitas**") is a native Hawaiian practitioner. During the contested case proceeding, W. Freitas represented himself *pro se*.

21. The Temple of Lono ("**Temple**") is an unincorporated association. During the contested case proceeding, the Temple was represented by Lanny Sinkin ("**Sinkin**").

22. Kalikolehua Kanaele ("**Kanaele**") is a native Hawaiian practitioner. During the contested case proceeding, Kanaele represented himself *pro se*.

23. Stephanie-Malia:Tabbada ("**Tabbada**") is a native Hawaiian practitioner. During the contested case proceeding, Tabbada represented herself *pro se*. Despite being admitted as a party, Tabbada did not physically appear during the evidentiary portion of the contested case hearing which commenced on October 20, 2016 and ended on March 2, 2017.

24. Tiffnie Kakalia ("**Kakalia**") is a native Hawaiian practitioner. During the contested case proceeding, Kakalia represented herself *pro se*.

25. Glen Kila ("**Kila**") is a native Hawaiian. During the contested case proceeding, Kila represented himself *pro se*. Despite being admitted as a party, Kila did not physically appear during the evidentiary portion of the contested case hearing which commenced on October 20, 2016 and ended on March 2, 2017.

26. Dwight Vicente ("**Dwight Vicente**") is a native Hawaiian. During the contested case proceeding, Vicente represented himself *pro se*.

27. Brannon Kamahana Kealoha ("**Kealoha**") is a native Hawaiian practitioner. During the contested case proceeding, Kealoha represented himself *pro se*. Mr. Kealoha stopped appearing in person and participating in the proceedings on or about December 8, 2016.

28. Kihoi, Kanuha, Fergerstrom, Camara, Sleightholm, Maelani Lee, C. Freitas, W. Freitas, Temple, Kanaele, Tabbada, Kakalia, Kila, Dwight Vicente, and Kealoha are referred to collectively herein as the "**Opposing Intervenors**."

II. PROCEDURAL HISTORY: PRE-HEARING

A. PRIOR CONTESTED CASE, REMAND, AND APPOINTMENT OF HEARING OFFICER

29. Unless otherwise explicitly indicated or clear from the context, "**Board**" and "**BLNR**" shall mean the Board of Land and Natural Resources; "**Chairperson**" shall mean the Chairperson of the Board of Land and Natural Resources; and "**Department**" or "**DLNR**" shall mean the Department of Land and Natural Resources.

30. This contested case is before the BLNR pursuant to the Hawai'i Supreme Court's ("**Supreme Court**") December 2, 2015 opinion in *Mauna Kea Anaina Hou v. Board of Land and Natural Resources*, 136 Hawai'i 376, 363 P.3d 224 (2015) and the Circuit Court of the Third Circuit, State of Hawai'i's Order for Remand filed February 22, 2016, in Civil No. 13-1-0349.

31. On September 2, 2010, UH Hilo submitted its CDUA for the TMT Project to the DLNR. The CDUA was designated CDUA HA-3568. Ex. A-1/R-1.

32. On February 25, 2011, at its regular meeting, the Board approved the CDUA. Exs. A-7/R-7, A-8/R-8, A-24, A-25. At that same meeting, the Board ordered that a contested case hearing be held on the CDUA. *See* Ex. A-27.

33. The BLNR issued its decision and order on April 12, 2013, granting the UH Hilo's CDUA and issuing a Conservation District Use Permit ("**CDUP**") for the TMT Project. MKAH, Ching, Ward, Neves, Flores-Case 'Ohana, and KAHEA appealed the BLNR's decision and order to the Circuit Court of the First Circuit, State of Hawai'i ("**First Circuit**") and later to the Supreme Court.

34. On December 2, 2015, the Supreme Court vacated the First Circuit's decision and order affirming the BLNR's decision and order granting the CDUA and issuing the CDUP. The Supreme Court remanded the matter back to the First Circuit for further remand to BLNR to hold a contested case hearing on the CDUA.

35. On February 22, 2016, the Circuit Court issued its remand order, remanding this matter to BLNR.

36. On February 26, 2016, BLNR delegated the conduct of the contested case hearing to a Hearing Officer, pursuant to Hawai'i Administrative Rules ("**HAR**") § 13-1-32(b). Minute Order No. 2. [Doc. 3].

37. On March 31, 2016, BLNR issued Minute Order No. 1, providing notice that Judge (Ret.) Riki May Amano ("**Judge Amano**" or "**Hearing Officer**") had been selected to serve as the Hearing Officer of this contested case proceeding. This contested case proceeding was designated as BLNR-CC-16-002. Minute Order No. 1 set a deadline of April 15, 2016 for any comments and objections to Judge Amano's appointment. Minute Order No. 1. [Doc. 1].

38. As summarized in Appendices A and B, several motions were filed objecting to the Hearing Officer selection process and seeking to disqualify the Hearing Officer. These motions were denied for the reasons stated in Minute Order Nos. 4 [Doc. 14]; 9 [Doc. 63]; 14 [Doc. 124]; 17 [Doc. 245]; and 39 [Doc. 406].

39. Any other informal or verbal request for disqualification not set forth hereinabove is denied.

B. MOTIONS TO INTERVENE

40. On May 9, 2016, Minute Order No. 5 was issued setting a pre-hearing conference on May 16, 2016. [Doc. 16]. The purpose of the pre-hearing conference was to discuss the record, parties, anticipated pre-hearing motions, a motions hearing(s) schedule, and other procedural and logistical matters.

41. During the May 16, 2016 pre-hearing conference, a deadline of May 31, 2016 was set for applications, motions, or requests to intervene. A hearing on the applications, motions, or requests was set for June 17, 2016. Minute Order No. 7 [Doc. 44].

42. From April 8, 2016 through June 13, 2016, requests to intervene as a party in this contested case proceeding were filed by the following parties/entities: TIO, Edward Akiona, Waiala Ahn, Fergerstrom, Ana Nawahine-Kahoopii, DeLeon, Kihoi, Kanuha, Camara, Halonaikaiopuna Mikala-Jiro Fukutomi, Crystal West ("**West**"), Ivy McIntosh

("**McIntosh**"), Wilma Holi ("**Holi**"), Moses Kealamakia, Jr. ("**Kealamakia**"), Michael Kumukauoha Lee ("**Michael Lee**"), PUEO, Ricky Cassiday, Keahi Tajon ("**Tajon**"), Eric Hansen ("**Hansen**"), Patricia Ikeda ("**Ikeda**"), Sleightholm, Lee, Michelle Cabalse, Linda Namauu, Dr. Maile Taualii ("**Dr. Taualii**"), Danelle Cooper (**"Cooper**"), Temple, Kanaele, Tabbada, Kakalia, Kila, Dwight Vicente, Joy Keahipuakauikawekiu Mills-Ferren, Kealoha, C. Freitas, and W. Freitas. [Doc. 2, 18-30, 32-40, 46-48, 50-54, 56-59, 64, 68].

43. On June 13, 2016, Dr. Taualii and Cooper filed a request to be withdrawn as a party. [Doc. 67].

44. On June 13, 2016, Petitioners filed a Memorandum in Opposition to PUEO's Motion to Intervene. [Doc. 69].

45. On June 17, 2016, a hearing was held on the pending motions, applications and/or requests for admission or intervention as a party or parties. The following applicants were not present at the hearing, and their applications were thus denied based on their failure to appear: Ana Nawahine-Kahoʻopiʻi, Edward Akiona, Waiʻala Ahn, Holonaikaipuna Mikala-Jiro Fukutomi, Michael Lee, Tajon, Hansen, Rick Cassiday, Linda Namauu, Joy Keahipuakauikawekiu Mills-Ferren, and Michelle Cabalse (collectively, the "**Non-Appearing Applicants**"). Minute Order No. 13. [Doc. 115].

46. At the June 17, 2016 hearing, a deadline of August 1, 2016 was set for the Non-Appearing Applicants to file a motion for reconsideration of the dismissal of the motions/requests for intervention. None of the Non-Appearing Applicants filed a motion for reconsideration of the dismissal of their motions/requests to intervene or otherwise requested to participate in the contested case hearing.

47. At the June 17, 2016 hearing, the following individuals voluntarily decided to be Hearing Officer witnesses, rather than parties, in the contested case hearing: West; McIntosh; Holi; Kealamakia; and Ikeda. Minute Order No. 13. [Doc. 115].

48. On August 29, 2016, Ikeda withdrew as a Hearing Officer Witness. Tr. 08/29/16 at 6:15-7:4. Ikeda re-confirmed her withdrawal as a Hearing Officer Witness on October 17, 2016. Tr. 10/17/16 at 8:3-6.

49. All remaining applicants for intervention had standing to participate in the contested case as parties and their motions to intervene were granted. Minute Order No. 13. [Doc. 115].

50. On August 17, 2016, Shelley Stephens ("**Stephens**") filed a request to intervene. [Doc. 213]. Her request came on for hearing on August 29, 2016. Stephens failed to appear at the hearing. On October 10 and 13, 2016, Minute Order Nos. 21 and 35 were issued denying Stephens' Request. Minute Order Nos. 21 and 35. [Docs. 344 and 365].

51. On November 14, 2016, Maelani Lee informed BLNR in writing that she would not be attending any of the evidentiary hearings. On November 25, 2016, Maelani Lee further requested that she no longer receive service of the pleadings and orders in this proceeding. [Doc. 421].

52. On December 7, 2016, Stephens again filed a Motion to be a Party. [Doc. 420]. The hearing on Stephens' second request to be a party was heard on December 12, 2016. Stephens was present at the hearing and her motion was orally denied. Stephens' request was untimely as it was filed over 6 months after the May 31, 2016 deadline set to file motions to intervene as parties. This contested case proceeding was also in its 15th day of ongoing testimony as of December 12, 2016.

53. Although intervenors Tabbada, Maelani Lee, DeLeon, and Kila's respective motions to intervene were granted, these individuals did not physically appear at the evidentiary portion of the contested case hearing as parties or otherwise participate in the proceedings.

C. PRE-HEARING PLEADINGS

54. During the June 17, 2016 hearing, July 18, 2016 was set as the deadline for filing pre-hearing motions and witness lists. August 1, 2016 was set as the deadline for filing responses to pre-hearing motions, objections to witness lists, and motions to reconsider dismissal. A hearing on pre-hearing motions was scheduled for August 5, 2016. Minute Order No. 13. [Doc. 115].

55. *See* Appendix A for a summary of all pre-hearing motions filed by July 18, 2016.

56. *See* Appendix B for a summary of all pre-hearing motions filed between July 19, 2016 and October 20, 2016.

57. On August 5, 2016, a second pre-hearing conference was held. Minute Order No. 16. [Doc. 238]. Represented were the following parties: UH Hilo, Petitioners, TIO, Fergerstrom, DeLeon, Kihoi, Kanuha, Camara, PUEO, Sleightholm, Maelani Lee, the Temple, Kanaele, Kakalia, Dwight Vicente, Kealoha, C. Freitas, and W. Freitas. Argument was held on the timely pre-hearing motions filed by the Temple, the Petitioners, Lee, Kihoi, Tabbada, Kanaele, Fergerstrom, and Dwight Vicente.

58. Certain pre-hearing motions could not be heard during the August 5, 2016 hearing so it was continued to August 12, 2016. Minute Order 15 [Doc. 185].

59. On August 12, 2016, a third pre-hearing conference was held. Represented were the following parties: UH Hilo, Petitioners, TIO, Kihoi, Kanuha, Fergerstrom, Camara, Sleightholm, PUEO, C. Freitas, W. Freitas, Kanaele, Tabbada, Kakalia, Dwight Vicente, Kealoha, and the Temple. Argument was considered on the timely pre-hearing motions filed by Petitioners, the Temple, and Fergerstrom.

60. Certain pre-hearing motions could not be heard during the August 12, 2016 hearing, so they were orally continued to August 29, 2016. Tr. 8/12/16 at 71:11-72:3.

61. On August 29, 2016, a fourth pre-hearing conference was held. Minute Order No. 21 [Doc. 344]. Represented were the following parties: UH Hilo, Petitioners, TIO, Fergerstrom, Kihoi, Kanuha, Camara, PUEO, Kanaele, Kakalia, Dwight Vicente, Sleightholm, the Temple, W. Freitas, and C. Freitas. Argument was considered on the

timely pre-hearing motions filed by Kihoi, Fergerstrom, TIO, the Temple, and PUEO.

D. SETTING THE ISSUES

62. On July 18, 2016, PUEO filed a Motion to Set the Issues, requesting that the Hearing Officer identify the specific issues to be addressed during the contested case hearing. [Doc. 99]. As summarized in Appendix A, multiple pleadings were filed both opposing and supporting PUEO's motion.

63. During the August 29, 2016 motion hearing, PUEO's Motion to Set the Issues was heard. Minute Order No. 21 [Doc. 344]. The Hearing Officer requested that PUEO submit a Proposed Minute Order Granting PUEO's Motion to Set Issues setting forth the issues to be addressed and issues not to be addressed in the contested case hearing, as ruled upon at the hearing. Tr. 8/29/16 at 83:5-19.

64. PUEO was given a deadline of September 9, 2016 by which to submit its Proposed Minute Order Granting PUEO's Motion to Set Issues. All other parties could submit responses or objections by September 19, 2016. Minute Order No. 21 [Doc. 344]. A summary of those pleadings is contained in Appendix A.

65. On September 23, 2016, Minute Order No. 19 was issued granting PUEO's Motion to Set Issues. [Doc. 281]. A summary of pleadings filed in response is contained in Appendix B.

66. Minute Order No. 19 limited the issues to be addressed in the contested hearing to the following inquiries:

    a. Is the proposed land use, including the plans incorporated in the application, consistent with Chapter 183C of the Hawaii Revised Statutes, the eight criteria in HAR § 13-5-30(c), and other applicable rules in HAR, Title 13, Chapter 5 Conservation District?

    b. Is the proposed land use consistent with Article XII, Section 7 of the Hawaii State Constitution and *Ka Pa'akai O Ka'aina v. Land Use Comm'n. State of Hawai'i*, 94 Hawai'i 31, 7 P.3d 1068 (2000)?

    c. Is the proposed land use consistent with Article XI, Section 1 of the Hawai'i State Constitution and the public trust doctrine?

67. Minute Order No. 19 also specifically ruled that the following issues were not to be addressed in the contested case hearing because they were not germane to the CDUA and/or within the subject-matter jurisdiction of this contested case proceeding:

    a. The sovereignty of the Kingdom of Hawaii or any other issues relating to the purported existence of the Kingdom of Hawaii;

    b. Challenges to the legal status of the State of Hawaii; and

c. Challenges to the State's ownership and title to the lands related to this contested case hearing.

E. SITE VISIT

68. During the hearing on August 12, 2016, a site visit to Mauna Kea was scheduled for September 26, 2016. Minute Order No. 16. [Doc. 238]. Parties were given ten days from August 23, 2016 to respond to the proposed site visit.

69. On August 17, 2016, the following parties submitted site visit proposals and/or designations: W. Freitas, UH Hilo, Sleightholm, TIO, Petitioners, Fergerstrom, and C. Freitas. [Doc. 214-220]. On August 22, 2016, TIO filed Objections to the Petitioners' and C. Freitas' site visit recommendations. [Doc. 229 and 230]. On September 9, 2016, PUEO filed its site visit designation. [Doc. 255]. On September 14, 2016, Kihoi filed her site visit proposal. [Doc. 260].

70. At the August 29, 2016 pre-hearing conference, September 26, 2016 was set as the date for the Mauna Kea site visit. Minute Order No. 21 [Doc. 344].

71. On September 19, 2016, Minute Order No. 18 was issued which designated the individuals approved to attend the site visit to Mauna Kea, as well as the logistics for the site visit. Minute Order No. 18 [Doc. 274]. A summary of the multiple pleadings that were filed in response to Minute Order No. 18 is contained in Appendix B.

72. The site visit occurred on September 26, 2016. During the site visit, employees of the Office of Mauna Kea Management ("**OMKM**"), which is charged with the management of the University-managed lands on Mauna Kea, were present to facilitate the site visit. No party objected to their presence at that time.

73. The Hearing Officer had a reasonable period of time and conditions for viewing the general landscape and areas proposed for the TMT Project, and the site visit is considered reasonable and appropriate for the purposes of the case.

F. THE PRIOR CDUP WAS VOIDED BY THE BLNR

74. On October 14, 2016, the Board issued Minute Order No. 36, formally voiding the previously issued CDUP. Minute Order No. 36 [Doc. 376].

G. SCHEDULING THE EVIDENTIARY HEARING

75. On July 21, 2016, Minute Order No. 13 was issued to inform the parties that the evidentiary hearing for this contested case proceeding would commence in October 2016. [Doc. 115].

76. During the August 5, 2016, August 12, 2016, and August 29, 2016 hearings, the parties were repeatedly informed by the Hearing Officer that the evidentiary hearing would likely be scheduled for several weekdays during October 2016. Minute Order No. 16. [Doc. 238].

77. On September 8, 2016, Wurdeman filed a request to: (1) set a staggered briefing schedule for opening briefs, witness lists, written direct testimony, exhibit lists and exhibits; and (2) set the evidentiary hearing for some time after November 10, 2016, excluding certain dates for which Wurdeman represented that he had scheduling conflicts. [Doc. 254].

78. On September 20, 2016, a Notice of Contested Case Hearing was issued, informing the parties that the hearing would commence on October 11, 2016. [Doc. 276].

79. On September 23, 2016, Wurdeman submitted correspondence advising that he was unavailable on October 11, 2016. [Doc. 282]. Wurdeman represented that he would be out of state on matters for a client that was "set a number of months ago," and also to inquire whether the evidentiary portion of the hearing would begin as noticed on October 11, 2016. [Doc. 282].

80. On October 3, 2016, a fifth pre-hearing conference was held - where all parties were verbally ordered to submit final witness lists, exhibit lists, prehearing statements ("**PHS**"), and any subpoena requests by October 11, 2016. Tr. 10/3/16 at 78:19-21.

81. During the hearing on October 3, 2016, Wurdeman was advised that "you were on notice, considerable notice that the hearing is going to be in October. You didn't say anything." Tr. 10/3/16 at 103:12-14. Nevertheless, the commencement of the evidentiary portion of the contested case hearing was moved from the originally-scheduled date of October 11, 2016 to October 18, 2016, to accommodate Wurdeman's schedule, including a trip to a conference in Las Vegas. *Id.* at 21:20-24:12.

82. On October 6, 2016, an Amended Notice of Contested Case Hearing was issued, informing parties that the hearing would commence on October 18, 2016. [Doc. 325].

83. On October 10, 2016, Wurdeman filed a Notice of Withdrawal of Counsel. [Doc. 341]. As such, also on October 10, 2016, Petitioners' filed a List of E-Mail Addresses for Service of Process. [Doc. 342]. On October 11, 2016, Yuklin Aluli, Esq. and Dexter Kaiama, Esq. filed a Notice of Appearance of Co-Counsel on behalf of KAHEA. [Doc. 362].

84. On October 13, 2016, UH Hilo filed a Statement of Position. [Doc. 369]. On October 17, 2016, the Temple filed a Response to the UH Hilo's Statement of Position. [Doc. 386].

85. On October 17, 2016, a sixth pre-hearing conference was held. Wurdeman was not present and the Petitioners entered their own appearance as *pro se* parties, except for KAHEA, which was represented by Ms. Yuklin Aluli. Tr. 10/17/16 at 4:6-5:11.

86. Each of the Petitioners was questioned regarding Wurdeman's Notice of Withdrawal. Tr. 10/17/16 at 19:10-44:23. The Petitioners confirmed that Wurdeman filed the Notice of Withdrawal with their consent and that they were each prepared to proceed *pro se.* Tr. 10/17/16 at 19:10-45:3.

87. Given Wurdeman's last minute withdrawal, commencement of the evidentiary hearing

was continued to October 20, 2016. Tr. 10/17/16 at 111:9-111:12.

III. PROCEDURAL HISTORY: HEARING

88. The evidentiary hearing for this contested case proceeding commenced on October 20, 2016. *See* Appendix C for a summary of all hearing motions filed between October 20, 2016 and March 2, 2017.

89. Testimony was taken during the following forty-four days: October 20, 24, 25, 26, 27, 31, 2016; November 2, 15, 16, 2016; December 1, 2, 5, 6, 8, 12, 13, 16, 19, 20, 2016; January 3, 4, 5, 9, 10, 11, 12, 19, 23, 24, 25, 26, 30, 31, 2017; February 13, 14, 15, 16, 21, 22, 23, 27, 28, 2017; and March 1, 2, 2017.

90. At an October 17, 2016 pre-hearing conference, the parties were advised that each witness would be allowed to present a summary of his or her written direct testimony prior to testifying. The summaries were not to exceed ten minutes, and would be followed by any cross-examination and re-direct examination of the witness. Tr. 10/17/16 at 64:12-64:23.

91. On October 20, 2016, UH Hilo offered Mr. White as an expert in land use planning and analysis. Tr. 10/20/16 at 45:5-45:7. After hearing objections from Petitioners and Opposing Intervenors, it was determined that no parties or witnesses will be formally designated as experts and that the witnesses' credentials will simply go to the weight to be given his or her testimony. Tr. 10/20/16 at 52:24-53:21.

92. Based on the length of the cross-examinations conducted by the Petitioners and Opposing Intervenors over the previous five days, and pursuant to HAR § 13-1-32(h), on October 31, 2016, a thirty minute time limit was imposed on cross examinations, subject to extensions of time for good cause shown. Tr. 10/31/16 at 11:23-12:6. Throughout the proceeding, the Hearing Officer would warn parties when they had reached or exceeded the 30-minute limit. Upon a showing of good cause, the Hearing Officer would afford extensions of time for further cross-examination. *See*, *e.g.*, Tr. 12/20/16 at 172:18-22 (giving W. Freitas approximately an hour and a half to cross-examine Rechtman); *see also* Tr. 11/16/16 at 209:13-209:14; Tr. 12/1/16 at 142:22-144:7, 150:21-150:25; Tr. 12/2/16 at 85:10-85:13, 89:5-89:11; Tr. 12/8/16 at 157:14-159:13, 221:18-221:24; Tr. 12/13/16 at 31:17-31:21, 39:15-41:22.

93. UH Hilo presented its case-in-chief from October 20, 2016 through December 13, 2016. UH Hilo presented the following witnesses: Perry White ("**White**"), James Hayes ("**Hayes**"), Dr. Günther Hasinger ("**Dr. Hasinger**"), Chad Baybayan ("**Baybayan**"), Dr. Robert McLaren ("**Dr. McLaren**"), Wallace Ishibashi ("**Ishibashi**"), Dr. Clifford Smith ("**Dr. Smith**"), Hon. Walter Heen ("**Judge Heen**"), Fritz Klasner ("**Klasner**"), Richard Nees ("**Nees**"), Stephanie Nagata ("**Nagata**"), and Tom Nance ("**Nance**"). The written direct testimony of each of those witnesses were admitted into evidence and fully considered, as well as the curriculum vitae of White, Dr. Hasinger, Hayes, Dr. McLaren, Baybayan, Nees, Dr. Smith, and Nance. Minute Order No. 44; Exs. A-30, A-32, A-35, A-127, A-120, A-119, A-37, A-43.

94. On December 7, 2016, Fergerstrom requested that he be allowed to recall White as a witness, claiming that he was previously unable to effectively cross-examine White due to his purported lack of exhibits. *See* Fergerstrom's *Opposition to University of Hawaii Confirmation of Exhibits and Direct Written Testimonies of Witnesses to be Entered into Evidence; Motion to Recall Mr. Perry White*.

95. On January 11, 2017, Fergerstrom withdrew his motion to recall White. He also noted that he was simultaneously withdrawing a prior oral request to recall Dr. Gary Sanders ("**Dr. Sanders**"). Tr. 1/11/17 at 13:22-14:2.

96. TIO presented its case from December 16, 2016 through January 5, 2017. TIO presented the following witnesses: Professor David Callies ("**Prof. Callies**"), Naea Stevens ("**N. Stevens**"), Dr. Ed Stone ("**Dr. Stone**"), Robert Rechtman ("**Rechtman**"), Dr. Sanders, Dr. Heather Kaluna ("**Dr. Kaluna**"), and Dr. Paul Coleman ("**Dr. Coleman**").

97. A deadline to submit notice of subpoenas was set for one week after the close of TIO's case (Tr. 12/20/16 at 231:7-231:12).

98. On January 8, 2017, the Temple filed a Request to Subpoena David Lassner, President of the University of Hawaii System ("**President Lassner**") and DLNR Employee, to Testify on Whether DLNR has a Form to Fill Out Requesting Permission to Build an Altar on Mauna Kea. [Doc. 438 and 439].

99. On January 12, 2017, the Flores-Case 'Ohana served a Request for Witness Subpoena for "John Doe" and for a Subpoena Duces Tecum to disclose unidentified Mauna Kea Observatories Support Services employee involved with the destruction of ahu (shrine) on Mauna Kea in August of 2015. [Doc. 447]. The Flores-Case 'Ohana also served a Request for Witness Subpoena for Samuel Lemmo ("**Lemmo**"), Administrator, Office of Conservation and Coastal Lands ("**OCCL**"), DLNR, State of Hawai'i. [Doc. 448]. The Flores-Case 'Ohana subsequently filed its Requests with OCCL on January 25, 2017.

100. On January 19, 2017, UH Hilo filed its Objections to the Requests for Subpoenas for "John Doe," Lemmo, and President Lassner. [Docs. 443, 444, 445].

101. A hearing on the requests for subpoenas was held on January 25, 2017 (Tr. 1/25/17 at 215:22-243:10), on January 26, 2017 (Tr. 1/26/17 at 12:12-15:25), and on January 30, 2017 (Tr. 1/30/17 at 14:21-29:11). The requests for subpoenas for President Lassner and "John Doe" were denied as the offers of proof for the proposed testimony of both witnesses were considered to be irrelevant and immaterial. Tr. 1/26/17 at 12:12-13:10. The Flores-Case 'Ohana's Request for Subpoena for Samuel Lemmo was granted for the reasons stated in Minute Order No. 42 [Doc. 464].

102. The Petitioners and Opposing Intervenors presented their combined case from January 9, 2017 through March 2, 2017. They presented the following witnesses: Dr. Ku Kahakalau ("**Dr. Kahakalau**"), Professor Candace Fujikane ("**Prof. Fujikane**"), Marti Townsend ("**Townsend**"), Laulani Teale ("**Teale**"), David Frankel ("**Frankel**"), Case, Professor Jonathan Osorio ("**Prof. J. Osorio**"), Narissa Spies ("**Spies**"), Dr. Kehaunani Abad ("**Dr. Abad**"), Hansen, Diana LaRose (**"LaRose**"), Michael Lee, Fergerstrom, Dr. Taualii,

Ku‘ulei Kanahele (“**Kanahele**”), Ching, Professor Peter Mills (“**Prof. Mills**”), Davin Vicente (“**Davin Vicente**”), Dr. Manulani Aluli-Meyer (“**Dr. Meyer**”), Flores, Ward, Neves, Pisciotta, Sleightholm, Kihoi, Sara Kihoi (“**S. Kihoi**”), Ruth Aloua (“**Aloua**”), Hawane Rios (“**Rios**”), Professor Gregory Johnson (“**Prof. Johnson**”), Nanci Munroe (“**Munroe**”), Susan Rosier (“**Rosier**”), C. Freitas, Nelson Ho (“**N. Ho**”), N. Kaopua-Goodyear (“**Kaopua-Goodyear**”), Professor Joseph Keaweaimoku Kaholokula (“**Prof. Kaholokula**”), Tammie Noelani Perreira (“**Perriera**”), Tajon, Kakalia, Lemmo, Brian Cruz (“**Cruz**”), Mililani Trask (“**Trask**”), Kahuna Frank Nobriga (“**Nobriga**”), Kanaele, Wiremu Carroll (“**Carroll**”), Ronald Fujiyoshi (“**Fujiyoshi**”), and W. Freitas.

103. On January 23, 2017, Fergerstrom called Professor Williamson Chang (“**Prof. Chang**”) to testify regarding challenges to the State of Hawai‘i’s title to Mauna Kea. Tr. 1/23/17 at 156:18-166:25. Based upon the offer of proof submitted by Fergerstrom, Prof. Chang’s testimony was excluded on the grounds that it was irrelevant and immaterial to the issues in this proceeding. Tr. 1/23/17 at 167:1-11; Minute Order Nos. 14 [Doc. 124], 17 [Doc. 245], 19 [Doc. 281], 25 [Doc. 348], and 29 [Doc. 352].

104. PUEO presented its witnesses on February 15, 2017 and February 21, 2017. PUEO presented the following witnesses: Keahi Warfield (“**Warfield**”), Richard Ha (“**R. Ha**”), Elroy Osorio (“**E. Osorio**”), and William Brown (“**Brown**”).

105. On February 23. 2017, Holi testified as a Hearing Officer witness.

106. No other witnesses were called or scheduled for testimony other than those set forth above.

IV. PROCEDURAL HISTORY: POST-HEARING

107. On March 1, 2017, a deadline of March 9, 2017 was set for parties to file written motions to move testimonies and exhibits into evidence that had already been introduced or referred to in the evidentiary portion of the contested case hearing. No new exhibits were to be included if not previously introduced or referred to before the close of the evidentiary hearing on March 2, 2017. March 16, 2017 was set as the deadline for any objections if a party believed the exhibits sought to be moved into evidence were not “appropriate, or grounded, or relevant”. Tr. 3/1/17 at 253:10-253:21. *See* Appendix D for a summary of all evidentiary motions and post-hearing filings.

108. On March 1, 2017, a discussion about the availability of copies of the transcripts of the proceedings in select libraries was held. In addition, the Hearing Officer advised that the parties would be required to submit any proposed findings of fact and conclusions of law within thirty days from when the transcripts were made available. Tr. 3/1/17 at 256:2-256:9.

109. On April 19, 2017, Minute Order No. 43 was issued informing parties that complete copies of the transcripts were available for reviewing at five locations. Minute Order No. 43 [Doc. 552]. Minute Order No. 43 established the deadline of May 30, 2017 for any proposed decision and order, findings of fact and conclusions of law. Minute Order No. 43 [Doc. 552].

110. Multiple motions for reconsideration of Minute Order No. 43 were filed and subsequently denied by Minute Order No. 50 [Doc. 646]. *See* Appendix D.

111. On April 20, 2017, Minute Order No. 44 was issued, ruling on all submitted motions to admit evidence. Minute Order No. 44 [Doc. 553].

112. Multiple motions for reconsideration of Minute Order No. 44 were filed and subsequently addressed by Minute Order No. 51 [Doc. 647]. *See* Appendix D. On May 26, 2017, Amended Minute Order No. 44 was issued. [Doc. 649].

FINDINGS OF FACT

I. THE DEVELOPMENT OF MODERN ASTRONOMY ON MAUNA KEA

A. THE GENERAL LEASE, THE MAUNA KEA SCIENCE RESERVE, AND THE UNIVERSITY MANAGEMENT AREA

113. In 1968, the State of Hawai‘i, through the BLNR, entered into a lease with the University of Hawai‘i for the Mauna Kea Science Reserve ("**MKSR**"), General Lease No. S-4191 (the "**General Lease**"). By its terms, the General Lease terminates on December 31, 2033. Written Direct Testimony ("**WDT**") Nagata at 1; Ex. B.17f; Tr. 11/02/16 at 179:20-23.

114. The General Lease allows the University to use the leased land as follows:

> 4. Specified Use. The land hereby leased shall be used by the Lessee as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex.
>
> Activities inimical to said scientific-complex shall include light and dust interference to observatory operation and certain types of electric or electronic installation on the demised lands, but shall not necessarily be limited to the foregoing.

Ex. B.17f at 3-4.

115. The MKSR includes approximately all of the land on Mauna Kea above the 12,000 foot elevation, except for certain portions that lie within the Mauna Kea Ice Age Natural Area Reserve ("**NAR**"). WDT Nagata at 1; Ex. A-9 at 6-1.

116. The entire MKSR is designated as part of the State of Hawai‘i Conservation District Resource Subzone. Uses on the land are subject to the DLNR's Conservation District Rules (HAR Chapter 13-5) and any associated permit conditions. WDT Nagata at 1; Ex. C-2 at 2 (WDT Sanders).

117. The MKSR is administered by the DLNR as State land under the authority and direction

of the BLNR. The MKSR is comprised of 11,288 acres, which the University's Master Plan describes as a 10,763-acre cultural and natural preserve and a 525-acre Astronomy Precinct. The University manages the MKSR, the Hale Pōhaku mid-level facilities, and the Summit Access Road (between Hale Pōhaku and the MKSR, including 400 yards on either side of the road, excluding the NAR). Collectively, those areas are referred to as the "**UH Management Area**." WDT Nagata at 1, 4-5.

B. THE DEVELOPMENT OF MODERN ASTRONOMY FACILITIES ON MAUNA KEA PRIOR TO 2000

118. The first road to the summit area of Mauna Kea—referred to as the Mauna Kea Access Jeep Trail—was established in 1964 to support astronomical testing. Ex. A-3/R-3 at 3-208.

119. The University began operating an observatory on Mauna Kea in 1968. Thereafter, a series of world class astronomical observatories were built in the summit region of Mauna Kea:

a. The University 2.2-meter Telescope, which became operational in 1970;

b. The United Kingdom Infrared Telescope ("**UKIRT**"), which became operational in 1979;

c. The NASA Infrared Telescope Facility ("**IRTF**"), which became operational in 1979;

d. The Canada-France-Hawai‘i Telescope ("**CFHT**"), which became operational in 1979;

e. The Caltech Submillimeter Observatory ("**CSO**"), which became operational in 1986;

f. The James Clark Maxwell Telescope ("**JCMT**"), which became operational in 1986;

g. The Very Long Baseline Array ("**VLBA**"), which became operational in 1992;

h. The W. M. Keck Observatory, the first phase of which ("**Keck I**") became operational in 1992, and the second phase of which ("**Keck II**") became operational in 1996;

i. The Subaru Observatory ("**Subaru**"), which became operational in 1999;

j. The Gemini North Observatory ("**Gemini**"), which became operational in 1999; and

k. The Submillimeter Array ("**SMA**"), which became operational in 2002.

Ex. A-3/R-3 at 3-208 to 3-210.

120. The past construction of these observatories has had cumulative impacts on cultural, archaeological, and historic resources that are considered substantial, significant, and adverse. Ex. A-3/R-3 at 3-214.

121. Existing astronomical observatories are prominent visual elements in the summit area of Mauna Kea. At least one of the existing observatories on the summit ridge is visible from approximately 43 percent of Hawai‘i Island. According to 2000 U.S. Census data, 72 percent of the Island's population reside within that viewshed area. At the summit ridge, the existing observatories obscure portions of the 360-degree panoramic view from the summit area. Overall, the existing level of the cumulative visual impact from past observatory construction projects at the summit ridge area has been considered to be substantial, significant, and adverse. Ex. A-3/R-3 at 3-217 to 3-218; Tr. 11/15/16 at 24:1-8; Ex. A-5/R-5, App. M at 50-54; Ex. A-54 at 50-54.

122. Development of the existing observatories also significantly modified the preexisting terrain. The tops of certain pu‘u, or cinder cones, were flattened to accommodate the foundations for observatory facilities. Some materials removed from the pu‘u were pushed over the sides of the cinder cones, creating steeper slopes that are more susceptible to disturbance. Consequently, the existing level of cumulative impact from preexisting observatories on geology, soils, and slope stability is considered to be substantial, significant, and adverse. Ex. A-3/R-3 at 3-218 to 3-219.

C. THE DEVELOPMENT AND IMPLEMENTATION OF THE 2000 MASTER PLAN AND THE OFFICE OF MAUNA KEA MANAGEMENT

123. In response to the concerns raised in an audit performed in 1998 that was critical of the University's management of the cultural and environmental resources in the MKSR, the University began preparing a new master plan for the MKSR. Ex. B.17e. On June 16, 2000, after nearly two years of work by an advisory committee and two series of public meetings, the University Board of Regents ("**BOR**") adopted the Mauna Kea Science Reserve Master Plan ("**Master Plan**"), which established management guidelines for the UH Management Area. The process reflected the Hawai‘i Island community's deeply rooted concerns over the use of Mauna Kea, including respect for Hawaiian cultural beliefs and practices, protection of environmentally sensitive habitat, recreational use of the mountain, as well as astronomical research. The Master Plan is an internal policy and planning guide for the University to promote the goal of balanced stewardship of the UH Management Area through on-island community based management. WDT Nagata at 2; Tr. 12/8/16 at 27:6-8, 28:3-9; WDT Heen at 1; Ex. A-48 at Chapter XII.

124. The purpose of the Master Plan is to guide the University towards achieving the Plan's goals, which include: (1) preserving and protecting the cultural, natural, educational/scientific, and recreational resources in the managed areas of Mauna Kea; (2) preserving and protecting the cultural and natural landscape; (3) preserving and managing

the cultural resources for future generations, protecting opportunities to engage in cultural practices; (4) defining areas for the use of cultural, natural and recreational resources; (5) protecting the right to exercise traditional cultural practices; (6) allowing for sustainable, integrated planning and management; and (7) protecting and enhancing astronomy research. The Master Plan recognized Mauna Kea as a community resource and community involvement should be part of the management. A major feature of the Master Plan was the establishment of a community-based management entity to achieve the plans' goals. WDT Nagata at 2; Ex. A-48 at X-7 to X-8.

125. The Master Plan's community-based management entity is composed of OMKM, the Mauna Kea Management Board ("**MKMB**"), and Kahu Kū Mauna ("**KKM**") ("Guardians of the Mountain"). The Master Plan recognized the need for a single entity to manage the MKSR and suggested the name OMKM and that it be housed in UH Hilo under the Chancellor. MKMB and Kahu Kū Mauna are composed of volunteers who live on the island of Hawai'i with a strong desire to see that the lands under the University responsibility are properly managed. Both the MKMB and Kahu Kū Mauna advise OMKM and the UH Hilo Chancellor. The management entity oversees the management of the UH Management Area on Mauna Kea. WDT Nagata at 2-3; Tr. 12/8/16 at 28:3-9; Tr. 12/8/16 at 101:3-102:6, 105:9-105:14; WDT Heen at 1-3; Ex. A-9 at 3-9 to 3-11; Ex. A-48 at X-3 to X-8.

126. The MKMB is comprised of seven members of the community. It conducts regular meetings using the state's sunshine law as guidelines for noticing of meeting agendas six days prior to the meeting. Written minutes are taken and approved at subsequent meetings. In carrying out its advisory function, the MKMB, with input from Kahu Kū Mauna, reviews and approves management policies, programs and actions, and makes recommendations to the UH Hilo Chancellor on proposed major projects. WDT Nagata at 3; Tr. 12/8/2016 at 185: 25 -187: 23; Ex. A-9 at 3-11; Ex. A-111; Ex. A-62; Ex. A-133.

127. Kahu Kū Mauna is an assembly of native Hawaiians who advise OMKM, MKMB and the Chancellor of UH Hilo on cultural matters pertaining to the UH Management Area. Kahu Kū Mauna serves as important advisors on matters affecting the cultural integrity of Mauna Kea, including land uses on Mauna Kea and assists with the development of rules and management guidelines, and developing programs to educate visitors about the cultural, historical, spiritual and archaeological values of Mauna Kea. Kahu Kū Mauna conducts regular monthly meetings. Written minutes are taken and then approved at subsequent meetings. In addition to these regular meetings, the members of Kahu Kū Mauna attend retreats and visit specific sites. Tr. 2/27/17 at 117:20-119:7. OMKM includes input from Kahu Kū Mauna in its recommendations to the MKMB for decision making. WDT Nagata at 2-3; Tr. 12/2/16 at 80:3-80:8; Ex. A-9 at 3-9, 3-11; A-11 at 3-3; Ex. A-48 at X-8, XI-4; A-52; A-62 at 4; A-133 at 4; Tr. 11/16/16 at 133:4-133:8; 12/2/16 at 41:15-41:19; Tr. 12/8/16 at 102:12-102:18, 105:9-105:14, 249:6-249:9; Tr. 12/12/16 at 203:18-204:4, 208:8-208:10; WDT Heen at 2; Tr. 10/27/16 at 215:3-216:15 and 326:16-327:1, 328:9-331:7; Tr. 2/27/17 at 119:14-120:22.

128. There are no *per se* qualifications to be a member of Kahu Kū Mauna. Applicants are interviewed by Kahu Kū Mauna council members. Council members look for individuals

with love and connection to Mauna Kea and the Hawaiian community. Members also have an awareness of Hawaiian cultural practices, traditions and significant landforms as applied to traditional and customary use of Mauna Kea. There is a conscious effort to have island-wide representation. Council members present selected candidates to MKMB, which then confirms membership on the Kahu Kū Mauna council. Tr. 12/8/16 at 102:12-20; Tr. 12/12/16 at 203:18-24; Tr. 2/27/17 at 119:20-120:7; A-9 at 3-11

129. Kakalia, who served as a member on Kahu Kū Mauna for two 4-year terms, vouched for the integrity of Kahu Kū Mauna and expressed her opinion that Kahu Kū Mauna was formed with high integrity and has evolved into a council that has discussions and provides recommendations about appropriate cultural and native Hawaiian issues affecting Mauna Kea. PHS/WDT Kakalia at 1; Tr. 2/27/19 at 148:4-148:8.

130. In addition, an environmental advisory group was established by MKMB which provides input and guidance on environmental issues and management. In particular, the Environment committee was instrumental in assisting with the development of the Natural Resources Management Plan ("**NRMP**") and the Maunakea Invasive Species Management Plan ("**MISMP**"), sub-plans of the CMP. WDT Heen at 2; Tr. 1/31/17 at 59:17-59:20; A-9 at 3-11; Ex. A-10 at Acknowledgements; Ex. A-40 at 4; Ex. A-48 at X-7; Ex. A-133 at 5; Ex. A-136; WDT Ward at 4-5. Ward testified that she was a member of the Environment Committee. Tr. 1/31/17 at 32:6-32:9.

131. OMKM's primary mission is the protection, preservation, and enhancement of cultural and natural resources in the UH Management Area on Mauna Kea. WDT Nagata at 2-3; Ex. A-9. OMKM is charged with and concerned about how to reasonably and rationally protect Mauna Kea from uncontrolled and unwarranted intrusion and how to preserve native Hawaiian traditional and customary rights and the mountain's natural environment, as required by the Hawai'i State Constitution, state statutes, and court decisions. OMKM's activities have sought to conform to the DLNR's laws, rules and regulations. WDT Heen at 1; Ex. A-9.

132. After adoption of the Master Plan, OMKM, with guidance from MKMB, developed a program to carry out the provisions of the Master Plan. OMKM and MKMB's subsequent planning was guided by cases from the Hawai'i Supreme Court to identify cultural and natural resources, assess potential adverse impacts to those resources by existing and proposed uses, and consider feasible measures to those mitigate impacts. In order to gather information on how best to manage Mauna Kea's varied resources, OMKM established close contacts with the astronomy, native Hawaiian, and environmentally concerned communities. WDT Heen at 1.

133. The management entity's roles and responsibilities include: (1) implementing the Master Plan and the CMP and its sub-plans; (2) developing and implementing management policies; (3) reviewing project proposals; and (4) overseeing day-to-day management of public activities, commercial tours, filming, research, and outside-the-dome observatory activities within the UH Management Area. WDT Nagata at 3; Ex. A-52; Tr. 12/8/16 at 28:10-28:19; Tr. 10/27/16 at 215:3-216:18, 326:16-327:1, and 328:9-331:7.

134. The management entity is also responsible for reviewing project proposals including major projects such as the TMT Project. The MKMB, with input from Kahu Kū Mauna, makes recommendations to UH Hilo Chancellor to approve or disapprove major projects presented to them by OMKM. WDT Nagata at 2-3; WDT: Heen at 2; Ex. A-62 at 2-6; Ex. A-133 at 3-5; Ex. 111; Tr. 12/8/16 at 105:9-105:14; Tr. 128/2016 at 249: 6 to 249:9; Ex. A-9 at 39 to 3-11.

135. The University recognizes the importance of maintaining compatibility and consistency of recommendations between the Master Plan and the Comprehensive Management Plan ("**CMP**") and subplans, which is described in greater detail below. Ex. A-9 at 7-58; A-73. Provisions of the Master Plan that were subsequently incorporated by reference into the CMP and its sub-plans. For example: the management structure including OMKM, MKMB, and the native Hawaiian advisory council, Kahu Kū Mauna; conditions for siting telescopes; allowable development; and major project review process. Ex. A-9 at 3-9 and 3-11; A-13 at D-2; A-60 Ex. A-9 at 7-43 to 7-44, Table 7-11 at 7-45, and 7-46 to 7-47. The BLNR has approved the CMP and sub-plans in full. WDT Nagata at 4; Ex. A-9, A-11, A-12, A-13, A-50, A-60.

D. THE DEVELOPMENT OF THE COMPREHENSIVE MANAGEMENT PLAN AND ITS SUB-PLANS

136. In the summer of 2005, UH Hilo began developing the CMP to govern its internal management of the MKSR. The CMP contains: (1) a summary of the description of the resources within the UH Management Area; (2) identification of uses and activities; (3) identification of threats to Mauna Kea's resources; and (4) a total of 103 management actions and associated reporting requirements to mitigate threats and to protect various resources in the UH Management Area on Mauna Kea. The CMP is an integrated planning guide for resource management that is designed to promote the protection of Mauna Kea's unique cultural, natural, recreational, educational, and scientific resources. The CMP describes and identifies the resources, uses, and activities that occur on the mountain. The CMP also identifies threats to resources and provides management actions that would help mitigate the help preserve and protect the resources. Ex. A-9; Tr. 12/8/16 at 28:23-29:17. The CMP is an adaptive management plan that provides general management guidelines and does not provide full or complete details on all projects contemplated. WDT Nagata at 3-4; Ex. A-9 at 2-3; Ex. A-50.

137. The University presented the draft CMP to Kahu Kū Mauna for the council's comments and input on the document. Tr. 2/27/17 at 108:7-108:22. Pursuant to the University's review process, the CMP was thereafter submitted to MKMB for review, and then to the BLNR for approval. Ex. A-9 at A4-17.

138. On April 8 and 9, 2009, the BLNR held its regular meeting in Hilo to consider the CMP. BLNR approved the CMP on April 9, 2009, on the condition that the University submit for approval four (4) additional sub-plans, a Project Development Framework, annual status reports on the development of each sub-plan, and status reports on the development of the various management actions. WDT Nagata at 3-4; Ex. A-9; Ex. A-50.

139. Some of the Petitioners requested that a contested case hearing be held on the BLNR's decision to approve the CMP. After that request was denied, Petitioners appealed to the Third Circuit Court. *See Mauna Kea Anaina Hou v. Board of Land and Natural Resources*, Civ. No. 09-1-336, in the Circuit Court of the Third Circuit, State of Hawai'i. The Court ruled that Petitioners had failed to show that their rights, duties, and privileges had been adversely affected by the acceptance and adoption of the CMP. As a result, the Court had no jurisdiction under Haw. Rev. Stat. § 91-14 to hear the appeal and dismissed the appeal. Ex. A-98. The Petitioners then appealed that ruling to the Intermediate Court of Appeals on the limited question of whether the BLNR and the Third Circuit Court had correctly ruled that Petitioners were not entitled to a contested case hearing. The Intermediate Court of Appeals affirmed the Third Circuit Court's decision in *Mauna Kea Anaina Hou v. University of Hawai'i*, 126 Haw. 265, 269 P.3d 800 (App. 2012).

140. To satisfy the conditions imposed by the BLNR, the University developed and submitted its Project Development Implementation Framework and the four sub-plans to the BLNR. OMKM held open houses in Waimea, Kona and Hilo on September 1, 2, and 3, 2009, respectively, presenting the Cultural Resources Management Plan ("**CRMP**") and the NRMP. Exs. A-92, A-93. The four sub-plans – the CRMP, the NRMP, the Decommissioning Plan for the Mauna Kea Observatories ("**Decommissioning Plan**"), and the Public Access Plan for the UH Management Area on Mauna Kea ("**PAP**") – were each approved by the BLNR on March 25, 2010. WDT Nagata at 4; Ex. A-52, Ex. A-60, WDT McLaren at 1; Tr. 11/02/16 at 161:12-17, 180:17-182:2; Exhibits A-10 to A-13; Tr. 12/8/16 at 29:18-30:8 WDT Nees at 2; Tr. 12/05/16 at 24:12-16.

141. The CRMP was developed as part of OMKM's efforts to create a comprehensive management plan for the UH Management Area on Mauna Kea. The CRMP provides OMKM and the University with the tools needed to meet their cultural resource management responsibilities and objectives in several ways, including: (1) promoting a greater understanding of the rich cultural heritage of Mauna Kea; (2) preserving and managing cultural resources in a sustainable manner so that future generations will be able to share in and contribute to a better understanding of the historic properties that exist in the summit region, which is of major cultural significance to Hawaiians; (3) maintaining opportunities for native Hawaiians to engage in cultural and religious practices; and (4) preserving the cultural landscape for the benefit of cultural practitioners, researchers, recreationalists, and other users. WDT Nagata at 4; Ex. A-11 at i-ii.

142. Cultural resource management under the CRMP involves archaeological inventory surveys of historic properties (archaeological sites including burials), development and implementation of a plan for long term monitoring of historic properties; development and implementation of a burial treatment plan; implementation of management actions related to access in general and specifically for cultural practices; education and outreach activities; and compliance with applicable state, federal rules and regulations. Ex. A-11 at Chapter 4; Ex. A-21 at 4, App. A at 11; Ex. A-22 at 8; Tr. 12/20/16 at 177:2-7, 210:16-22.

143. The CRMP considers specific activities in terms of the potential threats or impacts that

each may have on historic sites and properties as well as objects of contemporary value, and presents appropriate management measures to avoid or minimize impacts. Consultation for the CRMP has focused on native Hawaiian organizations, including the Kahu Kū Mauna Council, Hawaiian Civic Clubs in Waimea, Kona, Hilo, and Pahala on Hawai‘i Island, the Office of Hawaiian Affairs ("**OHA**"), Historic Preservation Committee, the Hawai‘i Island Burial Council ("**HIBC**"), and Royal Order of Kamehameha ("**ROOK**"). Ex. A-11 at ii, 6-1.

144. The focus of the NRMP is the protection and preservation of natural resources in the UH Management Areas on Mauna Kea. The NRMP provides detailed information on threats to natural resources and development of a management program to conserve these resources. The NRMP is based on a scientific framework that includes a comprehensive review of existing scientific studies, biological inventories, and historical documentation that identifies the current state of knowledge of resources and management activities as well as the effectiveness of current management actions. Community consultation is part of the process, with consultation done through surveys, email and phone interviews, and meetings held in Hilo and Honolulu to gather input from scientific experts, natural resource managers, and concerned members of the public. Ex. A-10 at i.

145. The NRMP examines human uses of Mauna Kea, with particular emphasis on their current and potential impacts on natural resources. The NRMP offers specific management actions to reduce the identified threats to natural resources and to guide adaptive responses to future threats. It also details a process for establishing and implementing a natural resources management program. The overarching goal of the NRMP is to help OMKM achieve its mission by providing natural resource management goals, objectives, and activities that protect, preserve, and enhance the natural resources of Mauna Kea. Ex. A-10 at i.

146. One of OMKM's primary areas of concern and one that is addressed in the NRMP is the prevention and control of invasive species. To that end, OMKM developed the MISMP. Ex. A-40. The plan was reviewed by both the Kahu Kū Mauna and MKMB and its implementation is supported by the Hawai‘i Ant Lab and Big Island Invasive Species Committee. WDT Klasner at 5; Ex. A-40; Ex. A-10 at 4.2:21-36.

147. As part of the MISMP, all vehicle operators are asked to inspect their vehicles daily. Tr. 12/6/16 at 17:3-17:8; Ex. A-40 at 20. If a vehicle is observed having mud on the flaps or on the tires, rangers will identify the vehicle operator and, if it is someone operating under a permit, the operator is sent down the mountain immediately and is not allowed to return until the vehicle has been cleaned and is banned for that same day. Tr. 12/6/16 at 17:9-17:22.

148. A DLNR-approved biologist inspects all large vehicles, meaning vehicles with three or more axles. The biologist inspects the undercarriage and wheel wells. The biologist inspects inside the vehicle, underneath the floor mats, under the seats, and behind the seats. The biologist inspects for any sign of biological material, plant, soil, seed, and/or insects. If any is found that cannot be remedied on the spot, the vehicle is rejected and the operator is told to clean the vehicle and reschedule an inspection. Tr. 12/6/16 at

54:18-55:4. These inspections take place below Puʻu Huluhulu in either an observatory baseyard, transportation company baseyard, or at the OMKM office. Ex. 48 at 7-15; Tr. 12/6/16 at 63:11-63:22.

149. The PAP provides a set of principles and policies to guide OMKM in the development of management actions relating to public and commercial activities and to regulate those activities in the UH Management Area. The PAP provides a summary of current public activities, including cultural, commercial, and public visitation, snow play, hunting and hiking. The recommended polices are based, in large part, on data collected by the OMKM Rangers, information from interviews with community members, and guidance obtained during round table discussions with members of the various constituencies interested in and involved with Mauna Kea. WDT Nagata at 4; Ex. A-12 at i; Tr. 12/8/16 at 29:24-30:2.

150. The PAP recognizes that native Hawaiians have the right to exercise their customary and traditional practices on Mauna Kea subject to reasonable regulation as provided by law. Ex. A-12 at 5-3; Tr. 12/13/16 at 61:4-61:13.

151. The Decommissioning Plan establishes a process framework for eventual removal of observatories and the restoration of sites. The Decommissioning Plan can be used by both existing and future observatories on Mauna Kea to ensure that the DLNR as the landowner, the University as the lessee, and the observatories as sublessees have clear expectations of the observatory decommissioning and restoration process. WDT Nagata at 4; WDT McLaren at 1; Ex. A-13 at i; Tr. 11/15/16 at 66:12-66:22; Tr. 12/8/16 at 30:3-30:8. The specifics of decommissioning for a facility can vary by location and community input. Tr. 11/15/16 at 137:21-138:2; Ex. A-13.

152. The decommissioning process begins with the submission of a Notice of Intent ("**NOI**"), followed by review and comment at several stages by OMKM, Kahu Kū Mauna, MKMB and the Environment Committee. Ex. A-38. The Decommissioning Plan recognizes the need for cultural sensitivity and calls for cultural considerations to be included as part of the deconstruction and restoration activities. Ultimate approval of the individual observatory's decommissioning plan rests with the University President and BOR. Review at the MKMB level provides an opportunity for community involvement and comment. WDT McLaren at 1; Ex. A-13 at 1-2, 18-33; Ex. A-38.

153. The Decommissioning Plan includes the Master Plan's general criteria for the siting of observatory facilities, including (1) minimizing the impact on wēkiu bug habitat; (2) minimizing the visual impact from towns and significant cultural resources; (3) avoidance of archaeological sites, and (4) proximity to roads so as to minimize disturbance to the natural terrain. Ex. A-13 at D-2; A-48 at 129-130. The Decommissioning Plan also cites factors for limiting observatory development including technical factors such as wind direction and view obscuration, and physical factors such as avoidance of biological, archaeological and geological features. Ex. A-13 at D-1. The Decommissioning Plan also summarizes the Master Plan's five types of observatory development that could be considered for development including Type IV, the next generation large telescope such as the TMT Observatory. Ex. A-48 at IX-37 to IX-39;

A-13 at 31-33. The Decommissioning Plan also addresses the future of astronomy on Mauna Kea, including the University's expectation that by the end of the current lease there will be fewer telescopes than existed at the time the plan was developed. Section 5 of the Decommissioning Plan states the University's long-term goal of having fewer observatories in the summit region, while maintaining a world-leading observatory complex for education and research in ground-based astronomy. WDT McLaren at 2; Ex. A-13 at i, 28-33; Tr. 11/02/16 at 161:5, 18, 24.

154. The Decommissioning Plan is consistent with Governor Ige's directive that the TMT Project site should be the last new site developed on the mountain and that any future development occur on already existing sites. The University confirmed that the TMT Project site is the last new area on the mountain where a telescope will be built. Ex. A-39; WDT McLaren at 3; Tr. 11/2/2017 at 164:13-164:22; Tr. 11/02/16 at 205:9-13, 206:9-13.

155. The Decommissioning Plan calls for all new telescopes and existing telescopes that renegotiate their subleases to develop a decommissioning funding plan. The purpose of the funding plan is to provide assurances that there will be sufficient funds available to finance the removal of a facility and restore the site when the time to decommission arises. Included in the funding plan is a cost estimate, and financial assurances mechanisms. A funding plan should be established prior to the commencement of permitted activities, incorporated into sublease terms and maintained until the sublease expires. Tr. 1/3/17 at 32:13-32:21; Ex. A-13 at 13-17.

156. While none of the subleases executed before the completion of the CMP and Decommissioning Plan are bound by the Decommissioning Plan, the sublessees are bound to any decommissioning and restoration terms set forth in their subleases or operating and site development agreements (*e.g.*, restore to even grade, remove all structures and visible improvements). Tr. 11/15/16 at 108:22-109:12; Exs. B.03k & B.03l; Tr. 11/15/16 at 123:11-14. While partial restoration could be contemplated, when the CMP was completed in 2009, the University asked for and received a commitment and understanding from the observatory sublessees to achieve decommissioning (including information indicating how the respective observatory would fund the decommissioning). Tr. 11/15/16 at 107:19-108:17; Tr. 11/02/16 at 232:15-233:3; *see*, *e.g.*, Ex. A-9 at App. A-9.

157. Whether or not an environmental assessment or CDUP will be required to decommission a given telescope is to be determined by DLNR. Tr. 11/02/16 at 212:19-213:9. The University, as the applicant, along with each facility, would prepare a project-specific environmental assessment to identify concerns and develop mitigation for decommissioning. Tr. 11/15/16 at 146:6-13.

158. Under the Decommissioning Plan, planning for decommissioning begins about 5 years prior to anticipated decommissioning. Tr. 11/15/16 at 158:22-159:22.

E. CURRENT AND FUTURE DECOMMISSIONING

159. TIO has committed to performing under the Decommissioning Plan. TIO formation documents include commitments by each of the members to be responsible for decommissioning. Tr. 1/3/2017 at 32:13-32:21, 55:1-55:6. The TMT Initial Decommissioning Funding Plan (Ex. C-39) is a commitment by the members of TIO to its decommissioning obligations. The plan calls for a sinking fund of a million dollars per year with adjustments for inflation commencing upon observatory operation to fund eventual decommissioning. The sinking fund will be fully funded and sufficient up to the end of the 50-year useful life of the TMT Project. Tr. 1/3/17 at 40:14-41:16, 147:20-148:1; Ex. C-39.

160. The University is responsible for funding and executing the decommissioning of its own facilities. The University owns four telescopes on Mauna Kea: UKIRT, JCMT, Hoku Ke‘a, and the University 2.2-meter Telescope. The University operates the University 2.2-meter Telescope and Hoku Ke‘a; UKIRT and JCMT are operated by other organizations. Tr. 11/15/16 at 112:11-114:16. Prior to transferring ownership of the UKIRT and JCMT facilities to the University, the University secured $2.5 million for each telescope from the United Kingdom to defray the anticipated costs of decommissioning those telescopes. Tr. 11/02/16 at 227:15-228:16; Tr. 11/15/16 at 65:21-66:16, 158:4-21. The IRTF is owned by NASA and operated by the University. The other 8 telescopes are both owned and operated by non-University entities. Tr. 11/02/16 at 161:25-162:6.

161. The University has committed to reducing the number of telescopes on Mauna Kea. Tr. 2/28/17 at 70:12-70:22. The University plans to decommission three (3) telescopes before the TMT Project is operational. WDT McLaren at 3; Ex. A-39; Tr. 11/02/16 at 164:13-165:5, 205:20-22; Tr. 11/15/16 at 118:25-119:14, 171:22-175:6. Two of these telescopes are confirmed: CSO and Hoku Ke‘a both submitted their NOI to decommission. Tr. 11/02/16 at 164:23-165:5. The University also committed to decommission UKIRT by the time TMT Project becomes operational. WDT McLaren at 3-4; Tr. 11/02/16 at 162:7-10; Tr. 11/02/16 at 164:23-165:5; Tr. 11/15/16 at 119:6-14.

162. In addition, VLBA and either JCMT or the SMA will likely be decommissioned by the end of 2033. Ex. A-13 at 34; Tr. 11/02/16 at 225:19-25; Tr. 11/15/16 at 121:14-122:7, 169:6-170:23.

163. The decommissioning of CSO, UKIRT and Hoku Ke‘a could be achieved by the time the TMT Project becomes operational. Tr. 11/15/16 at 119:25-120:11.

164. The decommissioning of CSO, UKIRT and Hoku Ke‘a will help to offset the impact created by the TMT Project. Tr. 11/15/16 at 142:16-143:11.

165. The CSO decommissioning will be done on Mauna Kea under the auspices of the Decommissioning Plan. Exact estimates on how long a facility will take to be decommissioned and what the exact process will be are not yet developed, but are expected to be reasonable and occur as promised. Tr. 11/02/16 at 216:19-217:7.

166. It is unlikely that the CSO site could be recycled as the site for the TMT project. Tr. 11/02/16 at 189:24-190:1. The TMT Project is not being proposed to be built on the UKIRT site because UKIRT is on the summit ridge, a more sensitive cultural area, and due to height restrictions. Tr. 11/02/16 at 193:13-194:3. For the same reasons, and although it could theoretically be built at these locations with extensive grading, the TMT Project is not being proposed to be built on any other existing site on the Kūkahauʻula Ridge. Instead, the TMT Project is being proposed to be built off the summit ridge area. Tr. 11/02/16 at 194:19-195:4.

F. ASTRONOMY DEVELOPMENT UNDER THE MASTER PLAN

167. The Master Plan delineates and identifies an area within the MKSR referred to as the Astronomy Precinct where astronomy-related development will be consolidated to maintain a close grouping of astronomy facilities roads, and support structure, and to minimize the potential impacts to natural and cultural resources in the summit region. Ex. A- 48 at IX-20 to IX-26; Tr. 12/12/16 at 168:15-169:14.

168. The Master Plan identifies five types of astronomy development and their locations (described as Areas A – F) that are allowed within the Astronomy Precinct. These include the redevelopment or expansion of existing observatory facilities or sites, and the development of a next generation large telescope such as the TMT Project. Ex. A-48 at IX-27 to IX-28. Under the Master Plan, new facilities proposed within the Astronomy Precinct are to be designed to: (1) avoid disturbing existing habitat areas and archaeological sites; (2) limit the extent of visual impacts from existing cultural sites and from downslope communities; (3) avoid the scattering of facilities by clustering within the development area, avoid impacts to other facilities including obscuration and wind flow patterns; (4) implement design measures to blend with the landscape; and (5) minimize development of new infrastructure by locating astronomy facilities near existing roads and utilities. Ex. A-48 at IX-20 to IX-23; WDT Nagata at 6; Tr. 12/8/16 at 32:7-32:21.

169. As described in the Master Plan, "Area E" within the Astronomy Precinct was identified as the anticipated location for a next generation large telescope such as the TMT. *See* Ex. A-1/R-1 at 1-6 & n.5; Ex. A-48 at IX-37 to IX-39 & Figure IX-15 at IX-25. The 13 North ("13N") site is located on the northwest slope area below the summit ridge in a location known as Area E. Ex. A-1/R-1 at 1-12, Figure 1.7. This site was recommended for a variety of reasons, as it would: (1) situate the observatory at a significant distance from historical and cultural sites including Kūkahauʻula and Lake Waiau; (2) minimize visibility of the observatory from significant cultural areas on the summit and from Waimea and Honokaʻa; (3) reduce wind shear forces; and (4) minimize the potential to obscure the views of existing observatories. The proposed location for the TMT Project in Area E will take advantage of the northerly extension of the summit ridge and ensure that the TMT Project will not be visible from the Hilo. Furthermore Area E is not considered good wēkiu bug habitat and Project-related disturbance will be minimized by using an existing roadway for access and installation of utilities. Tr. 11/15/16 at 41:20-22, 43:14-16; WDT Nagata at 9-10; Tr. 12/8/16 at 34:18-35:4; Ex. A-48 at IX-25, IX-35, IX-39; Ex. A-68.

170. Although the Master Plan does not discuss the EIS process, it is included in the review of a major project. There are four processes involved in the review and approval of a major project such as the TMT: (1) Master Plan Design Review; (2) EIS; (3) the University's approval process; and (4) submittal of a Conservation District Use Application (CDUA) to DLNR. The MKMB developed a framework for project development in the form of a flowchart. This framework illustrates the integration of the Master Plan's Design Review, EIS, the University's approval of the project, and submittal of the CDUA to DLNR. The MKMB approved the flowchart on October 14, 2009. As a condition of the approval of the CMP the BLNR required the University to submit this framework for approval. This flowchart was approved by the BOR on February 18, 2010, followed by the BLNR on March 25, 2010. WDT Nagata at 6; Exhibit A-48 at XI-4 to XI-12; Ex. A-52; Ex. A-58; Ex. A-59; Ex. A-60; Tr. 12/8/16 at 33:7-33:15; Ex. 111. The BLNR has therefore formally approved the Master Plan's major project review process. Ex. A-60.

171. The Master Plan's Design Review evaluates a project's design to ensure that a project: (1) conforms to the Master Plan's goals and objectives; (2) is consistent with the Master Plan's design guidelines; (3) relates harmoniously with the summit environment; (4) promotes resource conservation; and (5) does not contribute significantly to cumulative impact. WDT Nagata at 7; Ex. A-48 at XI-7 and XI-9; Tr. 12/8/16 at 33:16-33:23.

172. The Design Review is also intended to ensure that future projects in the MKSR conform to and implement the concepts, themes, and development standards and guidelines set forth in the Master Plan. The Master Plan contains a set of Design Guidelines to help direct development in a manner which integrates a facility into the summit environment. *See* Ex. A-111. Design Guidelines includes topics relating to facility siting; scale, heights and widths; color, roof (dome), and surface textures and materials; parking, roadway and utility development, and walls and signage. Ex. A-48 at XI-4 to XI-13; WDT Nagata at 6-8.

173. To assist the University with its Design Review, the Master Plan calls for the establishment of a Design Review Committee comprised of, but not limited to, professionals in the fields of architecture, landscape architecture, and engineering. In addition, MKMB and Kahu Kū Mauna, the developer and the Institute for Astronomy all have a representative on the Design Review Committee. WDT Nagata at 7; Tr. 12/8/16 at 33:24-34:2. For major projects such as the TMT Project, the Design Review Committee follows the Master Plan's Design Review process using the Design Guidelines for guidance in its examination of the overall design of the proposed observatory facility. Ex.t A-48 at XI-4 to XI-13.

174. The Design Review process involves four phases. Under Phase I, the developer is provided an orientation of the Master Plan's goals and objectives, overview of the design review process, and design guidelines. Under Phase II, schematics or conceptual drawings of the proposed project's design are reviewed (Schematic Design). MKMB as a whole reviews the outcome of Phase II, and, if it has no objections, the process is allowed to move to Phase III (Design Development). Under Phase III, a review of detailed drawings is performed, including, site plans, floor plans, and elevation plans. MKMB reviews the design outcome of Phase III. If there are no objections, the developer can

move to Phase IV (Construction Documents Review) and begin preparing its construction drawings. WDT Nagata at 7; Exhibit A-48 at XI-10 to XI-39; Exhibit A-52; Tr. 12/8/16 at 34:9-34:17.

175. 177. The second process in the review and approval of a major project is the preparation, review and approval of an EIS under Chapter 343, Hawai‘i Revised Statutes. The preparation of an EIS begins with the public scoping process followed by OMKM's review of the Draft EIS, a public comment period, responses to comments received, and preparation of a Final EIS. The MKMB reviews the Final EIS for the project and makes a recommendation to the appropriate University office or to the Governor on whether to accept the Final EIS. WDT Nagata at 8; Ex. A-52.

176. The third process is the University's approval process. In this stage, MKMB, with input from Kahu Kū Mauna, reviews and recommends approval or disapproval of the project to UH Hilo Chancellor, who in turn makes a recommendation to the University President and the BOR. The BOR makes the decision whether or not to proceed with the project. WDT Nagata at 8; Ex. A-52.

177. The fourth process involves the designation of the appropriate University agency to submit a CDUA to the DLNR. Upon approval of the project by the BOR, a CDUA is prepared. The MKMB reviews and approves the CDUA and recommends which agency within the University should submit the CDUA. A CDUA is then submitted to the DLNR. WDT Nagata at 8-9; Ex. A-52.

178. The TMT Project is currently in the fourth phase of the design review process. WDT Nagata at 10.

G. BLNR ONGOING SUPERVISION AND MANAGEMENT

179. The Board has jurisdiction over Conservation District lands, regulates and administers land uses in those lands, and retains management control over them – including the UH Management Area on Mauna Kea. The Board's jurisdiction also includes control over decisions affecting native Hawaiian traditional and customary practices. With respect to the UH Management Area, the BLNR has repeatedly exercised its authority and control by approving the CMP, sub-plans, and the University's project review and approval process. WDT Nagata at 11; Ex. A-50; Ex. A-60.

180. As a condition of the Board's approval of the CMP, it designated the BOR, the highest authority within the University, with the responsibility of implementing the CMP and sub-plans. The Board oversees the University's management of the UH Management Area. It requires the University to provide annual reports in writing and in person on the status of implementation of the CMP management actions. Every year since the BLNR approved the CMP in 2009, OMKM has prepared and submitted annual reports, beginning in 2010, on the status of the implementation of the CMP. WDT Nagata at 11-12; Ex. A-60; Exs. A-15 to A-22; Tr. 12/8/16 at 35:12-35:17.

181. The Board also retains land use management authority over Conservation District lands on Mauna Kea through HAR Chapter 13-5, *et seq*. Proposed astronomy development is a

land use on Conservation District lands on Mauna Kea and requires a Board-issued permit. Based on this, the BLNR retains ultimate management authority over Conservation District lands on Mauna Kea. WDT Nagata at 11-12.

182. For the TMT Project, the BLNR's management authority is further reflected in the BLNR considering the CDUA, directing that this contested case proceeding be held, and retaining responsibility for reviewing and accepting, rejecting, or modifying the Hearing Officer's recommended FOF and COL and accompanying decision and order. WDT Nagata at 12.

H. DEVELOPMENT OF THE UNIVERSITY MANAGEMENT EFFORTS

183. Management efforts have evolved and developed significantly over the last 15 years under OMKM. The most recent Hawai'i State audit report on the Management of Mauna Kea and the MKSR in August 2014 states: "we found that [the University] and DLNR have addressed many of our recommendations, including developing and implementing management plans for Mauna Kea's natural, cultural, and historic resources. The result is an improved and more comprehensive framework that coordinates the agencies' efforts to manage and protect Mauna Kea while balancing the competing interests of culture, conservation, scientific research, and recreation." Ex. A-34 at 36; WDT Hasinger at 6.

184. Most management actions contained in the CMP have either been implemented by OMKM or are in progress. Many actions are considered "ongoing" as they are long-term, continuous land management responsibilities. Mauna Kea's historical sites have been extensively surveyed and identified. The natural resources found in the summit region have been substantially surveyed and identified. OMKM continues implementation of baseline inventories of the natural resources on UH Management Area on Mauna Kea. Ex. A-22.

185. In 2012, OMKM hired Klasner as its first Environmental and Natural Resource Program Manager as part of its on-going efforts to fulfill its long-term commitment to preserve and protect the natural resources found within the MKSR. He is responsible for all the natural resource programs on the mountain, including developing programs and identifying collaborative partnerships that will help OMKM best achieve its overall goal to manage and protect lands managed by the University. WDT Klasner at 1; Tr. 12/8/16 at 38:1-19.

186. OMKM is continually in the process of removing fireweed and other invasive species from the Hale Pōhaku area road and summit areas. Rangers remove fireweed when they find it along the road and summit areas. In 2012, OMKM created a volunteer program to remove fireweed and other invasive weeds. To date, the program has engaged over 1,000 volunteers, who collectively have worked over 7,000 hours, removed over 1,500 bags of invasive weeds, and planted several hundred Mauna Kea Silversword plants. WDT Klasner at 5.

187. OMKM is working on restoring native vegetation, focusing on common native species, such as māmane, aweoweo, and puakala. OMKM is working with both botanists and

entomologists to understand and restore the basic habitat of some of the rarer species. Tr. 12/6/16 at 72:14-73:7.

188. The testimony of N. Ho, a witness for Sleightholm, focused on what he believes is a misplaced emphasis upon astronomy over environmental and cultural resources, as well as the past issues relating to the management of the mountain. *See generally* Ex. J-8 (Amended WDT Ho). However, N. Ho admitted that the follow-up to the 1998 State Auditor's Report indicated that most of the auditor's concerns were addressed. Tr. 2/22/17 at 32:12-38:14, 102:21-103:7.

189. Flores's position is based on an incorrect reading of OMKM's management documents and testimony to the contrary. His position that the University is not in compliance with the CMP because it has not been updated is incorrect. Ex. B.02a at 4; Tr. 1/30/17 at 31:16-17. When the BLNR approved the CMP, it only required the University or its designee to submit and present annual reports on the status of the CMP management actions. The BLNR does not require the University to prepare a five-year update, as Mr. Flores argued, but provides that OMKM may do one. Ex. B.02z at § 4.2.2 at 17. This language is permissive, not mandatory. OMKM's position is that a separate five-year review and a five-year amendment is premature because five years is too short a period to fully vet all management actions. If OMKM were to amend the CMP, it would be relatively minor edits, such as the spelling of place names and eliminating redundancies. Moreover, a five-year review is not necessary because OMKM's annual reports are cumulative and reflect everything that was done since the CMP was first implemented. Ex. A-133 at 5-6; Tr. 12/12/16 at 180:8-181:1. Therefore, all information that would have been included in a five-year review was and is incorporated in annual reports, such as OMKM's 2015 annual report. Exhibit A-21; Tr. 12/12/16 at 182:17-184:1.

190. The annual reports to the BLNR, beginning in 2010 to the most recent 2016, cite the management accomplishments that OMKM has done over the years. The 2016 report states that most of the CMP management actions have been implemented or in progress. Many of the actions are described as "ongoing" as they are long term, continuing land management responsibilities. All of the reports provide details on the implementation status with explanations for individual CMP management actions. The 2016 report includes details on the cumulative annual progression of the implementation status from 2010. Ex. A-22. In addition the U.S. Fish and Wildlife Service references OMKM's efforts and the adoption of the CMP and sub-plans and a procedure for formal review of projects all contribute to the protection and conservation of the wēkiu bug as such were reasons for removing the wēkiu bug from the candidate species list under the Federal Endangered Species Act. Ex. A-134a at 66377.

II. THE PROPOSED PROJECT

A. THE PROCEDURAL HISTORY OF THE TMT PROJECT

191. In 2000, the National Academy of Sciences recommended to prioritize a 30-meter segmented mirror telescope. Tr. 12/19/16 at 9:3-6.

192. In 2003, Caltech and the University of California formed the TMT Corporation, a California non-profit public benefit corporation, for the purpose of fostering astronomy through the building and operation of a thirty meter telescope. Tr. 12/19/16 at 9:6-12, 11:15-24.

193. The proposed location for the TMT Project at the 13N site was based on guidelines for siting a next-generation telescope (such as the TMT) in Area E as set forth in the Master Plan. Tr. 11/02/16 at 163:9-11; Ex. A-1/R-1 at 1-6 & n.5; Page A-4 & Figure A-1 of App. A to Ex. B of Ex. A-1/R-1; Ex. A-48 at IX-37 to IX-39. Site testing of the "seeing" conditions, such as turbulence and the impact on image quality at this site was conducted from 2003 through 2008. The results of the testing showed that this site is a world class site and possibly the best site in the world for an optical infrared telescope using adaptive optics. Tr. 01/04/17 at 30:16-31:7; Ex. A-3/R-3 at 2-11.

194. In 2008, the TMT Corporation in consultation with the University began assessing the development of the TMT Project in a location identified as "Area E" on the Northern Plateau of the summit of Mauna Kea. Pursuant to Chapter 343 of the Hawai‘i Revised Statutes, the University commenced environmental scoping activities for the TMT Project. WDT Hayes at 2; Tr. 10/25/16 at 118:14-23.

195. Advertisements were placed in the local papers notifying interested persons and organizations that an Environmental Impact Statement Preparation Notice/Environmental Assessment ("**EISPN/EA**") for the TMT Project was forthcoming. Interested persons and organizations – specifically including Petitioners KAHEA, MKAH, and Neves – were sent advance copies of the EISPN/EA. WDT Hayes at 2.

196. On September 23, 2008, an EISPN/EA for the TMT Project was officially published. The publication was announced that day by the State of Hawai‘i Department of Health's Office of Environmental Quality Control ("**OEQC**") in the *Environmental Notice*. Public scoping meetings were held throughout the State in October 2008. WDT Hayes at 2; Tr. 10/25/16 at 118:17-23.

197. On May 23, 2009, the Draft Environmental Impact Statement ("**DEIS**") for the TMT Project was published in the *Environmental Notice*. KAHEA, MKAH, and Neves submitted written comments on the DEIS. Ward submitted written comments on the DEIS on behalf of the Sierra Club's Hawai‘i Chapter. WDT Hayes at 2-3; Ex. A-76; Ex. A-77; Ex. A-78; Ex. A-80; Exs. A-82 to A-85; Exs. A-88 to A-91; Tr. 2/13/17 at 203:1-203:11.

198. The TMT Project's Final EIS ("**FEIS**"), which was prepared following the review of comments received during the DEIS review period, was issued on May 8, 2010. WDT Hayes at 2; Exs. A-2/R-2 to A-6/R-6.

199. On April 21, 2010, the MKMB reviewed the FEIS and recommended that UH Hilo Chancellor approve and sign it; that occurred on April 26, 2010. Ex. A-61; Ex. A-102. The Governor of the State of Hawai‘i accepted the TMT FEIS on May 19, 2010. WDT Nagata at 10-11; WDT Hayes at 2; Tr. 10/25/16 at 118:24-119:1; Ex. A-52; Ex. A-62 at

2-6; Ex. A-6/R-6.

200. The time to legally challenge the formal acceptance of the FEIS expired on August 7, 2010. Haw. Rev. Stat. § 343-7(c) (2011).

201. Although most of the Petitioners participated actively in the EIS process for the TMT Project, none of the Petitioners challenged the approval of the FEIS. Indeed, no challenges to the TMT Project's FEIS were ever filed. Tr. 10/25/16 at 119:1, 131:15-17; Tr. 2/13/17 at 171:4-171:10.

202. The TMT Project has complied with the EIS process required under HRS Chapter 343 and HAR, Title 11, Chapter 200.

203. Cruz, a rebuttal witness called by KAHEA and one of the authors of a preliminary draft of the Cultural Impact Assessment ("**Preliminary Draft CIA**"), claimed that the DEIS did not comply with HRS Chapter 343 because his recommendation that project proponents should strongly consider no further development atop Mauna Kea, which was included in the Preliminary Draft CIA, was not included in the Draft CIA that was attached to the DEIS. Tr. 2/28/17 at 123:24-124:1. Cruz's claim is not supported by law or the record. Initially, as detailed above, no one, including Cruz, challenged the approval of the FEIS. Cruz also admitted during his testimony that he does not have any expertise or experience in the preparation of an EIS. Tr. 2/28/17 at 161:7-19. He also conceded in his testimony that he did not read the DEIS in its entirety; but only read the CIA portion. Tr. 2/28/17 at 159:19-160:4. Notably, the Executive Summary in the beginning part of the DEIS specifically identifies and discusses a no action alternative to the building of the TMT Project. Ex. A-148a at S-9; *see also* Ex. A-148. The no action alternative is also identified and discussed in other parts of the DEIS. Ex. A-148a at 1-2, 4-5 through 4-7. Neither Cruz nor KAHEA cite to any law that was allegedly violated by presenting the no action alternative in the manner that it was presented in the DEIS. Accordingly, Mr. Cruz's assertion that the DEIS did not comply with HRS Chapter 343 is not credible. *See* Exs. A-147, A-149.

204. On May 19, 2010, MKMB reviewed the project, including TMT's scientific potential, project design, impacts (both positive and negative), and mitigation measures described in the TMT FEIS. MKMB, with input from Kahu Kū Mauna, recommended to UH Hilo Chancellor that she submit a recommendation to the University President and the BOR to approve the TMT Project. The BOR approved the TMT Project on June 28, 2010. WDT Nagata at 11; Ex. A-52; Ex. A-64.

205. Following the approval of the project by the BOR, the University prepared a CDUA for submittal to the DLNR. On September 1, 2010, the MKMB reviewed the CDUA, recommended that the UH Hilo Chancellor accept it, and requested the University President to designate UH Hilo as the appropriate agency within the University to submit the CDUA to the DLNR. The University President accepted this recommendation, and the UH Hilo Chancellor submitted the CDUA to the DLNR on September 2, 2010. Ex. A-1; WDT Nagata at 11; Ex. A-52; Ex. A-65; A-47.

B. FORMATION OF TIO

206. TIO was formed on May 6, 2014 as a Delaware limited liability company. Tr. 12/19/16 at 11:16-19; Ex. C-2 (WDT Sanders) at 1. TIO is a not-for-profit entity and an exempt organization under IRS regulations. TIO is comprised of the University of California, Caltech and governmental institutions from China, Japan, India and Canada. Ex. C-2 (WDT Sanders) at 1. Over time, TMT Corporation's role in the project has been reduced and transitioned to TIO. Tr. 1/4/17 at 77:11-20.

207. Upon its formation on May 6, 2014, TIO succeeded the TMT Corporation as the owner of the TMT Project. Tr. 12/19/16 at 13:15-20. TIO was formed so that the voting power (and observing time) could vary amongst the members and be proportionate to their respective contributions to the TMT Project. Tr. 12/19/16 at 10:9-20. In comparison, the TMT Corporation, a California corporation, did not allow for such unequal voting power. The TMT Corporation only allowed each member to have the same voting power. Tr. 12/19/16 at 10:3-14.

C. SUBLEASE BETWEEN THE UNIVERSITY AND TIO

208. On July 28, 2014, the University executed a written sublease ("**TIO Sublease**") for a portion of the UH Management Area to TIO. Ex. B.02f. Under the TIO Sublease, TIO agreed to pay rent on a graduated schedule that will eventually be approximately $1 million per year in about eight to ten years. Tr. 12/19/16 at 39:17-23; B.02f at 4-5. The TIO Sublease also requires TIO to decommission, remove its improvements, and restore the site at the end of the useful life of the proposed TMT Observatory, or in the event the General Lease between the University and BLNR is not extended or renewed. Ex. B.02f at 5-6, 8; Tr. 1/3/17 at 38:3-11, 165:21-25; Tr. 01/04/17 at 70:6-11.

209. The Flores-Case 'Ohana introduced the TIO Sublease and moved it into evidence in this proceeding as Ex. B.02f. It was received into evidence on April 20, 2017 as part of Minute Order No. 44.

D. CONSULTATION FOR THE PROPOSED PROJECT

210. Multiple levels of consultation with native Hawaiians and other interested parties regarding the TMT Project, including cultural practices and activities, were initiated in the 2000s. These efforts built upon earlier ongoing efforts that coincided with the management of the summit area by OMKM.

211. Prior to the CDUA being filed with DLNR, consultation on the TMT Project began as part of the EIS process.

212. As discussed above, advertisements were placed in local newspapers notifying interested parties that the EISPN/EA for the TMT Project was forthcoming. KAHEA, MKAH, and Neves were among the individuals sent advanced copies of the EISPN/EA. WDT Hayes at 2.

213. Advertisements also were placed to solicit participation and input from lineal descendants

in the cultural consultation process, as contemplated by the CRMP. Tr. 11/02/16 at 134:2-24; Tr. 12/12/16 at 44:21-45:4.

214. As part of the preparation of the development of a burial treatment plan for burials that may be found in the UH Management Area, in 2012, public burial notices were placed in the newspapers and in OHA's monthly publication, Ka Wai Ola. The advertisements sought individuals with knowledge about the identity and history of the burials on Mauna Kea and the appropriate treatment of unmarked burials. Ex. A-138, Appendix B. In 2004, burial notices were also placed in newspapers pertaining to the burial treatment plan for the Keck Outriggers Telescope project. Ex. A-11 at 4-47.

215. On May 8, 2010, the FEIS was published. WDT Hayes at 2. Approximately 780 Federal, State, and County agencies, organizations and individuals were on the mailing list for FEIS. Ex. A-5/R-5 at A-1 to A-10. Amongst those sent copies of the FEIS were: MKAH, Fergerstrom, Temple of Lono, KAHEA, Sierra Club, and ROOK I. *Id.* Other organizations and individuals who were mailed copies of the FEIS included Keomailani Von Gogh, Townsend, N. Ho, and R. Ha. *Id.*

216. The State Historic Preservation Division ("**SHPD**") of DLNR and OHA were consulted on which groups and individuals should be contacted for consultation on the CIA. Tr. 11/15/16 at 53:4-13. Approximately 64 individuals and organizations were contacted for consultation on the CIA for the TMT FEIS, including Flores, Ching, Neves, MKAH, Pisciotta, Fergerstrom, Kakalia, Kanaele, and KAHEA. Ex. A-5/R-5, App. D at 85-102; Tr. 11/15/16 at 50:21-52:9; *see also* Tr. 2/13/17 at 141:3-141:9, 141:16-142:14. Of those 64 organizations or individuals contacted, 25 responded and 18 people were interviewed. Tr. 11/15/16 at 50:21-51:10. Baybayan and Dr. Meyer were also consulted as part of the CIA. *Id.* SHPD and OHA provided comments on the CIA in writing. Ex. A-5/R-5, App. D. at ix-xi, 103-04; Tr. 12/12/16 at 45:5-45:17. Though Flores was sent information about consultation, he did not respond or otherwise participate in that process. Tr. 1/30/17 at 222:3-22; Ex. A-131.

217. Pisciotta testified that she made comments on behalf of MKAH, Neves, and Ching in 2009 that were included in the EIS process. Tr. 2/13/17 at 170:20-171:3. She also testified that she participated in the scoping meeting for the TMT EIS, reviewed the TMT DEIS and commented extensively twice. Tr. 2/13/17 at 203:1-203:11; Ex. C-43. Pisciotta acknowledged that she is aware that there is a time period to challenge an EIS that is approved by the Governor and that she did not challenge the FEIS for the TMT Project during this period. Tr. 2/13/17 at 171:4-171:10.

218. Aloua acknowledged that the consultation efforts described in Section 2.3 of Appendix G to the FEIS (the Archaeological Inventory Survey ("**AIS**") for the Mauna Kea Summit Area) can be considered consultation as defined in HAR Chapter 13-276. Tr. 2/15/17 at 82:18-21; Ex. A-132.

219. On September 2, 2010, the CDUA was submitted to DLNR. Ex. A-1/R-1; Ex. A-7/R-; Ex. A-8/R-8; Ex. A-23. On October 23, 2010, a notice of the application was published in OEQC's *Environmental Notice*. Ex. A-7/R-7 at 22. Copies of the CDUA were made

available for review at the Hawai‘i State Library, and the Kailua-Kona and Thelma Parker Public Libraries, as well as on OCCL's website. *Id.*

220. Written comments on the CDUA were submitted by a number of agencies, organizations, and individuals, including comments on behalf of KAHEA (represented by its then-executive director, Miwa Tamanaha, and Townsend), MKAH (represented by Pisciotta), Neves (claiming to represent ROOK I), Sierra Club Hawaii (represented by Ward), Ching, and the Flores-Case ‘Ohana. Ex. A-8/R-8 at 187-204, 207-08, 219-21, 239-43.

221. Extensive public hearings on the CDUA were held in Hilo and Kona. The hearings were noticed in the paper of record. Ex. A-7/R-7 at 37. The hearing in Hilo was held on December 2, 2010 at the Hawai‘i County Council Room, 25 Aupuni Street in Hilo. Approximately 125 members of the public attended the Hilo meeting, with 51 persons providing oral testimony. *Id.* The Kona hearing was held on December 3, 2010 at the Natural Energy Laboratory in Kona. Ex. A-7/R-7 at 22. Approximately 78 persons attended the Kona meeting, with 33 members providing oral testimony. *Id.*

222. MKAH, Neves, Ward, and Ching offered live testimony at the Hilo hearing on December 2, 2010. MKAH, Ward, Ching, and the Flores-Case ‘Ohana testified at the Kona hearing on December 3, 2010. Ex. A-7/R-7 at 37-43. R. Ha and Baybayan testified in support of the TMT Project at both the hearings in Hilo and Kona. Ex. A-7/R-7 at 40, 43.

223. Additional public meetings about the project were held and open to the public through MKMB and Kahu Kū Mauna meetings. Tr. 12/6/16 at 37:5-37:22; Tr. 12/8/16 at 74:8-74:9.

224. Kahu Kū Mauna provided input on the TMT Project to MKMB. On May 19, 2010, Ed Stevens, on behalf of Kahu Kū Mauna, read a statement saying that the Council had reservations about the TMT project, but after considerable deliberations they felt that their reservations were not sufficient to stand against the project since the TMT Project had demonstrated an intention to provide responsible tenancy that strives to meet the standards established by OMKM, which made the project less objectionable. Ex. A-62 at 4; Tr. 2/27/17 at 155:7-165:23; Ex. A-146 at 6.

225. Overall, the astronomy community has been considerate of the native Hawaiian community. Tajon, a witness for Kakalia and a member of Kahu Kū Mauna, testified that in his experience the astronomy community has truly expressed its interest in understanding and respecting the traditional Hawaiian faith. Tr. 2/27/17 at 12:2-7; *see* Ex. A-144a.

226. Consideration of traditional and contemporary cultural and religious practices, and the impacts thereto, were specifically included in the CIA for the FEIS. Ex. A-5/R-5, App. D; Tr. 11/15/16 at 28:12-23, 45:2-47:7.

227. A number of the Petitioners and Opposing Intervenors claimed that consultation for the TMT Project was insufficient or non-existent. The substantial evidence of the history of the TMT Project, consideration of historical, traditional and cultural resources and practices, as well as contemporary and religious practices and impacts to those practices

and resources by the TMT Project supports the finding that sufficient and significant consultation with the Petitioners, Opposing Intervenors, and the public at large occurred at several stages of the planning process and were specifically included in the FEIS and the CIA for the FEIS, as well as the CDUA. Ex. A-3/R-3 at 3-9 to 3-21; Ex. A-5/R-5, App. D; Ex. A-1/R-1 at § 4; Tr. 10/24/16 at 223:17-224:20; Tr. 11/15/16 at 23:11-23.

228. Dr. Hasinger testified that he personally consulted with various native Hawaiian practitioners throughout the CDUA process. Tr. 10/27/16 at 81:18-83:9; 91:16-93:2.

229. Despite asking for more consultation in this process, Prof. J. Osorio testified that building the telescope is a deal breaker, and that in this situation, compromise is impossible because either the telescope will be built or it will not be built. Tr. 01/12/17 at 89:21-25, 116:20-25. Accordingly, no amount of consultation or mitigation would be satisfactory. Spies also testified that those opposed to the TMT Project will stand against any project on Mauna Kea no matter what. Tr. 01/12/17 at 179:24-180:2.

230. Prof. Johnson testified that he does not disagree with the CDUA's characterization of its goals to protect historic and cultural resources up to the point that it was published, but stated that the religious life of the mountain has been catalyzed, magnified and intensified since the time of the CDUA, which is in his opinion, warrants review and revisions to the CDUA and the EIS with particular attention to consultation. Tr. 02/16/17 at 17:1-17. However, Prof. Johnson later testified that this contested case hearing is part of the consultation process and that he admires this process as a form of ongoing consultation. Tr. 02/16/17 at 88:10-16.

231. Despite initially claiming that he was not consulted, Ching admitted during cross-examination that he was interviewed for the TMT Project. Tr. 1/26/17 at 187:3-21, 226:24-227:20, 229:9-230:19, 238:15-240:10. The FEIS lists Ching as one of the individuals consulted and contains a written record of his views. Ex. A-5/R-5, App. D at A-5 (TMT EIS Vol. 3 at A-5). The CIA states that Ching was interviewed on three separate occasions. Ex. A-5, App. D at 92. A full summary of the interviews with Ching is included as part of the CIA. Ex. A-5, App. D, § 7.13 at 169-71. Therefore, Ching was fully and thoroughly consulted during the EIS and CIA processes, and his comments and information were fully considered as part of that process as well as his testimony and submissions during this proceeding.

232. Nobriga testified that the Temple was never consulted about the TMT Project; however, comments captured in the TMT FEIS (Ex. A-4, Chapter 8) indicate that the Temple of Lono was consulted and a comment letter was received from Fergerstrom, who claimed to be the representative of the Temple, and considered as part of that cultural review process. Tr. 3/1/17 at 23:1-14, 67:1-68:1; Ex. A-4, Chapter 8. Fergerstrom admitted that he was a member of the Temple and that the record speaks for itself that as to whether the Temple was consulted. Tr. 1/23/17 at 243:19-20.

233. Dr. Meyer testified that in her opinion, the University did its best in understanding and responding to cultural concerns, but ultimately did not make appropriate consultation efforts. Tr. 1/26/17 at 34:1-35:2. Dr. Meyer also testified, however, that she did not read

the CDUA and implied that she did not read any of the documents and studies related to the TMT Project. Tr. 1/26/17 at 35:3-5. Accordingly, any conclusions made by Dr. Meyer as to the sufficiency of the consultation process did not have any factual basis or support; but rather, appeared to be general, subjective opinions based on her own personal biases.

234. Kanaele was also extensively interviewed and consulted during the CIA process. Ex. A-5, App. D, § 7.4 at 113-118. Though he initially claimed that he read most of the FEIS, Kanaele was not aware that the CIA included a specific and separate section on his extensive interview and consultation. Tr. 3/2/17 at 33:2-34:6.

235. In addition to the materials and studies submitted as part of the CDUA and this contested case, consultation with cultural practitioners and interested parties regarding Mauna Kea has continued to occur, including through this contested case proceeding, which included significant testimony and documentary evidence which is being considered in connection with the CDUA.

236. Notwithstanding the University's and TIO's substantial efforts to consult with practitioners and others on an ongoing basis, certain individuals, including parties to this proceeding, have actively boycotted the University's ongoing consultation efforts. For example, in 2015, the University held public open houses on the EISPN for the new master lease. Case, along with the Flores-Case ʻOhana, Pisciotta, Ching, Ward, and Neves actively called for a boycott of the process. Ex. A-129; Tr. 1/11/17 at 212:3-219:22.

237. As evidenced by the record and the findings of fact above and below, consultation for the TMT Project has been extensive, multi-faceted and ongoing. Claims that appropriate consultation related to the TMT Project did not occur or was insufficient are not supported by substantial or credible evidence in the record.

E. PROJECT DESCRIPTION

238. The TMT Observatory will be located in the 525 acre Astronomy Precinct within the MKSR on Mauna Kea. The Astronomy Precinct is already home to eight optical and/or infrared observatories and three submillimeter observatories. Ex. C-2 (WDT Sanders) at 2.

239. In 1964, an unpaved, 4-wheel drive Mauna Kea Access Jeep Trail was established to facilitate astronomy testing in the northwest slope area, and in particular at a location designated 13N. There are also small foundations remaining on the site from that astronomical testing. Tr. 10/31/16 at 132:10-133:6. The Mauna Kea Access Road extends to near the summit and loops along the Puʻu Kea, Puʻu Hauʻoki, and an unnamed puʻu cinder cones to reach the existing observatories. The 4.6 mile segment of the Mauna Kea Access Road just past Hale Pōhaku is unpaved. The road is paved again above 11,600 feet. The existing observatories have mostly short paved or unpaved driveways off the main road. The unpaved SMA service roadways are the most extensive roads other than the main Mauna Kea Access Road. One branch of the SMA road extends

toward Area E. Where the SMA road ends, the unpaved 4-wheel drive trail extends into and runs through the middle of Area E to the 13N site, where it ends. Ex. A-1/R-1 at 3-4; Ex. A-3/R-3 at 3-165, 3-208 to 3-209.

240. Currently, utility services exist along the Mauna Kea Access Road Loop to a point near the intersection of the Mauna Kea Access Road Loop and the SMA building. There are electrical transformers at the Hale Pōhaku Substation, which is located approximately 2,000 feet southwest of the main headquarters building at Hale Pōhaku and about 1,000 feet from Mauna Kea Access Road. Utility lines run overhead from Saddle Road to near Hale Pōhaku and then underground from there to the summit area. There are conduits located approximately 50 feet west of the Mauna Kea Access Road for most of the distance to the summit area; one portion of the power line alignment follows a former access road alignment that is now within the NAR. Pull boxes are located approximately every 300 feet along the conduit. Ex. A-1/R-1 at 1-11 to 1-14; Ex. A-3/R-3 at 3-208 to 3-209.

241. The design guidelines from the Master Plan were conceptual and were incorporated into the design of the TMT Observatory. Tr. 1/3/17 at 257:23-258:2. The proposed design for the TMT Observatory is based on balancing the technical requirements of the observatory and the goal of minimizing adverse impacts of the project. Tr. 1/3/17 at 18:2-23:1, 258:8-262:5. The TMT Observatory design is therefore consistent with and in compliance with the 2000 Master Plan. Tr. 01/04/17 at 14:2-10.

242. The TMT Project consists of the following components:

a. "**TMT Observatory**" refers to the components of the TMT Project located at a site designated as "13N" within Area E on the upper elevations of Mauna Kea, but below the summit. The TMT Observatory generally consists of the 30-meter telescope, instruments, dome, attached building, and parking.

b. The "**Access Way**" refers to the road and other infrastructure improvements that will be provided to access and operate the TMT Observatory. Improvements in the Access Way will generally include a surface roadway and underground utilities.

c. "**Hale Pōhaku work**" refers to Hawai`i Electric and Light Company ("**HELCO**") upgrades to existing electrical transformers at the HELCO substation located near the University's Mid-Level Support Facility known as Hale Pōhaku. The new transformers will replace the existing ones on a 1:1 basis, and the fenced substation compound will not be expanded.

d. "**Headquarters**" refers to the facility located in Hilo to manage activities at and support operation of the TMT Observatory. This includes an office building with a parking area.

Ex. C-2 (WDT Sanders) at 1-2; Tr. 10/25/16 at 132:13-133:17.

243. The TMT Observatory will be the first optical/infrared observatory of its size to integrate Adaptive Optics ("**AO**") into its original design. AO systems correct for the image distortion that is caused by the atmosphere. The TMT AO system will project up to eight laser beams into the atmosphere to create an asterism, or group, of "guide stars" that are used to determine the atmospheric distortion of the visible and infrared light from distant objects and thus allow the telescope system to correct for it. The TMT AO system will generate each of these eight beams using a 25-watt laser; the laser light will appear yellow (0.589 microns – the sodium D2 line). The TMT AO system removes distortion caused by the atmosphere to create a very sharp image of celestial objects, allowing, for example, for highly accurate position measurements for moving objects. Ex. C-2 (WDT Sanders) at 4; Tr. 1/3/17 at 243:15-245:19.

244. The TMT Observatory dome housing the telescope will be a Calotte-type enclosure with the following characteristics: (1) total height of roughly 180 feet above the current ground surface, with an exterior radius of 108 feet; (2) the dome shutter will be 102.5 feet in diameter and it will retract inside the dome when opened; (3) the dome will rotate on two planes, a horizontal plane and a second plane at 32.5 degrees to the horizontal plane. By rotating on both planes simultaneously, the dome will allow viewing of the sky from vertical to roughly 25 degrees above the horizon; and (4) the Calotte dome base, cap, and shutter structures will appear rounded and smooth and have a reflective aluminum-like exterior coating. This reflective aluminum-like coating was chosen to minimize the visual impacts of the dome; throughout the majority of the day, this coating will reflect the surroundings of the TMT Observatory. Ex. C-2 (WDT Sanders) at 5; Tr. 10/25/16 at 125:8-17, 133:21-134:3; Tr. 1/3/17 at 102:9-103:23. Ex. C-3.

245. C. Freitas argued that the TMT Project does not comport with the 2000 Master Plan because its design exceeds the 130 feet height limit designated in the Master Plan. Ex. S-2a at 3; Tr. 2/21/17 at 116:8-117:4. The TMT dimensions are not in conflict with those set forth in the Master Plan because the 130 feet height limit in the Master Plan applies to facilities on the summit ridge, not the northwest slope in Area E. Tr. 11/15/16 at 196:6-197:1; Ex. A-48 at XI-5.

246. C. Freitas also argued that the TMT Project does not comport with the Master Plan because it is designed to have reflective surfaces, which are discouraged in the Master Plan. Tr. 2/21/17 at 129:23-130:19. The TMT design is not in conflict with the Master Plan because it calls for non-reflective to be used "as much as possible . . . to minimize glare and visibility from distant areas." Ex. A-48 at XI-6. As discussed above, TMT was designed to have a reflective coating in order to reduce visibility from distant areas. WDT White at 11; WDT Hayes at 20; Ex. A-3/R-3 at 3- 103; Ex. A-1/R-1 at 7-13; Tr. 10/25/16 at 125:8-17. Accordingly, the design is consistent with the 2000 Master Plan's objective of reducing visibility of structures on Mauna Kea.

247. A support building will be attached to the TMT Observatory dome. The building will have a roof area of approximately 21,000 square feet, a total interior floor area of roughly 18,000 square feet, a flat roof, and be lava-colored. The support building will include the following spaces: (1) mirror coating and staging area; (2) laboratory and shop spaces, including a computer room, engineering and electronics laboratories, and mechanical

shop; (3) utility spaces including electrical services, chillers, a generator, pumps for fire suppression and other non-potable water needs, restrooms, and fluid dynamic bearing pumps that control the movement of the telescope; (4) administration space, including offices and a kitchenette; and (5) visitor and public spaces, consisting of a lobby, restroom, and viewing platform. Ex. C-2 (WDT Sanders) at 6.

248. A roughly 6,000 square foot exterior equipment area on the north side of the support building will include: two electrical transformers and electrical service switchboards; three 5,000-gallon underground storage tanks (one for water storage, one for domestic waste storage, and one double-walled for chemical waste storage); a 25,000-gallon underground storage tank for water storage as part of the fire suppression system; and one double-walled 2,000-gallon above-ground storage tank for diesel fuel to power the emergency generator. *Id.* at 6.

249. Up to 140 people will operate and maintain the Observatory. An average of 24 employees will work at the TMT Observatory during daytime operations, with a minimum of 15 and a maximum of 43 possible depending on activities. Fewer persons will be present at night. During darkness, typically 2 to 3 operators (but occasionally as many as 6) will be present at the TMT Observatory. Observers and support astronomers will view remotely from the Headquarters. All other members of the staff will work at the Headquarters. *Id.* at 11.

250. The parking area for TMT Observatory staff and delivery vehicles will be unpaved and located outside of the support facility. A guard rail will be placed along the top of the slope on the north and west sides of the graded area where there will be a drop-off. *Id.* at 7.

251. TIO does not anticipate constructing a construction camp. Workers will either be housed at Hale Pōhaku using the dormitories or transported from lower altitudes to the project site through a rideshare program. TIO anticipates that most of the construction workers will be local residents. Tr. 1/3/17 at 43:23-44:19.

252. The footprint of the TMT Observatory dome, support building, parking area, and area disturbed during construction will be roughly five acres. A half-acre portion of this has previously been disturbed by the existing 4-wheel drive road and site testing equipment; the original disturbance occurred during site testing in the 1960s, and site testing was also performed in this area for the TMT Project in the 2000s. Ex. C-2 (WDT Sanders) at 7. Additional areas (outside of the TMT Project site, the access way, and Hale Pōhaku) will be temporarily utilized for construction. Tr. 01/04/17 at 17:16-18:6; 36:3-15. The total construction acreage footprint for the TMT Project (including the TMT Project site, access way, Batch Plant, underground utilities, and use of the facilities at Hale Pōhaku) is approximately 12.5 acres. Tr. 01/04/17 at 50:11-51:3.

253. The deepest part of the foundation will be approximately 21 or 21.5 feet below the ground. Tr. 01/04/17 at 56:21-:57:6.

254. The TMT Access Way will include a road and utility services to the TMT Observatory

from existing services. Currently, utility services exist along the Mauna Kea Access Road Loop to a point near the intersection of the Mauna Kea Loop Road and the SMA road. The proposed Access Way will start at that point and extend to the TMT Observatory following either the existing 4-wheel drive road or the wider roads that serve the SMA facility. The Access Way that the TMT Project has proposed is limited to a single lane (reduced from a previous design of two lanes) over the southernmost portion of the Access Way (i.e., the portion that crosses Puʻu Hauʻoki and through the SMA); the remainder is two lanes. The vast majority of the Access Way route follows and goes over an existing single-lane, 4-wheel drive road that was previously developed for access to and testing of the 13N site in the 1960s. A portion of the route was graded during construction of the SMA facility as well. Construction will not require a widening of the access roads. Ex. C-2 (WDT Sanders) at 8; Tr. 10/25/16 at 134:4-135:8, 178; Tr. 1/3/17 at 46:21-25.

255. The switch boxes needed to extend electrical power and communication service to the TMT Observatory will be placed above ground next to the existing ones across the road from the SMA facility. To the extent possible, utilities from that point northward to the TMT Observatory site will be placed beneath the road to reduce the footprint of disturbance, with pull boxes located to the side of the road in already disturbed locations where possible. Ex. C-2 (WDT Sanders) at 8; Tr. 10/25/16 at 178:11-13.

256. Various elements have been incorporated into the Access Way design to minimize the visual impacts of the Access Way, including: (1) coloring the pavement of the Access Way so that it blends with the surrounding environment; (2) limiting the Access Way to a single lane in certain areas; and (3) minimizing the visual impacts of the Access Way guardrail so that it blends with the surrounding environment. Ex. C-2 (WDT Sanders) at 8.

257. Two transformers within the HELCO substation will be upgraded by the local electrical utility company. The HELCO substation is located across Mauna Kea Access Road from Hale Pōhaku. The new transformers will be placed in the same location as the existing transformers and the existing fenced substation compound will not be expanded. *Id.*; Tr. 10/25/16 at 135:16-136:4.

258. In addition, HELCO will upgrade the electrical service from the transformer compound near Hale Pōhaku to the existing utility boxes across the road from the SMA building to support the TMT Observatory's power requirements. This will be done by removing the existing conducting wire and placing a new electric conducting wire in existing underground conduits. Ex. C-2 (WDT Sanders) at 8; *see also* Ex. A-3/R-3 at 2-26.

259. During construction, additional areas will temporarily be utilized and/or disturbed. Base yards required for the construction of the telescope and observatory will include the following:

    a. Port Staging Area: An existing warehouse and/or yard near the port where the TMT Project components are received.

b. Batch Plant Staging Area: A roughly 4-acre area northwest of where the Mauna Kea Access Road forks near the summit that will primarily be used for storing bulk materials and a concrete batch plant, as this area has been used in the past during construction of other observatories.

c. TMT Observatory and Headquarters sites: The areas within the TMT Observatory and Headquarters sites not occupied by structures will also be utilized as staging areas during construction of those facilities.

Id. at 10.

260. The CDUA for the TMT Project does not request subdivision approval, and UH Hilo does not intend to request or utilize subdivision of land as part of the Project. Ex. A-1; Ex. C-6 (WDT Callies) at 9.

261. None of the existing observatories pay fair market rent, but TIO will pay rent as set forth in the TIO Sublease. Tr. 11/15/16 at 65:4-7; Tr. 12/19/16 at 39:17-23; Ex. B.02f at 5-6.

F. THE UNIQUE COMBINATION OF CONDITIONS THAT MAKES MAUNA KEA A PREMIER LOCATION FOR ASTRONOMICAL OBSERVATORIES

262. TIO identified Mauna Kea as the preferred site for the TMT Observatory after an extensive worldwide study to evaluate potential locations. Mauna Kea was and remains TIO's preferred site for several reasons. Ex. C-2 (WDT Sanders) at 10.

263. Mauna Kea possesses a rare combination of many natural resources that, taken together, make it an outstanding location for astronomical research, including the TMT Project. Mauna Kea has:

a. generally little to no cloud cover;

b. a stable atmosphere;

c. low mean temperature and temperature variability;

d. low humidity;

e. low light pollution; and

f. a location at a favorable latitude.

See WDT Hasinger at 1; Tr. 10/27/16 at 88:15-89:13. Tr. 1/5/17 at 105:18-106:6.

264. In addition to its advantageous combination of natural resources, the presence of other astronomical facilities in close proximity creates the opportunity for many scientific synergies between the TMT Observatory and those facilities. Smaller optical/infrared

observatories can provide observation targets for the TMT Observatory and carry out supporting science programs that do not require the large light-gathering power and fine diffraction limit of the TMT Observatory. Facilities that observe at radio wavelengths would also be able to provide targets for TMT observations and collect supporting complementary scientific information. These synergies increase productivity in conducting science when compared to a single observatory operating independently. Observatories that share common partners are more likely to collaborate and go to greater lengths to work together, including designing and installing complementary suites of instruments on individual telescopes. *See* Tr. 10/27/16 at 116:1-119:12.

G. THE SCIENTIFIC VALUE OF THE TMT OBSERVATORY

265. Astronomy is one of the oldest of the sciences and its contributions to humankind are immeasurable. Many benefits of astronomy impact our daily lives. Among its many contributions, astronomical research has been the basis of timekeeping, navigation, and climate science. For example, quantum mechanics, which is the basis for computers and electronics, was discovered in astronomy. The physics of climate change was originally discovered through observations of the atmosphere on Venus. Tr. 10/27/16 at 18:8-19:4. Various tools developed for astronomical research have also been the basis of many "spin-off" technologies such as Global Positioning Satellite ("**GPS**") systems and transition bifocal lenses. *See* Tr. 10/27/16 at 18:12-20:2, 341:13-21; WDT Hasinger at 4.

266. Observatories on Mauna Kea were involved in the majority of astronomical breakthroughs in the last 50 years. The yearly number of scientific publications from Mauna Kea observatories is greater than that from the Hubble Space Telescope or the European Southern Telescope. Observatories on Haleakalā are currently providing the world's best early-warning system for dangerous asteroids. TMT would able to provide more detailed information about their orbits, composition, and ultimately the danger they pose. This would aid in predicting the path of the asteroid, and potentially aid in preventing an asteroid from impacting the Earth. Although there are telescopes planned for locations in the southern hemisphere that would have similar capabilities, those telescopes could not view asteroids approaching from the north, where TMT, being located in the northern hemisphere, could. WDT Hasinger at 3-4; Tr. 10/27/16 at 29:4-30:5; Tr. 1/5/17 at 201:19-202:12.

267. Astronomy on Mauna Kea has also led to the Mauna Kea Weather Center ("**MKWC**"), which was originally created to provide excellent custom forecasts for the observatories. However, MKWC recently adapted its computer programs to predict the dispersion of vog from the Kilauea volcano. This is a valuable service to the Hawai‘i community at no cost. WDT Hasinger at 4. Similarly, 20 years ago, the Mauna Kea observatories contributed $2 million to help expedite the installation of fiber-optics communications infrastructure on Hawai‘i Island, and today, astronomy is leading the big data efforts in the State. WDT Hasinger at 4.

268. Modern astronomy was a key component in the revival of Hawaiian navigation. Nainoa Thompson and others used modern celestial maps at the Bishop Museum to reconstruct the Hawaiian star lines. Tr. 10/27/16 at 181:14-182:11.

269. Although these benefits currently exist, without the development of the TMT project, many of these services could lose funding that is necessary for their continued availability. Tr. 10/27/16 at 167-168. The TMT Project will allow Hawai‘i to maintain its leading position in generating new knowledge about the universe and help to produce a new generation of leaders in science, technology and education. WDT Hasinger at 1; Tr. 10/27/16 at 16:3-11, 192:13-194:4.

270. Although 13 telescopes are currently present on Mauna Kea, the addition of TMT is needed because it has capabilities that are unique from the existing telescopes. Telescopes commonly work together like instruments in a symphony, and more often than not, multiple telescopes work in unison to produce scientific discoveries. In this context, the TMT "instrument" would be a new and unique addition to the "symphony" of telescopes on Mauna Kea, which will open a completely new area of discovery that could not otherwise be reached. Tr. 10/27/16 at 15:18-16:2.

271. The light collection power of TMT's larger aperture will be about ten times bigger than that of the largest telescopes today. The size of the aperture, combined with the excellent atmospheric conditions above Mauna Kea will yield about ten times sharper images than the Hubble Space Telescope. The mirror on the James Webb space telescope is only 6.5 meters, and the angular resolution is inferior to that planned for TMT. Tr. 12/19/16 at 73:10-19. With the larger aperture and higher resolution, the stars will be 81 times brighter at TMT than at Keck, which is currently the best in the world. Tr. 12/19/16 at 8:9-9:2, 15:1-16:17. In other words, one night at TMT is equivalent to 81 nights at Keck. Tr. 12/19/16 at 15:6-7.

272. TMT's advanced capabilities will allow it to observe any class of astronomical objects much further than current telescopes. TMT will be sensitive enough to see things formed billions of year ago that could never been seen using Keck. Tr. 12/19/16 at 8:9-9:2, 14:15-15:25. 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 our Milky Way Galaxy. Tr. 12/19/16 at 15:23-16:6. TMT may also aid in the quest to find and study Earth-like planets. WDT Hasinger at 2.

273. The United States has been the leader in astronomy research for the last 150 years, and locating the TMT Observatory in Hawai‘i will maintain the nation's leadership in astronomy research, discovery, and innovation. Moreover, for the past forty years, the State of Hawai‘i, the University, and Mauna Kea have been at the forefront of terrestrial astronomy. The TMT Observatory will help to maintain this leadership by leveraging the capacity of the existing observatories on Mauna Kea, including the Keck Observatory, Subaru and the CFHT. The University will have approximately 7.5% of the observing time at TMT. Tr. 12/19/16 at 45:12-17. While these observatories are world-leading observatories today, their future scientific productivity will be enhanced by co-location with a next generation observatory, such as the TMT Observatory. Ex. C-1 at 3; A-70.

274. Certain Petitioners and Opposing Intervenors disputed the scientific value or tangible benefits of the TMT Observatory. For example, Pisciotta testified that in her opinion the benefits of astronomy are purely academic and the knowledge gained from astronomy will do nothing to change the lives of the people of Hawai‘i. Ex. B.01a (WDT Pisciotta) at 5-6. Pisciotta opined that astronomy is not solving the cure for hunger, cancer or HIV, protecting our biodiversity by protecting rare, threatened or endangered species, providing people with clean water, reducing our energy consumption or inventing new forms of energy. WDT Pisciotta at 6. Pisciotta's assertions are directly rebutted by the more credible testimony of Dr. Hasinger, which demonstrates that astronomy has many tangible benefits, in addition to the gains in scientific knowledge addressed above. WDT Hasinger at 3-4; *see* FOF Nos. 265-273. The testimony of Dr. Hasinger on the scientific value and tangible benefits of the TMT Observatory is more credible than the testimony of Pisciotta.

H. ECONOMIC BENEFITS OF THE TMT OBSERVATORY

275. Astronomy has historically been an economic driver to the local community, as well as the state. After the devastating tsunami of 1960, the observatory on Mauna Kea and the IfA were founded with the explicit goal of producing educational opportunities to Hawai‘i students, and to promote economic growth. A study by the University of Hawai‘i Economic Research Organization ("**UHERO**") shows that in 2012 alone, astronomy had a total economic impact of $168 million (with approximately $91 million attributed to Hawai‘i County), a job creation impact of 1,400, and generated State taxes of $8.2 million. The TMT project will further contribute to these economic benefits. WDT Hasinger at 3; Ex. A-33 at 3.

276. Astronomy provides close to 1,000 quality jobs in clean high-tech activities that offer employment opportunities in science, technology, engineering, and mathematics ("**STEM**") fields to local youth. These opportunities are not limited to astronomers, as most jobs are technical and administrative. The workforce currently has more than 50% local employees, but efforts are being made to increase this number because it is much better and more efficient to hire local residents instead of mainland residents, who typically leave after a few years of employment. WDT Hasinger at 4; Tr. 10/27/16 at 17:1-16, 390:16-391:9.

277. Additionally, astronomy has resulted in spin-off industries. For example, IfA innovation has spun off new Hawai‘i business working in remote sensing and new technologies for solar power. Tr. 10/27/16 at 19:11-13.

278. As previously mentioned, unlike the existing observatories on Mauna Kea, TIO will pay rent as set forth in the TIO Sublease. Tr. 11/15/16 at 64:20-65:3; Ex. B02f at 5-6. Furthermore, a staff of up to 140 employees is planned to work on the TMT Project in Hawai‘i during operations. Many of the positions require specialized skills in computing, optical-mechanical engineering, and other technical areas. The availability of a local workforce with the requisite skills is a very strong plus for a site. The unique technical systems that comprise the Observatory make it desirable to have long-term employees. Thus, locating the TMT Observatory on Mauna Kea is favored in that the availability of

housing, quality schools and medical care, and opportunities for spousal employment are important factors in attracting and retaining long-term employees. Ex. C-2 (WDT Sanders) at 11.

I. TMT PROJECT CONSTRUCTION ACTIVITIES

279. The TMT Observatory construction crew will average 50 to 60 crew members through the life of construction; during certain phases, a crew of more than 100 will be working at the site. Construction is expected to take place six days a week, 10 hours a day; however, some special operations or construction phases will require longer work hours. It is also expected that winter weather conditions at the TMT Observatory site will interrupt construction at times. *Id.*

280. During construction of the TMT Project, as it has been used in the past for the construction of other observatories, the Batch Plant Staging Area will be used primarily for storing bulk materials and as a concrete batch plant. Roughly four acres of the Batch Plant Staging Area will be used by TMT construction activities. TMT construction activities at the Batch Plant will be done in compliance with all existing laws and regulations. Upon completion of construction of the TMT Observatory, the Batch Plant Staging Area will be partially restored. *Id.* at 10; Tr. 10/25/16 at 136:5-24; Ex. A-1/R-1 at 1-13.

281. During all operations with heavy equipment, the TMT construction manager will monitor the weather and decide when any shutdowns will be necessary. Tr. 01/04/17 at 35:19-36:2. Crane operators will monitor all safety procedures and will be trained on proper operating methods. Tr. 01/04/17 at 36:2-42:24.

282. Tests will then be conducted and adjustments to the telescope and instruments made for a period of time to gain optimum efficiency and viewing. Ex. C-2 (WDT Sanders) at 11. The first scientific results using the TMT Observatory are expected, at the earliest, in 2024. During the life of the TMT Observatory, astronomical observations will be made by scientists from around the world.

283. No explosives will be used and no blasting will be done to construct the TMT Project. Tr. 01/04/17 at 45:2-6.

J. EDUCATIONAL AND EMPLOYMENT OPPORTUNITIES

1. The Need for Educational Opportunities

284. The creation of educational and employment opportunities is an important and relevant factor in this proceeding.

285. PUEO was formed by native Hawaiians who support the pursuit of educational opportunities for the children of Hawai‘i. They intervened in this contested case proceeding to express their views that the TMT Project will greatly enhance the educational opportunities for Hawai‘i’s children. WDT Ha at 1-3; Tr. 2/15/17 at 196:3-197:25; Tr. 2/21/16 at 161:12-22, 21:12-15.

286. The testimony of PUEO members established that there is a need for educational opportunities in Hawai‘i, specifically on Hawai‘i Island. Warfield, the president of PUEO, testified as to his substantial experience working with children on Hawai‘i Island through public outreach programs. Warfield's testimony evidenced the lack of educational opportunities for children on Hawai‘i Island. WDT Warfield at 1; Tr. 2/15/17 at 207:8-17, 214:3-215:14. Additionally, there have been instances where Native Hawaiian children have expressed interest in astronomy, but were discouraged from pursuing this interest due to a lack of educational opportunities, as well as a lack of support from the local community. Tr. 2/15/17 at 200:13-202:11, 230:14-231:3, Tr. 2/21/17 at 260:4-261:15. PUEO's goal is to protect and foster such interest through educational opportunities, such as those provided by the TMT Project. WDT Warfield at 1; Tr. 2/15/17 at 200:13-202:11.

287. Warfield testified that Hawaiian culture and modern science can co-exist, as evidenced by his current efforts in the community. Warfield works to provide educational opportunities on Hawai‘i Island, while at the same time fostering positive self-esteem and cultural identity in Native Hawaiian children. WDT Warfield at 1.

288. PUEO members R. Ha, E. Osorio, and Brown, also testified as to the need for educational opportunities in Hawai‘i, and that if TMT is not built, educational opportunities may be lost, thereby injuring the children of Hawai‘i. WDT Ha at 1-3; WDT E. Osorio at 1-3; WDT W. Brown at 1-3; Tr. 2/21/17 at 162:10-14, 179:9-15; 242:24-243:22.

289. PUEO Members support the TMT Project and its potential educational and community benefits, despite backlash from those who oppose the TMT Project. *See* Ex. C-48; Tr. 2/21/17 at 210:17-212:12.

290. The testimony of PUEO members supports the fact that educational opportunities are needed for the well-being of the children of Hawai‘i. Additionally, the testimony of PUEO members established that there are Native Hawaiian children who are interested in the field of astronomy, but who lack the resources and support to pursue such interests. The TMT Project will help to address the lack of educational opportunities and resources testified to by PUEO members.

2. **Native Hawaiians and Modern Astronomy**

291. Coleman testified that he is aware of only four native Hawaiians in the world who currently hold astronomy degrees. Tr. 1/5/17 at 97, 126:10-11. The TMT Project will allow the University to continue its astronomy outreach and teaching efforts, and aid in the quest to produce "home grown" astronomers. Ex. C-17 at 3.

292. The effort to produce "home grown" astronomers is important because astronomy is an essential part of the identity of the Hawaiian people. In fact, the defining characteristic of a Hawaiian is rooted in astronomy. The mastery of astronomy, and its application—long distance voyaging—is what separates Hawaiians from their Polynesian brothers and sisters. Embracing modern astronomy would represent Hawaiians coming full circle from being masters of astronomy in the past, to being masters of astronomy in the future.

Ex. C-17 at 3; Tr. 1/5/17 at 92:10-17.

293. Outreach programs have been implemented by the observatory operators, including TIO, that are particularly effective in sparking interest in Hawai‘i’s youth for all types of STEM-related fields, not just astronomy. Every year the Journey Through the Universe program, a national program that focuses on science as a human endeavor, reaches over 7,000 elementary, middle, and high school students and is now well into its second decade. The HI-Star program trains local high school kids to participate in science fairs and go on to university careers in STEM fields. HI-Star alumni have received almost half a million dollars in prized fellowships and stipends, and have won local and national science fairs. The Akamai program provides internships, many of them for Native Hawaiians, in observatories and high-tech companies for jobs not just in astronomy, but across many industries. The Akamai program is designed to allow people to gain experience with different companies and different jobs. Tr. 10/27/16 at 69:21-70:7. Akamai has a retention rate of close to 80% in STEM jobs, meaning 80% of the students are actually gaining employment at places where they apply. Tr. 10/27/16 at 13:19-23.

294. The astronomy programs in the University System (undergraduate and graduate) are some of the finest and most attractive in the country. WDT Hasinger at 4-5; Tr. 10/27/16 at 12:2-14:4. University students currently have access to several of the existing telescopes on Mauna Kea. Tr. 01/12/17 at 55:15-20. The observatories recently added another element which is the Mauna Kea Scholars Program, where high school and middle school students can get viewing time on the telescopes for their projects. Tr. 10/27/16 at 12:25-13:3.

295. The University currently incorporates elements of Hawaiian navigation and astronomy into its outreach efforts. Tr. 10/27/16 at 110:7-111:21.

296. Dr. Kaluna, a Native Hawaiian from the Big Island of Hawai‘i. who received her Ph.D in Astronomy in 2015, testified in support of the TMT Project. She participated in the Akamai program, as well as the Keaholoa STEM program, during her studies at the University. Ex. C-8 at 1; Tr. 1/5/17 at 72:22-73:1.

3. **Community Benefits Package**

297. The TMT Project has committed to a Community Benefits Package (“**CBP**”). A portion of the CBP funding commenced in 2014 upon the start of the TMT Project construction and was committed to continue throughout the TMT Observatory’s presence, so long as the original CDUP was not invalidated or construction was not stayed by court order. However, even though the original CDUP has been invalidated, TIO has continued the CBP. As part of the CBP, TIO has provided $1 million annually during such period to the THINK Fund; the dollar amount is adjusted annually using an appropriate inflation index. The funding is divided; $750,000 is distributed through the Hawai’i Community Foundation and $250,000 through the Pauahi Foundation. To date, TIO has remitted $630,000 to the Pauahi Foundation, and $1.8 million to the Hawai‘i Community Foundation, a total of approximately $2.5 million. Ex. C-2 (WDT Sanders)] at 13-14.

298. The $2.5 million remitted to date has funded over sixty scholarships and $100,000 in small grants for classroom projects for twenty seven classrooms. The THINK Fund was the originator and initial contributor to the STEM Grant Learning Partnership program, giving $400,000 in the first two years for this endeavor. Programs supported focus on key elements of building a strong STEM education system. Education initiatives are focused on K-5, 6-8, 9-12, and college. The program includes support for students to visit Imiloa Astronomy Center and the Mauna Kea observatories. *Id.* at 14. The CBP addresses concerns regarding providing educational opportunities and lack of resources, which were expressed by some members of the Native Hawaiian community. Tr. 1/3/17 at 214:15-23.

299. The CBP helps to reduce the impact to cultural resources at the project site because it provides an understanding to the community about the values of Mauna Kea and science. Tr. 12/05/16 at 22:20-23:15.

300. The Hawai‘i Community Foundation and the Pauahi Foundation decide which local organizations receive THINK Fund monies. TIO does not make this decision. Tr. 2/15/17 at 237:2-8; Tr. 1/3/16 at 58:8-11.

4. **Workforce Pipeline Program**

301. The TMT Project is committed to partnering with UH Hilo, Hawai‘i Community College ("**HawCC**"), and the Department of Education ("**DOE**") to help develop, implement, and sustain a comprehensive, proactive, results-oriented Workforce Pipeline Program ("**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. Special emphasis will be given to those programs aimed at preparing local residents for science, engineering, and technical positions commanding higher wages. Therefore, there will be a significant component in the WPP for higher education on the Island of Hawai‘i. Ex. C-2 (WDT Sanders) at 14.

302. In addition, 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. *Id.*

303. Key elements of the WPP include: (1) initiation of a TMT Project workforce committee including members from UH Hilo, HawCC, DOE, and Hawai‘i Island workforce development groups; (2) identification of specific TMT Project job requirements that UH Hilo, HawCC, and DOE can use to create education and training programs, and ongoing support for the identified programs; (3) earmarking of funds in the TMT Project's annual operations budget which can be used to support workforce development programs at suitable educational institutions; (4) TMT Project support for development and implementation of education and training programs, including at least 4 internships per semester, apprenticeships, and at least 10 summer jobs for students; (5) creation of a

partnership between UH Hilo and the TMT Project's partner organizations, such as Caltech, the University of California system, and Canadian universities to attract and develop top talent; (6) support of, and active participation in, ongoing efforts to strengthen STEM education in Hawai'i Island K-12 schools and informal learning organizations; and (7) focusing the WPP program on long-term investments to strengthen the current STEM skills infrastructure, programs, and curricula at UH Hilo, HawCC, and Big Island K-12 education organizations, especially those serving lower income and first-generation college attending populations. *Id.* at 13-14.

K. TMT PROJECT MITIGATION MEASURES

304. Mitigation of impacts has been a fundamental component of the TMT Project from its inception and at all times thereafter. Thus, the TMT Project has already implemented and is committed to implementing a number of measures that are intended to mitigate the impacts of the Project. A comprehensive recitation of these measures can be found in the TMT FEIS, TMT CDUA and TMT Management Plan appended to the CDUA. Exs. A-1/R-1, A-3/R-3, A-4/R-4 and A-5/R-5.

305. The use of mitigation measures is a universally recognized and widely adopted means of lessening otherwise adverse impacts in land use projects. Ex. C-6 (WDT Callies) at 8.

306. The TMT Observatory has been sited at the 13N site, within Area E, north of and below the summit ridge. One of the principal reasons this location was chosen is to mitigate impacts on cultural and historic resources, viewplanes, and biological resources. As a direct result of locating the TMT Observatory at its chosen site, and although the TMT Observatory will be the largest dome and tallest built on Mauna Kea, as well as a new visual impact on the Northern Plateau, it: (1) will not be visible from culturally sensitive locations, such as the summit of Kūkahau'ula, Lake Waiau, and Pu'u Līlīnoe; (2) is more than 200 feet from known historic properties; (3) will not be visible from Hilo and the southern portion of Hawai'i Island, including the Kona areas; and (4) is outside of the wēkiu bug's preferred habitat. Ex. C-2 (WDT Sanders) at 15; Tr. 01/04/17 at 79:3-13; WDT Nagata at 9-10; Ex. A-48 at IX-37 to IX-39; Ex. A-68; Ex. A-69; Tr. 12/8/16 at 34:24-35:4. Open space on the Northern Plateau would largely be preserved. Tr. 01/04/17 at 79:14-80:12.

307. Prof. Fujikane, an English professor and a witness for KAHEA, opined that locating the TMT Project on the Northern Plateau should not be considered a mitigation measure because there was no room for the TMT Project on the summit. Tr. 1/9/17 at 225:25-226:7. This statement is in direct contradiction with the credible testimony of Hayes that the TMT Project could have been considered for the summit. *See* Tr. 10/25/16 at 209:21-210:7. Her testimony also ignores the Master Plan which specified Area E as a preferred location for a next generation large telescope because of the minimum impact on existing facilities, wēkiu bug habitat, archaeological sites, and viewplanes while providing suitable observation viewing conditions. Ex. C-2 (WDT Sanders) at 4.

308. Petitioners contend that the location of the TMT Project on the Northern Plateau, out of sight of the Pu'u Wēkiu summit, Lake Waiau, and Pu'u Līlīnoe, and off of Kūkahau'ula,

should not be considered a mitigation measure. *See*, *e.g.*, Ex. B.02a at 15-17; Ex. B.01a at 16; Ex. B.13a at 4; Tr. 1/10/17 at 41:1-21; Tr. 1/19/17 at 226:9-226:13, 226:9-226:13; Tr. 1/26/17 at 138:3-19; Tr. 1/30/17 at 86:3-87:8. The reliable, probative, substantial, and credible evidence shows that the Project location on the Northern Plateau was chosen in large part to avoid the most culturally sensitive areas of the summit ridge region, and supports the finding that the location of the TMT Project was intended to be, and is, a significant mitigation measure. Ex. C-2 (WDT Sanders) at 15; WDT Nagata at 9-10; Ex. A-48 at IX-37 to IX-39.

309. The TMT Access Way's physical and visual impacts have been directly mitigated by: (1) designing the Access Way to reduce the potential for both physical and visual impacts to the historic properties and potential impacts to natural resources known to be in the vicinity; (2) limiting the southern 750-foot long portion of the Access Way to a single lane even though such a configuration is not desirable from an operational standpoint; (3) aligning most of the Access Way to follow an existing single-lane, 4-wheel drive road that was built in the 1960s for access and testing of the 13N site; (4) paving the portion of the Access Way within the boundaries of Kūkahauʻula on the flank of Puʻu Hauʻoki to reduce dust; (5) coloring the pavement and guardrail a reddish color that blends with the surrounding area; and (6) placing the utilities to the TMT Observatory within the Access Way and beneath the paved roadway instead of on a different or parallel alignment that would cause more ground disturbance. Ex. C-2 (WDT Sanders) at 15-16; Tr. 10/25/16 at 134:4-135:8; Ex. C-3.

310. The option selected for the placement of the TMT Access Way was the one recommended by SHPD of the DLNR to minimize adverse effects on Kūkahauʻula. Page 3-9 of Ex. B to Ex. A-1/R-1.

311. The TMT Observatory has been designed to mitigate its visual impact by: (1) reducing the size of the dome through the use of a Calotte-type dome; (2) designing the telescope to be much shorter than usual given its mirror size; (3) designing the dome to fit very tightly around the telescope; (4) finishing the dome with a reflective aluminum-like surface, which during the day reflects the sky and reduces the visibility of the structure; and (5) finishing the support building and fixed structure exterior with a lava color. Ex. C-2 (WDT Sanders) at 19-21; Tr. 10/25/16 at 124:24-125:17, 133:5-134:3.

312. While the design mitigation measures reduce certain costs, they also increase both cost and technical risk in other areas. The mitigation measures also will make maintenance of the observatory more difficult. Tr. 1/3/17 at 70:11-71:16. For example, if the TMT telescope used the same f/1.75 design as the Keck Observatory, then the dome would be 256 ft. high and 261 ft. wide. To reduce the dome size, TMT will use an f/1 design so that the telescope will be shorter. Such a design requires more expensive mirrors, is harder to maintain, and creates more technical risk. Tr. 1/3/17 at 18:2-19:25. The result is a dome that is only 180 feet high. For reference, the Magellan Telescope, which has a smaller mirror measuring only 24 meters in diameter, is 200 ft. high. Tr. 1/3/17 at 21:24-22:5; Ex. C-23.

313. The TMT Project will camouflage certain HELCO electrical pull-boxes and other utility

boxes that are visually distracting or intrusive at the summit of Mauna Kea and other key locations visible from other portions of Kūkahauʻula. The method of camouflage will be determined through consultation with Kahu Kū Mauna and may include one of the following options: (1) painting the covers to match the surrounding natural colors; and (2) affixing stones and cinders from the vicinity to the exposed utility box. Ex. C-2 (WDT Sanders) at 17; Page A-9 of App. A of Exhibit B to Ex. A-1/R-1.

314. A zero-discharge self-contained wastewater system will be installed at the TMT Observatory. All wastewater generated at the TMT Observatory will be transported off-site to an approved treatment facility for treatment and disposal. The discharge of wastewater within the summit region has been identified as an impact on cultural resources and is one of the reasons for this mitigation measure. Ex. C-2 (WDT Sanders) at 21.

315. There will be three 5,000-gallon Underground Storage Tanks ("**UST**") to the northwest of the support building; one each for potable water, wastewater and chemical waste. There will also be a 25,000-gallon UST for fire suppression, and an above ground tank for diesel fuel for the emergency generators. Tr. 01/04/17 at 84:8-15.

316. The TMT Project will install water efficient fixtures and implement water saving practices to reduce the demand for freshwater resources. Ex. C-2 (WDT Sanders) at 22.

317. The TMT Project, including its USTs, is designed to survive conceivable seismic disturbances. Tr. 1/3/17 at 79:10-15.

318. The TMT Project will implement a Waste Minimization Plan ("**WMP**") and institute an annual WMP audit, which will include an examination of: (1) waste produced by the TMT Project and how that waste could be reduced, reused, or recycled; (2) water use by the TMT Project and how that use could be reduced; and (3) energy use by the TMT Project and how that could be reduced. Ex. C-2 (WDT Sanders) at 22.

319. The TMT Project will recycle solid and non-hazardous waste materials and reuse them to the extent possible. *Id.*

320. The TMT Project will implement a Materials Storage/Waste Management Plan, including a Spill Prevention and Response Plan. This plan will require: (1) daily inspections of equipment handling hazardous materials; (2) mandatory training of all personnel handling hazardous materials and wastes; (3) regular inspections by a Safety and Health Officer; (4) that all solid waste be collected in secured and covered storage containers; and (5) that all waste be transported down the mountain for proper disposal at an off-site facility. *Id.*

321. The TMT Project will implement a mandatory Ride-Sharing Program for TMT Observatory employees to travel beyond Hale Pōhaku. Ex. A-1/R-1 at 4-25. This program will reduce the number of vehicle trips to the summit and, in turn, will also reduce the amount of noise and dust generated by vehicles. Ex. A-1/R-1 at Table 2.1, pp. 4-25 to 4-26.

322. At the conclusion of construction of the TMT Observatory, a portion of the Batch Plant Staging Area will be restored. Page A-9 of App. A to Ex. B of Ex. A-1/R-1; Tr. 12/05/16 at 62:10-15.

323. The TMT Project will fund the restoration of the closed access road on Puʻu Poliʻahu in accordance with plans already submitted by the IfA and approved by the DLNR. Ex. C-2 (WDT Sanders) at 16-17; Page A-9 of App. A to Ex. B of Ex. A-1/R-1.

324. The TMT Project will support, through financial contributions and utilization of its outreach office, the development of educational exhibits related to Mauna Kea. The exhibits will: (1) be developed in coordination with OMKM and UH Hilo's ʻImiloa Astronomy Center ("**ʻImiloa**"); (2) address the cultural, natural, and historic resources of Mauna Kea; (3) be developed for use at the Mauna Kea Visitor Information Station ("**VIS**"), ʻImiloa, TMT Project facilities, and other appropriate locations; and (4) include informational materials that explore the connection between Hawaiian culture and astronomy. Ex. C-2 (WDT Sanders) at 16

325. The CMP requires that all users on the mountain receive an orientation prior to going up the mountain for the first time and MKMB policy requires that all users receive that orientation at least every three years. Tr. 12/6/16 at 88:13-90:7. Since the orientation began in 2013, 1,537 people have attended the orientation and, beginning in 2016, those who took the orientation in 2013 have begun their renewal process. Ex. A-22. The current focus is to incorporate contractors and vendors and ensure all observatory staff have taken the orientation within the past three years. WDT Klasner at 7.

326. The TMT Project will institute a Cultural and Natural Resources Training Program that all TMT Project staff and all construction workers will be required to attend annually. The training is approximately 1-hour and is considered sufficient to convey a sense of the need to be respectful to cultural and natural resources. Tr. 01/04/17 at 63:14-22; 65:25-66:5. The content of the training program will be determined by OMKM. The program is intended to educate attendees on the sensitive natural, cultural, archaeological, and historic resources of Mauna Kea, the cultural practices exercised on Mauna Kea, and the measures to prevent potential impact to such resources. Ex. C-2 (WDT Sanders) at 16; Tr. 1/3/17 at 210:23-211:1, 212:2-11. Workers who have not taken the training will not be allowed to work on Mauna Kea. Tr. 1/3/17 at 212:12-16.

327. Dr. Kahakalau testified as a witness for the Flores-Case ʻOhana, but is not a practitioner on Mauna Kea. Tr. 3/1/17 at 97:23-103:22; Ex. C-52. She criticized the Cultural and Natural Resources Training Program by stating that an annual training is inadequate for any employee to gain an understanding and respect for any cultural and religious practices, and/or sensitivity to the negative impacts on cultural resources. Ex. B.06a (WDT Kahakalau) at 5. Dr. Kahakalau demonstrated her personal bias in this case by testifying that her personal belief is that there is no place for the TMT Project on Mauna Kea and all existing observatories should be immediately decommissioned. Tr. 1/9/17 at 195:8-195:17. Dr. Kahakalau's critique of TMT's proposed Cultural and Natural Resources Training Program was not credible and is disregarded because of her demonstrated personal bias. Tr. 1/9/17 at 116:22-117:6.

328. Dr. Ku Kahakalau also criticized the TMT Project's proposed educational contributions, stating that for native Hawaiians, something is only educational if it follows their value system. Tr. 1/9/17 at 33:25-34:5. That is not a standard contained in HAR § 13-5-30(c), nor is it an appropriate standard for the Board to adopt. The Board cannot evaluate educational programs meant for the benefit of the general public based on their conformity with specific native Hawaiian preferences as articulated by Dr. Kahakalau.

329. In addition to those mitigation measures at the project-level, the University has also proposed area-wide mitigation measures, including formally and legally binding itself to the commitment that this is the last new area on the mountain where a telescope project will be contemplated or sought, and has committed to decommission the Caltech Submillimeter Observatory, Hoku Keʻa, and the United Kingdom Infra-red Telescope by the time TMT is operational. Exhibit A-39; WDT McLaren at 3-4; *see also* Ex. A-13. These actions go beyond simply addressing the impact of the TMT Project in a vacuum. They will substantially mitigate existing area adverse impacts of the astronomy sites on Mauna Kea as a whole and therefore on claimed impacts to native Hawaiian traditional and customary rights. Ex. C-6 (WDT Callies) at 8.

330. Petitioners and Opposing Intervenors contend that the significant economic benefits of the TMT Project described above should not be considered as mitigation measures. Petitioners and Opposing Intervenors fail to acknowledge that the THINK Fund and the WPP were developed and shaped in large part to respond to community input and suggestions. In the extensive scoping process for the TMT Project, one of the most frequently raised issues was the local community's desire to have the Project positively affect the socioeconomic landscape of Hawaiʻi Island and increase the potential for residents to work for the TMT Project during its construction and operation. Ex. A-3/R-3, § 1.6.3, at 1-4 to 1-5. Given that the public specifically requested these socioeconomic benefits, and that the Project has been tailored to give the public what it requested, these are appropriately considered mitigation measures.

L. TMT PROJECT DECOMMISSIONING

331. At the end of the TMT Observatory's useful life, the TMT Observatory and the portion of the Access Way exclusively used to access the TMT Observatory will be dismantled and the site restored in compliance with the Decommissioning Plan. TMT will take approximately 3-4 years to decommission. Tr. 11/2/16 at 201:16-20. Deconstruction and site restoration efforts will be managed by TMT Project staff with oversight by OMKM. TIO is committed to adequately fund decommissioning. Ex. C-2 (WDT Sanders) at 11-12; Tr. 11/02/16 at 233:8-17. Even if the General Lease, which expires in 2033, is not extended, TIO members have committed to providing the funds needed for decommissioning of the TMT Observatory and portion of the Access Way exclusively used to access the TMT Observatory. Tr. 12/19/16 at 120:7-121:2, 178:7-179:6; Tr. 11/02/16 at 201:16-20.

332. Excess landscape materials removed from the site during construction will be stored at the Batch Plant so that they can be used to restore the TMT Project site as best as possible upon decommissioning. Tr. 01/04/17 at 58:16-24.

333. In compliance with the Decommissioning Plan, TMT Project staff will develop a Site Restoration Plan ("**SRP**") that will present specific targets for site restoration and describe the methodology for restoring disturbed areas after the demolition/construction activities described in the Site Deconstruction and Removal Plan ("**SDRP**") for the TMT Project are completed. Under the Decommissioning Plan, the two primary objectives of site restoration are: (1) restoring the look and feel of the summit prior to construction of the observatories; and (2) providing habitat for the aeolian arthropod fauna. Ex. C-2 (WDT Sanders) at 12; Ex. A-13 at 22-26.

334. The level of restoration to be performed and the potential impact of the restoration activities on natural and cultural resources will be carefully evaluated in the SRP and in consultation with OMKM and DLNR. Tr. 01/04/17 at 60:2-14. Specific factors that are required to be considered during the development of the SRP include cultural sensitivity. WDT Sanders at 12. TMT employees took approximately 960 photographs of the site, over 600 photographs of the Batch Plant area, and aerial photographs to a resolution of 2-3 inches to document the original conditions so that the site may be restored as close to its original condition as possible upon decommissioning. Tr. 1/3/17 at 39:1-14; Tr. 01/04/17 at 58:16-19, 60:2-24.

335. Site restoration activities may involve using cinder or materials similar to the surroundings either to fill holes or to reconstruct topography. Consideration will be given to where fill material will come from, how excavation and removal of materials will impact the collection area and any wēkiu bug habitat surrounding the restoration area, and the cultural considerations related to bringing materials from a different area on Hawai‘i Island to Mauna Kea. Upon the completion of site restoration, monitoring of the restoration activities will begin and continue for at least three years. Results of monitoring activities will be submitted to OMKM. Ex. C-2 (WDT Sanders) at 12.

336. Some underground facilities may be left in place because removing them could cause more of a disturbance than leaving them. This decision will be during the planning and review of the decommissioning process, however, the starting point for determining the level to restore the site begins with full restoration. Tr. 01/04/17 at 61:3-21; Ex. A-13 at 26.

337. During decommissioning of the TMT Observatory, there may be temporary adverse impacts due to noise, traffic, dust, visual intrusion, and the increase in human presence on the mountain. Possible adverse impacts during construction and decommissioning also include potential disturbance beyond project limits. Ex. A-1/R-1 at 2-7; Tr. 11/15/16 at 147:18-24.

M. FUNDING

338. During the evidentiary hearing, Petitioners and Opposing Intervenors argued that the CDUA should be denied because they claimed that TIO does not yet have all the funds necessary to build the TMT Project. *See, e.g.*, B.19a at 5, 6-7. Dr. Sanders, the Project Manager for the TMT Project, provided uncontroverted testimony that TIO has already received substantial funds and will undertake additional fundraising efforts once a

decision has been made as to the project approval. Tr. 1/3/17 at 35:15-20. The members of TIO have committed to providing their respective shares of the operating budget. Tr. 1/3/17 at 55:1-6. If the TMT Project is permitted, sufficient funds would be committed to decommission it by the current termination of the General Lease in 2033. Tr. 11/02/16 at 233:8-17.

339. Ching did not dispute Dr. Sanders's testimony. Nonetheless, he posited that the TMT Project has not taken proper steps to ensure funding of the project. Ching cites Section II(C) of the Mauna Kea Plan (1997), which provides that "[n]o application or any proposed facility shall have final approval without the applicant having first filed with the Board, adequate security equal to the amount of the contract to construct the telescope facilities, support facilities and to cover any other direct or indirect costs attributed to the project[.]" Ching argues that, to comply with the foregoing, a bond in the amount of the contract to construct the project (and ancillary facilities) must be posted before the CDUA can be approved. Ex. B.19a at 6-7; Ex. B.17g; Tr. 1/24/17 at 215:9-21. The Mauna Kea Plan (1997) is a policy guide that is not intended to impose rigid development standards. This is evidenced by statements contained in the plan itself, stating that it is a "policy guide" and "a policy framework for the management of Mauna Kea." Ex. B.17g at 6, 16. Similarly, the plan indicates that it is "conceptual" and must be reviewed and updated as time goes on, and circumstances change. *Id.* at 16. Consequently, there is no requirement that a bond be posted for the TMT Project before the CDUA can be approved.

N. THE OCCL REPORT RECOMMENDS APPROVAL OF CDUA

340. On February 25, 2011, OCCL submitted its staff report recommending that DLNR approve the University's CDUA. Ex. A-7/R-7; Ex. A-8/R-8; Ex. A-24; Ex. A-25. Lemmo, the administrator of OCCL and signatory to the OCCL report, testified that in drafting its recommendation, OCCL consulted the CDUA, the FEIS, the CMP and subplans, and comments from members of the community and various state agencies. Tr. 2/28/17 at 34:8-34:17, 40:3-41:1; 83:5-83:14, 84:23-85:1; Tr. 2/27/17 at 218:14-17, 219-220, 222-223; Ex. A-7/R-7.

341. OCCL's conclusion that astronomy is an economically and environmentally sustainable use was the result of very difficult, deep analysis, reflection, and concern. It looked at all actions in the context of the setting in which the action might take place, the framework that is currently in place, and the outcomes that it believes will occur if it should recommend approval. Tr. 2/28/17 at 65:10-66:6.

342. OCCL's recommendation was based upon its finding that:

    a. The TMT Project had done everything possible to absolutely mitigate or ameliorate cultural, ecological, recreational effects of placing the largest telescope in the world on the summit of Mauna Kea. Tr. 2/28/17 at 65:10-66:6; Ex. A-7/R-7 at 19-21, 59-61.

    b. The TMT Observatory will not be built in critical habitat for the wēkiu

bug or any species of concern. Tr. 2/28/17 at 66:22-67:3; Ex. A-7/R-7 at 6, 45, 50-51.

c. The TMT Project is proposed to be located on the north slope, away from traditional cultural properties ("**TCPs**"). A portion of the Access Way will traverse the lower portion of Kūkahauʻula. There are no known burial sites, ahu, or other historic features near the project area. Historic maps do not show any paths crossing the Northern Plateau where the TMT is being proposed. The proposed location is removed from the Kūkahauʻula Summit and other identified culturally significant features. Tr. 2/28/17 at 66:22-67:3; 67:25-68:9; Ex. A-7/R-7 at 49-50, 59; Ex. A-59 at 39.

d. The TMT Project will bring significant funds to Hawaiʻi that will be used to reinvest in Mauna Kea. It also will provide needed blue-collar and professional jobs. The financial and other resources that TMT will bring will improve the University's ability to implement many of the management plan actions. Ex. A-7/R-7 at 45, 60; Tr. 2/28/17 at 68:10-68:18.

e. A strong management regime, approved by the BLNR, is now in place for caring for the mountain's resources. The management framework consists of a comprehensive management plan with the subplans, resource plans, cultural plans, public access plans, and decommissioning plans. Tr. 2/28/17 at 68:19-69:1; Ex. A-7/R-7 at 46-47, 60.

343. Lemmo further testified that the TMT Project met all eight of the criteria applicable to conservation district use applications, as set forth in HAR § 13-5-30, and thus, recommended approval of the CDUA to the BLNR. OCCL considered the cultural and religious issues and concluded that the site location below the summit ridge in Area E mitigated the impacts of the new telescope in the area. While the TMT Project represents an incremental impact, the TMT Project in and of itself is not a significant impact in the context of the proposed mitigation measures and the already existing significant impacts within the Astronomy Precinct. Tr. 2/28/17 at 66:7-70:22.

III. THE TMT PROJECT COMPLIES WITH THE EIGHT CRITERIA CONTAINED IN HAR § 13-5-30

344. HAR § 13-5-30(c) establishes eight criteria that the BLNR must apply when evaluating the merits of a proposed land use in a Conservation District. Failure to meet any one criterion does not disqualify a project from receiving a CDUP. Rather, the Board must consider each criterion and decide how to weigh each criterion in the context of the entire project. Tr. 10/24/16 at 93:24-94:6.

345. The University has the burden to demonstrate by a preponderance of the evidence that the TMT Project meets the eight criteria to support a recommendation of approval of the

CDUA and issuance of a CDUP. HAR § 13-1-35(k) ("The party initiating the proceeding and, in the case of proceeding on alleged violations of law, the department, shall have the burden of proof, including the burden of producing evidence as well as the burden of persuasion. The quantum of proof shall be a preponderance of the evidence.").

346. In preparing the CDUA, the University's consultants relied on a wide variety of materials as well as consultation with, *inter alia*, specialists and archaeologists. Tr. 10/24/16 at 12:14-13:10.

347. The CDUA was prepared in 2010. Whether a CDUA requires revisions or updates does not depend upon the mere passage of time; rather, it depends on the particular facts of the situation. Tr. 10/24/16 at 186:10-13. White, the primary author of the CDUA, testified that he knows of no new fact that would change his assessment of the CDUA. Tr. 10/24/16 at 187:9-18. The other parties have not presented any reliable, credible and material evidence that contradict White's testimony and conclusion.

348. As set forth herein, the TMT Project satisfies the eight criteria for a BLNR-approved CDUP under HAR § 13-5-30(c). WDT White at 13; Ex. A-31; Tr. 10/20/16 at 218:3-28:5; Tr. 10/24/16 at 24:17-23.

349. Many of the Petitioners, Opposing Intervenors, and their witnesses claimed during their testimonies that the TMT Project does not comply with the eight criteria in HAR § 13-5-30. However, in offering their respective testimonies, the Petitioners, Opposing Intervenors, and their witnesses repeatedly admitted that they did not even consider or read the Hawai'i Supreme Court's recent decision in *Kilakila 'o Haleakala v. Board of Land and Natural Resources*, 138 Hawai'i 383, 382 P.3d 195 (2016), which extensively discussed several of the same eight criteria. *See* Tr. 1/11/17 at 84:25-85:15 (Fujikane); Tr. 1/19/17 at 129:2-11 (Abad); Tr. 1/25/17 at 147:18-24 (Mills); Tr. 1/30/17 at 229:3-6 (Flores); Tr. 1/31/17 at 135:7-10 (Ward); Tr. 2/22/17 at 132:20-133:8 (Ho); Tr. 2/28/17 at 263:15-20 (Trask); Tr. 3/1/17 at 202:22-25 (Camara). While Frankel, who testified on behalf of KAHEA in this proceeding, represented the appellant in the *Kilakila* case, he testified on cross examination that he did not consider *Kilakila* in offering his testimony in this proceeding because it did not involve the public trust doctrine, which his testimony in this proceeding was limited to. Tr. 1/11/17 at 49:9-17.

A. CRITERION ONE: THE PROPOSED ACTIVITY IS CONSISTENT WITH THE PURPOSE OF THE CONSERVATION DISTRICT

350. The first criterion in HAR § 13-5-30(c)(1) requires that "The proposed land use is consistent with the purpose of the conservation district[.]"

351. The Conservation District statute is designed "to conserve, protect and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare." HRS § 183C-1.

352. The Conservation District administrative rules are designed "to regulate land-use in the conservation district for the purpose of conserving, protecting, and preserving the

important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare." HAR § 13-5-1.

353. Astronomy development is an expressly permitted use within the Conservation District with a valid CDUP; the Conservation District rules are designed to appropriately regulate and manage land uses. HAR § 13-5-24(c); HRS § 183C-1.

354. Thus, the TMT Project is to be reviewed to determine if the proposed land use will be appropriately managed and used to protect, preserve and promote the long-term sustainability of important natural resources, public health, safety and welfare.

355. The 11,288 acre MKSR is within the Conservation District. Ex. A-9 at 3-1. The proposed TMT Project is within the MKSR's 525 acre Astronomy Precinct. Ex. A-1/R-1 at 1-6. Currently, there are eight optical and/or infrared observatories, and three submillimeter observatories in the Astronomy Precinct. Ex. A-1/R-1 at 1-1.

356. The CDUA outlines how the proposed use within the already-developed Astronomy Precinct is consistent with the purpose of the Conservation District to conserve, protect, preserve and promote the long-term sustainability of the surrounding areas within the MKSR, which are at present used principally for scientific astronomical activities. Ex. A-1/R-1 at 2-1 to 2-2.

357. The CDUA also contains descriptions of practices and protocols that provide for "appropriate management and use" to promote the long-term sustainability of resources and the public health, safety, and welfare within the Conservation District. Ex. A-1/R-1.

358. The TMT Project will promote the health, safety and welfare of the public through the advancement of scientific study, providing educational benefits in the form of telescope viewing time for the University's students and researchers, advancing STEM educational opportunities for Hawai‘i residents through the community benefits package, and other measures. Ex. A-1/R-1; WDT Hasinger at 2-6.

359. The TMT Project will be subject to management through the BLNR-approved CMP and sub-plans, the TMT Management Plan, which complies with Ex. 3 of HAR § 13-5 et seq., and the BLNR-imposed conditions to the CDUP, as well as the University's internal Master Plan. Ex. A-1/R-1 at 2-1. The TMT Project is consistent with the foregoing plans. Ex. A-1/R-1 at 2-2. The comprehensive management framework appropriately addresses cultural and natural resources, public access, and the ultimate decommissioning of the Project and restoration of its site.

360. The relevant plans, sub-plans, and permit conditions require the University and TIO to conserve, protect, and preserve the important natural and cultural resources of the State, and promote their long-term sustainability, as well as promoting the health, safety, and welfare of the public. Ex. A-9 at 7-40.

361. The relevant plans, sub-plans, and permit conditions require the TMT Project to comply with the Conservation District rules and applicable laws and regulations. Ex. A-9 at

7-40.

362. The natural resource characteristics that make Mauna Kea uniquely suitable for astronomy (including its elevation, stable atmospheric clarity, low humidity and absence of light pollution), making it arguably the single best location in the northern hemisphere to conduct astronomical research, are also "important natural resources of the State" that must be appropriately managed and used to "promote their long-term sustainability and the public health, safety, and welfare." HRS § 183C-1; WDT Hasinger at 1; Ex. A-9 at A4-13 to A4-15.

363. Based on a review of the TMT Project's design, mitigation efforts, planned financial contributions to the management of MKSR, and its consistency with the objectives and provisions of the applicable plans, the TMT Project will conserve, protect and promote these unique and important astronomical natural resources of the State. WDT White at 2-5; Ex. A-1/R-1 at 2-2.

364. As the Board has acknowledged in the past, astronomy is an environmentally responsible and economically sustainable use that does not extract a large amount of resources, and does not consume significant natural resources once constructed. WDT White at 5; Tr. 10/20/16 at 60:5-7, 92:17-94:7.

365. The design of the TMT Project complies with the goals and objectives of the Master Plan, the purpose of which is to protect and preserve the resources of the UH Management Area on Mauna Kea, and with the CMP and sub-plans for Mauna Kea. Ex. A-48 at II-1 to II-4; WDT White at 3; WDT Nagata at 7-10; Tr. 10/20/16 at 60:7-10, 61:2-62:9; Tr. 10/24/16 at 15:17-17:11.

366. The CMP and sub-plans provide management strategies designed to preserve and protect the resources located in the UH Management Area. These plans are the BLNR-approved management documents for the UH Management Area on Mauna Kea, and they provide the management framework and strategies that protect, preserve, and enhance the resources within the UH Management Area. The TMT Project is consistent with the CMP and sub-plans. WDT Nagata at 3-4; WDT White at 3-5; Tr. 10/20/16 at 59:15-60:10; Tr. 10/24/16 at 15:17-17:15, 129:11-15; *see generally* Exs. A-9 to A-13.

367. In compliance with Ex. 3 of HAR Chapter 13-5 *et seq.* (entitled "Management Plan Requirements"), TIO has developed a TMT Management Plan (attached as Ex. A-1/R-1 at Ex. B) that adopts the approach, goals, objectives, findings, recommendations, and management strategies and actions of the CMP and sub-plans in their entirety. Ex. A-1/R-1 at 2-3 to 2-4. The TMT Management Plan is intended to guide various activities within the TMT Project area. WDT White at 4; *see generally* Ex. A-1/R-1, Ex. B; Tr. 10/24/16 at 63:8-13. As previously stated, the CMP and its sub-plans have been approved by the BLNR. *See* FOF No. 135; Ex. A-26 at 36-37.

368. The TMT Management Plan is the management plan required under HAR § 13-5-24.

369. The TMT Management Plan provides a general description of the proposed TMT Project, the existing conditions on the parcel, proposed land uses on the parcel, and reporting

schedule. It also provides for implementation of all relevant action items in the CMP and sub-plans on a site-specific basis. This ensures that the management actions called for in the CMP and sub-plans are effectively and responsibly implemented in the TMT project areas. WDT White at 4; Ex. B of Ex. A-1/R-1; Tr. 10/20/16 at 59:19-60:10.

370. The TMT Management Plan sets forth mitigation measures in the form of best management practices and conservation methods intended to mitigate the impacts of the TMT Project on Mauna Kea's varied resources (see, for example, Table 4-1 in Ex. B of the TMT CDUA). The TMT Management Plan provides site-specific information and complements the CMP and sub-plans. Both mitigation and avoidance are consistent with the goals of the Conservation District. Tr. 10/24/16 at 227:23-228:4. By following the applicable provisions of all of the plans (the Master Plan, CMP, sub-plans, and TMT Management Plan), the University and TIO will fulfill the purpose of the Conservation District concerning the TMT Project. WDT White at 4; WDT Nagata at 7-10; Ex. A-1/R-1, Ex. B, Table 4-1.

371. The University and TIO have committed themselves to developing and operating the TMT Project in compliance with Conservation District Rules, the CMP and its sub-plans, the TMT Management Plan, and all conditions included in a CDUP. Tr. 10/20/16 at 61:17-22. Adherence to the Conservation District rules, the CMP and its sub-plans, the TMT Management Plan and a CDUP will ensure proper management. Tr. 10/20/16 at 61:23-62:9.

372. The TMT Project is the first proposed astronomical observatory since the inception of the Master Plan to commit to contributing funds to assist in the management of Mauna Kea. WDT White at 3.

373. The TMT Project will not have a significant or adverse impact on area water resources, including the waters of Lake Waiau and Mauna Kea's underlying groundwater. The TMT Observatory will use a zero-discharge wastewater system. Ex. A-3/R-3 at 3-120. Therefore, the TMT Project will not threaten the health, safety and welfare of the public, with regard to water resources. WDT White at 5; WDT Hayes at 23-28; *see generally* WDT Nance.

374. The TMT Project will make optimum use of the natural resources that make Mauna Kea one of the best places on Earth to conduct astronomical research. These resources include Mauna Kea's altitude, location at a favorable latitude, atmospheric clarity and stability, general lack of cloud cover, low humidity, low mean temperature and temperature variability, and distance from light pollution. The TMT Project will make use of these natural resources in a sustainable manner. Tr. 10/27/16 at 337:22-338:12; Tr. 10/20/16 at 92:17-94:13; Tr. 10/24/16 at 50:8-11; WDT Hasinger at 1. The TMT Project will allow the people of Hawai‘i to continue to use and benefit from the astronomical resources of Mauna Kea and to maintain the University at the forefront of astronomy. Tr. 10/20/16 at 62:3-9.

375. TIO has committed to developing, in compliance with the CMP and the Decommissioning Plan, as approved by the BLNR, a project-specific decommissioning

plan through which it intends to restore the Project site at the end of the useful life of the TMT Observatory, or at the end of the General Lease if extended, or if a new General Lease is not executed. WDT White at 5; Ex. A-1/R-1, Ex. B, 4-39 to 4-44. The specific details of the decommissioning of the TMT Observatory will be determined once decommissioning is determined to be required, or approximately five years in advance of planned decommissioning. Tr. 10/20/16 at 131:16-132:6.

376. As detailed in the TMT FEIS, CDUA, and Management Plan, TIO has committed to implementing a number of measures and management actions intended to address and effectively mitigate the impacts of the Project. *See generally* Ex. A-1/R-1, A-3/R-3, A-4/R-4 and A-5/R-5. Harm to resources on Mauna Kea that has already occurred will be mitigated by providing resources for the management of Mauna Kea and through public education about Mauna Kea's resources. Tr. 10/24/16 at 89:17-24.

377. The management of the Project appropriately addresses cultural and natural resources, public access, and the ultimate decommissioning of the Project and restoration of its site.

378. Implemented in accordance with its plans, the TMT Project will not consume significant natural resources; will not pollute; will not harm species of concern, or the environment generally; will not prevent contemporary, customary, historical and traditional cultural practices; will not impede recreational uses; and will not threaten the public health, safety, or welfare.

379. Implemented in accordance with its plans, the TMT Project will make optimum and sustainable use of the natural resources that make Mauna Kea an ideal location for astronomy; will facilitate the management of Mauna Kea; will be an enormous benefit to the public welfare by contributing significant funds to Hawai‘i Island; will provide jobs; will inject significant money spending and revenues into the local economy; will contribute new programs and funds to Hawai‘i Island schools; will enable the University to remain at the forefront of astronomy in research and education; and contribute to the overall knowledge base of mankind. Those discoveries made using TMT will provide inspiration to generations of students for which many of Hawai‘i's citizens can be proud. Tr. 12/19/16 at 108:19-22.

380. Tajon, who appeared on behalf of Kakalia, testified that in his opinion the TMT Project is not consistent with the purpose of the Conservation District because he felt there was no community input. Tr. 2/27/17 at 15:5-15:10. The extent of community input is not the proper standard by which to determine whether or not a project is consistent with the purpose of the Conservation District. Moreover, as discussed herein, the credible evidence demonstrates that significant community input was sought and generated for this project at various public approval stages. In any event, as discussed above, the TMT Project complies with the purpose of the Conservation District, as set forth in the applicable authorities. *See supra* at FOF Section III.A.

381. Prof. Fujikane, a witness for KAHEA, testified that the TMT Project is not consistent with the purpose of the Conservation District because the TMT Project will be built in a pristine area of Mauna Kea that is viewed as the firstborn child of Papahānaumoku, Earth

Mother, and Wākea, Sky Father. Ex. B.13a (WDT Fujikane) at 4. This is not the standard for evaluating whether or not a project is consistent with the purpose of the Conservation District. Prof. Fujikane's assertion that the University's CDUA improperly directs the Board's attention to the proposed mitigation measures proposed by the TMT Project is not supported by the record. The University has shown that it considered all eight criteria applicable to its CDUA, and that the TMT Project complies with the purpose of the Conservation District, as set forth in the applicable authorities.

382. Conversely, Prof. Fujikane also opined that Mauna Kea is already so overbuilt and that there are no mitigation measures that can remedy the area. Tr. 1/9/17 at 226:9-226:13. This is in contradiction with the credible testimony of White that because of the proposed mitigation measures the construction and operation of the TMT Project will not have a substantial adverse impact on natural resources in the area. WDT White at 7-8. Additionally, Prof. Fujikane's statement that Mauna Kea is overbuilt is inconsistent with and contradicts her previous testimony that the TMT Project will be built in a pristine area. Tr. 1/9/17 at 224:1-224:3.

383. Dr. Kahakalau, a witness for the Flores-Case ʻOhana, argued that the TMT Project is not consistent with the Conservation District because any construction will have some impact on the existing environment. This is not the standard for evaluating whether or not a project is consistent with the purpose of the Conservation District. As discussed above, the TMT Project complies with the purpose of the Conservation District, as set forth in the applicable authorities.

384. As set forth herein, the TMT Project is broadly and generally consistent with the objectives, requirements and purpose of the Conservation District on Mauna Kea.

B. CRITERION TWO: THE PROPOSED ACTIVITY IS CONSISTENT WITH THE OBJECTIVE OF THE RESOURCE SUBZONE

385. The second criterion, HAR § 13-5-30(c)(2), provides: "The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur[.]"

386. The Conservation District is divided into various subzones, some more restrictive than others. Uses that are not appropriate in the most restrictive subzone may be appropriate in the Resource subzone. Tr. 10/20/16 at 60:15-61:1.

387. The TMT Project will be located in the Resource subzone. Ex. A-2/R-2 at SS-1.

388. Amendments to the Conservation District Rules were adopted by the BLNR on August 12, 2011. These amendments were signed into law by the Governor of the State of Hawai'i on November 23, 2011, and became effective ten days thereafter. *See* HAR §13-5 et seq. (2011).

389. Under the version of HAR § 13-5-13(a) that was in effect when the CDUA was submitted to the BLNR, "[t]he objective of this [Resource] subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas."

390. Within the Resource subzone, astronomy facilities—such as the TMT Project—(along with other specifically enumerated uses such as commercial forestry, mining and extraction, and aquaculture) can be allowed with proper management. HAR § 13-5-24(c); WDT White at 5; Tr. 10/20/16 at 61:8-61:11; Tr. 10/24/16 at 17:16-18:15; Tr. 1/11/17 at 51:4-22; Ex. A-3/R-3 at 3-142, 3-155.

391. Evidence presented addressed whether the TMT Project will be properly managed to ensure the sustained use of the natural resources within the MKSR.

392. For purposes of the criteria in HAR § 13-5-30(c)(1) and (c)(2), the rules do not specify limits as to the size, appearance or other characteristics of an astronomy facility within the Resource subzone.

393. As an astronomy facility that will be subject to appropriate management aimed at ensuring the protection and sustained use of natural resources in the area, the TMT Project is consistent with the purposes of the Resource subzone.

394. One of the objectives of the Resource subzone is to develop and promote science through astronomical facilities constructed in the approved geographic areas, including the specific Area E location for the TMT Project within the Mauna Kea Astronomy Precinct.

395. The version of HAR § 13-5-24(c) in effect when the CDUA was submitted to the BLNR, clearly provided that "Astronomy facilities under an approved management plan" are permitted activities in the Resource subzone.

396. The version of HAR § 13-5-2 in effect when the CDUA was submitted to the BLNR, provided that a "'Management plan' means a comprehensive plan for carrying out multiple land uses."

397. The evidence presented at the hearing, and addressed further below, shows that the CMP, with its sub-plans, is a comprehensive plan for carrying out multiple land uses in the designated subzone. The CMP that was previously approved by the BLNR is still fully applicable and was in place and approved by the BLNR when the CDUA for the TMT Project was presented to the BLNR for approval.

398. The TMT Project, as set forth in the CDUA and supporting documents, is consistent with the provisions of the CMP and sub-plans.

399. The current amended version of HAR § 13-5-13(a), provides: "[t]he objective of this [Resource] subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas."

400. The evidence presented demonstrates that the TMT Project, with proper management, provides a mechanism for the sustainable use of the natural resources in areas affected by the TMT Project.

401. The current amended version of HAR § 13-5-24(c), provides that "Astronomy facilities under a management plan approved simultaneously with the permit" are permitted in the

Resource subzone.

402. The current amended version of HAR § 13-5-2, provides that "'Management plan' means a project or site based plan to protect and conserve natural and cultural resources."

403. The TMT Management Plan is a project or site-based plan to protect and conserve natural and cultural resources, and was appended to and incorporated into the CDUA.

404. The TMT Management Plan is consistent with the CMP and sub-plans, and provides for implementation of all relevant action items and plans of the CMP and sub-plans on a site-specific basis.

405. HAR § 13-5-13(a) seeks to "ensure, with proper management, the sustainable use" of the resources that are proposed to be used. Here, the TMT Project will not consume or significantly adversely affect Mauna Kea's "natural resources"—*i.e.*, Mauna Kea's high altitude, large fraction of clear nights, atmospheric stability, low mean temperature, low perceptible water vapor, distance from light pollution, and optimal latitude. The TMT Project is sustainable in that it does not actually consume the natural resources; it principally uses the existing natural environment as an optimal resource to observe the night sky and star light. The 5 acre area of land upon which the TMT Observatory will be built, will ultimately be restored and returned to its original state following its use after decommissioning. Tr. 10/27/16 at 337:22-338:14.

406. The University and TIO have committed to managing the natural resources in the UH Management Area in a manner that fulfills the objectives of the Resource subzone and the purpose of the Conservation District. WDT White at 6; Tr. 10/20/16 at 60:15-62:25; *see* Exs A-9 to A-13.

407. The proposed TMT Project meets the objectives of the Resource subzone by using the excellent natural astronomical resources that Mauna Kea possesses in a sustainable way in order to uphold Hawai'i's position at the forefront of astronomical research, while also implementing and supporting overall Mauna Kea management activities in a way that promotes the sustainable use of the resources in the subzone area. WDT White at 6; *see* Tr. 10/20/16 at 62:14-62:20.

408. The University and TIO have committed themselves to develop and operate the TMT Project in compliance with the Conservation District rules, CMP, sub-plans, TMT Management Plan, and with all conditions attached to any resulting CDUP. Compliance with the Conservation District Rules, CMP, CRMP, NRMP, Decommissioning Plan, PAP, and the TMT Management Plan will ensure the appropriate and sustained use of the natural and cultural resources found on Mauna Kea. WDT White at 6; Tr. 10/20/16 at 61:17-62:9.

409. The CMP and sub-plans comprise the BLNR-approved management documents for the UH Management Area on Mauna Kea. Tr. 12/8/16 at 28:23-29:17. The University has taken significant steps to implement the CMP and sub-plans and to manage the resources found in the UH Management Area on Mauna Kea to ensure the sustainable use of those resources. Exs. A-9 to A-14; Ex. A-16 - A-22.

410. The TMT Management Plan adopts the approach, goals, objectives, findings, recommendations, and management strategies and actions of the CMP and sub-plans in their entirety. Exhibits A-1, Ex. B at S-2, 1-1 to 1-2; Ex. A-26 at 7. The TMT Management Plan commits to guide various activities and uses within the TMT Project area. The TMT Management Plan is consistent with HAR § 13-5-24(c). Ex. A-1/R-1, Ex. B at 1-1 to 1-2; Tr. 10/20/16 at 59:15-60:18.

411. The TMT Management Plan contains a draft historic preservation mitigation plan, a construction plan, a historical and archaeological site plan, a maintenance plan, and an arthropod monitoring plan. These plans are consistent with and link to the broader CMP and sub-plans. Ex. A-1/R-1, Ex. B at App. A to App. E; Ex. A-7/R-7 at 46-47.

412. The TMT Management Plan will govern the TMT Project construction, operation and decommissioning. The TMT Management Plan will be updated every five years based on: (1) updates to the Mauna Kea CMP and sub-plans; (2) relevant new or modified laws, regulations, and policies; (3) results from the regular monitoring and reporting done by the TMT Project and OMKM; and (4) modifications to the operation of the TMT Observatory. Ex. A-1/R-1, Ex. B at 5-2.

413. The reliable, probative, substantial, and credible evidence demonstrates that, through the comprehensive management schemes and the thoughtful design elements and mitigation measures described above and in the CDUA and supporting documents and evidence, the sustainable use of those TMT Project area natural resources will be appropriately protected and ensured.

414. To the extent HAR § 13-5-13(a) requires protection of other natural resources within the Resource subzone beyond those proposed to be used, the reliable, probative, substantial, and credible evidence demonstrates that the comprehensive management plans, design elements, and mitigation measures described herein and in the CDUA and supporting documents and evidence provide for the sustainable use and protection of those natural resources.

415. Dr. Abad, a witness for KAHEA, testified that in her opinion, the CDUA does not meet the criterion stated in HAR § 13-5-30(c)(2) because an astronomy facility must "also meet the full spectrum of permitting requirements under § 13-5-30(c)." Ex. B.08a (WDT Abad) at 4-5. Dr. Abad's reasoning is unpersuasive and illogical given the undisputed fact that HAR § 13-5-30(c) sets forth eight distinct criteria for the Board to consider, of which the second criterion is one.

416. As set forth herein, the TMT Project is broadly and generally consistent with the objectives, requirements and purpose of the Resource subzone.

C. CRITERION THREE: THE PROJECT COMPLIES WITH CHAPTER 205A, HAWAI'I REVISED STATUTES

417. The third criterion in HAR § 13-5-30(c)(3), provides that: "The proposed land use complies with provisions and guidelines contained in chapter 205A, HRS, entitled 'Coastal Zone Management', where applicable[.]"

418. HRS § 205A-1 defines Hawai‘i’s Coastal Zone Management Area (“**CZMA**”) as consisting of “all lands of the State and the area extending seaward from the shoreline to the limit of the State’s police power and management authority, including the United States territorial sea.” It establishes guidelines for the use of these lands. Many of the objectives of the Coastal Zone Management program parallel the purpose and objectives of the Conservation District under HAR § 13-5 *et seq.* HRS § 205A; Tr. 10/24/16 at 18:16-19:13.

419. HRS § 205A-22 provides: “‘Special management area’ means the land extending inland from the shoreline as delineated on the maps filed with the authority as of June 8, 1977, or as amended pursuant to section 205A-23.”

420. The TMT Project is not in the special management area.

421. Part II of Chapter 205A, HRS §§ 205A-21 through 205A-33, which applies only to special management areas, is not applicable to the TMT Project.

422. The evidence presented demonstrates that the TMT Project complies with the purpose and objectives of the Conservation District and also complies with the objectives of Chapter 205A of the Hawai‘i Revised Statutes, specifically including those objectives that do not overlap with the objectives of the Conservation District, but are unique to Chapter 205A. Ex. A-1/R-1 at 2-4 to 2-6; Ex. A-7/R-7 at 48-49; WDT White at 6; Tr. 10/24/16 at 18:16-19:13. The objectives of Chapter 205A that do not overlap with the Conservation District’s objectives relate specifically to the protection of water quality.

423. As set forth in more detail below, the TMT Project will have no significant or adverse impacts on water resources, including no significant impacts upon Lake Waiau and ground water, and no significant effects upon the area surrounding the project through surface water runoff or through wastewater (which will be collected and transported off the summit for treatment and disposal).

424. The TMT Project proposal is to conservatively treat all chemical waste as if it were hazardous waste for purposes of handling and disposal. Tr. 1/3/17 at 97:11-18, 196:12-197:8. The TMT Observatory will use a zero-discharge wastewater system. Ex. A-1/R-1, App. D at D-2; Ex. A-3/R-3 at 3-120. The TMT Project will not release wastewater into the surrounding environment. Ex. A-3/R-3 at 3-120. All wastewater, including mirror washing wastewater (which is not a hazardous waste), will be collected and transported off of Mauna Kea for proper disposal. Ex. A-3/R-3 at 3-120 to 3-121.

425. While construction of the TMT Project will create some new impermeable surfaces at the five-acre TMT Project site, due to the high permeability of the surrounding area, surface rainwater will percolate into the ground whether or not the TMT Project is built. The TMT Project will not create any additional adverse impact on existing water resources. WDT Hayes at 24; *see generally* WDT Nance; Ex. A-3/R-3 at 3-127 to 3-130; Ex. A-9 at 6-6 to 6-8; Tr. 10/25/16 at 36:11-14, 202:15-205:11; Tr. 11/15/16 at 25:23-27:20.

426. It is impossible to completely eliminate the possibility of an accidental spill. Tr. 10/24/16 at 205:5-8. However, the TMT Project will implement measures to mitigate the risk of

an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events.

427. To minimize the potential for an accidental spill while waste materials are in transit down the mountain to a proper disposal site, no tanks or containers being transported will be filled to the top. To further ensure the safe transport and disposal of hazardous waste, the TMT Observatory will utilize only Environmental Protection Agency- permitted and licensed contractors to transport hazardous wastes. WDT Hayes at 23-25; Ex. A-3/R-3 at 3-127 to 3-131.

428. No mercury will be used at the TMT Observatory. WDT Hayes at 23; Ex. A-1/R-1 at 2-30 and 4-32; Ex. A-3/R-3 at 3-234. Further, the TMT Observatory will utilize a secondary containment area to store all hazardous materials or wastes. That containment area will be inspected daily for leaks. Fuel storage and piping will also be double-walled and will be equipped with leak monitors. Based on these measures, the chance of a spill entering the surrounding environment is negligible. WDT Hayes at 23-25; Ex. A-1/R-1 at 3-127 to 3-131 and App. D at D-2.

429. No fracking or liquid dynamite use has been planned as part of the TMT Project. Tr. 10/25/16 at 38:11-14; Tr. 10/24/16 at 206:4-7.

430. Storage and waste management include a Spill Prevention and Response Plan ("**SPRP**") and a Materials Storage/Waste Management Plan. The SPRP provides for inspections to ensure that systems are working properly, no leaks are occurring, and any necessary maintenance measures are taken. The SPRP also requires protocols for proper handling, storage, use, and disposal of liquid and solid materials and wastes. WDT Hayes at 25; Ex. A-3/R-3 at 3-128 to 3-130.

431. The TMT Project site is 12 miles from the nearest wells that extract groundwater. The groundwater beneath the summit of Mauna Kea is impounded and compartmentalized by subsurface geologic structures. Because the TMT Observatory will use a zero-discharge wastewater system, wastewater will not be released from the TMT Project so no percolation of wastewater will reach the aquifer. Moreover, Mauna Kea is comprised of very porous lavas that naturally treat and filter water percolating downward. A discharge on the summit area would be naturally treated and filtered through thousands of feet of the porous lavas, which would remove any contamination from that discharge before reaching any groundwater. *See* Ex. A-44. Contamination of groundwater is extremely remote and very unlikely from the TMT Project. Ex. A-3/R-3 at 3-116; WDT Nance at 4.

432. There is no reasonable prospect of an adverse impact on either drinking or coastal waters from the TMT Project. Accordingly, the TMT Project complies with the applicable objectives, provisions and guidelines in Haw. Rev. Stat. Chapter 205A. WDT Hayes at 26.

D. CRITERION FOUR: THE PROPOSED LAND USE WILL NOT CAUSE SUBSTANTIAL ADVERSE IMPACT TO EXISTING NATURAL RESOURCES WITHIN THE SURROUNDING AREA, COMMUNITY, OR REGION

433. The fourth criterion in HAR § 13-5-30(c)(4), provides: "The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region[.]"

434. Under the version of HAR § 13-5-2 that was in effect when the CDUA was submitted to the BLNR, "Natural resource" is defined as meaning "resources such as plants, aquatic life and wildlife, cultural, historic and archeological sites, and minerals." The amendment added to this definition "recreational" and "geologic" sites, "scenic areas, sociologically significant areas," and "watersheds."

435. The BLNR has considered impacts to the resources that exist within the surrounding area, and the TMT Project has been assessed in the context of what resources are already in place.

436. The impacts of the TMT Project are consistent with existing uses and the scientific observatory context for the MKSR. The MKSR was specifically established by the community and the State to promote astronomical uses on Mauna Kea. The summit region has housed astronomical observatories since the 1960's, and currently has eight optical/infrared observatories, three submillimeter observatories and a radio telescope.

437. All of the current astronomical facilities (except the radio telescope), as well as the proposed site of the TMT Project, are within the 525-acre Astronomy Precinct, which is less than five percent of the total 11,288 acre MKSR.

438. Under the MKSR Master Plan, the development of astronomical facilities is further restricted to a 150-acre area within the Astronomy Precinct.

439. Prior to the TMT Project, the cumulative effects of astronomical development and other uses in the summit area of Mauna Kea have resulted in impacts that are considered substantial, significant and adverse.

440. The TMT Observatory will not significantly add to or burden the balance of any existing impact from a level that is currently less than significant to a significant level within the Astronomy Precinct. Tr. 10/25/16 at p. 181:6-10. This means that the TMT Project itself will not cause substantial adverse impacts. But rather, when taken in conjunction with its proposed mitigation and applicable management and decommissioning plans, the overall effect of the TMT Project will be either neutral or provide for lesser overall impacts than current existing uses in the Astronomy Precinct.

441. Petitioners and Opposing Intervenors' argument that Mauna Kea has suffered previous "unlawful" significant and adverse impacts, does not require a proposed project to first reduce existing cumulative impacts to a level that is less than significant and adverse.

442. HAR § 13-5-30(c)(4) does not require the University, as an applicant for a CDUP, to prove whether and to what extent all summit region area cumulative impacts should be mitigated.

443. In the context of the existing summit area cumulative impacts—and under the assumption that such cumulative impacts will continue—the TMT Project does not create or cause substantial adverse impacts to existing natural resources in the applicable area. The existing uses and resources are already committed to astronomical uses and objectives, and otherwise based upon commitments of the CDUA and University proposals, several facilities will be removed thereby significantly reducing substantial existing adverse impacts on the more sensitive and visible summit ridge areas within the Astronomy Precinct.

444. The CDUA and supporting documents provide sufficient information for the BLNR to consider whether the "proposed land use" itself – and not other existing uses and/or conditions – will cause "substantial adverse impact to existing natural resources within the surrounding area, community, or region[.]" HAR § 13-5-30(c)(4).

445. The reliable, probative, substantial, and credible evidence, specifically including, but not limited to, the testimonies of White, Hayes, Nees, Dr. Smith, Nance, Dr. Sanders, and Rechtman, and admitted relevant exhibits, demonstrates that the TMT Project will not cause substantial adverse impact to existing plants, aquatic life and wildlife, cultural, historic, and archaeological sites, minerals, recreational sites, geologic sites, scenic areas, ecologically significant areas, and watersheds.

446. Petitioners and Opposing Intervenors did not offer reliable, probative, substantial, and credible evidence, whether from expert or lay witnesses or exhibits, that would support the conclusion that the TMT Project would cause substantial adverse impact to existing plants, aquatic life and wildlife, cultural, historic, and archaeological sites, minerals, recreational sites, geologic sites, scenic areas, ecologically significant areas, or watersheds.

447. The surrounding pāhoehoe lava rock upon which the structure will be constructed is a common lava foundation feature for the surrounding summit areas upon which existing astronomical facilities have been constructed.

448. Under HAR § 13-5-30(c)(4), UH Hilo has provided sufficient information to show the level of impacts on natural resources within the MKSR would be substantially the same even in the absence of the TMT Project within the MKSR.

449. The incremental nature of a project's impacts, standing alone, cannot endlessly justify development within an existing developed area; however, based on the reliable, probative and substantial evidence, the TMT Project itself, and otherwise in conjunction with the proposed mitigation efforts, will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region under HAR § 13-5-30(c)(4).

450. The reliable, probative, substantial, and credible evidence demonstrates that the TMT Project itself, and through its proposed mitigation efforts, will not cause substantial

adverse impacts to resources such as cultural, historic, and archaeological sites.

451. The definition of "Natural resource" in HAR § 13-5-2, includes cultural, historical, and archaeological "sites"; but not necessarily cultural practices.

452. Prof. Fujikane, a witness for KAHEA, argued that the TMT FEIS's conclusion that the TMT Project will add a limited increment to the level of cumulative impact is not persuasive and does not consider the TMT Project as a whole with its proposed mitigation efforts. Her opinion focused on a limited view of the cumulative impact of the TMT Project, with all existing observatories, as an added impact on the cultural concerns of certain native Hawaiian practitioners. B.13a (WDT Fujikane) at 2. This is not the proper standard for evaluating this criterion. Prof. Fujikane testified that she had not read the Hawai'i Supreme Court's *Kilakila 'O Haleakalā* opinion and thus, her testimony was uninformed by the Court's ruling in that decision. Tr. 1/11/17 at 84:25-85:15.

453. While the TMT Project's location in the Northern Plateau section of Area E will introduce a new visual element in that area for certain individual practitioners which may affect the setting in which certain practices occur; the reliable, probative, substantial, and credible evidence demonstrates that the TMT Project itself and otherwise in conjunction with its mitigation efforts, will not cause substantial adverse impact to recognized historic traditional and cultural practices.

454. There is no credible proof that any historic feature, traditional practice or viewplane will be substantially or adversely impacted by construction at the TMT Project site.

455. Under HAR § 13-5-30(c)(4), mitigation measures for the TMT Project have been considered even though "mitigation" is not expressly stated as a requirement.

456. Petitioners and Opposing Intervenors claimed proposed mitigation measures, in their view, do not specifically address the environmental and cultural impacts of the project. *See* Petitioners' Collective Prehearing Statement at 4.

457. Numerous proposed mitigation measures for the TMT Project are specifically designed to address the environmental and cultural impacts of the project, including, but not limited to:

a. The site selection and physical design of the project itself and related infrastructure to mitigate its visual, cultural and environmental impact;

b. The TMT Access Way design;

c. Implementing a cultural and natural resources training program;

d. Developing educational exhibits;

e. Restoring of Pu'u Poli'ahu;

f. Providing a sense of place within the TMT facilities;

g. Providing financial contributions to support cultural programs;

h. Implementing specific cultural and community outreach efforts;

i. Implementing cultural observance days;

j. Continuing consultation with the State Historic Preservation Division and Kahu Kū Mauna Council regarding the protocols for the relocation of the modern shrine at the 13N site;

k. Implementing arthropod and other biological monitoring;

l. Working with OMKM to develop and implement a wēkiu bug habitat restoration study;

m. Developing and implementing an invasive species prevention and control program; and

n. Continuing consultations with cultural practitioners.

458. Mitigation measures accepted in the approved TMT FEIS may be considered as part of the CDUA approval process. On the basis of the evidence presented, those measures are reasonable and accurate efforts to mitigate and lessen any cultural impacts in the Mauna Kea summit area as a whole which benefits would not otherwise exist without the TMT Project.

459. The approved and unchallenged FEIS for the TMT Project identifies several mitigation measures, both direct and indirect, that are aimed at ameliorating potential impacts on the environment and cultural practices. These measures mitigate the Project's potential impacts on the environment and cultural practices so that the TMT Project will not create a substantial adverse impact to these areas.

460. The TMT Project also provides significant scientific, economic and educational benefits, which are material, substantial, and highly unique.

461. Dr. Stone's testimony and other evidence demonstrated that the TMT Project is designed to be a world-class telescope that will provide a much more advanced and powerful ground-based observatory than currently exists anywhere on Earth. The TMT Project is designed to investigate and answer some of the most fundamental questions regarding our universe, including studies relating to the formation of stars and galaxies shortly after the Big Bang and how the universe evolved to its present form. Ex. C-1 (WDT Stone) at 3; WDT Hasinger at 2.

462. TIO has committed to a substantial community benefits package, addressed in more detail below, which has provided over $2.5 million to date for grants and scholarships for STEM education to benefit Hawai‘i students. TIO has committed to providing $1 million annually for this program.

463. TIO will pay sublease rent to the University (the first telescope developer to do so on Mauna Kea). Those funds will be used for the management of Mauna Kea through the Mauna Kea Special Management Fund, administered by OMKM. *See* Ex. A-134.

464. The TMT FEIS addresses the existing natural resources within the surrounding area, community, or region, as well as the potential impacts of the TMT Project. The incremental nature of a project's impacts, standing alone, cannot endlessly justify development within an existing developed area. However, in this case, the TMT Project's compliance with all applicable rules, regulations, and requirements, the Master Plan, CMP, sub-plans, and the TMT Management Plan, along with the mitigation measures committed to in the TMT FEIS, CDUA, and TMT Management Plan, demonstrate that the TMT Project will not cause substantial adverse impact to the existing natural resources within the surrounding area, community, or region under HAR § 13-5-30(c)(4). WDT White at 7; Tr. 10/20/16 at 73:1-21.

465. Further specific areas of concern presented in evidence are set forth and summarized below:

1. **Biologic Resources**

466. Dr. Smith has extensive education and experience in the field of botany. Ex. A-37. Reliable, probative, substantial, and credible evidence supports Dr. Smith's opinions.

467. There are two general ecosystems or habitats in the Mauna Kea summit region. They are: (1) alpine shrub lands and grasslands, which generally occur from the 9,500 foot elevation to the 12,800 foot elevation; and (2) alpine stone desert located above the 12,800 foot elevation. Ex. A-3/R-3 at 3-59 to 3-60.

468. Vegetation generally decreases in diversity, density, and size towards the summit of the mountain, moving from alpine shrub lands and grasslands above the tree line, at roughly 9,500 feet, to a stone desert above 12,800 feet. The TMT Observatory site, the Access Way, and the Batch Plant Staging Area are located in the alpine stone desert. The plant community in the alpine stone desert consists of several species of mosses and lichens, and a limited number of vascular plants. Ex. A-3/R-3 at 3-58 to 3-62.

469. The highest densities and diversity of the 21 known species of lichens tend to grow on north and west facing rocks in protected locations away from direct early morning sun exposure. WDT Smith at 10; Ex. A-3/R-3 at 3-60 to 3-62.

470. A general botanical survey of the summit area above 12,992 feet was conducted in 1982 and recorded one species of algae, no hornworts or liverworts, 12 species of moss, 25 species of lichen, one fern, and five flowering plants. All species occurred in very low abundance though there were very small, highly protected pockets where the lichens and mosses were common. WDT Smith at 1-2, 10; Tr. 12/1/16 at 189:3-190:7.

471. A 2009 comprehensive survey of Area E detected 10 lichen species, 2 species of moss, and 7 vascular plants. This survey and subsequent report determined that there is a very low diversity and cover of plants in Area E and that all of the species are found at lower

elevations at least on the southern side of Mauna Kea. None of the lichen or moss species are unique to Hawai‘i. WDT Smith at 5-10; Tr. 12/1/16 at 154:5-156:10, 161:8-162:11; Ex. A-3/R-3 at 3-59 to 3-62; Ex. A-5, App. K at 12-13, 21-25.

472. There are no unique plants within the proposed project site. Tr. 12/1/16 at 154:5-156:10, 171:11-172:4.

473. Although there is vegetation in the summit region, because of the incredibly harsh environment, there is an extremely low cover of lichens, and bryophytes (less than 1%) in the summit region. Most, if not all, types of the vegetation found in the summit region can be found at lower elevations on Mauna Kea. There are no endangered or threatened species of flora in the TMT Project area. WDT Smith at 1-2, 8, 10; Tr. 12/1/16 at 174:5-176:13, 207-208:4.

474. There are no species of flora unique to the TMT Project site. Based on this, the TMT Project will not have a significant impact on botanical resources because species and habitat of these areas are not unique to the Project site and are found elsewhere on Mauna Kea and/or on other islands of Hawai‘i. In addition, any potential impacts will be appropriately mitigated by the measures described herein. Thus, the displacement of roughly 6 acres of alpine stone desert lava habitat—which is the ecosystem located above 12,800 feet and includes the summit cinder cones—is less than significant because this represents less than 0.5% of this type of habitat available. Overall, the TMT Project will not have a substantial adverse impact on the biological resources of Mauna Kea. WDT Hayes at 31-33; Ex. A-3/R-3 at 3-69 to 3-77, 3-214 ; WDT Smith at 10; Tr. 10/25/16 at 126:14-20; Tr. 12/1/16 at 156:5-156:10, 203:6-23, 209:1-212:20.

475. The only resident faunal species in the alpine stone desert ecosystem above 12,800 feet on Mauna Kea are arthropods. At least 10 confirmed resident species of native Hawaiian arthropod species have been collected near the summit, including: (1) wēkiu bugs (*Nysius wēkiuicola*); (2) lycosid wolf spiders (*Lycosa* sp.); (3) two sheetweb spiders (genus *Erigone*); (4) two mites (Family Aystidae and Family Eupodidae: both species unknown); (5) two springtails (Family Entomobryidae: two species unknown); (6) a centipede (*Lithobius* sp.); and (7) a noctuid moth (*Agrotis* sp.). Several other native Hawaiian species have also been collected near the summit but their resident status is unconfirmed. Additional arthropod species, non-native to Hawai‘i, are thought to be resident to the summit area cinder cones. Ex. A-3/R-3 at 3-62 to 3-63.

476. There are no currently listed threatened or endangered species known to occur in the Astronomy Precinct. The arthropod and botanical surveys conducted in 2008 and 2009 of the TMT Project areas in the Mauna Kea summit region did not encounter any species listed as endangered or threatened under either Federal or State of Hawai‘i endangered species statutes. The Mauna Kea Silversword, an endangered species, is known to occur at lower elevations and not at the TMT Project site. One species currently considered a species of concern by the United States Fish & Wildlife Service ("**FWS**"), the Douglas' bladderfern, is known to occur in the Mauna Kea summit region. The Douglas' bladderfern was found in Area E. However, it is known to be widespread, occurring on all main Hawaiian Islands, and on Mauna Kea it is more common to the east, in the

vicinity of Area F. Area E is not considered critical habitat for the Douglas' bladderfern. Ex. A-3/R-3 at 3-64 to 3-65.

477. Hansen was called as a witness for KAHEA. He has a Master's of Science degree in Tropical Conservation Biology & Environmental Science and a Bachelor's of Science degree in Environmental Science from UH Hilo. Ex. B.10b. His background is in tropical conservation, biology, and environmental science, with an emphasis on botany, conservation biology, and landscape ecology. Ex. B.10b. In May 2011, Hansen began working as a field crew leader for the Mauna Kea Baseline Botanical Survey for OMKM. Ex. B.10a (WDT Hansen) at 1.

478. Hansen is not a trained entomologist and admitted that he is not an expert in lichen, even though the significant majority of his testimony focused on the lichens present on Mauna Kea. He identified two endemic lichen species present on Mauna Kea, but he was unsure if they were endemic to Mauna Kea only, or could be found throughout the Hawaiian Islands. Tr. 1/19/17 at 160:4-10, 167:8-10. Hansen testified to the presence of unique assemblages of lichens found at the TMT Project site. However, Hansen admitted that those species of lichen can be found elsewhere on the mountain and that the particular assemblages of lichens found at the TMT Project site could be found elsewhere. Tr. 1/19/17 at 147:7-25, 192:6-22.

479. When asked about the report prepared by his superior, Dr. Gerrish, which did not focus significantly on the assemblages of lichens that he testified to, Hansen admitted that there were differences between his opinion and that of his superior, Dr. Gerrish. Specifically, Hansen admitted that the report prepared by Dr. Gerrish did not consider the lichen assemblage to be "significant." Tr. 1/19/17 at 194:7-195:14. Therefore, the lichen assemblage is not sufficient to halt the planned development and is not considered to be a significant factor in the evaluation of this criterion.

480. Hansen testified that, in his opinion, the CDUA does not meet criterion 4 because the development of the TMT Project will "dig into the mountain, move rocks and alter substrate." Ex. B.10a (WDT Hansen) at 2. However, the mere fact that a project will require excavation is insufficient to disqualify a project from approval under HAR § 13-5-30(c). To hold otherwise would render nearly every proposed project insufficient under HAR § 13-5-30(c).

481. The wēkiu bug was previously proposed as a candidate species for Federal listing under the Endangered Species Act. On October 26, 2011, the FWS formally removed the wēkiu bug as a candidate from the Federal Endangered Species Act stating threats to the wēkiu bug did not put the species in danger of extinction throughout all or a significant portion of its range. FWS cited OMKM's continued monitoring of the bug and its habitat, scientific studies to assist in managing and protecting the wēkiu bug's populations and habitat, the CMP, subplans, and procedure for formal review of new projects all contribute to the protection and conservation of the wēkiu bug. FWS concluded that the wēkiu bug no longer met the definition of a threatened or endangered species and no longer warranted listing. WDT Hayes at 31-32. The FWS's action is documented in the official Federal Register at 76 Fed. Reg. 66,377 (Oct. 26, 2011).

482. Wēkiu bugs are found in habitat composed of loose cinder found on cinder cones above 11,715 feet on Mauna Kea. WDT Hayes at 32. The wēkiu bug is a small "true bug" that has made a remarkable adaptation in feeding behavior. Many true bugs, including most of those found elsewhere in Hawai'i, are herbivores and feed on seeds and plant juices. The wēkiu bug is a scavenger that uses its straw-like mouth to feed on insects blown up to the summit area from the surrounding lowlands. These aeolian insects accumulate in protected pockets on the cinder cones; they quickly become moribund in the cold and thus easy prey for foraging wēkiu bugs who have adapted to the harsh conditions of the summit area. Wēkiu bugs are generally concentrated on the cinder cones in the summit area, but also utilize other habitats. Ex. A-1/R-1 at 3-6.

483. OMKM has an overarching plan to restore wēkiu bug habitat that was prepared in coordination with the wēkiu bug working group, the FWS, and University entomologists, and is currently being implemented. Tr. 12/6/16 at 20:6-20:16.

484. There are six arthropod habitat types in the alpine stone desert, including:

Type 1 Snow patches. Seasonal patches of snow accumulate insects that are blown up the mountain from lower elevations. Wēkiu bugs are thought to exploit the edges of these patches, feeding on aeolian insects as they emerge from the melting snow.

Type 2 Tephra ridges and slopes. On cinder cones, where tephra cinders are large enough (≥1 cm), wēkiu bugs, spiders, caterpillars (Agrotis sp.) and smaller arthropods are able to move within the interstitial spaces and utilize humid, protected microhabitats among the tephra. This is the habitat where wēkiu bugs are observed in greatest abundance. Smaller arthropods, like springtails (Collembola), and mites inhabit smaller (≤1cm) tephra cinders.

Type 3 Loose, steep tephra slopes. The unstable steep outside slopes of cinder cones where tephra cinders are smaller and subject to downward creep. Wēkiu bugs are present in low abundance in this habitat.

Type 4 Lava flows. A'ā and pāhoehoe flows with large outcrops of andesitic (iron-poor gray lava) rock are the primary habitat for lichens and mosses, lycosid wolf spiders, and centipedes. Wēkiu bugs are uncommon in this habitat, presumably because of the lack of suitable microhabitat.

Type 5 Talus slopes and fractured rock outcrops. Usually found as islands within Type 4 habitat, these are areas of talus slopes, highly fractured rock outcrops, and depressions between lava flows with glacially deposited, rounded cobbles and rocks lie on fine loess. Small voids provide suitable microhabitat for the wēkiu bug, which can occur in moderate abundance during times of high population outbreaks.

Type 6 Compacted ash, silt, and mud. Found on roadways, disturbed areas, and where fine aeolian loess accumulates. The interstitial spaces are mostly filled with fine-grained material and therefore not suitable for wēkiu bugs

and lycosid spiders. Springtails and mites are the most abundant arthropods in this habitat type.

Ex. A-1/R-1 at 3-6 to 3-7; Ex. A-3/R-3 at 3-62 to 3-64.

485. The great majority (greater than 95 percent) of the area that would be disturbed by construction of the proposed TMT Observatory and Access Way consists of Type 4, 5, and 6 habitats. Surveys conducted in 2008 and 2009 show these to be free of wēkiu bugs. Only one percent of the area that would be disturbed consists of Type 3 habitat, which the spring 2009 survey showed had a few members of this species. No wēkiu bugs were identified in the affected Type 3 habitat in the summer of 2008. Ex. A-1/R-1 at 3-7.

486. The lava substrate in Area E is not considered an ideal wēkiu bug habitat. Area E is largely comprised of Type 4 habitat, with smaller areas comprised of Type 5 habitat. The loose cinder adjacent to the existing TMT Access Way is highly suitable as wēkiu bug habitat, consisting of different sized cinders larger than ½ inch in a depth of 2 – 10 inches above the ash layer. The bulk of the Access Way alignment is habitat similar to the lava flow terrain in Area E (Types 4 and 5), while the rest is Type 6 habitat. No wēkiu bugs were located in Area E or the Access Way during the 2008 and 2009 sampling efforts. During the 2009 sampling effort, wēkiu bugs were only found in the cinder along the southern portion of the Access Way. Ex. A-1/R-1 at 3-7; Ex. A-3/R-3 at 3-62 to 3-66, 3-229; Ex. A-5/R-5, App. K at 20.

487. The stockpiled cinder at the Batch Plant Staging Area has already been altered and is disturbed regularly for road maintenance activity and, thus, is not suitable wēkiu bug habitat. Activity at the Batch Plant Staging Area, does not appear to impact wēkiu bug populations elsewhere. It is unlikely that construction activities at the Batch Plant Staging Area would have any significant impact on the wēkiu bug population. Ex. A-5, App. K at 20.

488. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. The amount of Type 4 and 5 wēkiu bug habitat that will be affected by the TMT Project is approximately 10 acres, which is less than 10.25% of the total more than 4,000 acres of Type 4 and 5 wēkiu bug habitat that exists at elevations above 11,700 feet. Ex. A-3/R-3 at 3-70 to 3-71, 3-229.

489. The impact to wēkiu bugs resulting from construction of the TMT Access Way will be less than significant. The total population of the species will not be significantly impacted by the disturbance of a small area of habitat along the TMT Access Way. Ex. A-3/R-3 at 3-70 to 3-77.

490. Any potential adverse impacts on the wēkiu bug and its habitat, such as dust generated from excavation and site preparation, wind-blown debris, and potential introduction of invasive species, will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. Ex. A-3/R-3 at 3-68 to 3-77. Currently, a program for inspections for invasive species prevention and control is in place with the Big Island Invasive Species Committee. Tr. 1/3/17 at 80:7-19. The

TMT Project also imposes requirements on materials shipped to the site from any country and any supplier to control invasive species. In other words, despite varying standards for invasive species control in other countries, the TMT Project will impose the most stringent requirements for *all* shipments to the site. Tr. 1/3/17 at 81:21-82:21.

491. Equipment and materials will be inspected for invasive species at lower elevations, below Hale Pōhaku. TIO follows the Mauna Kea Invasive Species Management Plan and has additional invasive species controls that augment OMKM's requirements. TIO is working with the Big Island Invasive Species Committee to implement those actions. Tr. 01/04/17 at 43:1-44:10.

492. The TMT Project will implement the following mitigation measures with regard to potential impacts on biologic resources, including wēkiu bugs: (1) implementation of a Cultural and Natural Resources Training Program that will give TMT personnel and construction workers an annual orientation regarding Mauna Kea's natural resources; (2) implementation of an Invasive Species Prevention and Control Program that will outline steps to be taken to avoid the potential impacts associated with invasive species; (3) pursuant to CMP Management Action FLU-6, the TMT Access Way has been designed to limit disturbance and displacement of sensitive wēkiu bug habitat, including reducing the Access Way configuration to a single lane in certain areas and paving the roadway where adjacent to such habitat to reduce dust-related impacts; (4) pursuant to CMP Management Action FLU-6, construction-phase measures will be implemented to reduce impacts to sensitive habitat and arthropods will be monitored in the area of the TMT Access Way prior to, during, and for two years after the occurrence of construction on the alpine-cinder cone habitat; (5) implementation of a Ride-Sharing Program that will reduce the number of vehicle trips per day to the summit; and (6) the planting of two new māmane trees for each māmane tree directly impacted by possible TMT Project activities. Ex. A-3/R-3 at 3-75 to 3-77.

493. TIO plans to relocate as little material from the mountain as possible. The Project will use excavated material from the grading and excavations for the building foundations and will stockpile excess material at the Batch Plant for future use in restoration. Tr. 01/04/17 at 58:16-24. The only materials that TIO plans to bring in from outside of Mauna Kea are those necessary for paving and will be removed from the mountain upon deconstruction of the TMT Observatory. Tr. 1/3/17 at 113:13-15:23.

494. Dust generated from an unpaved road can degrade wēkiu bug habitat by filling the voids between cinder making it more difficult for the bugs to move about. There is a potential that dust generated vehicle traffic during operation of the TMT Observatory will impact wēkiu bugs. However, the bugs only occupy habitats nearby and downwind of the Project areas during periods of high population, an uncommon event, and generally are more abundant elsewhere in the Mauna Kea summit region that will not frequently receive dust from the Project areas. Nevertheless, the Access Way will be paved where it is adjacent to, but upwind of, sensitive wēkiu bug habitat. This will reduce the generation of dust. Accordingly, the potential impact to the wēkiu bug is less than significant. Ex. A-3/R-3 at 3-74. The existing roadway is required to be paved where adjacent to sensitive habitats to reduce dust-related impacts. Construction-phase mitigation measures

will be implemented to reduce potential impacts to sensitive habitat. WDT Hayes at 33.

495. The paving of the TMT Access Way will not have a significant adverse impact on wēkiu bug populations. Wēkiu bugs have been seen crossing dirt roads, but none have been observed crossing paved roads. Only wēkiu bugs that occasionally cross dirt roads while dispersing during periods of high population could be impacted by the pavement. Ex. A-3/R-3 at 3-74.

496. There is no scientific evidence that the wēkiu bug population on Mauna Kea has declined since 1982. Ex. A-5/R-5, App. K at 18.

497. TMT Project impacts on biological resources is proposed to be less than significant through implementation of the Cultural and Natural Resources Training Program and Invasive Species Prevention and Control Program. Implementation of the additional mitigation measures is planned to further reduce the potential impact of the TMT Project. Ex. A-3/R-3 at 3-76 to 3-78.

498. Petitioners and Opposing Intervenors generally dispute the University's positions regarding the fauna and flora in the vicinity of the TMT Project, primarily through the testimony of Ward, Hansen, and C. Freitas.

499. Ward offered opinion testimony concerning certain entomological, biological, and botanical issues to support her claim that the CDUA is inadequate. Ward did not offer any scientific studies or data to support her opinions. Ward also conceded during cross-examination that she is not an entomologist, biologist, or botanist. Tr. 1/31/17 at 132:8-11; 117:2-4; 132:2-7. Although Ward sits on the advisory OMKM Environment Committee, her background is in horticulture, which is a distinct field from botany, entomology, and biology. *Id.*

500. Petitioners raised general concerns regarding the introduction of invasive species caused by the TMT Project. C. Freitas testified as to her concerns regarding the protocols for invasive species management. Tr. 2/21/17 at 2/21/17 at 102:25-104:13. C. Freitas failed to produce any evidence that the TMT Project will result in the introduction of invasive species, or that such introduction would result in a significant and adverse impact on the biological resources on Mauna Kea.

501. The only recent evidence of invasive species introduction to the UH Management Area is near the Hale constructed by persons opposing the TMT Project across from Hale Pōhaku. *See* Ex. A-135 at 1. The invasive fire ant *Ochetellus glaber* was identified in the area on or about April 16, 2015. OMKM continues to monitor the situation and has not observed *O.glaber* on the summit of Mauna Kea. Camara testified that he has never seen red fire ants on the summit and acknowledged that the summit is a harsh environment not only for the fire ant, but for arthropods and other insects as well. Tr. 3/1/17 at 198:3-9.

502. Based on the totality of the evidence, Petitioners and Opposing Intervenors have not refuted the University's extensive scientific studies, reports and testimony that the TMT Project will not have a significant adverse impact on biological resources.

2. Archaeological and Historic Resources

503. The archaeological process generally consists of surveying the project area, a walk through, contacting people with knowledge about the area, generating maps, photographs, recordings, historical background research, and writing a report with all historical information combined. Tr. 01/04/17 at 152:23-153:18. The walkthrough consists of fieldworkers walking transects, lines, and spacing intervals. The spacing intervals are spaced sufficiently to ensure the entire site can be carefully surveyed and reviewed. Tr. 12/20/16 at 47:23-48:7. Archaeologists also rely on previous surveys by other archaeologists and historical maps by map makers and surveyors. Tr. 12/20/16 at 135:24-136:2.

504. Subsurface work is done on occasion. Tr. 12/20/16 at 131:17-132:20. Excavations are allowed only based on a permit to conduct archaeological studies in the State of Hawai‘i. Tr. 12/20/16 at 136:10-18.

505. Nees was called as a witness for UH Hilo and testified in the area of archaeology, particularly archaeological investigations on Mauna Kea. Nees has expertise in archaeology and is particularly familiar with the archaeological investigations on Mauna Kea. He has extensive experience in archaeology in Hawai‘i, with over 26 years in physical anthropology, historic preservation, and archaeological monitoring. He also has experience and is familiar with the historic preservation process under Haw. Rev. Stat. Chapter 6E. Reliable, probative, substantial, and credible evidence supports Nees's opinions and recommendations. Nees has actively participated in archaeological field work on Mauna Kea since 2005 and co-authored numerous inventory survey reports for Mauna Kea. Ex. A-119 (Nees CV); WDT Nees at 1; Tr. 12/05/16 at 188:4-8. Nees was responsible for ensuring that cultural resources on Mauna Kea were properly recorded. Tr. 12/05/16 at 68:4-8. Nees testified that all AIS reports prepared in relation to the TMT Project comply with Haw. Rev. Stat. Chapter 6E, and its implementing regulations found in Haw. Admin. Rules §§ 13-275 through 282. Nees also testified as to the extent of cultural and historic resources present in the Mauna Kea Summit Region Historic District, and opined that the TMT Project would not result in a substantial adverse impact to such resources within the surrounding area, community or region. WDT Nees at 1-8.

506. Rechtman was called as a witness for TIO and testified about archaeological investigations for the TMT Project on Mauna Kea. Rechtman has extensive expertise in archaeology and is particularly familiar with the archaeological investigations on Mauna Kea for the TMT Project. Rechtman has been the principal archaeologist at ASM Affiliates, Inc. ("**ASM**") since 2013. He has spent 38 years in the field of archaeology, with extensive experience in archaeology in Hawai‘i, completing more than 800 cultural resources management projects throughout the state for private parties, as well as state, county, and federal agencies. Ex. C-11 (WDT Rechtman) at 1. Those projects included compliance with Section 106 of the National Historic Preservation Act ("**NHPA Section 106**"), cultural impact assessments, archaeological assessments, reconnaissance surveys, inventory surveys, site testing, data recovery, preservation planning, burial treatment planning, and archaeological monitoring. *Id.*; Tr. 12/20/16 at 37:1-38:11. He is also familiar with the historic preservation process under Haw. Rev. Stat. Chapter 6E.

Rechtman conducted five archaeological studies of the TMT Project site from 2013 to 2015. These studies included archaeological monitoring reports and archaeological field reconnaissance reports of the TMT Project site. Tr. 12/20/16 at 38:12-40:9; Exs. C-12, C-14; C-15; C-16; C-39. Rechtman concluded that all of the constructed features encountered were modern in nature. Ex. C-11; Tr. 12/20/16 at 37:2-40:12.

507. The National Environmental Policy Act ("**NEPA**") and NHPA Section 106 apply to federal agencies and private projects that use federal funding. Tr. 12/20/16 at 136:22-137:3. If a project involves a federal undertaking, then the federal agency must conduct its own environmental review process under NEPA and NHPA Section 106. Tr. 1/3/17 at 83:16-23, 229:3-8. There was no federal nexus for the TMT project requiring or allowing NEPA or NHPA Section 106 compliance. Tr. 12/20/16 at 211:1-11. Therefore, NHPA Section 106 does not apply, and no federal EIS is required nor allowed. Tr. 10/25/16 at 139:12-40:14, 157:2-162:4, 182:6-183:25.

508. While the National Science Foundation ("**NSF**") previously awarded a planning grant of $250,000 to TMT Corporation, the grant specifically stated that no funds were to be used for construction. TIO has not applied for any construction funding from the NSF. Tr. 1/3/17 at 33:17-19, 88:7-90:25, 228:2-15; A-126. The NSF was not involved in the design of the TMT Observatory. Tr. 1/3/17 at 177:9-20. The NSF has stated that it has made no commitment to the construction of the TMT Observatory, and that it has not triggered the federal review processes under NEPA or NHPA Section 106. Tr. 1/3/17 at 88:10-25, 227:18-25; A-125.

509. Consultation under NHPA Section 106 was not required nor allowed for the TMT Project because: 1) the proposed TMT Project does not have the potential to cause effects on federally protected historic properties; and 2) the NSF funding does not convert the TMT Project into a federal undertaking for the purposes of NHPA Section 106 because such funds were provided for the limited purpose of governance planning focused on development of a partnership model for the TMT Observatory, which would serve as a model for other similar projects at other locations in the future. The TMT project is not a federal project and will not use federal funding. Exs. A-124, A-125 and A-126; Tr. 12/19/16 at 30:2-31:7. 227:13-228:15; Tr. 1/3/17 at 33:14-19, 88:8-90:6.

510. Under Haw. Rev. Stat. § 6E-2, an "**Historic Property**" means any building, structure, object, district, area, or site, including heiau and underwater sites, which is over fifty years old. "**Historic Districts**" are geographically definable areas possessing a significant concentration, linkage, or continuity of contributing properties – sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. A contributing property adds to the historic architectural qualities, historic associations, or archaeological values for which a district is significant because it was present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period. Ex. A-3/R-3 at 3-40.

511. Historic properties contribute to the Historic District's significance. The natural landscape may be considered a contributing characteristic in relation to the significance

of a historic site, but find spots are not given any sort of significance in terms of impacts when archaeological surveys are done and reviewed. Tr. 12/20/16 at 71:19-74:6, 105:9-14, 218:3-12; Ex. A-3/R-3 at 3-12, Figure 3-1; Ex. C-12 at 3, Figure 2.

512. In 1997, SHPD instituted a process of recording "find spots." "Find spots" are cultural resources that are obviously modern features or features that cannot be classified with any confidence because of their uncertain age or function. Ex. A-11 at 2-50. Find spots are sites that could resemble historic properties (50 years older) but are likely of more recent vintage, typically shrines of recent origin that are not contributing properties to the Historic District. Tr. 12/5/16 at 31: 17-32:13, 79:13-80:1, 86:16-88:5; 218:3-12. Find spots may or may not be historic properties, contemporary, and/or made by practitioners. Tr. 12/05/16 at 31:21:-33:1; 238:15-239:7. Find spots are generally manmade features on the landscape that appear to be a more recent construction such as pile of stones on a boulder, camp sites with tin cans, pieces of glass or other modern material cultural items. They are less than 50 years old. Generally, they are structures that are of indeterminate age, but assumed to be modern. Tr. 12/20/16 at 86:16-88:5, 179:25-180:8, 252:23-253:2. They are likely to be recent because they were not recorded during the first or previous archaeological visits. Tr. 12/05/16 at 79:9-80:11; Ex. A-55 at 5-20.

513. Find spots encountered on Mauna Kea often incorporate ti leaves. Ti leaves are considered contemporary given their organic nature. Ex. A-122 at 7-49; Tr. 12/20/16 at 187:23-188:4.

514. Several AISs have been conducted on and adjacent to the MKSR documenting the historic properties and cultural resources of the MKSR. Reports have been completed and approved by SHPD for the following areas: (1) Astronomy Precinct of the MKSR;[1] (2) Mauna Kea Access Road Management Corridor; (3) the MKSR;[2] (4) Hale Pōhaku Rest House; and (5) the NAR. WDT Nees at 1-2; Ex. A-55; Ex. A-56; Ex. A-122; Ex. A-123; Ex. A-5/R-5, App. G, App. H, App. I.

515. In addition to these reports, archaeological surveys were conducted for the TMT Project areas. The University prepared the CRMP to identify and manage the cultural resources in the entire the University Management Areas. The University also prepared a Mauna Kea Historic Preservation Plan that was prepared in conjunction with the Master Plan. WDT Nees at 1-2; Ex. A-11; Ex. A-48, App. F; Ex. A-3/R-3 at 3-39 to 3-41, Appendices G and H; Ex A-5/R-5, App. J.

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[1] Applicant submitted into evidence copies of: (1) SHPD's December 28, 2009 letter to Dr. McCoy accepting the draft AIS of the Astronomy Precinct of the MKSR as final (Ex. A-53), and (2) SHPD's May 26, 2010 letter accepting the draft AIS for the MKSR as final (Ex. A-63). Notwithstanding that Exhibits A-53 and A-63 were not received into evidence in this contested case hearing, see Minute Order No. 44 [Doc. 553], as amended [Doc. 649], SHPD did in fact accept the AIS for the Astronomy Precinct of the MKSR by letter dated December 28, 2009 (LOG NO: 2009.4076; DOC NO: 0912TD22) and the AIS for the MKSR by letter dated May 26, 2010 (LOG NO: 2010.0066; DOC NO: 1005TD05).

[2] *See supra* n.1.

516. Rechtman and ASM prepared the following archaeological documents for the TMT Project (1) Archaeological Monitoring Report: Geotechnical Boring (2013); (2) Archaeological Monitoring Report for the Construction of a Graded Site Pad (2014); (3) Field Reconnaissance of TMT Development Site (July 2015); (4) Updated Field Reconnaissance of the TMT Development Site (Dec. 2015); and (5) Assessment of Find Spots. Ex. C-11 (WDT Rechtman) at 1-2; Tr. 12/20/16 at 38:12-40:7; Exs. C-12; C-14; C-15; C-16; C-39. In preparing these studies, ASM reviewed and considered the previous archaeological studies done on Mauna Kea and the identification of find spots on the TMT Project site as a starting point. Tr. 12/20/16 at 67:19-68:21.

517. In 2012, Nees's employer, Pacific Consulting Services, Inc. ("**PCSI**") began archaeological monitoring of sites in the UH Management Area. Tr. 12/05/16 at 9:9-12. Annual monitoring inspections of historic properties are conducted on Mauna Kea. WDT Nees at 1; Tr. 12/05/16 at 188: 17-20. PCSI surveyed all of the MKSR, Astronomy Precinct and the NAR, including Area E, not knowing it was the proposed TMT Project site. Tr. 12/05/16 at 240:9-242:15.

518. There were no challenges to the acceptance of the Astronomy Precinct AIS. Tr. 12/05/16 at 215:24-216:2. There were also no legal challenges to the TMT FEIS, including the AISs that were attached. Tr. 12/05/16 at 216:3-8.

519. Surveys indicate that people's activities on Mauna Kea occurred on the top of the mountain area that is now the MKSR. Tr. 12/05/16 at 55:7-18. While there is also a foot trail on the summit, the trail does not connect all sites identified on the map. Tr. 12/05/16 at 54:19-55:4; *see* Ex. A-12 at 2-27, Figure 2-5 (Historic Properties, Traditional Cultural Properties, and Find Spots).

520. There are historic (but not ancient) campsites on Mauna Kea. Historic campsites are generally identified by features such as writing or carvings on rocks and rock enclosures. Tr. 12/05/16 at 55:20-56:20, 101:4-23.

521. The TMT Observatory site, the TMT Access Way, and the Batch Plant Staging Area are all within the proposed Mauna Kea Summit Region Historic District – Statewide Inventory of Historic Places ("**SIHP**") No. 50-10-23-26869 – as previously defined in SHPD's Mauna Kea Historic Preservation Plan Management Components. WDT Nees at 2-3; Ex. A-48, App. F at Figure 1.

522. The Mauna Kea Summit Historic District is not currently listed on the National Register of Historic Places. Ex. A-1/R-1 at 4-3.

523. The proposed boundary for the Mauna Kea Summit Region Historic District starts at the summit and goes down to approximately the 10,000 foot level above sea level. The Mauna Kea Summit Historic District does not include Hale Pōhaku. Tr. 12/05/16 at 26:9-21.

524. Mauna Kea has one of the largest concentrations of shrines anywhere in Polynesia. Ex. A-122 at 7-67; Tr. 12/05/16 at 17:3-5. There are roughly over 200 sites identified as historic properties on Mauna Kea. These sites are mostly concentrated on the eastern and

northeastern sides of the mountain. Tr. 12/05/16 at 68:17-21, 115:7-19. On the southern side, within the NAR, many sites relate to the adze quarry. Tr. 12/05/16 at 115:21-116:4. There is not a large concentration of sites outside of the NAR and adze quarry areas on the south side. Tr. 12/05/16 at 116:6-15.

525. Mauna Kea's archaeological landscape consists of clusters of terraces, shrines and burial sites. Tr. 12/20/16 at 184:20-17.

526. Sites consisting of rock shelters and shrines and coral located in the NAR have been carbon dated to between 1280 to 1660, which predate western contact and the arrival of Captain Cook as well as the statutory historic period of 1892. Tr. 12/05/16 at 78:2-79:7.

527. The Mauna Kea Summit Region Historic District contains significant historic properties that are linked through their setting, historic use, traditional associations, and ongoing cultural practices. These include shrines, adze quarry complexes and workshops, burials, stone markers/memorials, temporary shelters, historic campsites, traditional cultural properties, a historic trail, and sites of unknown function. WDT Nees at 2-3; Tr. 12/05/16 at 100:21-101:3. All of these types of historic properties are contributing properties to the Historic District.

528. SHPD is not notified when modern cultural sites are located because they do not fall under historic preservation; OMKM and KKM handle those more recent sites. Tr. 12/20/16 at 85:9-86:3. New (find spots) as well as old sites that are identified are reported to SHPD via reports completed after the survey is done. Tr. 01/04/17 at 155:8-10. Find spots are documented and photographed, but not evaluated. Tr. 01/04/17 at 155:11-21.

529. The Mauna Kea Summit Region Historic District has been determined by SHPD to be significant under all five criteria (A, B, C, D, and E), as defined in HAR § 13-275-6. Ex. A-122 at iii; WDT Nees at 2-3; Ex. A-5/R-5, App. I at 7-3; Ex. A- 1/R-1, at 4-1; Tr. 12/05/16 at 11:14-14:1, 29:13-22, 100:21-101:3.

530. The Historic District is significant under Criterion A because of the presence of Mauna Kea adze quarry complex which is a national historic landmark which was used for a period of 500 to 700 years or more and hundreds of shrines are inside and outside of the quarry. Tr. 12/05/16 at 12:3-11.

531. The Historic District is significant under Criterion B because of the association with several gods who may have been deified ancestors. These include Kūkahauʻula (SIHP No. 50-10-23-21438), Līlīnoe (SIHP No. 50-10-23-21439) and Waiau (SIHP No. 50-10-23-21440). These puʻu were deemed TCPs by SHPD. Tr. 12/05/16 at 12:12-23.

532. The National Register of Historic Places also identifies a category of properties called "TCPs" based on its association with the cultural practices, traditions, beliefs, life ways, arts, crafts or social institutions of a living community. Tr. 12/05/16 at 31:8-15.

533. Some of the current activities observed in the Astronomy Precinct are by religious persons (not necessarily native Hawaiians) making offerings to the gods as they travel

through the area. Tr. 12/05/16 at 114:8-115:1.

534. Shrines embody distinctive characteristics of traditional Hawaiian stone tools manufactured by craft specialists and a distinctive type of shrines construction found only in a few other places in the Hawaiian islands, making the district significant under Criterion C. Tr. 12/05/16 at 12:25-13:8.

535. Studies of the Mauna Kea adze quarry complex have made a significant contribution to our understanding of Hawaiian prehistory and history, making the district significant under Criterion D. Tr. 12/05/16 at 13:10-16.

536. The district is significant under criterion E because of the presence of numerous burials and hundreds of shrines. Many of the shrines have been interpreted as evidence of land use practices in the form of pilgrimages to the summit of Mauna Kea and Lake Waiau to worship gods and goddesses. Tr. 12/05/16 at 13:18-14:1.

537. Criteria to determine historic properties for uprights includes the shape of the stones, placement of stones (by man), and associated artifacts. Tr. 12/05/16 at 77:10-18.

538. The State-recognized TCPs that are contributing properties to the Mauna Kea Summit Region Historic District include Puʻu Kūkahauʻula, Puʻu Waiau (which encloses Lake Waiau), and Puʻu Līlīnoe. WDT Nees at 3. SHPD declined to designate all lands on Mauna Kea above the 6,000 foot level as a TCP. *See* Ex. A-122 at 3-26 to 3-27. WDT Nees at 3. SHPD did not designate Puʻu Poliʻahu as a TCP. *See* Ex. A-122 at 3-27.

539. Puʻu Kūkahauʻula (SIHP No. -21438) encompasses the three puʻu that form the highest portion of Mauna Kea's summit, Puʻu Hauʻoki, Puʻu Kea, and Puʻu Wēkiu. All three puʻu were given recent geographic names for these landmarks. Established by SHPD in 1999 as a TCP, Puʻu Kūkahauʻula bears the name of a legendary figure that appears in Hawaiian traditions and is particularly associated, by name, with legends about Mauna Kea. Kūkahauʻula variously appears as the husband of Līlīnoe, a suitor or husband of Poliʻahu, and as an ʻaumakua of fishermen. The initial area of the Access Way that begins the road leading to the TMT Project site would intersect the northwestern edge of Puʻu Kūkahauʻula for approximately 800 feet. Ex. A-55 at 5-15 to 5-20; WDT Nees at 3.

540. SHPD designated Puʻu Līlīnoe as SIHP No. 50-10-23-21439. At the same time, SHPD designated Lake Waiau and the encompassing Puʻu Waiau as the Waiau Site (SIHP No. -21440). The Waiau Site is located outside the MKSR, within the Mauna Kea Ice Age NAR. Puʻu Līlīnoe is within the MKSR, southeast of Puʻu Kūkahauʻula. No portion of the TMT Project area is in or near Puʻu Līlīnoe or the Waiau Site. WDT Nees at 3.

541. Puʻu Poliʻahu is a summit cone to the immediate southwest of the Astronomy Precinct. Poliʻahu is identified as a goddess who plays a prominent role in many Hawaiian traditions pertaining to Mauna Kea. In the 1890s, W.D. Alexander proposed giving her name to a puʻu in the summit region. No portion of the current project is located on Puʻu Poliʻahu. Ex. A-5/R-5, App. D at 17, 26-30; Ex. A-55 at 5-18; Ex. A-3/R-3 at 3-12 to 3-13; WDT Nees at 3.

542. Notwithstanding extensive surveying, no archaeological or historic sites, or burials have been found on the TMT Observatory site, on the TMT Access Way, or in the Batch Plant Staging Area. WDT Nees at 4; Tr. 12/05/16 at 217:18-23. As identified in the CDUA for the TMT Project, Ex. A-1/R-1 at 4-1 to 4-5, recent surveys have recorded a few archaeological sites designated as historic properties that are in the general vicinity of the TMT project areas. Tr. 12/05/16 at 57:24-58:6.

543. The following sites are known to be in the vicinity of the TMT Access Way and TMT Observatory site:

a. SIHP No. -16172 was recorded as a shrine and consisted of a single upright with several support stones. SIHP No. -16172 is located about 225 feet north of the proposed TMT Observatory site.

b. SIHP No. -16167 was recorded as a shrine in 1982 and subsequently documented during surveys conducted in 1995, 1999, and 2007. The site consisted of two uprights placed in a bedrock crack. SIHP No. -16167 is located approximately 500 feet east of the proposed TMT Access Way, and about 1,300 feet southeast of the proposed TMT Observatory site.

c. SIHP No. -16166 was recorded as a multi-feature shrine with eight, possibly nine, uprights arranged in two groups. SIHP No. -16166 is approximately 350 feet east of the TMT Access Way and 1,600 feet southeast of the proposed TMT Observatory site.

d. SIHP No. -21449 consists of a single terrace constructed of stacked cobbles and small boulders with a surface composed of cobbles, small boulders, and thin flat slabs which were probably brought to the area by human agency. SIHP No. -21449 is located approximately 200 feet east of the TMT Access Way and 700 feet south of the proposed TMT Observatory site.

Ex. A-1/R-1 at 4-1 to 4-3; Ex. A-55; WDT Nees at 3-4; Ex. C-44.

544. Archaeological landscape is defined as built (man-made) structures having an age greater than 50 years old. Tr. 12/20/16 at 176:3-12.

545. The TMT FEIS describes Site 21449 as first being recorded in 2005 and located about 200 feet east of the access road and 700 feet south of the TMT project site. Ex. A-3/R-3 at 3-44 to 3-46. The site was given a State Inventory of Historic Places number even though testing found no evidence of historic origin. An archaeological excavation was conducted to determine the presence or absence of cultural materials and to determine the site's function. No cultural materials or features were encountered and no human burials, or isolated human skeletal remains were present. This site is likely to be a natural feature. Ex. A-3/R-3 at 3-44 to 3-46; Ex. A-55 at 5-20 to 5-22; Ex. A-5/R-5 Appendix G at A-4. SHPD determined that it was not a historic site. Tr. 12/20/16 at 151:5-152:10. SIHP 21449 is one of thousands of natural features that occur on that landscape. It

remains labeled as a historic property because it has not lost its designation. It is not man made and not a historic site. Tr. 12/20/16 at 152:13-21. For these reasons, this site is not on Figure 2 of Ex. C-12. Tr. 12/20/16 at 80:5-81:10.

546. No subsurface archaeological work was done at the proposed TMT Project site except for the geotechnical testing. During the geotechnical testing done in 2013, no archaeological findings were identified and no water was located during the geotechnical work on the TMT Project site. Tr. 01/04/17 at 156:6-12. Archaeological monitors were present during all ground disturbing activity and observed all the materials excavated or removed during ground searching. Tr. 12/20/16 at 78:22-79:6. A grading permit was acquired for the geotechnical work. Tr. 01/04/17 at 16:19-23.

547. ASM selected sites 16166, 16167 and 16172 for monitoring because they were the three closest sites to the area proposed for development of the TMT Observatory. Tr. 12/20/16 at 79:16-25.

548. The TMT Project site and rocks were identified and evaluated before groundbreaking and grading for the road took place and before any rocks were broken up and placed in the crusher. Tr. 01/04/17 at 156:13-23.

549. W. Freitas asserted that there were two stones near the groundbreaking site that were dislodged. Mr. Rechtman testified that the stones were not in the area that was bulldozed. Tr. 12/20/16 at 152:22-156:24. The stones are not near SIHP 21448, SIHP 16172 or find spots 2005.08 or 2005.06. Tr. 12/20/16 at 157:8-21. The stones were in the vicinity of the boundary of the TMT Project site; the TMT Project site is indicated by the large block in the middle of the pink area on the map identified as Figure 2 in Ex. C-12. Ex. C-12 at 3.

550. The lāʻī lei in the photo was placed next to the drill overnight. Ex. C-12 at 12, Figure 14. So it was placed after the drill was already there and when construction crews and the archaeological monitor were not present. Tr. 12/20/16 at 157:18-158:20. Rechtman testified that in his opinion, the ti leaf lei placed under the drill on the TMT Project site is a cultural symbol of protest. Tr. 12/20/16 at 190:21-191:14.

551. The determination of what sites were historic versus modern "find spots" was made using the criteria established by Dr. McCoy in 1995, based on reasonable scientific certainty. Tr. 12/05/16 at 252:21-253:3. The definition of find spots was developed during earlier archaeological studies for rock constructions on Mauna Kea that are less than 50 years old. Those are not considered historic properties. Tr. 12/20/16 at 40:24-41:3.

552. When certain find spots (like a building for example) turns 50 years old, it becomes eligible to be considered historic property. Tr. 12/20/16 at 58:13-22.

553. There are a variety of ways to determine that find spots are less than 50 years old, one of which is if there has been work done at the site previously and evidence shows it was not previously in place, but exists in the place later in time. Determinations are also made by looking at the form, structure and style of the find spot. Tr. 12/20/16 at 41:6-10.

554. Ex. A-11, Figure 2-9 identifies find spots and TCPs, as well as historic properties in the MKSR.

555. Two "find spots" (2005.06 and 2005.08) were identified within Area E. Tr. 12/05/16 at 210:19-25; Ex. A-55 at 5-20. One was initially interpreted to be a possible pre-contact shrine, consisting of two upright stones, located in the northwestern portion of Area E. The second was initially interpreted to be a possible pre-contact temporary habitation complex, consisting of a C-shaped enclosure and two small terraces, located within a lava channel in the northern portion of Area E. Upon completion of a site visit and survey by SHPD staff of the two find spots, neither was determined to warrant historic property designation. The shrine was determined to be a modern structure constructed within the last 10 years. Ex. A-5/R-5, App. G at A-1 to A-3. The possible temporary habitation complex was determined to most likely be a natural geological feature that only gave the appearance of being possibly not naturally formed. Ex. A-5/R-5, App. G at A-4 to A-6. Therefore, neither of the find spots located within the TMT Project area is considered a Historic Property. Ex. A-3/R-3 at 3-44 to 3-46; Tr. 12/05/16 at 218:13-24.

556. Rope and cautionary signs were put up around find spot 2005.08 at the request of SHPD. Tr. 12/20/16 at 97:21-98:15; Ex. C-38.

557. Find spot 2005.08 is not an historic property. It was constructed sometime in 2004 or 2005. Tr. 12/20/16 at 98:8-101:2; Ex. C-38. This was determined based on prior archaeological studies and field work, as well as through discussions with esteemed archeologist Pat McCoy. The letter to DLNR notifying it of the site was submitted on August 22, 2014. Tr. 12/20/16 at 99:2-24; Ex. C-38. No determination was made as to the origin or religious nature of find spots 2005.06 and 2005.08. Tr. 12/20/16 at 147:11-22.

558. The Updated Field Reconnaissance (Dec. 2015) survey found one additional offering, a rock stack location. Tr. 12/20/16 at 112:21-25; Ex. C-16.

559. Prof. Mills, a witness for MKAH, is a professor of anthropology at UH Hilo. Ex. B.12a (WDT Mills). He testified that, in his opinion, the CDUA inadequately acknowledges the adverse impacts of the TMT Project to cultural practices because: 1) the CDUA underestimates the visual impact of the TMT Project on cultural practitioners; 2) while the CDUA emphasizes the physical impacts to tangible cultural resources, the CDUA does not adequately recognize the impacts to "intangible" cultural resources; and 3) the CDUA omits a number of "find spots" and SHPD sites 16169 and 21447. See Tr. 1/25/17 at 39:19-40:10, 43:1-24, 78:14-25. However, Prof. Mills admitted that he had not read the CDUA and the FEIS in their entirety. Tr. 1/25/17 at 130:9-132:3. On cross-examination, Prof. Mills acknowledged that—contrary to his understanding—SHPD sites 16169 and 21447 are in fact referenced in the CDUA. See Tr. 1/25/17 at 152:1-153:7; Ex. A-1/R-1 at Fig. 4.1. He further testified that the comment letter he submitted during the public comment period for the EIS makes no reference to "intangible interest" or the "area of effects" alleged in his present testimony. Tr. 1/25/17 at 135:19-138:16; Ex. A-4/R-4 at 343. Prof. Mills also acknowledged that the time period to challenge the EIS or the AIS had expired. Tr. 1/25/17 at 139:23-140:2.

560. Flores asserted that the CDUA is deficient because it does not (1) make assessments based on criteria that ***are not part of the CDUA criteria***, or (2) evaluate impacts that have in fact been analyzed. *See* Ex. B.02a at 11-12; Tr. 1/30/17 at 223:5-232:17, 236:3-13 (asserting that the scope of the CDUA is wrong under State Historic Preservation Law), 236:14-239:6. Flores' WDT asserts that the CDUA does not assess the impacts of the TMT Project on historic properties or find spots, however, the FEIS for the TMT Project, and the related AISs, which are part of the CDUA, do in fact analyze such impacts. *See* Ex. A-5, App. G at 52-57 (Archaeological Inventory Survey, Mauna Kea Summit Area); Ex. A-5, App. I. Flores also acknowledged that both the CDUA and EIS reference find spots. Tr. 1/30/17 at 237:8-240:4. Flores testified that the AIS for the MKSR did not include the proposed TMT Project site, when in fact, it does. Tr. 1/30/17 at 208:12-15. All relevant surveys and documents, specifically including the CDUA, were provided to SHPD for its review and comments. SHPD found no incompleteness in those submissions. WDT Nees at 2-3; *see, e.g.*, Ex. A-4/R-4 at 22-27; Ex. A-66.

561. There are pockets on the TMT Project site filled with eroded materials such as sand, cinders and silt. Rechtman testified that those pockets are identified as a sort of geologic phenomenon that takes place with the movement of a form of mini glacier that can happen overnight during the cooling process. So those are considered features that are naturally formed and derived – not archaeological features. Tr. 12/20/16 at 134:2-19.

562. There was no physical evidence that the TMT Project site was used for piko, iwi, placenta or otherwise storing artifacts. Tr. 12/20/16 at 145:9-12; Tr. 2/21/17 at 122:12-123:2, 147:2-12.

563. There are natural formed terraces on Mauna Kea. Dr. McCoy excavated one terrace (SIHP 21449), but did not find any iwi, ashes, piko, or other artifacts. Tr. 12/20/16 at 158:21-167:5; Ex. A-55 at 5-20 to 5-22.

564. The TMT Project site has been extensively and intensively surveyed. There are no known pre-existing burials or human remains located in the TMT Project area. Ex. C-11 (WDT Rechtman) at 1-2; Tr. 2/21/17 at 147:2-12; Tr. 12/05/16 at 217:18-23; 211:13-16; Ex. A-5/R-5, App. G at Table 1, pages 39 and A-1 to A-6; Ex. A-55. There is no reasonable likelihood that there are burials in the surface or any opening to the subsurface on the TMT Project site. Tr. 12/05/16 at 218:25-219:5.

565. Teale testified that she believed the archaeology studies are incomplete. However, her testimony is unpersuasive since she admitted that she had not actually read all of the studies and provided no countervailing evidence to the contrary. Tr. 1/11/17 at 95-96.

566. LaRose was called as a witness for the Flores-Case ʻOhana. LaRose is not a native Hawaiian practitioner, is not from Hawaiʻi, and admitted that she has no knowledge of Hawaiian history. Her testimony included assertions that she is able to pinpoint the locations of burials with a high degree of accuracy based on her subjective feelings, and that her feelings indicate there are burials in the summit area. Other than her feelings, LaRose was unable to point to any credible, probative or admissible evidence of actual burials she felt existed. She otherwise admitted that her testimony was speculative. Tr.

1/19/17 at 204-205, 214-215, 238-240. LaRose's speculation is not scientifically verifiable or logically credible.

567. Michael Lee testified that his family has burial sites somewhere on the planned access road leading to the TMT Project site. He could not provide any specific location or demonstrate a specific location on or near the roadway. Lee testified as to his beliefs regarding the water god Kane on the northern side of Mauna Kea, and the significance of various find spots. Ex. D-1 (WDT Lee) at 2-11. Lee claimed to have knowledge of underground caves and burials near the access road that will be impacted by the TMT Project, but was unable to provide any concrete evidence of such underground caves and burials. Additionally, Lee claimed that the underground caves and burials are located in an area identified in Ex. D-4, which is not within the TMT Project site and is not within the MKSR area. Ex. D-4 shows a portion of the access road far removed from the TMT Project site, below the MKSR. Tr. 1/23/17 at 39-40, 83, 146.

568. Camara, a native Hawaiian practitioner and NAR Resource Manager, was unable to identify the location of any burials and admitted to having a "limited understanding" of any burials that might be located on Mauna Kea. Tr. 3/1/17 at 167, 189-190.

569. Some known burials were identified well away from the TMT Project site on the way to the adze quarry and outside of the adze quarry. Tr. 12/05/16 at 128:17-129:4. Pu'u Makanaka is within the MKSR and the Historic District, but it is not within the Astronomy Precinct. There are 2 identified burials and roughly 8 possible more burials on Pu'u Makanaka. Tr. 12/05/16 at 169:17-172:22; 243:4-13; 216:9-21.

570. A burial treatment plan was prepared by PCSI for the entire MKSR and Mauna Kea Access Road Corridor, including the TMT Project site. Ex. A-138; Ex. A-139; Tr. 12/05/16 at 216:22-24; 243:20-244:2; Tr. 12/6/16 at 141; Ex. A-138. The burial treatment plan was approved by the HIBC and SHPD. Tr. 12/05/16 at 217:1-14; Ex. A-128. Burials on Mauna Kea are not excavated or disturbed. Tr. 12/05/16 at 138:3-5. Though no burials have been identified within the TMT Project area, the burial treatment plan for the area that includes the TMT Project site provides that any burials found are to be left alone. Tr. 12/05/16 at 199:9-14; Ex. C-11 (WDT Rechtman) at 2; Tr. 12/20/16 at 40:10-12; Ex. A-5/R-5 at 39; Ex. A-138. Archaeological recommendations to redesign projects, which may include realigning a road so it does not go through a heiau, will be made if burials or other significant features such as a large complex of structures, are found even though that is highly unlikely given the prior studies that show none exist. Tr. 12/05/16 at 139:5-13.

571. The TMT Project site has been extensively and intensively surveyed. There are no known historic properties located in the TMT Project area or on the TMT Project site. Tr. 12/20/16 at 40:10-12; Ex. A-55; *see generally* Ex. A-3/R-3 at 3-15, 3-25, App. G. This was deduced based on modern properties being around the site, coupled with the fact that several earlier archaeological surveys of the TMT Project site did not identify those new properties. Tr. 12/20/16 at 55:8-18; Ex. A-55 at 5-20 to 22; Ex. A-5, App. G at 39, A-1 to A-6.

572. The Batch Plant Staging Area is adjacent to the southwestern boundary of Puʻu Kūkahauʻula, across the Mauna Kea Access Road. No historic properties are known to be within this area. Two shrines are located in the general region of the Batch Plant Staging Area, both of which are more than 500 feet to the west: (1) SIHP No. -16164 is a shrine composed of two upright features: a) Feature 1 consists of three (possibly five) upright stones that are positioned along the edges of a low rectangular platform, and b) Feature 2 which consists of a single upright placed in a bedrock crack, supported by several cobbles. (2) SIHP No. -16165 consists of two single uprights about 1.4 meters apart along a ridge. Each upright is supported by cobbles. WDT Nees at 4-5; Ex. A-5/R-5, App. I at 3-9 and App. G at 18, 44.

573. Several features of the Puʻu Kalepeamoa Site Complex (SIHP No. 50-10-23-16244) are in the general vicinity of HELCO's Hale Pōhaku Substation. Two lithic scatters were designated as SIHP Nos. 50-10-23-10310 and -10311. These sites eventually underwent archaeological data recovery after increased erosion made preservation difficult. The data recovery fieldwork demonstrated the presence of both lithic workshops and manufacturing areas for octopus lure sinkers. WDT Nees at 5; Ex. A-5/R-5, App. I at 3-13.

574. In addition to the lithic scatters, two shrines are located across the four-wheel drive access road and to the south about 190 feet away from Hale Pōhaku. SIHP No. -10313 is a shrine with three to five upright stones, and SIHP No. -10315 is a single upright shrine. The shrines and lithic scatters are over 1,200 feet from the HELCO substation and from the nearest electrical pull box that will be accessed when the conductors in the existing conduits are replaced. None of the actions required to construct the TMT Project will affect those historic properties. WDT Nees at 5.

575. Only one known archaeological site is present near HELCO's Hale Pōhaku Substation, where transformer swaps will occur. SIHP No. -10320 (also part of the Puʻu Kalepeamoa Site Complex) is a lithic scatter that lies about 200 feet west of the existing substation. None of the potential TMT Project activities in this area will be carried out near this site. WDT Nees at 5.

576. Sites on the summit and near Hale Pōhaku were used to produce fishing (octopus) lures. Tr. 12/05/16 at 37:13-25. A pre-1778 fishing tool was identified on Mauna Kea and is detailed in the archaeological monitoring reports. Tr. 12/05/16 at 207:13-24.

577. The AIS fieldwork was carried out in accordance with the prevailing professional standards. WDT Nees at 8; Tr. 12/05/16 at 47:19-22. Generally, cultural practitioners are not present as consultants when archaeologists are performing field surveys. Tr. 12/05/16 at 109:18-110:8.

578. The historic preservation work that Nees and his employer prepared with respect to the TMT Project to identify historic sites within the MKSR was done in compliance with Chapter 6E, the Historic Preservation Law. The work was reviewed by SHPD. The results of the reports were fully approved and accepted by SHPD. Tr. 12/05/16 at 215:8-23; WDT Nees at 8. All of the AISs done for the summit area of Mauna Kea have been

reviewed by SHPD. SHPD has determined that the TMT Project would have no significant adverse impact on historic properties. *See*, *e.g.*, Exs. A-66, A-137.

579. SHPD recognized that the proposed mitigation measures to address impacts to cultural practices and visual impacts in the TMT Project's application documents (including the CDUA and EIS) address the project-specific and cumulative impacts to the Mauna Kea Summit Historic District and the TCPs from existing observatories on the summit. Ex. A-137 at 1.

580. TIO developed an Archaeological Monitoring Plan and submitted the draft to SHPD for review and approval on September 20, 2012. SHPD approved the TMT Archaeological Monitoring Plan on April 24, 2013. *See* Tr. 12/05/16 at 197:20-198:18; WDT Nees at 6; Ex. A-142; Ex. C-13.[3]

581. A portion of the Batch Plant Staging Area will be restored to a more natural condition upon completion of TMT Project construction. The TIO will also fund restoration of the closed access road on Puʻu Poliʻahu to its natural state to address visual impacts of astronomy-related development on the summit region of Mauna Kea. WDT Nees at 7; Ex. A-1/R-1, Ex. B, App. A, at A-9.

582. Ching acknowledged that kūpuna of his age would prefer to keep the road in place so that they can drive up to the top of Puʻu Poliʻahu since they cannot walk that distance. Tr. 12/05/16 at 63:5-15.

583. The TMT Project will develop and implement construction best management practices to avoid potential disturbance of land beyond the planned limits of disturbance. WDT Nees at 7; Ex. A-1/R-1, Ex. B, App. A at A-9.

584. The TMT Project will camouflage the existing HELCO pull-boxes and other utility boxes that are visually distracting or intrusive at the summit as well as other key locations on Kūkahauʻula by treating them so that they blend and integrate visually with the natural environment. WDT Nees at 7; Ex. A-1/R-1, Ex. B, App. A at A-9.

585. The TMT Project will develop and implement a Cultural and Natural Resources Training Program, as required by the CMP and to help mitigate any potential effects on historic properties generally. Cultural event training as a part of mitigation would benefit the public and cultural practitioners. Tr. 12/05/16 at 64:9-20. As discussed in the CMP, the

[3] Applicant submitted into evidence Exhibits A-141 (Historic Preservation Mitigation Plan In Support of Construction of the Thirty Meter Telescope in the Astronomy Precinct, dated Sept. 2012) and A-143 (Letter from SHPD to PCSI approving Ex. A-143). Notwithstanding that Exhibits A-141 and A-143 were not received into evidence in this contested case hearing, see Minute Order No. 44 [Doc. 553], as amended [Doc. 649], the Historic Preservation Mitigation Plan (Ex. A-141) does in fact exist, a draft of which is attached as Appendix A to the TMT Management Plan in Ex. A-1/R-1 and referred to in SHPD's letter dated December 1, 2010 (Ex. A-137).

Cultural and Natural Resources Training Program will include educational instruction and materials designed to: (1) impart an understanding of Mauna Kea's cultural landscape, including cultural practices, historic properties and their sensitivity to damage, and the rules and regulations regarding the protection of historic properties; (2) make it clear that any disturbance of a historic property is a violation of Haw. Rev. Stat. § 6E-11, and punishable by fine; and (3) provide guidance and information about what constitutes respectful and sensitive behavior within the summit area. Ex. A-3/R-3 at 3-51 to 3-52; WDT Nees at 7.

586. To mitigate the TMT Observatory's visual effect within the Historic District, the TMT Observatory specifically chose site 13N within Area E. Additional design efforts to reduce the Observatory's size, finish, and coloring have been taken to address the TMT Observatory's potential visual impact. The TMT Observatory will not be visible from Puʻu Wēkiu (which is the actual summit of Mauna Kea), Lake Waiau, and Puʻu Līlīnoe, the three traditional cultural properties in the summit region of Mauna Kea. Ex. A-3/R-3 at S-12, Table ES-1, 3-31 to 3-32, Ex. A-5/R-5, App. G at 57-58 & Figure 26; WDT Nees at 6; Ex. C-18. This is due to the presence of the northern ridge of Kūkahauʻula (Puʻu Wēkiu) blocking the view from the summit peak. Ex. A-3/R-3 at 3-31.

587. Rechtman testified that he and members of the ASM team have participated in OMKM's cultural orientation. Rechtman has participated in 3 orientations to date. Tr. 12/20/16 at 82:2-83:11. The orientation included discussions regarding cultural resources and find spots related to native Hawaiian traditional and customary practices. Tr. 12/20/16 at 83:23-:84:2.

588. Two of the ASM staff members who worked on the TMT Project reports are native Hawaiian, including the cultural monitor. Tr. 12/20/16 at 214:17-215:22.

589. To mitigate the TMT Access Way's effect on Puʻu Kūkahauʻula and the Historic District, the Access Way has been devised to reduce disturbance by designing it as a single lane configuration in certain areas, and coloring the pavement of the roadway to blend with the surroundings, and paving the roadway for a length of approximately 1,600 feet. Ex. A-1/R-1 at 2-14; WDT Nees at 6.

590. To mitigate the general effects of the development of the TMT Observatory, the Project will work with OMKM and ʻImiloa to develop exhibits for the VIS and ʻImiloa regarding cultural and archaeological resources as well as to develop a TMT outreach office that will work with ʻImiloa and native Hawaiian groups to support and fund programs specific to Hawaiian culture and archaeological resources. Ex. A-3/R-3 at 3-52 to 3-54; WDT Nees at 8.

591. The TMT Project will not result in the loss or significant destruction of any historic properties within the MKSR. Physical impacts on the only two historic properties physically affected, Puʻu Kūkahauʻula and places in the Mauna Kea Summit Region Historic District, will be minimal and will not be significant. The TMT Project will not have a substantial adverse impact on any historic properties within the MKSR. Ex. A-3/R-3 at 3-48 to 3-55.

592. Appropriate mitigation for archaeological and historic properties may consist of keeping the status quo or omitting some proposed actions. Tr. 12/05/16 at 60:8-61:12.

593. The mitigation measures for addressing any effects on cultural practices that have been developed for the TMT are consistent with those stipulated in the CMP and CRMP. WDT Nees at 8; Tr. 12/05/16 at 47:11-17. The mitigation measures contained in the CMP and CRMP are sufficient to protect historic sites. Tr. 12/05/16 at 50:12-16.

594. PCSI conducts ongoing monitoring of the archaeological and historic sites on UH Hilo-managed lands. Monitoring entails going back to the sites previously recorded and then documenting, photographing and re-mapping those sites in order to assess any changes, alterations or damage. WDT Nees at 1; Tr. 12/05/16 at 98:1-4; 188:18-25. Monitoring is done by returning to the sites once a year. The entire MKSR is surveyed once every five year period. Tr. 12/05/16 at 96:6-97:13.

595. ASM's archaeological monitoring for the TMT Project site consisted of monitoring the little road extension, the grading of the loop road, and all of the bore locations as shown on Ex. C-12, Figure 6 (Map of Bore Locations). Tr. 12/20/16 at 92:15-23.

596. The ASM archaeological monitor did not notice any oil spots or residue on the ground associated with drilling activities on the TMT Project site. Tr. 12/20/16 at 96:14-17.

597. New ahu, shrines, and other features were located and documented in annual monitoring done during the period 2012-2016. Tr. 12/05/16 at 189:9-14. These ahu or properties documented during this period were not reported to SHPD because they are considered recently constructed find spots. Tr. 12/05/16 at 189:16-20.

598. A few practitioners construct ahu on Mauna Kea today, although in some instances, their construction and location are based more on political disagreements over land uses rather than cultural practices. Tr. 12/05/16 at 192:7-19; Tr. 3/2/17 at 184:22-188:14; 194:20-194:24, 199:2-199:22, 201:12-202:4, 252:12-253:12, 259:4-266:22, 268:13-269:13; Tr. 2/16/17 at 25:22-26:3, 91:7-13.

599. To the extent that the new ahu are constructed in the existing roadway to the project site, and to the extent said practices can even be considered customary and traditional practices, those are not *reasonable* exercises of customary and traditional practices.

600. Petitioners called witnesses Aloua, Rios, and Dr. Abad to argue that the archaeological studies conducted in connection with the TMT Project are inadequate.

601. Aloua testified that the archaeological studies conducted in connection with the TMT Project fail to, *inter alia*: 1) take into account the impacts to the Mauna Kea Summit Region Historic District 2) include adequate consultation of cultural practitioners; and 3) adequately consider impacts to find spots "CSH 1" and "CSH 2." Ex. B.24a (WDT Aloua) at 1-2; Tr. 2/14/17 at 203:2-206:22; Tr. 2/15/17 at 15:1-20:12; *see* Ex. A-140.

602. Aloua's testimony does not provide probative evidence that archaeological studies conducted in connection with the TMT Project are inadequate. Aloua's *curriculum vitae*,

as well as her written and oral testimony itself, demonstrated that she lacks the requisite historical practice and expertise as a credible scientific expert. Ex. B.24b (CV Aloua); Tr. 2/14/17 at 201:8-12; Tr. 2/15/17 at 44:6-60:23. Aloua did not review the CDUA, EIS, or their incorporated documents in depth, nor did she review the archaeological studies conducted for the MKSR and the Astronomy Precinct. Tr. 2/14/17 at 202:22-203:1, 206:11-15; Tr. 2/15/17 at 61:8-70:8. Aloua was not aware that issues she raised in her testimony were in fact specifically addressed in the EIS and referenced archeological documents. Tr. 2/15/17 at 66:3-86:4. Aloua could not provide a qualified and informed opinion regarding the archaeological studies conducted in connection with the TMT Project. Accordingly, little weight is afforded Aloua's testimony that challenges those studies and reports.

603. Rios testified that the examination of archaeological/historic resources failed to take into account the intangible relationships between certain features on Mauna Kea. Rios's testimony was based primarily on her alleged ability to connect with and receive information from a spiritual realm. Rios testified that she received 'ike kupuna (or ancestral insight) that certain ahu or shrines are energetically connected to one another, are aligned with certain tides, and connect as a portal to the celestial bodies of the universe. Tr. 2/15/17 at 149:1-152:23. Rios's testimony does not prove unverifiable and intangible connections between certain ahu or shrines on Mauna Kea that may be affected by the TMT Project. Even if such connections were assumed, Rios's testimony failed to provide tangible, logical, scientific, or admissible evidence of specific connections that would be affected by the TMT Project.

604. Dr. Abad is the director of Kealaiwikuamo'o at Kamehameha Schools and received her Ph.D. in anthropology with a specialization in Hawaiian archaeology from the University of Hawai'i at Manoa. Ex. B.08b (CV Abad). Her opinion that the CDUA does not meet the criterion stated in HAR § 13-5-30(c)(4) is based on her opinion that the CDUA does not adequately consider the appropriate "region" surrounding the TMT Project site, and the CDUA does not adequately address impacts on certain cultural sites, cultural practices and historic properties. Ex. B.08a (WDT Abad) at 5-12. A large portion of Dr. Abad's testimony focused on her assertion that the unit of analysis for the CDUA should be at a regional level based upon legal requirements, as well as archaeological and cultural considerations. However, Dr. Abad was unable to specify exactly what larger region should have been considered in the CDUA. Additionally, Dr. Abad admitted that the CDUA did in fact address areas of concern in a larger region outside of the project area, outside the MKSR, and within the historic district, including Lake Waiau and Kūkahau'ula. Dr. Abad also admitted that section 3 through 8 of the AIS were included in the CDUA for consideration. Tr. 1/19/17 at 22:2-25:6, 129:14-133:21.

605. While Dr. Abad testified extensively to the items she felt were lacking in the CDUA, her review of relevant documents was admittedly incomplete. She admitted to inadvertently missing the burial treatment plan in her review. One of her criticisms included the inaccurate assumption that no burial treatment plan had been completed for the project site, which is refuted by Ex. A-138. Tr. 1/19/1 at 37:21-38:12, 126:4-14

606. In Dr. Abad's opinion, the proposed mitigation measures for the TMT Project do not

"outweigh" the negative impacts of the project. Ex. B.08a (WDT Abad) at 18-19. Dr. Abad's assertion is unpersuasive given her personal biases and her opinion that the TMT Project would cause harm no matter where it is located on Mauna Kea. Tr. 1/19/17 at 135:18-23.

607. Dr. Abad also placed great emphasis on Bulletin 38 (Ex. B.01i), claiming it should be afforded significant weight due to its status as a federal government document and that it should be considered authoritative on the subject of historic properties. Ex. B.08a (WDT Abad) at 15-16; Tr. 1/19/17 at 36:15-37:20, 40:4-10. However, Bulletin 38 is not applicable because the TMT Project is not a federal project. Furthermore, Bulletin 38 does not support Dr. Abad's position concerning the immovability of significant historic properties:

> The fact that the community as a whole may be willing to dispense with the property in order to achieve the goals of the project does not mean that the property is not significant, but ***the fact that it is significant does not mean that it cannot be disturbed, or that the project must be foregone***.

Ex. B.01j at 4 (emphasis added); Tr. 1/19/17 at 136:4-141:3.

608. While Dr. Abad claimed her views are based in part on applicable law, she is not an attorney, and has not reviewed applicable case law, including the Hawai'i Supreme Court's *Kilakila O Haleakalā* opinion, in preparing her testimony. Tr. 1/19/17 at 129:2-11.

609. Ching also testified as to certain alleged inadequacies in the archaeological studies and analyses conducted in connection with the TMT Project. See, e.g., Tr. 1/24/17 at 206:5-208:7, 223:1-223:14. As with Aloua, Ching lacks the requisite knowledge and expertise in the field to render such an opinion on archeological practices and protocols. Ching has no education or experience in the field of archaeology, and therefore his testimony in this area is given no weight.

610. Petitioners and Opposing Intervenors have not refuted the University's prima facie showing that the TMT Project will not have a significant impact on archaeological and historic resources.

3. **Cultural Resources and Practices**

611. Traditional and customary cultural practices have been defined as those customs and practices of a living community of people that have been passed down through generations, usually orally or through practice. Traditional and customary cultural practices are those practices that fall within the purview of Article XII, Section 7 of the Hawai'i State Constitution. Ex. A-67 at 1-2; Ex. A-11 at 2-18 to 2-19.

612. Some native Hawaiians consider the large number of shrines as evidence of Mauna Kea being a sacred center. These shrines have been interpreted as remains of the historically undocumented and but now known pattern of pilgrimage to worship, presumably the snow goddess Poli'ahu and other mountain gods and goddesses such as Kūkahau'ula,

Līlīnoe, and Waiau. Ex. A-122 at 7-12; Tr. 12/20/16 at 185:18-186:8.

613. There is current evidence of at minimum two functional classes of shrines in the MKSR: (1) occupational specialist shrines related to adze manufacture, and (2) all others, which appear to be non-occupational. Ex. A-122 at 6-14; *see generally* Ex. A-122 at 6-53 to 6-75.

614. However, prior to Western contact, Mauna Kea was considered by some accounts kapu, uninhabitable and not available to the general public for areas above the habitable tree line. Tr. 12/20/16 at 193:24-194:3; *see also* Ex. A-122 at 2-19. David Malo, who was a contemporary of pre-Western contact times, reported that such areas were considered a wasteland and off limits above the tree line for lack of utility. *See* Ex. A-122 at 2-19, 7-16 to 7-17, 7-62.

615. Mauna Kea has been referred to by some as a burial ground and a living temple. Tr. 12/20/16 at 194:4-10.

616. Mauna Kea and its summit cinder cone to this day still play an important role in religious and cultural practices to many native Hawaiians and non-native Hawaiians. Ex. C-12 at 1; Tr. 12/20/16 at 218:8-11.

617. Lithic materials found along the trail, and among shrines, burials, and dwelling structures, were markers on the routes that pre-contact adze makers used. These include are nine pathways to various sections of Hawai‘i island. Ex. A-122; Tr. 12/20/16 at 186:21-187:6.

618. Some Native Hawaiians have traditionally viewed the summit region, including Kūkahau‘ula, as the realm of the ancestral akua (gods, goddesses, deities) who are believed to take earthly form as the pu‘u, the waters of Lake Waiau, and other significant features of the mountain’s landscape. A number of traditional and customary practices are derived from these beliefs which have led to related contemporary cultural practices. Ex. A-11, Section 4.2.1.1; Ex. A-5, App. I at 2-9 to 2-12.

619. Notwithstanding the University’s position that cultural practices do not appear to be encompassed by the definition of “Natural resource” contained in Haw. Admin. R. § 13-5-2, both the University and the DLNR identified and assessed such practices as resources to be considered under the criterion of Haw. Admin. R. § 13-5-30(c)(4).

620. The TMT Project considers and provides efforts to mitigate negative impacts to culture. Tr. 11/15/16 at 136:16-137:7. The CDUA relies on the consultation and findings of the FEIS, including the cultural inventory assessments contained therein as well as the extensive public comment letters and responses. Tr. 10/20/16 at 57:12-21; Tr. 10/24/16 at 170:14-20, 226:18-24. The University and developers of the TMT Project engaged in direct and regular consultation with Kahu Kū Mauna. Tr. 10/20/16 at 63:6-13. The HAR do not require the University to separately retain or consult cultural practitioners for purposes of preparing the CDUA.

621. Numerous research studies, plans, and impact assessments have been prepared in recent times documenting the cultural practices and resources on Mauna Kea, including native

Hawaiian traditional and customary practices. These various materials have all been fully considered in developing the TMT Project, and include:

a. the CMP, which provides information and management actions to protect, preserve, and enhance the cultural resources and native Hawaiian traditional and customary practices of Mauna Kea within the UH Management Area (Ex. A-9);

b. the CRMP, which provides an overview of cultural resources and was formulated to ensure that the University fulfills its mandate to preserve and protect cultural resources and native Hawaiian traditional and customary practices within the UH Management Area (Ex. A-11);

c. Mauna Kea-Ka Piko Kaulana o ka ʻĀina (meaning "Mauna Kea-The Famous Summit of the Land"), which provides a review of historic records and information collected through oral history interviews with kūpuna and kama'āina pertaining to Mauna Kea (Ex. A-5/R-5 at App. F);

d. the Mauna Kea Master Plan, which includes an Oral History and Consultation Study and Archival Literature Research (Ex. A-48, App. I) and a CIA (Ex. A-48, App. N; Ex. A-5, App. E);

e. the FEIS for the TMT Project including all public comment letters and responses (Ex. A-3/R-3);

f. the CIA produced for the TMT FEIS (Ex. A-5/R-5 App. D);

g. the AIS for the Mauna Kea Summit Region produced for the TMT FEIS (Ex. A-5/R-5 at App. G);

h. the TMT CDUA (Ex. A-1/R-1);

i. the TMT Management Plan (Ex. A-1/R-1 at Ex. B);

j. the TMT Draft Historic Preservation Plan (Ex. A-1/R-1 at Ex. B, App. A);

k. the TMT Historical and Archaeological Site Plan (Ex. A-1/R-1 at Ex. B, App. C);

l. the Mauna Kea Historic Preservation Plan Management Components (Ex. A-48 at App. F);

m. the Archaeological Assessment Report for Hale Pōhaku (Ex. A-5/R-5 at App. H);

n. the Final Environmental Assessment for the CMP (Ex. A-51);

o. the Final AIS for the Mauna Kea Access Road Corridor (Ex. A-56);

p. the Final AIS for the MKSR and the Final AIS for the Astronomy Precinct [Ex. A-55; *see also* Tr. 12/05/16 at 49:10-12 (Mr. Nees confirming the AIS for MKSR and Astronomy Precinct, respectively, included the TMT Project site but were not performed specifically for the TMT Project)].

Ex. A-3/R-3 at 3-8 to 3-10.

622. The CRMP found that there are a number of different kinds of cultural practices occurring on Mauna Kea. There are two broad categories of cultural practices: (1) traditional and customary practices, and (2) contemporary cultural practices. Ex. A-11 at 2-18 to 2-19.

623. Numerous research studies, plans, and impact assessments identify the potential impacts the TMT Project and astronomy-related development may have on cultural practices and resources, including native Hawaiian traditional and customary practices. These include, but are not limited to, the following:

a. the CMP (Ex. A-9);

b. the CRMP (Ex. A-11);

c. the FEIS for the TMT Project, including all public comment letters and responses (Ex. A-3/R-3);

d. the CIA produced for the TMT FEIS (Ex. A-5/R-5 at App. D);

e. the AIS for the Mauna Kea Summit Region produced for the TMT FEIS (Ex. A-5/R-5 at App. G);

f. the TMT CDUA (Ex. A-1/R-1);

g. the TMT Management Plan (Ex. A-1/R-1 at Ex. B);

h. the TMT Draft Historic Preservation Plan (Ex. A-1/R-1 t Ex. B, App. A);

i. the TMT Historical and Archeological Site Plan (Ex. A-1/R-1 at Ex. B, App. C);

j. the Mauna Kea Historic Preservation Plan Management Components (Ex. A-48 at App. F);

k. the Archeological Assessment Report for Hale Pōhaku (Ex. A-5/R-5 at App. H);

l. the Final Environmental Assessment for the CMP (Ex. A-51);

m. the Final AIS for the Mauna Kea Access Road Corridor (Ex. A-56);

n. the Final AIS for the MKSR; and

o. the Final AIS for the Astronomy Precinct (Ex. A-55; *see also* Tr. 12/05/16 at 49:10-12 (Mr. Nees confirming the AIS for MKSR and Astronomy Precinct, respectively, included the TMT Project site but were not performed specifically for the TMT Project).

624. No known customary and traditional practices occur within the Area E location site of the TMT Observatory.

625. W. Freitas testified that he began conducting his practices on the summit of Mauna Kea in 2015, the same time he began actively opposing the TMT Project. Tr. 3/2/17 at 252:23-253:12. It was during this time that W. Freitas oversaw the construction of two new ahu structures in the TMT Project site area that were built, in part, as a response to the TMT Project. Tr. 3/2/17 at 194:20-194:24, 199:2-199:22, 201:12-202:4, 259:9-259:17

626. The mere construction and use of a telescope observatory in the Astronomy Precinct area of Mauna Kea does not in itself infringe upon or restrict any recognized historic or customary and traditional practices.

627. The Area E location of the Northern Plateau for the approximate 5-acre TMT Project site has no known traditional religious uses. No credible evidence was presented that any historic or traditional cultural practices will be irreparably prevented or halted in that proximate locality.

628. There are no known burials or funerary relics of any significance found or located within the TMT Project site and no proof of any related ongoing cultural or historical practice of any significance. Ex. C-11 (WDT Rechtman); Tr. 2/21/17 at 147:2-12; Tr. 12/05/16 at 217:18-23; 211:13-16.

629. The new structures (ahu) built on or near the TMT Project site are modern practices because they were built within the last two years and appear to be, at least in part, for the purpose of protesting the TMT Project by W. Freitas and others. Tr. 12/05/16 at 253:14-22; Tr. 3/2/17 at 259:4-262:17, 268:13-24. The two ahu were encountered by Rechtman during a field reconnaissance survey of the TMT Project site and the access road on July 7, 2015. Tr. 12/20/16 at 169:16-21. It has not been conclusively established that the two uprights are in fact on the TMT Project site, but they are near the boundary of the TMT Project site. Tr. 12/20/16 at 88:6-14.

630. Archaeologists generally would not classify a new construction as a cultural placement unless they witnessed it being constructed by a cultural practitioner. Tr. 12/20/16 at 41:21-42:4. However, upright stones and ahu are generally associated with traditional, religious or spiritual practices. Tr. 12/20/16 at 147:24-148:4. W. Freitas testified he conducted no prior practices on Mauna Kea before he assisted in constructing the ahu. He constructed the ahu on the existing access roads to the TMT Project knowing it would

interfere with and block construction workers and traffic to the proposed approximate 5-acre TMT Project site within Area E. Tr. 3/2/17 at 198:11-199:25, 232:5-11, 252:7-254:23.

631. To the extent that it can even be considered a customary and traditional practice, the building of an ahu in the middle of an existing roadway is not a reasonable exercise of customarily and traditionally exercised rights.

632. Archaeologists do not distinguish between religious, cultural and spiritual significance when assessing a modern cultural placement. Archeologists describe what is present at a site. If it is determined to be modern, whether it is marking a foundation for a weather station or consists of a spiritual offering, it is not analyzed or evaluated within the archaeological study. Its existence is documented. Tr. 12/20/16 at 45:22-46:11.

633. A cultural act does not exclude a spiritual act. Tr. 01/04/17 at 147:22-148:7.

634. A hoʻokupu (offering) is something that is left there by somebody to commemorate something (sometimes consisting of one or two rocks stacked on each other). Tr. 12/20/16 at 107:25-108:2, 109:14-18. Not all hoʻokupu are considered native Hawaiian cultural offerings but some are considered other than traditional. Tr. 12/20/16 at 108:3-6.

635. Likewise, Mr. Flores testified that he believes that all spiritual and cultural practices are one and the same, but that not all religious practices are spiritual and cultural. Tr. 1/30/17 at 234:9-19.

636. The rock hoʻokupu or ti leaf wrapped offerings and sites are not similar to the other type of historic properties found on the summit of Mauna Kea. Tr. 12/20/16 at 109:19-24.

637. Opposing Intervenor Temple of Lono argued that non-native Hawaiians can take part in the traditional Hawaiian faith. Mr. Rechtman testified as to his belief that non-native Hawaiians can practice the traditional Hawaiian faith, but such rights are recognized as constitutionally protected only for native Hawaiians. Tr. 01/04/17 at 142:25-143:9.

638. Recent uprights could be connected to native Hawaiian cultural practices that may be entitled to protection, if reasonably exercised. Tr. 12/05/16 at 88:7-13. For example, if the practice results in a land use such as the building of a structure, or introduction or new material, or the movement of natural features on Conservation District zoned lands, such practice would be reviewed under Conservation District Rules, or Administrative Rules related to the land designation, such as Forest Reserve or Natural Area Reserves. Tr. 12/12/2016 at 26: 3- 16; Ex. L-18. Modern cultural practices are identified based on the movement or rearrangement of uprights. Tr. 12/05/16 at 97:15-19.

639. No known traditional and customary practices are associated with the proposed 5-acre TMT Project site. Since 2015, when the recent opposition to the TMT Project began, contemporary Hawaiian practices have taken place on the site, including the construction of two ahu. *See, e.g.*, Ex. T-1 at 3; Tr. 02/16/17 at 21:13-18, 25:22-26:3, 91:7-13.

640. The Mauna Kea summit also known as Kūkahauʻula (cluster of cinder cones) is

considered to be a wahi pana, or storied place. It serves as a site for various practices including traditional and modern shrine construction, pilgrimage, prayer, and offerings. Ex. A-1/R-1 at 4-6; Ex. A-5/R-5, App. D at 185, 191-194; Tr. 2/16/17 at 19:1-16.

641. For some individuals, the introduction of new elements associated with the TMT Project in the area of the Northern Plateau would adversely affect the setting in which their practices may occur. Although the TMT Project may decrease the viewplane desirability of the Northern Plateau for some, this is not anticipated to result in a substantial effect on shrine worship, pilgrimage, prayer, and offerings in the summit area. The principal areas traditionally used for these practices would not be affected by the TMT Project. There is also no evidence suggesting that the presence of existing observatories has prevented or substantially impacted these practices. Ex. A-3/R-3 at 3-25 to 3-28.

642. Petitioners offered evidence that building the Project on Mauna Kea offends, and is contrary to the beliefs of, some members of the community, including some native Hawaiians. Petitioners also acknowledge that native Hawaiian cultural and religious practices are not codified, but rather are individual and personal in nature and vary from practitioner to practitioner. *See, e.g.*, Tr. 2/13/17 at 108:5-16; Tr. 1/11/17 at 228:1-229:25; Tr. 1/19/17 at 77:2-78:1; Tr. 2/14/17 at 110:1-111:7, 122:12-131:9. There is no single native Hawaiian viewpoint or opinion on any subject, including the TMT Project. Some native Hawaiians, including native Hawaiian cultural practitioners with lineal or other significant ties to Mauna Kea – such as Ishibashi and Baybayan – support the TMT Project and testified that it would have no adverse impact on their cultural practices. *See* Ex. A-138a; WDT Baybayan at 1; WDT Ishibashi at 1-3; Tr. 11/02/16 at 15:11-15:14.

643. Dr. Coleman and Dr. Kaluna are native Hawaiians who conduct cultural practices on Mauna Kea and testified that the TMT Project would have no adverse impact on their practices. Tr. 1/5/17 at 21:12-20, 25:14-26:4, 96:7-23. Although he does not consider himself a cultural practitioner, Warfield, a native Hawaiian member of PUEO, testified in support of the TMT Project, despite his personal and cultural ties to Mauna Kea. WDT Warfield at 1-2; Tr. 2/15/17 at 190:22-198:25. Likewise, even though he does not consider himself a cultural practitioner, N. Stevens does conduct cultural practices on the summit of Mauna Kea and testified that the TMT Project will not impact his practices. Tr. 12/16/16 at 194:13-23, 216:15-217:4.

644. Prof. J. Osorio testified that there are clear distinctions between Wao Akua and Wao Kanaka, differences in expectations and practices and what is allowed in those areas. Tr. 01/12/17 at 68:16-22. Wao Akua, according to Prof. J, Osorio, are "are places essentially where human activity is generally curtailed," whereas "Wao Kanaka" is a place for human habitation. Tr. 1/12/17 at 68:2-15. He also testified that it is not true to say that human presence is not allowed in the Wao Akua. It is not that you do not want human presence or that human presence is barred – you want them to come as a supplicant, leaving as small a footprint as possible. Tr. 01/12/17 at 68:23-69:7.

645. Prof. J. Osorio testified that the University's action in applying for the permit to build TMT in Wao Akua is in alignment with some of the University's goals but not with the goal of preserving Hawaiian values, traditions and culture. Tr. 01/12/17 at 106:3-15.

646. One of the foremost authorities and scholars of Hawaiian culture, David Malo, lived on the island of Hawai‘i in pre-Western contact and pre-abolition of the kapu system times. He made no mention of traditional or historic practices atop the summit of Mauna Kea and reported that it was considered wasteland or the realm of the gods. Ex. A-122 at 2-19, 7-16 to 7-17, 7-62; Ex. A-130 at 37-38; Tr. 1/25/17 at 156-157.

647. Malo reported that the Wao Akua is actually not traditionally considered an area above the tree-line or near the summit area, but it was an area below the tree-line. A-130 at 37-38 ("The belt below the *kua-mauna*, in which small trees grow, is called *kua-hea*, and the belt below the *kua-hea*, where the larger sized forest-trees grow is called *wao*, or *wao-nahele*, or *wao-eiwa*."). Traditionally, the summit areas were known as *kua lono*. Ex. A-130 at 37-38; Tr. 12/16/16 at 210:8-211:1; Tr. 1/25/17 at 145:1-147:4.

648. Dr. Coleman testified that many things that are claimed to be "cultural truths" have no firm basis in prior use historically. Just because someone remembers certain cultural practices a certain way, does not establish that they are traditional and cultural practices that are recognized by all. Tr. 1/5/17 at 128:20-129:9. Certainly, such an approach to allow restrictions on construction activities and uses of public or private property is subject to abuse any time a person claims something is part of an historic property, with or without any historical evidence or proof.

649. In 2007, Baybayan was awarded the rank of Pwo in the hierarchy of Wayfinders in the Satawalese tradition, a Master Navigator for Voyages Upon Any Ocean. This was recognized in the Constitution of the Federated States of Micronesia. Tr. 11/02/16 at 9:25-10:13; WDT Baybayan. Baybayan has experience working with ‘Aha Pūnana Leo to revitalize the Hawaiian language, and ‘Imiloa Astronomy Center. He now works with the Polynesian Voyaging Society on the Malama Honua Worldwide Voyage. Tr. 11/02/16 at 10:13-23.

650. Baybayan testified that his relationship to the sacred mountain, Mauna Kea, is that the summit serves as a beacon for leading him back home to his family. This relationship is spiritual but not religious. This perspective is based upon the tradition of oceanic exploration and the legacy of people who left the safety of the shoreline and sailed away to discover the stars. Tr. 11/02/16 at 11:2-12.

651. Baybayan testified that construction of the project would be appropriate and culturally consistent. Tr. 11/02/16 at 11:13-11:18, 12:9-12:16. He also testified that it is culturally consistent to advocate for Hawaiian participation in the field of science that continues to enable Hawaiian tradition of exploration and a legacy of discovery, and a field of work for Hawaiians to lead. WDT Baybayan at 3; Tr. 11/02/16 at 135:8-135:11; 12:9-16.

652. Baybayan's position does not oppose astronomy, but rather he views it as appropriate to construct the TMT telescope, which is a facility used to advance astronomical science. His view was developed from sharing experiences with people from all walks of life, international and local, including fishermen, craftsmen, carpenters, cultural practitioners, firemen, policemen, students, teachers, educators, researchers, and policy makers. Tr. 11/02/16 at 11:13-12:2.

653. Baybayan is involved with the Hōkūleʻa seafaring efforts, which is an indigenous project, led by indigenous, intelligent Hawaiians, whose mission is spiritual and embraces science and technology as a principal mechanism for designing a strategy for success. Tr. 11/02/16 at 12:3-8. In his opinion, the highest level of desecration rests in actions that remove the opportunity and choices from the kind of future our youth can participate in and learn from. Tr. 11/02/16 at 12:9-16.

654. Petitioners offered evidence that ahu built on Mauna Kea have been removed from an area of the South facing summit access roadway above Hale Pōhaku. This is not near the TMT Project site. Ex. B.01x; Tr. 11/15/16 at 80:1-83:19, 86:22-88:11.

655. There is no policy that says a modern or contemporary ahu or lele should not be allowed to remain after built. Tr. 11/15/16 at 84:10-13.

656. The OMKM cultural resource manager is responsible for alerting Kahu Kū Mauna regarding any new cultural features. Tr. 12/12/16 at 211:22-212:5. Kahu Kū Mauna's position is that objects that are considered cultural require a permit, and if not permitted, then they should be removed. This policy reflects existing DLNR rules and regulations regarding land use. Tr. 12/12/16 at 141:19-142:9. If a structure is going to remain in place for more than 30 days in the Conservation District, that is considered a land use requiring a permit under DLNR rules. *See generally* HAR § 13-5-2. However, if a structure poses a health or safety risk, it will be removed right away. Tr. 12/8/16 at 106:4-107:19; L-18.

657. While there is no written policy that says an ahu or lele should not be allowed to remain after built, a structure built on an existing roadway within a planned development area cannot be considered permanent and not removable since it was installed in part to halt a preexisting project and is not demonstrated to be historic or purely for cultural or religious purposes, but is an effort to interfere with pre-existing known property rights and interests. Tr. 11/15/16 at 84:10-13. To the extent it can even be considered a customary and traditional practice, this type of activity is not a reasonable exercise of customarily and traditionally exercised rights.

658. Dr. Kaluna testified in support of the TMT Project and her view that the pursuit of astronomy on Mauna Kea is a beautiful blend of culture and science. She testified about how her father placed her piko in a bottle and placed it in the ocean establishing a life-long bond with the water. She pursued a graduate degree in astronomy studying water on asteroids, part of her passion of studying water in our solar system. While on Mauna Kea, she gives offerings and prayers at the lele at Hale Pōhaku. Astronomy on Mauna Kea will all us to study our origins. One's origin and genealogy are critical aspects of Hawaiian culture. Ex. C-8 (WDT Kaluna) at 1-2.

659. Dr. Kaluna supports the TMT project because the proponents of the project have proceeded with honorable intentions, working with community members, promoting educational opportunities, and attempting to respect the cultural significance of the mountain. Ex. C-8 (WDT Kaluna) at 1-2; Tr. 1/5/17 at 64:2-20, 70:15-19, 78:1-24.

660. Dr. Kaluna, who earned her Ph.D in astronomy, developed her relationship with Mauna Kea as a result of her involvement with astronomy on the mountain. Dr. Kaluna conducts cultural practices on Mauna Kea, which includes giving offerings and prayers at the ahu lele behind the visitor center adjacent to Hale Pōhaku. Her work in the astronomy field has allowed her to continue her cultural practices and understanding the significance of Mauna Kea. Ex. C-8 (WDT Kaluna) at 1-2; Tr. 1/5/17 at 21:7-20, 32:2-14, 39:25-41:25.

661. Dr. Kaluna affirmed that her practices will not be impacted by the TMT Project. Tr. 1/5/17 at 26.

662. Dr. Coleman, a native Hawaiian astronomer, testified in support of the TMT Project, stating that the TMT Project does not conflict with Hawaiian culture, rather, it represents a return to things that were important to Hawaiians in the past. Dr. Coleman testified that it would be contrary to Hawaiian culture not to take advantage of the opportunity to construct TMT in Hawai‘i, because Hawaiian culture is rooted in astronomy, which is what led Hawaiians to Hawai‘i initially. Ex. C-17 (WDT Coleman) at 1-3; Tr. 1/5/17 at 92:10-17, 105:18-107:3.

663. Dr. Coleman received his bachelors in physics from the University of Notre Dame and a Ph.D in astronomy from the University of Pittsburgh and has worked as an astronomer in Hawai‘i since 1987. Ex. C-17 (WDT Coleman) at 1.

664. Dr. Coleman testified that his genealogy connects him to the Kumulipo, and therefore, the Big Bang. The TMT Project would allow him and all Hawaiians to look back in time as far as possible. In the Hawaiian sense, this would be to literally investigate their ancestors. Ex. C-17 (WDT Coleman) at 1-2.

665. For Dr. Coleman, although each Hawaiian may have a different opinion, the Mo‘okini Heiau in Kohala is more important spiritually and culturally than the summit of Mauna Kea to the Hawaiian people. In fact, there are many other places he considers more important than Mauna Kea. Although Mauna Kea is sacred, it is not so sacred that the TMT Project cannot be built upon it, particularly since will advance benefits for the Hawaiian people. According to Dr. Coleman, Mauna Kea is not mentioned in the Kumulipo. He was unable to locate any literature stating that Mauna Kea is sacred in the way Petitioners and Opposing Intervenors have described, despite his extensive research on the topic. Ex. C-17 at 2-3; Tr. 1/5/17 at 132-133; *see also* Ex. A-130, Tr. 1/25/17 at 143:6-147:4.

666. Dr. Coleman himself conducts cultural practices on Mauna Kea. This includes asking permission to enter Mauna Kea through oli. These practices will not be impacted by the TMT Project. Tr. 1/5/17 at 96:7-23.

667. Petitioners offered the testimony of Kanahele to rebut Dr. Paul Coleman’s testimony concerning Mauna Kea’s significance. Tr. 1/24/17 at 138:11-139:2, 142:8-144:11. However, Petitioners appear to have misinterpreted Dr. Coleman’s personal views that Mauna Kea is not as sacred as other sites in Hawai‘i. Rather, Dr. Coleman testified that each person must make his or her own determination regarding the sacredness of Mauna

Kea. Ex. C-17 (WDT Coleman) at 2-3; Tr. 1/5/17 at 132:10-133:3.

668. Dr. Coleman opined that many things claimed to be "cultural truths" are in fact not so. Tr. 1/5/17 at 128:15-129:9. As the evidence demonstrated, the determination of whether something is sacred, traditional, or customary—whether it be a person, place, thing, or practice—cannot be made based solely off of the testimony of a particular person or persons.

669. Kanahele also testified that water from outside of the Wao Kanaka region should not be brought to the Wao Akua region on Mauna Kea. Tr. 1/24/17 at 195:4-196:6. However, there is evidence that in 2016, Case poured water originating from Mount Shasta (California) into Lake Waiau, which is inconsistent with the cultural norm not to do so as described by Kanahele. Exs. C-45 and C-45a; Tr. 2/14/17 at 122:12-131:9; Tr. 2/15/17 at 175:5-176:14. Those differing practices show that there is substantial flexibility when it comes to interpreting Native Hawaiian culture and traditions.

670. Water from Lake Waiau is collected by some cultural practitioners for use in healing and ritual practices. The TMT Project would not affect this practice, nor would it affect the quality of the water in Lake Waiau. There will be no adverse effect associated with the TMT Project on this cultural practice. Ex. A-3/R-3 at 3-26 to 3-28. Lake Waiau is located 1.42 miles from the TMT Project site. Ex. C-18.

671. Historically, depositing piko on Mauna Kea has been associated with Lake Waiau. The TMT Project would not affect cultural practices at or near Lake Waiau. There is no evidence that the vicinity of the TMT Observatory has ever been used for depositing piko. While some individuals may be unwilling to deposit piko in the vicinity of the TMT Observatory, the vast majority of the MKSR, as well as the Mauna Kea Ice Age NAR, including Lake Waiau, would remain unaffected by the TMT Project and available for depositing piko. Ex. A-3/R-3 at 3-27.

672. The scattering of cremation remains is considered an ongoing contemporary cultural practice. There is no evidence that the vicinity of the TMT Observatory has ever been used for the scattering of cremation remains. The approximate 5-acre area occupied by the TMT Observatory would not be available for scattering of cremation remains during the life of the project. Certain individuals may decide not to scatter cremation remains in the vicinity of the TMT Observatory. This would not result in a substantial impact on this cultural practice as significant undeveloped natural areas are still available for scattering ashes throughout the MKSR and summit areas. Ex. A-3/R-3 at 3-27 to 3-29.

673. Consideration of burials is a recognized and essential part of the Hawaiian religion. Tr. 12/20/16 at 193:15-19.

674. The TMT Project site has been extensively surveyed. No known burials exist in any of the TMT Project areas. Ex. C-11 (WDT Rechtman) at 2; Tr. 12/20/16 at 39:12-40:12; Tr. 12/05/16 at 211:6-21, 217:2-24; Ex. A-138 at i; Ex. A-5/R-5 at Appendix G 39. The closest known burial sites are the two identified burials located in the cinder cones on Puʻu Makanaka, and roughly eight possible more burials on that puʻu. Tr. 12/05/16 at

169:18-172:23. A burial treatment plan was prepared for all burials in the Mauna Kea Science Reserve. Ex. A-138; Tr. 12/05/16 at 216:22-217:8; *see also* Ex. A-139. Puʻu Makanaka is not in the Astronomy Precinct, on the summit, or close to the TMT Project site; it is several miles away. Tr. 12/05/16 at 216:10-22. If any inadvertent or unknown burial were discovered at the TMT Project site, the burial treatment plan for the MKSR has an approved plan for handling such discoveries, including leaving burials in place. Ex. A-138 at 31. As a result, the TMT Project is not anticipated to have an adverse effect on any inadvertent burials or burial blessing practices on Mauna Kea. Ex. A-3/R-3 at 3-27 to 3-29.

675. Dr. Kahakalau, a witness for the Flores-Case ʻOhana, testified that in her experience almost every large construction project has inadvertently discovered burial sites. However, Dr. Kahakalau acknowledged that reports indicate that there are no burials located on the remote and high elevation approximate 5-acre TMT Project site. Tr. 1/9/17 at 179:7-179:13. Dr. Kahakalau's statement that every large construction project has inadvertently discovered burial sites is speculative, conclusory, and is not evidence of actual burials at the remote and isolated TMT Project site. Dr. Kahakalau does not dispute that the burial treatment plan and the CRMP would mitigate any adverse effects on such inadvertently discovered burial sites.

676. Dr. Kahakalau also acknowledged a plot of land is not considered a burial site just because there is the possibility that an inadvertent burial might be found in that location. Tr. 1/9/17 at 181:12-181:17.

677. The TMT Observatory cannot be seen from Puʻu Wēkiu. The TMT Project will not have an adverse effect on solstice and equinox observations occurring on Puʻu Wēkiu. Ex. A-3/R-3 at 3-21, 3-31; Ex. A-5/R-5, App. D at 127, 139, 142; WDT Hayes at 15-17.

678. OMKM can close the Mauna Kea access road for reasons specified in the CMP. Tr. 11/15/16 at 73:20-74:5. When the road is closed to the public, observatory personnel can still access the summit because they have the proper vehicles, are familiar with the snow conditions, and can navigate the landscape safely. Tr. 11/15/16 at 74:6-75:6.

679. The CMP requires that access for cultural practitioners to culturally significant sites on Mauna Kea be maintained. According to the CMP, native Hawaiian traditional and customary practices shall not be restricted except where safety, resource management, cultural appropriateness, and legal compliance considerations may require reasonable restrictions. The TMT Project will comply with this requirement and, as a matter of policy, will train TMT employees to respect, honor, and not unreasonably interfere with cultural or religious practices. Ex. A-9 at 7-7; Ex. A-3/R-3 at 3-23 to 3-26.

680. Prof. Fujikane believes the land for the proposed TMT Project site is a cultural resource because the formation of the land is referenced in the Moʻolelo. Tr. 1/9/17 at 225:5-225:19. She did not offer any source that states the land under the TMT Project site is referenced in Moʻolelo. Prof. Fujikane testified that the excavation of the TMT Project site would eliminate the ability to connect the land to the Mo'olelo because the land formations will have been changed. Tr. 1/9/17 at 225:14-19; 255:16-256:15. That is not

an appropriate standard for determining a cultural resource.

681. Other than limiting access to the actual construction site for safety reasons and to the interior of the TMT Observatory facilities once they are completed, the TMT Project will not restrict anyone from any portion of the Mauna Kea summit area. WDT White at 9; Tr. 10/20/16 at 63:18-24, 135:2-13. During construction, cultural practitioners on the Northern Plateau would be exposed to noise, dust and the sight of construction equipment. Tr. 10/20/16 at 135:14-23. However, those impacts will be temporary.

682. If the TMT Observatory is built, there will be limitations on access to the buildings themselves. There is no prohibition on access to the areas outside of the TMT Observatory. Upon decommissioning of the TMT Observatory, cultural practitioners will be able to access the entire site. Tr. 10/24/16 at 223:4-16.

683. N. Stevens credited the astronomy community for ensuring that people can easily, freely, and safely travel to Mauna Kea to practice cultural practices and share in the grandeur of the mountain. Ex. C-9 (WDT Stevens) at ¶ 5.

684. Numerous research studies, plans, and impact assessments identify the mitigation measures, including actions the BLNR can take, to reasonably protect cultural practices and resources on Mauna Kea, including native Hawaiian traditional and customary practices. These include but are not limited to the following:

a. the CMP (Ex. A-9);

b. the CRMP (Ex. A-11);

c. the FEIS for the TMT Project (Ex. A-3/R-3);

d. the CIA produced for the TMT FEIS (Ex. A-5/R-5 at App. D);

e. the AIS for the Mauna Kea Summit Region produced for the TMT FEIS (Ex. A-5/R-5 at App. G);

f. the TMT CDUA (Ex. A-1/R-1);

g. the TMT Management Plan (Ex. A-1/R-1 at Ex. B);

h. the TMT Draft Historic Preservation Plan (Ex. A-1/R-1 at Ex. B, App. A);

i. the TMT Historical and Archeological Site Plan (Ex. A-1/R-1 at Ex. B, App. C);

j. the Mauna Kea Historic Preservation Plan Management Components (Ex. A-48 at App. F);

k. the Archeological Assessment Report for Hale Pōhaku (Ex. A-5/R-5 at

App. F);

l. the Final Environmental Assessment for the CMP (Ex. A-51);

m. the Final AIS for the Mauna Kea Access Road Corridor (Ex. A-56);

n. the Final AIS for the MKSR and the Final AIS for the Astronomy Precinct (Ex. A-55; *see also* Tr. 12/05/16 at 49:10-12 (Mr. Nees confirming the AIS for MKSR and Astronomy Precinct, respectively, included the TMT Project site but were not performed specifically for the TMT Project);

o. the Final AIS of the Mauna Kea Ice Age Natural Area Reserve (Ex. A-122); and

p. the Final AIS of Hale Pōhaku Rest House 1 and 2 and Comfort Station (Ex. A-123)

685. The mitigation measures proposed for the TMT Project, as outlined in Appendices A (Draft Historic Preservation Mitigation Plan) and C (Historical & Archaeological Site Plan) of the TMT Management Plan (Ex. A-1/R-1 at Ex. B), will prevent substantial adverse impact to existing and identified historic and cultural resources within the surrounding area, community, or region. WDT Nees at 6-8; Ex. A-71.

686. The University and TIO have established measures to avoid and minimize direct and indirect impacts on cultural practices, including but not limited to the following: (1) selecting a site off of the Kūkahauʻula summit and away from known historic and traditional cultural properties and cultural resources; (2) selecting a site that minimizes the impact of the TMT Project on viewplanes; (3) complying with all applicable provisions of the CMP and sub-plans; (4) engaging in direct and regular consultation with Kahu Kū Mauna, with the broader Hawaiʻi Island community, and with cultural practitioners on various issues; (5) establishing an outreach office to engage with the larger community; (6) developing and implementing a Cultural and Natural Resources Training Program for all TMT staff and construction workers; and (7) minimizing TMT Observatory operations (up to 4 days per year) to accommodate cultural activities on culturally sensitive days of the year. Ex. A-71; Ex. A-1/R-1 at 2-6 to 2-26; Ex. A-3/R-3 at 3-31 to 3-37, 3-54 to 3-55; WDT White at 8-9; Tr. 10/20/16 at 59:5-9, 62:21-63:24; Tr. 10/24/16 at 15:12-17:15, 19:5-22:23.

687. The TMT Observatory will reduce operations to minimize daytime activities on up to four days a year in observance of native Hawaiian cultural practices. That mitigation measure was adopted at the suggestion of the State of Hawaiʻi Historic Preservation Division. Tr. 1/3/17 at 189:8-23.

688. TIO will implement a Cultural and Natural Resources Training Program that will require all construction managers, contractors, supervisors, construction workers, and TMT staff to be trained annually regarding the potential impacts to cultural and archaeological resources and the measures to prevent such impacts. Ex. A-3/R-3 at 3-34 to 3-35; WDT

Nees at 7.

689. In accordance with the CMP and with the commitments described in the TMT FEIS, TIO will hire a cultural resource specialist to work in conjunction with the archaeological monitor at all times and in all places or situations where on-site archaeological monitoring is required. Cultural monitors will have the appropriate background to serve as a cultural monitor and cultural resource specialist for cultural matters. Cultural monitors will provide direct oversight of construction activities and will regularly provide Kahu Kū Mauna and OMKM with a report of activities and findings. WDT Nees at 6-8; Ex. A-9; Ex. A-1/R-1, Ex. B, App. A, at A-7 to A-8.

690. TIO developed an Archaeological Monitoring Plan in accordance with HAR § 13-279 et seq. The Archaeological Monitoring Plan was accepted by SHPD on April 24, 2013. Cultural and archaeological monitors will be present at construction sites on Mauna Kea and will have authority to stop work if cultural finds are made, including historic properties. They will also inform workers of the possibility of inadvertent cultural finds, including human remains. Ex. A-3/R-3 at 3-35; Ex. A-142.

691. Pursuant to HAR § 13-284 et seq., TIO developed and will implement the Archaeological Mitigation Plan and in consultation with native Hawaiian organizations and the Office of Hawaiian Affairs, will seek their views on proposed mitigation. Ex. A-3/R-3 at 3-35.

692. TIO plans to implement a Ride-Sharing Program to reduce the number of vehicle trips between Hale Pōhaku and the TMT Observatory. This step is anticipated to further reduce the Project's impact on the spiritual and sacred quality of Mauna Kea by reducing dust, transient noise, and general movements in the summit region. Ex. A-1/R-2 at 4-25 to 4-26; Ex. A-3/R-3 at 3-36; WDT Nees at 8.

693. TIO committed to fund a CBP of $1 million per year, to be administered via the THINK. THINK Fund purposes could include scholarships and mini-grants; educational programs; college awards; educational programs specific to Hawaiian culture, astronomy, math, and science; and community outreach activities. Ex. A-3/R-3 at 3-35 to 3-36; WDT Nees at 7; WDT Hasinger at 5.

694. TIO conducts community outreach including consulting with the Kahu Kū Mauna council regularly regarding cultural impact issues. The TMT outreach office policy is to have an open door with the native Hawaiian community over issues of concern. TIO has committed to support, financially and through use of its outreach office, the following measures related to cultural resources: (1) hosting an annual cultural event or training; (2) the translation of chants or mele and the use of their teachings; (3) the translation of modern astronomy lessons into the Hawaiian language; (4) development of exhibits regarding cultural, natural, and historic resources in coordination with OMKM and ʻImiloa that could be used at the VIS, ʻImiloa, TMT facilities, or other appropriate locations; and (5) developing a TMT outreach office consisting of two full time staff who will work with native Hawaiian groups and ʻImiloa to support/fund programs specific to Hawaiian culture and archaeological resources. Ex. A-3/R-3 at 3-35 to 3-37.

695. The TMT Project has committed to operate in accordance with the TMT Management Plan, the CMP and its sub-plans, as well as other relevant rules, regulations, and requirements. The mitigation measures and management actions proposed in the TMT Management Plan, together with the broader management and mitigation actions to be implemented through the CMP and sub-plans, will prevent substantial adverse impact to the various resources of Mauna Kea and the surrounding area, community, or region. Ex. A-1/R-1 at Table 2.1; WDT White 9; Tr. 10/20/16 at 62:14-20.

696. Although the Petitioners and Opposing Intervenors did not offer any specific evidence establishing that they are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, it is not disputed that several of the Petitioners and Opposing Intervenors are native Hawaiian.

697. Evidence was presented that certain Petitioners and Opposing Intervenors have been conducting cultural practices on Mauna Kea since at least 2000. These practices have occurred within the presence of the thirteen observatories at the summit and were not prevented or curtailed by these astronomical facilities. *See, e.g.*, Tr. 3/1/17 at 188:7-191.

698. Dr. Kahakalau, a witness for the Flores-Case ʻOhana, testified that there are many ways native Hawaiians can honor Mauna Kea without going up to the summit. Tr. 1/9/17 at 102:1-103:25. According to Dr. Kahakalau, *mana* can be acquired from honoring Mauna Kea by practitioners actively refraining from going up to the summit in honor of Mauna Kea's sacredness. Tr. 1/9/17 at 100:22-101:7. It is Dr. Kahakalau's belief that unless a practitioner is specifically a Poliʻahu or mauna practitioner, then that practitioner should not go to the summit of Mauna Kea. Tr. 1/9/17 at 39:5-39:18.

699. N. Stevens noted that in ancient Hawaiʻi, it was kapu for makaʻāinana to travel to the summit area of Mauna Kea. Until the kapu system broke down, only the aliʻi and kahuna were allowed to go to the summit. Ex. C-9 (WDT Stevens) at ¶ 4.

700. There is no evidence of a customary and traditional, or contemporary, native Hawaiian practice of placing ahu at the TMT Project site prior to the TMT Project site being identified. White testified that he observed two ahu at the TMT Project site on October 5, 2016 that were not present during his prior visits to the site. Tr. 10/24/16 at 27:12-28:2.

701. Rechtman testified that in addition to recent ahu construction, two upright stones near the TMT boundary were placed just off to the side of the construction work area and not actually on the TMT Project site. Tr. 12/20/16 at 88:6-14.

702. Ahu are dated by assessing the characteristics of its construction (ahu are constructed rocks). There is no physical way to take an ordinary individual rock and date it from an archeological standpoint. Dating is a visual determination by the archaeologist, sometimes coupled with other historical information (*e.g.*, looking at older maps and seeing which sites or ahu have been marked and looking to see if it still exists today). Tr. 12/20/16 at 135:5-23.

703. Pisciotta has been conducting her cultural practices since the early 1990s when she was employed at the CSO Observatory. Tr. 2/13/17 at 194:13-195:5. Her practices consisted

of a) caring for burials; b) collecting water from lake Waiau; c) monitoring or observing the adze quarry; and d) observing stars, constellations and the heavens. Tr. 2/13/17 at 195:4-196:8. Her practices included going to the summit for the equinox and solstice. These practices averaged once a month every year up to the present in addition to the solstice and equinox events. Tr. 2/13/17 at 196:19 – 198:3. These practices would not be altered by the TMT Observatory since they occur at areas away from the TMT Project site.

704. Pisciotta testified concerning alleged impacts to site plane views. Ex. B.01a (WDT Pisciotta) at 7-9. There is no credible evidence that her viewplanes from the summit ridge area towards Haleakalā or other areas would be materially affected or blocked, or that she could not move her viewing location as needed. *See e.g.*, Ex. C-19. Pisciotta's cultural concerns were fully considered in the CIA and EIS process where she was interviewed extensively and placed numerous written materials in the record. Ex. A-5/R-5, App. D at 31-39, 100, 131-146, 182-188, 191-193, D-1 to D-9.

705. Pisciotta further objected to any policies and signage that discourage the contemporary practice of stacking rocks. The policies and signage Ms. Pisciotta finds objectionable pre-exist the TMT Project. Ex. B.01a (WDT Pisciotta) at 13.

706. Pisciotta claims that TMT would impede her ability to track the setting sun, but admits that those observations have been performed at the summit and she and others have been doing that for years. Specifically, Pisciotta referred to a "need to track the . . . precession," described as a "26,000 year cycle … [that] is the measure of the wobble of the earth's axis, and the time it takes for the wobble to make a complete cycle." For Pisciotta, tracking this "wobble" is important because "relative to earth the pole stars appear to change over time"; "[i]f the pole stars change it drastically impacts navigation"; and if these changes are not noted, celestial navigators will get "lost at sea." Ex. B.01a (WDT Pisciotta) at 7. Pisciotta did not provide any credible or verifiable evidence supporting native Hawaiians tracking the wobble, nor a Hawaiian term for precession, a western concept. Nor did Pisciotta provide any credible or verifiable evidence reconciling the 26,000 years it takes to complete the wobble cycle with how this affected navigation by Native Hawaiians to Hawai‘i less than 2,000 years ago. No other independent witness confirmed or verified these statements.

707. Pisciotta also testified that the po‘e kahiko (ancient Hawaiian people) conducted ceremonies meant to keep track of the motions of the celestial bodies and their relationship to the observers on earth. WDT Pisciotta at 7. However, Pisciotta did not provide any credible or verifiable evidence supporting that contention. Importantly, she admits that the TMT would be below the horizon if they were viewing the sunset from the Keck Observatory on the summit ridge. Tr. 2/13/17 at 198:14-200:14; Fig. 3-24 of Ex. A-3/R-3 at 3-100. Based on the evidence, Pisciotta has failed to establish that she has any cultural practices within the site of the proposed TMT Project site that will be materially and adversely affected or prevented from occurring.

708. Baybayan, who is a Master wayfinder, disagreed with Ms. Pisciotta's assertion that celestial navigators will get lost at sea if they do not track changes in the location of the

pole stars over time. He testified that according to his training and practice, traditional celestial navigation is not dependent on going to the summit of Mauna Kea and making observations from there. Tr. 11/02/16 at 14:12-14:16. For Baybayan it is most appropriate and logical to train celestial navigators along a coastline or from a coastal location. Tr. 11/02/16 at 22:21-23:10.

709. Baybayan testified that the only summit area used for wayfinding practices and teaching is on Kahoʻolawe, which would not be affected by the TMT Project. Tr. 11/02/16 at 99:1-99:8. Dr. Coleman confirmed that Hawaiian star knowledge was mostly confined to what can be seen from lower elevations because the human eye works better at lower elevations, and therefore, stars are more visible from lower elevations than at the summit of Mauna Kea. Tr. 1/5/17 at 107:8-108:11, 169:3-8.

710. Baybayan also testified that if cultural sites, particularly heiau used by traditional navigators, were destroyed, navigators would nonetheless be able to continue to use the heiau. Tr. 11/02/16 at 25:24-26:20. Baybayan further testified that the telescopes are not noticeable to navigators when they sail into Hawaiʻi. Tr. 11/02/16 at 43:23-44:6. He clarified that his understanding of desecration, means something that has been there historically, such as a man-made structure from pre-history, pre-contact, that's established and recorded, and is purposefully removed. Tr. 11/02/16 at 75:18-76:3.

711. Baybayan does not believe that Mauna Kea is considered a public monument or structure, but recognizes that it is a cultural treasure, a place of worship and burial. Tr. 11/02/16 at 76:5-21.

712. According to Baybayan, the current system of Hawaiian wayfinding is a hybrid system built on tradition as well as academics. Tr. 11/02/16 at 57:8-58:20. Modern wayfinders use both traditional methods but also use modern technology such as GPS and chart plotters on a board. Tr. 11/02/16 at 97:14-97:18. An example is Hikianalia, the second boat in the Malama Honua voyage that is equipped with modern technology and has access to modern navigational tools such as GPS. Tr. 11/02/16 at 143:7-143:16.

713. For Baybayan, the TMT project is consistent with Hawaiian's ancestral forbearers, and will benefit tomorrow's generation as an important tool for modern Hawaiian society. Tr. 11/02/16 at 59:20-59:25, 68:24-69:6. TMT will contribute to the scientific endeavor to sustain life on this planet. Tr. 11/02/16 at 80:9-81:13.

714. Baybayan believes that cultural practices can coexist with the TMT Project and there is enough room on the island for everyone to conduct their personal practices. Collaboration between the community and TMT has been the nature of Hawaiians for generations and generations. Tr. 11/02/16 at 73:10-73:13. Tr. 11/02/16 at 93:18-94:14.

715. Prof. Johnson, a witness for party W. Freitas, is not a native Hawaiian practitioner. He is a religious studies professor at the University of Colorado. He focuses on comparative studies of religion, religious freedom, and living indigenous traditions, particularly American Indian and Native Hawaiian religions. Ex. T-1 (Johnson WDT at 1). He is not an expert in land use planning or environmental review. See Ex. T-1 (Johnson CV at

PDF page 10). In his opinion, the entire mountain is one religious site. Tr. 02/16/17 at 60:14-23. He also opined that there are sacred places, churches for Hawaiians, that do not include physical structures, but are just natural land formations. Tr. 02/16/17 at 75:5-16.

716. Prof. Johnson was present on Mauna Kea on June 22, 2015 when the first two ahu on the TMT Project site were installed in the middle of the access roadway to the TMT Project site. Ex. T-1 at 3. That group included W. Freitas, a stone mason by trade, who was a primary person responsible for designing and installing the ahu in the specific locations in or near the TMT Project site. Tr. 02/16/17 at 20:13-21:22. Prof. Johnson's testimony concluded that the two ahu on the TMT Project site were the first ahu to be built in that location. Tr. 02/16/17 at 21:13-18. He acknowledged that the ahu did not exist on the site at the time that the FEIS was considered and approved and that the ahu were placed after the location of the TMT Project site was made known to the public. Tr. 02/16/17 at 25:22-26:3, 91:7-13. That testimony confirms and corroborates the evidence that no prior ahu or religious practice occurred at that specific location prior to its designation as the TMT Project site. He also testified that members of the native Hawaiian community disagree about the status and meaning of the ahu, as some of the stones came from the Kona shoreline, and not from the surrounding summit area, thus breaking protocol. Ex. T-1 at 5.

717. Prof. Johnson argues that the presence of new ahu constructed on the TMT Project site, after the site was known and the project heavily opposed, triggers a requirement for a new EIS. Tr. 2/16/17 at 17:4-17, 28:3-21; 53:14-18. This argument, however, is unsupported under Hawai‘i law and would produce an absurd result. The purposes of HRS Chapters 343 and 6E are to inventory existing conditions at the time that the studies are done. To provide protection to these new structures placed after the project site is known and in direct and obvious protest of that project would allow persons who oppose a proposed project to stop it simply by placing a stone in the area or initiating a new practice that incorporates recognized traditional practices from other areas on the island.

718. While Prof. Johnson opined that requiring a permit to build an ahu might be considered offensive to some from a religious perspective, he agreed the State has a right to regulate cultural practices. He acknowledged that in any democratic system where there are competing interests and rights, there are mechanisms, even within Hawai‘i state law, that enable reasonable recognition of religious freedoms if administrative procedures are adequately followed. Tr. 02/16/17 at 78:7-17; 94:12-15; *see also* Ex. A-145 (KKM October 13, 2010 meeting minutes, contemplating a form of regulation of lele construction). Prof. Johnson also acknowledged that while a practitioner may be unable to get a permit in the middle of the night during moments of crisis, one of the benefits of a permitting system to build an ahu is that it should provide ongoing protection of an approved ahu. Tr. 02/16/17 at 80:10-81:6.

719. Prof. Johnson acknowledged that W. Freitas had no legal title or property interest to the land upon which he had placed the ahu and W. Freitas had not practiced in the area before the recent protests in 2015. Tr. 02/16/17 at 94:16-20. Initially, Prof. Johnson testified that placing the ahu in the middle of the narrow, bumpy four-wheel drive road

does not cause a health or safety concern because the ahu were quite prominent and one could drive around them. Tr. 02/16/17 at 92:2-10. However, he did not address how large tractors and trucks could navigate around them or address the concern that during inclement weather and low light conditions, travelers on the road would not have clear visibility, and therefore ahu in the middle of a narrow road would pose a substantial safety risk.

720. While initially failing to answer the question directly, Prof. Johnson did concede that protestors standing in the access road for the purpose of blocking traffic do pose a safety and health risk. Tr. 02/16/17 at 94:7-11.

721. Prof. Johnson testified that if a native Hawaiian cultural practitioner says that the TMT telescope is consistent with the ancient Hawaiian practice of studying the stars, the telescope would be a possible expression of traditional Hawaiian ideals. Tr. 02/16/17 at 122:16-23. This testimony was consistent with Baybayan's testimony that the proposed TMT Project is consistent with Hawaiian culture and Trask's testimony that the concept of geothermal can be traced back to King Kalākaua, who also happened to own a telescope. *See* Tr. 03/01/17 at 111:5-112:1; Ex. C-54.

722. As a whole, Prof. Johnson's testimony concerning the TMT Project's adverse impacts on religious practitioners is not fully credible. Prof. Johnson was not aware of the dispute surrounding the TMT Project until the fall of 2014, and there is no evidence he conducted or reviewed any peer reviewed studies concerning impacts to native Hawaiian practitioners on the mountain. Ex. T-1 at 3. Furthermore, his testimony concerning the protests that took place in June 2015 appeared to show his personal bias against the TMT Project. For example, when questioned about whether the protestors standing in the road block access posed a public health and safety concern, Prof. Johnson was evasive and attempted to avoid answering the question. Only after being asked repeatedly to answer Prof. Johnson finally did admit that protestors blocking the road pose a health and safety concern. *See* Tr. 02/16/17 at 113:15-116:14; Ex. C-46; Ex. C-47.

723. Trask was a witness for Camara. She had no previous traditional or cultural practices in the Area E location and does not conduct any practices on the summit of Mauna Kea. Tr. 2/28/17 at 249:25-250:1. Her testimony was principally concerned with sovereignty and her political reasons for opposing the TMT Project. Trask noted, quoting portions of the CMP, that contemporary practices undertaken by native Hawaiians on Mauna Kea may or may not have a basis in traditional practice, and that the revival of an ancient practice, without established continuity to the past, can only be considered a modern interpretation and thus must be considered a contemporary practice. WDT Trask. Trask also agreed that unrestricted public access to the summit is a problem. Tr. 03/01/17 at 85:24-86:9; Ex. A-155 at 4.

724. Trask's and N. Ho's involvement with Mauna Kea and collaboration with the State of Hawai‘i can be traced back to the mid-1990s. *See* Exs. A-152, A-153, A-154. On June 2, 1995, Trask wrote a letter to Michael D. Wilson, then-Chair of the Board of Land and Natural Resources, and Mr. Don Hall, then Director of IfA, seeking to form a cultural review committee for Mauna Kea. Ex. A-152. Chair Wilson responded positively that

such a committee would be a good idea for Mauna Kea and that DLNR would be interested in working with Trask's group, and directing her to contact SHPD for further consultation. Ex. A-153.

725. On February 4, 1997, N. Ho wrote a letter to Senator Malama Solomon expressing concern as to certain issues on Mauna Kea. Ex. A-154. Chair Wilson responded to N. Ho's letter on May 22, 1997. Ex. A-155. Trask agreed with Chair Wilson's statement in response to N. Ho. that unrestricted public access to the Mauna Kea summit is a problem. Tr. 03/01/17 at 85:24-86:9; Ex. A-155 at 4.

726. In addition to her formal correspondence with Chair Wilson, Ms. Trask testified that she also engaged in conversations with Chair Wilson in his personal capacity. Tr. 3/1/17 at 89:6-14, 91:19-92:5.

727. Trask noted, quoting portions of the CMP, that chief among the contemporary practices was the use of Mauna Kea as a spiritual and religious site of prayer and contemplation, which included building family ahu or altars and the placement of offerings to honor families or as a form of personal spiritual worship. WDT Trask at 2.

728. Fujiyoshi, a witness for W. Freitas, is not a native Hawaiian practitioner. He was the pastor of the Ola'a First Hawaiian Church in Kurtistown, Hawai'i. Tr. 3/2/17 at 99:2-5, 171:16-23, 174:13-19; Ex. T-2 (WDT Fujiyoshi) at 1. In Fujiyoshi's view, the TMT Project will interfere with native Hawaiian religious practices. Ex. T-2 (WDT Fujiyoshi) at 3. Fujiyoshi testified that "public opinion" holds that Mauna Kea is sacred; however, he was unaware of the poll (Ex. I-1) showing that 46% of native Hawaiians support the project and 45% are opposed. Tr. 3/2/17 at 138:7-141:3; Ex. T-2 (WDT Fujiyoshi) at 6.

729. No other claimed native Hawaiian practitioner credibly testified about any potential practice that would be materially and adversely impacted by the construction of the TMT Project on the Area E site location itself or how that observatory would prevent any actual practice that may have occurred previously on the approximate 5 acre project site.

730. The Temple has no actual religious practices on the summit area and none in the Area E location for the TMT Project. The Temple has no congregation. WDT Nobriga at 1. Nobriga, the Kahuna of the Temple, testified that he believes his practices will be affected by the development of the TMT Project, even though he has never constructed an altar or shrine on Mauna Kea. Nobriga admits that he has been able to conduct his practices and faith since 1980 with the 13 existing telescopes in place on Mauna Kea. Tr. 3/1/17 at 47:14-22, 64:12-23, 70:1-76:21. Nobriga offered no specific evidence as to how the TMT Project specifically would restrict or otherwise prevent his practices or any practices on Mauna Kea.

731. The Temple's position was fully reviewed and considered in a prior comment letter to the EIS process in 2010, through written submission and statements from its representative, Fergerstrom. Ex. A-4/R-4 at 153-62.

732. The two ahu built and installed by W. Freitas and others on the access road in and near Area E in 2015 were placed for political or protest reasons to halt the TMT Project, and

were not placed in accordance with any recognized traditional practice performed by W. Freitas or others at the locations of the two ahu within Area E. W. Freitas, who is from Oahu originally, had not been on the area where the two ahu were placed prior to 2015. He acknowledged the two ahu were placed in the road path where vehicles that need to access the site for construction would traverse and that he personally opposed the project at that time. Tr. 3/2/17 at 184:22-188:14; 194:20-194:24, 199:2-199:22, 201:12-202:4, 252:12-253:12, 259:4-266:22, 268:13-269:13.

733. Camara is a NAR resource manager. WDT Camara at 1. He is a native Hawaiian practitioner and claims to be a lineal descendant of kupuna of the aliʻi of Mauna Kea, though he has never notified SHPD of his lineal descendant claims and has never been officially recognized as a lineal descendant by any state agency. Tr. 3/1/17 at 123:21-124:3, 126:7-17, 186:2-8. Camara has conducted native Hawaiian practices on Mauna Kea, though not in the Astronomy Precinct. Though he provided no support for his belief, Camara believes that the iwi of his ancestors are located on Mauna Kea. Tr. 3/1/17 at 167, 189:21-190:6. Camara is a member of KAHEA, and has been involved in protests against the TMT Project. He was also part of a group opposed to the TMT Project that has petitioned the United Nations for a sacred site designation. WDT Camara at 9.

734. Carroll, a witness for Kanaele, is a native Hawaiian, who was born in New Zealand and is now a member of ROOK. Tr. 3/2/17 at 54:24-55:9, 61:11-15. Carroll has not lived in Hawaiʻi continuously. Tr. 3/2/17 at 88:16-89:6. There is no evidence that Carroll has any cultural practices that would be adversely affected by the TMT Project.

735. Kanaele is a native Hawaiian practitioner who has been connected to Mauna Kea since birth when his parents took him there. He is also a member of the ROOK, Heiau Mamalahua Heluʻelua. Tr. 3/1/17 at 231:2-9, 250:19-252:16; WDT Kanaele at 2. Kanaele complains that Maunakea Observatories Support Services staff had denied practitioners access to the summit in the past. WDT Kanaele at 6. However, he offers no evidence that the TMT Project site will prevent him from performing his practices on Mauna Kea.

736. Kakalia also testified about her emotional reaction to the proposed project, but had no traditional or cultural practices within the Area E site location that would be impacted by construction. Kakalia expressed her opinion that the TMT Project cannot meet the eight criteria because the project will impact her family practice, community, and well-being. PHS Kakalia; Tr. 2/27/17 at 115:1-115:12. However, she did not present any credible evidence in support of her general concern. Moreover, she stated that she believes that there is no area on Mauna Kea on which TMT could be built and that there is nothing that can be done or said that would cause her to reconsider or change her opposition to the TMT Project. Tr. 2/27/17 at 156:10-156:23, 208:8-210:21.

737. Tajon testified as a witness for Kakalia. Ex. O-15 (WDT Tajon). He did not provide any evidence that any practice of his on Mauna Kea would be affected by the TMT Project. Tajon acknowledged that plurality of cultures exist in Hawaiʻi, but suggested that the native Hawaiian culture should dominate simply based on residency in Hawaiʻi. Tr.

2/27/17 at 42:13-43:5; A-144. That position is inconsistent with the fundamental constitutional principles that recognize the rights to equal protection under the law.

738. Holi is a native of Kauai and acknowledges she does not conduct practices on Mauna Kea. Holi has never been to Mauna Kea. Tr. 2/23/17 at 81; Ex. Z-1-A. Holi conducts cultural practices with respect to salt gathering on Kauai. Ex. Z-1-A. Holi stated general concerns regarding the impacts of development. Holi did not provide any evidence of traditional or cultural practices on Mauna Kea or that such practices would be impacted by the TMT Project.

739. Kaopua-Goodyear appeared as a witness for Sleightholm and testified that she has performed mele and hula on various locations on Mauna Kea. She is native Hawaiian, but she had no historical or familial native Hawaiian cultural practices on the summit area of Mauna Kea. She has never engaged in traditional or cultural practices on the Northern plateau Area E section of Mauna Kea. Tr. 2/22/17 at 148:12-149:21, 226:4-228:3. She had no practice before 2011 and has only been to the summit once, in 2011. Ex. J-6 (WDT Goodyear-Kaopua) at 4; Tr. 2/22/17 at 211:21-24, 227:1-25. There is no evidence of any traditional or cultural practice by her within the Area E section of Mauna Kea, and no evidence was presented that the TMT Project would otherwise prevent or halt any of her current activities or practices.

740. Kaopua-Goodyear confirmed that nothing would change her mind about the TMT project. She believes the development of TMT is an act of colonization in violation of United Nations consensus to end colonization, although she admits that she is not an expert in international law. Tr. 2/22/17 at 158:17-159:19, 212:3-19. She admits that native Hawaiians have many different opinions about TMT and she did not speak for all native Hawaiians. She agrees that some native Hawaiians support the TMT Project. An article she authored, entitled "Protectors of the Future" (Ex. J-9), did not inform the reader of any support for the TMT Project by native Hawaiians. Kaopua-Goodyear was unaware of the poll indicating that approximately half of the native Hawaiian population supports the TMT Project. Tr. 2/22/17 at 211:3-18, 233:1-22, 243:20-244:9; Ex. C-49.

741. N. Ho testified that he has no traditional or cultural practices in Area E and stated he considers himself to be a long-standing opponent to development on the mountain. Tr. 2/22/17 at 120:24-121:2. N. Ho testified that he and Ward contributed substantially to the Sierra Club letter that they both signed and submitted as part of the TMT EIS process. Tr. 2/22/17 at 127:4-128:20. N. Ho also admitted that OMKM had the opportunity to review and comment on the DEIS. Tr. 2/22/17 at 132:9-16.

742. C. Freitas testified that she conducts cultural practices on Mauna Kea, including the summit area. Tr. 2/21/17 at 145:3-147:1; Ex. S-2a at 1. However, C. Freitas did not establish how the TMT Project would impact her practices, or that she would be unable to continue such practices if the TMT Project were built. There is no evidence that the TMT Project will cause a substantial adverse impact on C. Freitas's cultural practices.

743. W. Freitas is a native Hawaiian practitioner who admits that his first time engaging in cultural practices on Mauna Kea was on April 2, 2015. While he has no previous practice

on Mauna Kea, W. Freitas testified that he believes his present or future planned spiritual, religious, and cultural practices will be impacted by the TMT Project. He admitted that his cultural practices are intact today despite the presence of the existing telescopes on the summit areas of Mauna Kea. Ex. T-3.0 (WDT W. Freitas) at 2; Tr. 3/2/17 at 227:6-9, 252:7-253:12, 271:20-272:12. W. Freitas has constructed ahu on Mauna Kea, though he admits the first ahu he constructed was on June 22, 2015. Tr. 3/2/17 at 259:4-262:25, 268:13-22. Prior to 2015, he had never been to the summit of Mauna Kea to perform any practices; he had only done so from areas below the summit. Tr. 3/2/17 at 252:23-254:8.

744. Kihoi is a native Hawaiian practitioner, whose first visit to Mauna Kea was in 2012. She testified to this Criterion 7 and Criterion 8, generally, based on her stated emotional and psychological effects from the proposed project. Kihoi's practices have included pilgrimages to Mauna Kea since 2012 on numerous occasions. Kihoi was able to conduct her practices on Mauna Kea despite the presence of 13 existing telescopes, paved roads, and power and telecommunication lines. Tr. 2/14/17 at 109:1-25, 120:1-121:6. Prior to the October 7, 2014 groundbreaking ceremony, she had never been to the area of the proposed TMT Project site. Tr. 2/14/17 at 118:1-8. While Kihoi testified to engaging in certain practices generally over 33 years, those practices have not been directly on Mauna Kea, until recently. Kihoi believes in the sacredness of Mauna Kea. She agrees that native Hawaiians have many different forms and types of practices that are personal to each individual. Tr. 2/14/17 at 108:7-111:7.

745. Kihoi's mother, S. Kihoi, is a native Hawaiian practitioner. Her practices do not include pilgrimages to Mauna Kea. Her experiences on Mauna Kea are minimal. Ex. F-2 (WDT S. Kihoi); Tr. 2/14/17 at 141:23-148:23, 170:3-6, 178:15-179:21. She had never travelled to Mauna Kea until the efforts in June 2015 to protest the access of workers to the project site. Tr. 2/14/17 at 170:3-6.

746. Sleightholm is a native Hawaiian practitioner. Sleightholm did not conduct any practices on Mauna Kea until October 7, 2014, when she ascended the mountain to protest the TMT project. Sleightholm has followed the principles of Case, and both oppose the TMT Project. Tr. 2/14/17 at 12:15-22, 26:21-29:1, 42; Ex. F-3 (WDT Sleightholm) at 1.

747. Neves moved to Hilo in 1984. While he is a practicing Catholic, he began his native Hawaiian practices related to Mauna Kea in the late 1980s. Neves has been involved in solstice and equinox ceremonies on the summit of Mauna Kea since 1999. Ex. B.18a (WDT. Neves) at 1; Tr. 1/31/17 at 239:6. His practices related to Mauna Kea continue through the present, amongst the existing telescopes on Mauna Kea. Tr. 1/31/17 at 220:5-12, 244:8-17. His practices include lele. He is unaware of any lele located on the proposed TMT Project site. Tr. 1/31/17 at 163:12-15, 241:1-11. Neves testified that the TMT Project will obstruct his view of Haleakalā from the summit ridge area of Mauna Kea and will be a dominant feature. However, he did not demonstrate or show how the TMT Observatory would block those views, especially since it will be below the summit ridge. He also testified that a view plane is not by sight alone. WDT Neves at 4. His practices include pilgrimages to Mauna Kea, approximately four times per year, though he admits that one need not always travel to the Mauna Kea summit to conduct these practices. He has practiced from his home, and states that offerings can be made at lower

elevations. He also admitted that there is no one particular place that you need to stand on Mauna Kea in order to view Haleakalā. Tr. 1/31/17 at 202:4-20, 207:3-10, 219:1-10, 245:5-20.

748. Ward is not a native Hawaiian practitioner. She has no traditional or cultural native Hawaiian practices related to Mauna Kea. Ward's interest in Mauna Kea is for recreation and hiking, which she believes will be impacted by the TMT Project. However, Ward had no prior practice of hiking in the rough lava areas of the TMT Project. Her main concern is the view towards the northwest will be impacted by the existence of the completed project. Tr. 1/31/17 at 17:3-18:14, 22:2-25, 57:19-58:23, 64:8-65:23, 110:3-19. Ward's use of Mauna Kea for recreation purposes began when there were telescopes already existing on Mauna Kea. Tr. 1/31/17 at 17:15-18:9.

749. During the 1980s and 1990s, Ward did not witness any native Hawaiians engaging in traditional or cultural practices on Mauna Kea. Tr. 1/31/17 at 17:19-18:14, 113:3-9. This testimony is also confirmed by Dr. Coleman who also did not observe cultural practices on Mauna Kea from the mid-to-late 1980s through the 1990s. Ex. C-17 (WDT Coleman) at 2; Tr. 1/5/17 at 155:2-156:4. Although Ward offered various legal, hydrological, entomological, cultural, archaeological, biological, botanical and medical arguments to support her view that the CDUA does not meet the eight criteria in HAR § 13-5-30(c), Ward did not offer any credible evidence to support that she has any expertise or is otherwise qualified to provide expert or scientific opinions relating to these subjects. Ex. B.17a (WDT Ward); Ex. B.17b (CV Ward).

750. Flores is a native Hawaiian practitioner who has been conducting his cultural and spiritual practices since the late 1970s or early 1980s at areas on Mauna Kea and the summit. Tr. 1/30/17 at 34:10-36:5, 202:21-203:4; 232:18-233:24. Flores admitted that the Astronomy Precinct was "substantially developed" and that he was able to continue these practices despite this development. Tr. 1/30/17 at 234:5-8; *see also* Ex. B.02a (WDT E.K. Flores) at 4.

751. Flores claimed throughout his testimony that the FEIS for the TMT Project was flawed in many ways, including failing to adequately address traditional and cultural practices and failing to address a sublease beyond 2033. *See generally*, Ex. B.02a (WDT E.K.Flores). However, Flores conceded that he and his family did not participate and file any objections to the FEIS. While Flores initially could not recall if he was consulted regarding the FEIS, he acknowledged receiving an email indicating that he was directly solicited for his input into the FEIS as part of the consultation process. Ex. A-131; Tr. 1/30/17 at 222:3-22. He was not certain if he provided a statement in response. When questioned about the content of the FEIS, Flores was unsure of the content, and admitted that he had no experience in preparing an FEIS, AIS, or CDUA, and was not an expert in land use, archaeology, or anthropology. Tr. 1/30/17 at 38-39, 124-52, 163-65, 205-06, 210, 212-13, 222-23, 232. Neither he, nor his family members, filed any objections to the FEIS. Tr. 1/30/17 at 210:19-23.

752. Flores has seen ahu that he believes are associated with traditional and customary native Hawaiian practices on Mauna Kea. Tr. 1/30/17 at 41:2-15. He is aware of shrines on

Mauna Kea, and his kupuna took pilgrimages to the mountain for various reasons. Tr. 1/30/17 at 45:10-46:6, 59:14-22.

753. Flores relayed that native Hawaiians conduct rituals and celebrations during solstices and equinoxes, during various times of the day and night. This depends upon the particular astronomical event, but he did not provide any evidence that he himself takes part in these activities. Tr. 1/30/17 at 113:19-114:5.

754. Flores's asserts that the TMT Project will adversely impact his pilgrimages because many of the ahu on the Northern Plateau are interconnected and TMT would be situated amongst these sites, "causing adverse disturbance and impacts between the grid of interconnected sites." Ex. B.02a (WDT E.K. Flores) at 13. The various and extensive archaeological and cultural studies for the TMT Project provide evidence to the contrary. There are no historic properties or ahu on the proposed 5-acre TMT Project site, and the TMT Project will not result in substantial adverse impacts to cultural, archaeological and historic properties on Mauna Kea. *See* Ex. A-5, Apps. D, E, G, H, I, J; Ex. C-12, C-14. Flores provided no evidence that certain ahu on other parts of Mauna Kea, used to navigate ascent and descent of the summit, are used in the same way today by practitioners. *See* Tr. 12/20/16 at 185:18-186:4; Ex. A-122 at 3-20, 5-2, 6-53 – 6-75, 7-47. Flores currently travels to the summit area by truck using the paved roads. Tr. 1/30/17 at 233:25-234:4.

755. Davin Vicente was called as a witness by MKAH. He is a Biology Lecturer at UH Hilo. Ex. B.09b (WDT Davin Vicente) at 1. Vicente testified that he is opposed to the TMT Project because it will cause irreparable damage to Mauna Kea and to native Hawaiian culture generally. Ex. B.09a (WDT Davin Vicente) at 1-2. Vicente acknowledged that telescopes already exist on Mauna Kea, which in his view, currently affect native Hawaiian cultural and religious practices. Tr. 1/25/17 at 194:14-21. Vicente testified that nothing short of placing the TMT Project on an existing telescope site would be acceptable to him. Tr. 1/25/17 at 198:21-199:9. He has no evidence regarding how the TMT Project will specifically cause "damage" to Mauna Kea. Vicente does not regularly conduct any cultural practices on Mauna Kea. Tr. 1/25/17 at 186:12-19.

756. Dwight Vicente provided no direct testimony. His primary concern was with legal arguments over Hawai'i's statehood and sovereignty issues. Dwight Vicente did not present any evidence that he conducts any practices on Mauna Kea, including the TMT Project site.

757. Prof. Mills was called as a witness by Mauna Kea Anaina Hou to relay historical information about native Hawaiian issues generally. He is not a native Hawaiian practitioner and has no prior practice experience personally on Mauna Kea. He participated in the EIS process with a comment letter that was fully considered in the approval process for the FEIS. Ex. A-4/R-4 at 343. His testimony about viewplanes does not rise to the level of a personal cultural or traditional practice. There is no evidence that the TMT Project would impact any historical traditional practice within Area E.

758. Ching testified as to his cultural practices on Mauna Kea. Ching testified that he

participates in cultural practices related to the use of Lake Waiau and other water sources and cultural sites in and around the summit area of Mauna Kea. These practices include performance of traditional astronomy, cosmology, navigation, continuing burial practices, performing solstice and equinox ceremonies, and conducting temple worship around the Mauna Kea summit, Ice Age Natural Area Reserve, and Science Reserve. Ex. B.19a (WDT Ching) at 12-13. Since 2002, Ching has participated in a group (Huakaʻi I Na ʻAina Mauna) that hikes ancient trails that traverse certain areas on Mauna Kea. *Id.* Ching testified that, although he hikes ancient trails on Mauna Kea, none of the ancient trails go to the summit of Mauna Kea. Tr. 1/26/17 at 150:11-13. Ching did not establish that any of his cultural practices at the Mauna Kea Summit area that are connected to a firmly rooted traditional or customary native Hawaiian practice dating back to 1892. Ching also did not establish that he performs any historical or traditional native Hawaiian practice at the TMT Project site. No evidence was presented that his practices would be substantially impacted or prevented by the TMT Project.

759. Prof. Fujikane also testified that the group Huakaʻi I Na Aina Mauna, led by Ching, has walked the ancient trails of Kaneikawaiole from Waiau down to the springs of Houkokane, Waihuakane, and Līlīnoe, Pōhakuloa at Puʻu Keʻeke where the other springs Waikiʻi, Anaohiku, and Kipaheʻewai are said to have spread out from Mauna Kea to Hualalai, ʻUmikoa-Kaʻula from Puʻu Līlīnoe to Puʻu Makanaka, and across the Northern Plateau. Ex. B.13a (WDT Fujikane) at 1. The CDUA makes it clear that none of these trails are near the proposed TMT Project site or the access roadway. Ex. A-1/R-1 at 3-5. Additionally, although Prof. Fujikane refers to the Northern Plateau as the site of the TMT Project, Prof. Fujikane does not account for the fact that the TMT Project will only occupy five acres of the Northern Plateau site and will not prevent or prohibit Huakaʻi I Na Aina Mauna from traversing or walking across the remaining open areas on the Northern Plateau. Ex. A-1/R-1 at 1-6.

760. Dr. Taualii, initially requested to intervene as a party in this contested case hearing, but later withdraw her request and was instead identified as a witness for the Flores-Case ʻOhana. She 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 Taualii).

761. Fergerstrom is a native Hawaiian practitioner whose cultural practices include hoʻoponopono and lele, as well as utilizing a "bridge" of light from Mauna Kea to Haleakalā. Tr. 1/23/17 at 200:7-204:11, 213:8-18. Fergerstrom believes that the entire MKSR is "wao akua" and that no astronomy should occur in that region. Fergerstrom further testified that, on occasion, he is the one who should decide who gets to travel up Mauna Kea, not the State or University. Tr. 1/23/17 at 215:10-218:19, 233:4-234. Fergerstrom presented no credible evidence that he performed any traditional or cultural practice at the location of the proposed TMT Project site. Fergerstrom believes that development of the TMT Project will injure him, although he did not explain how he would be injured. Tr. 1/23/17 at 196:6-197:13. Fergerstrom fully participated in the CIA and EIS process in approximately 2010. His comments and concerns were fully noted, responded to and considered as part of the EIS process. Ex. A-5/R-5, App. D at 140, 184. Fergerstrom is a member of Temple of Lono. As a representative for the Temple of

Lono, he was consulted during the various cultural review processes of the CIA, EIS, and AIS. Ex. A-4/R-4 at 153-162; Tr. 1/23/17 at 244:4-245:4. No challenge to that EIS process and its approval was ever made by Fergerstrom. His positions and views were fully considered and part of the record. There is no evidence demonstrating that his practices would be interfered with in any significant way by construction at the TMT Project site or otherwise.

762. Spies was called as a witness for KAHEA. She considers herself an embodiment of the principle that culture and science can coexist. Tr. 01/12/17 at 150:21-151:14; Ex. B.52a (Spies WDT). She performs no cultural practices at the Mauna Kea summit ridge area or the TMT Project site location in Area E. She recognizes a cultural divide, but the construction of the TMT Project would not otherwise halt any traditional or cultural practice at the proposed site location. Spies testified that there are native Hawaiians who support the TMT Project, including native Hawaiian scientists. Tr. 01/12/17 at 186:21-187:7.

763. Prof. J. Osorio testified that he is not a cultural practitioner, has never been to the summit of Mauna Kea, and has not observed the telescopes. Tr. 01/12/17 at 28:12-19, 41:13-42:4, 140:19-141:10. For him, the TMT Project would violate native Hawaiian cultural practices; however, he had no knowledge or evidence that anyone practiced any traditional or cultural acts in the location of the TMT Project. He had no direct evidence as to how the TMT Project would result in significant adverse impacts to any protected historical traditional practice. Tr. 01/12/17 at 25:20-26:10, 27:15-24. In large part, Prof. J. Osorio's testimony was immaterial and irrelevant to the core issues set forth in Minute Order No. 19. Tr. 01/12/17 at 134:23-135:1.

764. Case of the Flores Case 'Ohana testified to viewplane issues from Kamuela, but did not show any significant impact on any traditional cultural practice by the construction of the TMT Project. Case testified that Mo'oinanea believes that the existing observatories are blocking her (and other divine beings') views and areas that they used to occupy. Ex. B.21a (WDT Case) at 3. Case testified that her hula, chants and prayers are connected to the entire mountain of Mauna Kea, including the Northern Plateau, and that construction of the TMT Project would affect her and her cultural practices physically and spiritually. Ex. B.21a (WDT Case) at 4. The Area E site is not a place that she identified as having performed any historical traditional or customary practices. Her information has been fully considered and given the appropriate weight in these findings.

765. Teale has been a long-time member of Mauna Kea Anaina Hou, one of the Petitioners in this proceeding. Ex. B.15a (WDT Teale) at 1. While she is a native Hawaiian, she presented no evidence that any cultural practice of hers would be prevented by construction of the TMT Project on the Area E site.

766. Both Spies and Prof. Fujikane acknowledged that there are native Hawaiians who support the TMT Project. Tr. 1/11/17 at 61:18-61:22; Tr. 01/12/17 at 186:21-187:7.

767. Spies also testified that there are fields where science and culture coexist, such as the fields of ecology and evolution, geology, and hydrology, because none of these involve

building large structures in sacred spaces. Tr. 01/12/17 at 154:20-155:4. There are other sciences that co-exist quite well on Mauna Kea. Spies participated in a project on Mauna Kea looking at ʻōhiʻa trees. Tr. 01/12/17 at 174:12-21. Science and culture have historically co-existed and need to be incorporated together. Tr. 01/12/17 at 164:24-166:11. Hawaiians are among the first scientists; for example, Hawaiians were experts in aquaculture. Tr. 01/12/17 at 167:9-18.

768. Construction impacts of the TMT Project would only impact practitioners during construction and only if they are on the Northern Plateau. Tr. 11/02/16 at 96:8-96:22.

769. Certain Petitioners, including Pisciotta, argued that the TMT Project will obstruct the viewplanes used in Polohiwa ceremonies and those connected to the path of the sun, solstice, and equinox. Tr. 2/13/17 at 106:7-106:10, 107:12-107:18, 198:18-198:24. However, this testimony contradicts Pisciotta's previous statements that her ceremonies relating to the celestial equator are located near where the Subaru and Keck observatories are located. Tr. 2/13/17 at 104:5-105:17. Moreover, Pisciotta's conclusion that the TMT Project will obstruct traditional viewplanes ignores her testimony that she has already adjusted her practices because existing telescopes block traditional viewplanes. Tr. 2/13/17 at 91:22-93:5.

770. Prof. Fujikane also testified that while standing on the Northern Plateau, the viewplane facing the summit already includes the existing observatories. Tr. 1/11/17 at 79:18-80:3.

771. The TMT Observatory will not be visible from Puʻu Wēkiu. WDT Hayes at 15-17; Tr. 10/25/16 at 123:9-15; Ex. C-18. It will not obstruct any viewplanes from Puʻu Wēkiu, and will not interfere with any practices involving viewplanes to or from Puʻu Wēkiu.

772. Based on the evidence, since 2000, some cultural practices involving Mauna Kea have been conducted from locations not at Mauna Kea, such as from the pu'u of Waimea by Case (Tr. 1/11/17 at 225:1-226:24) and by W. Freitas from his aunt's farm in Waimea (Tr. 3/2/17 at 267:17-268:12). There is no evidence that these practices cannot continue if the TMT Project is built. Nobriga has been able to continue to worship his god, Lono, and to conduct his spiritual practices since the observatories were built on Mauna Kea, despite his claim that the observatories are a form of persecution to him (Tr. 3/1/17 at 73-75:24).

773. Since the year 2000 and up to the present, the reliable probative evidence shows that those cultural and/or spiritual practices can continue to be conducted with the existing astronomy facilities and those activities will not be prevented by the TMT Observatory which will be located 600 ft. below the summit ridge.

774. Therefore, the reliable, substantial and credible evidence demonstrates that the TMT Project will not result in any substantial adverse impact on the cultural practices of the community or State or native Hawaiian traditional and customary practices on Mauna Kea. Ex. A-3/R-3 at 3-37.

4. **Visual and Aesthetic Resources**

775. The FEIS reflects extensive consultation with cultural practitioners as well as input from public meetings to determine the impact on viewplanes. Tr. 10/20/16 at 94:21-95:9; Exs. A-3/R-3, A-4/R-4, and A-5/R-5.

776. There are currently 11 observatories on Mauna Kea within the Astronomy Precinct. Some of these existing observatories are visible from locations around the island such as Hilo, Honokaʻa, and Waimea. Considering all existing observatories together, at least one observatory is visible from roughly 43 percent of the island's land area. The existing development on Mauna Kea does not block or obstruct any of the identified views in the County of Hawaiʻi General Plan or the South Kohala Development Plan. The existing observatories are, however, visible within the viewplanes from Hilo, Waimea, and the summit. WDT Hayes at 4-5; Ex. A-3/R-3 at 3- 80 to 3-81; Ex. A-36.

777. The TMT Observatory will not substantially affect scenic vistas and viewplanes identified in the Hawaiʻi County General Plan or the South Kohala Development Plan. The TMT Observatory will not be visible in the view of Mauna Kea from Pāhoa-Kea'au, Volcano-Keaʻau Roads, and various Puna subdivisions or from locations where Hilo Bay is visible with Mauna Kea in the background. Although the TMT Observatory may be visible in the view of Mauna Kea from portions of the South Kohala district and the area around Waimea, it will not block or substantially obstruct the views and viewplanes of the mountain. Therefore, the TMT Project's visual impact will be less than significant under HAR § 11-200-12. Ex. A-3/R-3 at 3-84 to 3-85.

778. According to a viewshed analysis conducted pursuant to Chapter 343 of the Hawaiʻi Revised Statutes, the TMT Observatory will be visible from roughly 14 percent of the island area. From nearly all this area, existing observatories are currently visible. According to 2000 U.S. Census data, approximately 15.4 percent of Hawaiʻi Island's population, or 23,000 people, live within the viewshed of the TMT Observatory. Others, including visitors and island residents who reside outside the viewshed, will be able to see the TMT Observatory when they travel through and visit locations within the viewshed. WDT Hayes at 5-6; Tr. 10/25/16 at 119:7-121:25.

779. The determination of which viewsheds to use for that analysis took into account input from the community, including at seven public meetings around the State. Certain individuals and groups who are now Petitioners in this contested case received those documents and/or attended the meetings. No input was received suggesting other/additional methods be employed to evaluate the visual impact of the Project. WDT Hayes at 3.

780. The TMT Observatory will not be visible from the summit of Mauna Kea (Puʻu Wēkiu) or Lake Waiau, where the majority of visitors to the summit region, including native Hawaiian cultural practitioners, spend their time. The TMT Observatory will also not be visible from Puʻu Līlīnoe. WDT Hayes at 7, 15-17; Tr. 10/25/16 at 123:5-25; *see also* Ex. C-18 for distances from cultural practice areas to TMT Observatory site..

781. The TMT Observatory will be visible from other locations within the summit region, primarily the Northern Plateau and the northern ridge of Kūkahauʻula where the Subaru, Keck I and II, IRTF, and CFHT observatories are located. The TMT Observatory will add a new visual element in the landscape that will be visible from viewpoints along the northern ridge of Kūkahauʻula and by people as they travel within the northern portion of the summit region. WDT Hayes at 16-17.

782. Currently, views from the northern ridge of Kūkahauʻula are already dominated by views of observatories, including the Subaru, Keck, IRTF, and CFHT observatories, which are located on this ridge. The majority of visitors to the summit region visit the Kūkahauʻula summit (Puʻu Wēkiu), not the northern ridge of Kūkahauʻula. In addition, taking into account the TMT Observatory's lower elevation and its size and height, it will not block the view of Maui or Haleakalā from the northern summit ridge area. WDT Hayes at 15-17; Tr. 10/25/16 at 123:5-124:23.

783. The Northern Plateau is not an open space with no telescope structures on it; SMA roads and facilities are already on the Northern Plateau. Tr. 10/20/16 at 63:18-25. However, the open space characteristic of the Northern Plateau will still be preserved after the construction of the TMT Observatory because the observatory will only take up five of the 2,000 acres. Tr. 12/12/16 at 163:21-164:5.

784. While the TMT Observatory will be a new visual element among the existing observatories within the views of Mauna Kea (for approximately 14 percent of the island area, and visible to approximately 15.4 percent of the population, the great majority of whom already can see one or more observatories), it will not substantially obstruct or block existing views of Mauna Kea from around the island of Hawaiʻi. WDT Hayes at 21; Tr. 10/25/16 at 119:7-123:24; Ex. A-3/R-3 at 3-80 to 3-104.

785. The TMT Observatory will not block the views of Haleakalā, the setting sun, the shadow of Mauna Kea, or the Southern Cross constellation from the northern ridge of Kūkahauʻula. Tr. 10/25/16 at 124:3-23; Ex. A-109; Ex. C-19; *see also* Ex. A-36.

786. The TMT FEIS considered and analyzed the viewplanes from the perspective of a Hawaiʻi religious practitioner. Tr. 11/15/16 at 15:21-22:7. Consultation on viewplanes with religious practitioners was taken in part from the CIA and also contained in comment letters and responses. Tr. 11/15/16 at 28:8-11.

787. While several of the Petitioners participated in the public consultation and information processes to develop the CMP, the CIA, the CRMP for the TMT Project from 2008 through 2011, at no time prior to this contested case hearing did Petitioners and Opposing Intervenors contend that the TMT Observatory would impede views from the summit of Puʻu Poliʻahu. *See* Ex. A-5/R-5, App. D; Ex. A-9 at 4-1 to 4-7, App. A; Ex. A-11 at 6-1 to 6-23, App. F; Ex. A-74; Ex. A-75; Ex. A-79; Ex. A-81; Ex. A-86; Ex. A-87; Ex. A-91; Ex. A-94, Ex. A-95; Ex. A-99; Ex. A-100; Ex. A-101, Ex. A-103; Ex. A-104; Ex. A-105. Petitioners and certain Opposing Intervenors now contend that the TMT Observatory will interfere with views from the summit of Puʻu Poliʻahu to the setting sun (which they say is significant for solstice ceremonies) and to Haleakalā on Maui.

788. Based on the evidence presented, the TMT Observatory will be outside of the viewplane of observers viewing the setting sun from the summit of Puʻu Poliʻahu. Tr. 10/25/16 at 124:3-24; Ex. A-110. The summit area is farther south from the TMT Project site and is not directly in the line of sight at the highest sun setting point on June 21, or the summer solstice. The TMT Observatory will add a visual element below and to the right side of the view of Haleakalā from Puʻu Poliʻahu, but it will not greatly interfere with that view. Tr. 10/25/16 at 124:3-24; Ex. A-110; Ex. C-19.

789. In particular, views to the west which Petitioners and certain Opposing Intervenors now contend are unobstructed are already impacted by existing observatories including Subaru, SMA, JCMT, CSO, UKIRT, and the University 0.6-Meter Telescope. Views to the north, which Petitioners and certain Opposing Intervenors contend are unobstructed, are already obstructed by observatories including both Keck I and Keck II, IRFT, CFHT, Gemini, and the University 2.2-Meter Telescope. *See* Tr. 2/13/17 at 140:21-141:2.

790. The solstice ceremonies referenced are modern in nature and there is no evidence that solstice ceremonies at the summit of Mauna Kea are a traditional and customary practice. Dr. Coleman testified that there were no "sightline" or solstice/equinox ceremonies, and with the exception of the treatment of piko in Lake Waiau, and no cultural practices were conducted on the summit of Mauna Kea prior to the construction of the access road. This is due to the fact that it is too difficult to reach the summit by foot through the rough lava terrain and altitude, and there are sites at lower elevations that are actually preferable for such ceremonies. The construction of the access road contributed to the modern cultural practices at the summit of Mauna Kea. Ex. C-17 (WDT Coleman) at 2; Tr. 1/5/17 at 155:2-156:4, 167:19-169:9.

791. The TMT Project has already implemented, and is committed to implementing, several mitigation measures intended to address the visibility of the TMT Observatory, including: (1) locating the TMT Observatory in Area E, which is north of and below the summit of Mauna Kea, to avoid a more visible location such as the summit ridge or on a puʻu; (2) designing the telescope to be as short as possible given its focal length to allow for the smallest dome feasible; (3) covering the dome enclosure with an aluminum-like coating that will reflect the sky and reduces the visibility of the observatory during most of the day; (4) designing the support building to be small and low relative to the size of the dome and telescope; and (5) making the support building lava-colored to blend with its surroundings. WDT Hayes at 18-21; Tr. 10/25/16 at 124:3-25:17, 126:5-127:12, 208:10-209:15; Ex. C-3.

792. In addition to residents within the TMT viewshed, the TMT Observatory will be visible to other island residents and visitors when they travel within the TMT viewshed, including travel along roads and stops at various viewpoints. The TMT Project's visual impact is perceived by some to be significant. In the context of the existing observatories, and the fact that the TMT Observatory will not block or substantially obstruct the identified views and viewplanes of Mauna Kea which is the applicable significance criterion in HAR § 11-200-12, the Project's visual impact will be less than significant. WDT Hayes at 21; Tr. 10/25/16 at 119:7-124:23; Ex. A-3/R-3 at 3-80 to 3-104.

793. Dr. Kahakalau testified that the TMT project will be a visible eyesore because it will add another monument to Americanism, to capitalism, and to expansion at all costs without any care and any concern about the people who live on the island and their values and traditions. Tr. 1/9/17 at 123:14-124:3. This is not relevant for purposes of evaluating the actual visual impact of the observatory.

794. C. Freitas testified that the Manitowoc 2250 crane that will be used for construction of the TMT Project will impede viewplanes during construction activities (approximately 7 years). Tr. 2/21/17 at 117:25-118:13. The crane will be a temporary impediment, and therefore does not constitute a substantial adverse impact on the visual resources of Mauna Kea.

795. The TMT Project will add a visual element to the summit of Mauna Kea, but it will be one such element among many. The incremental increase in cumulative visual impact due to the TMT Project will be less than significant. Therefore, the TMT Project will not have a substantial adverse impact on the visual resources of Mauna Kea. WDT Hayes at 21-23.

5. **Hydrology and Water Resources**

796. Nance has substantial education and experience in the field of hydrology and water resources. Reliable, probative, substantial, and credible evidence supports Nance's scientific opinions.

797. The TMT Project will cause minimal surface runoff, and the impacts of such runoff will not be significant. Paved areas and buildings are impervious surfaces that prevent rainwater from percolating directly into the subsurface. The TMT Project will create approximately 1.3 acres of new impervious surfaces at the TMT Observatory site (about 0.5 acres) and portions of the Access Way (about 0.8 acres), including the dome and support building. The parking areas will not be paved and will remain pervious, allowing water to percolate naturally. WDT Nance at 2; Tr. 12/13/16 at 98:5-14.

798. The impact due to new impervious surfaces will be limited by the high permeability of the surrounding ground surface and the area downslope of the TMT Observatory and Access Way. The existing landforms attest to the high permeability of the area: there are no developed water channels or evidence of overland water flow. As such, the impact associated with localized runoff from new impervious surfaces created by the Project will not be significant. Runoff will dissipate via percolation into surrounding highly permeable areas. WDT Nance at 2; Tr. 12/13/16 at 98:5-14; Tr. 10/25/16 at 203:9-25; Ex. C-35; Ex. C-36.

799. Lake Waiau, which is located within Pu‘u Waiau, is one of the highest alpine lakes in the United States. The lake is about 300 feet in diameter, reaches approximately 7.5 feet in depth at full capacity, and sits at an elevation of 13,020 feet on the southern flank of Mauna Kea. The lake's water is derived primarily from snow melt and precipitation within its watershed. Due to the topography of Pu‘u Waiau, only surface runoff from within the crater rim, an area of about 30-35 acres, can enter the lake. WDT Nance at 2-

3; Tr. 12/13/16 at 98:15-23, 104:15-24; Ex. A-108.

800. The TMT Observatory will be on the opposite flank of Mauna Kea from Lake Waiau and will not be in the lake's tributary watershed. In the event that surface runoff during an extreme storm event were to flow off the TMT Project site, it would move in an opposite direction from the lake. This path of potential runoff is depicted in Ex. A-108. It is not physically possible for such surface runoff to flow to and over the Puʻu Waiau crater rim to enter the lake. WDT Nance at 2; Tr. 12/13/16 at 98:5-99:5, 105:4-5, 107:20-110:8; Ex. C-35; Ex. C-36.

801. The TMT Project's Batch Plant Staging area, roughly 3,000 feet upslope of Lake Waiau, is also not located in the lake's watershed. Lake Waiau is approximately 3,000 feet south of the Batch Plant and 285 feet lower in elevation. Contamination from the TMT Project site is not possible for several reasons. First, Lake Waiau sits in the central depression of Puʻu Waiau, one of a number of eruptive vents near the summit of Mauna Kea. It is surrounded by the ridges of the puʻu which define an enclosed area of approximately 32 acres. This topographic enclosure makes it physically impossible for surface runoff from other areas to reach the lake, even areas at higher elevation such as the Batch Plant. The only water that can enter the lake as surface flow is direct precipitation on the two-acre lake itself and runoff from the surrounding and enclosing 30-acre sloped area which comprises the interior of the puʻu crater area. Second, the subsurface volcanic intrusives (dikes) which created Puʻu Waiau form an impermeable base that enables Lake Waiau to be a perennial water feature. If it had a more permeable base, accumulated rainfall runoff on the 32-acre interior area of the puʻu would simply drain downward and no perennial water feature would exist. The near-vertical and impermeable intrusives complete Lake Waiau's hydrologic isolation. Perched subsurface water from upslope areas, possibly including local runoff from the Batch Plant percolating downward, would be prevented from entering the lake because of these barriers. WDT Nance at 3; Ex. A-108; Tr. 12/13/16 at 98:15-100:5, 108:13-112:13, 123:8-24, 170:3-22.

802. In accordance with CMP Management Action FLU-7, a zero-discharge wastewater system will be installed at the TMT Observatory. A zero-discharge system means there will be no discharge of any wastewater from the TMT Observatory, including domestic wastewater and mirror washing wastewater, in the summit region. Instead, all wastewater will be collected and transported off the mountain for proper treatment and disposal. Given that no wastewater from the TMT Observatory will be released into the environment at the summit, there is no reasonable prospect of adverse impact on groundwater, and wastewater will not be an environmental issue for the TMT Project. WDT Nance at 3-4; Ex. A-9 at 6-6 to 6-7, 7-57 to 7-58; Tr. 12/13/16 at 99:6-19.

803. The occurrence of groundwater beneath the summit area is what is referred to in Hawaiʻi as "high-level," which means that the groundwater is impounded by subsurface geologic structures, such as intrusive dikes, which act to compartmentalize the groundwater. Although groundwater is the primary source of drinking water in Hawaiʻi, there are no wells extracting groundwater near the summit. The nearest wells are located approximately 12 miles away in Waikiʻi Ranch along Saddle Road. Ground elevation at these wells is 4,260 feet above mean sea level and the static water level is about 1,280

feet above mean sea level. The TMT Project's use of a zero-discharge wastewater system means that wastewater will not be released from the TMT Project into the environment and therefore will not percolate into the groundwater at a depth below the TMT Observatory. WDT Nance at 4; Tr. 12/13/16 at 110:9-114:16.

804. The composition of Mauna Kea consists of very porous lavas that naturally treat and filter water percolating downward. Any discharge on the summit would be naturally treated and filtered through thousands of feet of the porous lavas, thereby removing any contamination in that discharge by the time it reaches groundwater. Therefore, contamination of groundwater is very unlikely. The effectiveness of this natural filtering phenomenon is evidenced by the Kahalu'u Shaft and the Kealakehe Wastewater Treatment Plant in Kona on Hawai'i Island. The horizontal tunnel from which water is derived from the Kahalu'u Shaft sits approximately 800 to 1400 feet below the more than 30 residences that are upgradient of the Shaft. Ex. A-44. Wastewater from these homes is disposed of in cesspools and septic system leach fields. As the wastewater percolates downward through the unsaturated lavas to finally reach the basal lens below, a natural treatment process occurs such that there is no evidence of wastewater contamination in the drinking water pumped from the basal lens by the Kahalu'u Shaft. The Kealakehe Wastewater Treatment Plant secondarily treats effluent by pumping it into a pit that is approximately 3,750 feet inland of Honokohau Harbor. Testing and various occasions at the harbor indicates that this trickling effect works and that there are no definable adverse impacts occurring from what people may think is an otherwise alarming way of discharging effluent. Tr. 12/13/17 at 114:20-116:24; Ex. C-37. As such, for the TMT Project sitting atop porous lavas at over 10,000 feet above the existing water lens, there is no reasonable prospect of the TMT Project adversely impacting groundwater. WDT Nance at 4-5; Tr. 12/13/16 at 99:20-103:6, 113:9-116:24; Ex. A-44.

805. The primary watershed recharge areas for Mauna Kea occur at lower elevations where it rains, and not in alpine deserts, where precipitation is minimal. It is extremely unlikely that any spill would be large enough to have any impact on the drinking water for Hawai'i County. The main threats to Mauna Kea's aquifer occur at lower elevations in areas of heavier population and use. Ex. A-24 at 48.

806. Although Petitioners and Opposing Intervenors expressed generalized "concerns" about water issues, including runoff, Lake Waiau, and groundwater, they did not substantiate those concerns with reliable, credible, or scientific evidence. For example, Pisciotta testified to her fear or belief that the TMT Project will impact Lake Waiau, but presented no data to support the contention that the TMT Project site will in any manner impact or contaminate the snow, ice, or water. Tr. 2/13/17 at 192:11-192:22, 194:7-12.

807. KAHEA presented Kanahele to argue that the water sources on Mauna Kea would be negatively impacted. Kanahele is educated in the field of Hawaiian Studies, and her background and experience is in matters relating to Hawaiian culture and traditions. Ex. B-11.b. She testified as to native Hawaiian knowledge of the water resources on Mauna Kea, as demonstrated though chants that have been passed down through the generations. Ex. B-11.a at 2-3; Tr. 1/24/17 at 141:11-20. Kanahele recited various chants indicating the native Hawaiian understanding of the water resources and hydrology cycles of Mauna

Kea. Ex. B-11.a at 2-3; Tr. 1/24/17 at 141:24-147:13. She believes that Mauna Kea plays an integral role in the hydrology cycles on the mountain, and on Hawai‘i Island as a whole, due to its ability to collect clouds and mist, which recharge the aquifer. Tr. 1/24/17 at 144:12-146:16, 150:6-12, 163:1-164:1. Kanahele testified further that further building on Mauna Kea should not be allowed in order to prevent damage to the water resources. Ex. B-11.a at 3; Tr. 1/24/17 at 147:10-13.

808. Kanahele's testimony is insufficient to rebut the reliable, probative, substantial, and credible evidence presented by Nance that the TMT Project will not have an impact on the water resources on Mauna Kea. Kanahele's testimony is based on her personal beliefs and interpretation of traditional Hawaiian chants, which, she admits are subject to different interpretations. Tr. 1/24/17 at 170:3-16, 185:8-23, 196:8-21. Her anecdotal evidence is not supported by any scientific data or research. There was no evidence of any actual specific adverse impacts that the TMT Project would have on water resources. Her testimony is insufficient to support a finding that the TMT Project will negatively impact the water resources on Mauna Kea.

809. Teale testified that placing a "5,000-gallon hazardous chemical storage tank directly above" the "healing waters of Mauna Kea" which "are sourced deep within the mountain" is harmful to practitioners, and that construction of the TMT Project could cause harm to waters and plants in the area. B.15.a (WDT Teale) at 2. Teale did not provide any scientific or empirical evidence to support these concerns or fears, and her opinions on these issues are speculative. B.15.a (WDT Teale) at 2-3. Teale's testimony is also directly contradicted by Nance. Nance, who has worked in the field of hydrology and water resource engineering for the past 44 years, testified that the TMT Project will have no significant or adverse impact on water resources. WDT Nance at 1.

810. Tajon expressed his unsupported opinion that the TMT Project would negatively impact the spring water that feeds his farm. No credible scientific evidence was presented to support his view. Tajon is not a scientist and the basis of his beliefs are taken from his reading of traditional native Hawaiian stories regarding Mauna Kea. Tr. 2/27/17 at 39:18-39:24. Tajon's concerns are speculative and unpersuasive.

811. Michael Lee claimed that the water resources used for cultural practices would be affected by the TMT Project. *See* Tr. 1/23/17 40:13-25. He did not provide any evidence that the TMT Project would contaminate any water resource on Mauna Kea or the surrounding coastal waters. Lee is not an expert in land use and has never been qualified as an expert in land use in any proceeding. Tr. 1/23/17 at 24:21-25:17, 27:15-23, 31:10-33:8, 103:4-105:16. Notwithstanding his objections to the proposed TMT Project and speculative allegations that there must be spills by the observatories, Lee testified that the waters "have always been clean," even despite the presence of the existing observatories. Tr. 1/23/17 at 31:10-13.

812. Ward testified to her concerns regarding hydrology and existing plant and animals species in the area; however, she is not a hydrologist, botanist, entomologist, archaeologist, land use expert, or an attorney. She did not provide any credible evidence to support her concerns. Tr. 1/31/17 at 24:20-28:3, 44:3-9, 84:7-88:6, 106:7-21, 116:17-

117:7, 131:13-133:12.

813. Rosier, appearing on behalf of C. Freitas, referred to alleged oil leaks occurring during pre-construction activities for the TMT Project. Ex. S-17a; Tr. 2/16/17 at 223:22-248:19; Tr. 2/21/17 at 32:22-72:21. Rosier has experience as a mechanic's assistant. She felt that mechanical malfunctions may lead to oil leaks from heavy machinery used during construction of the TMT Project, and that the possibility of such leaks is heightened by the harsh conditions present on Mauna Kea (increasing the likelihood of hose malfunctions, etc.). *Id*. Rosier's testimony is speculative and does not rebut the reliable, probative, substantial, and credible evidence presented by Mr. Nance, that spills/leaks on Mauna Kea, even if they did occur, are unlikely to have any impact on the aquifer.

814. C. Freitas also testified that TMT Project will negatively impact the aquifer, based on the possibility of oil leaks on Mauna Kea. She testified as to past leaks at the CSO site in 2009, as well has her own personal observations of leaks on Mauna Kea in 2015. Ex. S-2a at 1-2; Tr. 2/21/17 at 78:18-84:3.

815. C. Freitas's testimony does not establish that the TMT Project will adversely impact water resources on Mauna Kea. The 2009 oil leak circumstances at CSO are irrelevant to the instant CDUA for the TMT Project. Additionally, the 2009 oil leak was properly remedied and there is no evidence of any resulting impact to the water resources on Mauna Kea. Ex. S-18d. With regards to the alleged 2015 oil leaks, there is no evidence that such leaks resulted in an impact to the water resources on Mauna Kea. Dr. Sanders testified that some observed fluid leaks were likely moisture from condensation. Tr. 1/3/17 at 23:14-25:16. He further testified that all of the alleged leaks were addressed appropriately. *Id*. A protocol requires an oil drip pan be placed next to each piece of machinery to catch leaking fluids. *Id*. 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. *Id.* at 25:11-16. Dr. Sanders' testimony established that the alleged 2015 oil leaks were limited in nature and addressed thoroughly.

816. C. Freitas offered her own personal opinion that oil leaks will negatively impact the aquifer. This opinion was not supported by any facts or evidence, but rather, was based on C. Freitas's personal beliefs. Tr. 2/21/17 at 155:1-5. C. Freitas's testimony does not rebut the scientific, reliable, probative, substantial, and credible evidence presented by Nance, that spills/leaks on Mauna Kea are unlikely to have any impact on the aquifer.

817. W. Freitas claimed that chemicals from Mauna Kea were leaching into the water source at Kiholo Bay; however, he admitted to not seeing a study confirming the identity of the aquifer feeding Kiholo Bay. He admitted that his claim of contamination came only from his own "logic." Tr. 3/2/17 at 254:20-258:15, 278:3-279:25. Such speculative and unverifiable opinion is insufficient to overcome or rebut the testimony of Nance.

818. Furthermore, after review of Figure 1 of the Commission on Water Resource Management, DLNR's *A Study of the Ground-Water Conditions in North and South Kona and South Kohala Districts, Island of Hawaii, 1991-2002* (Sept. 2003), W. Freitas

acknowledged that Kiholo Bay is fed from the Kiholo aquifer, whose boundaries are not within the areas associated with aquifers below Mauna Kea. Tr. 03/02/17 at 254:12-258:15; Ex. A-156.

819. N. Ho opposes development on Mauna Kea. He conceded that the TMT Project's use of a zero-discharge wastewater system mitigates the impacts related to cesspools at the summit. Tr. 2/22/17 at 134:2-22. Nonetheless, his position is that mitigation should occur beyond the requirements of the current law. Tr. 2/22/17 at 136:7-9. N. Ho would require a CDUA to meet undefined, vague, and ambiguous requirements beyond those required under the law or regulations and therefore, is speculative and untenable.

820. Camara testified to his belief that Mauna Kea holds an important water resource, but was unable to answer specific questions about Mauna Kea's hydrology. He admitted that he was not a hydrologist, and that there is not enough information about the Mauna Kea aquifer. He briefly reviewed the hydrology section of the FEIS for the TMT project and did not review the testimony of Nance. He was unaware of any existing water sources at the TMT Project site. Tr. 3/1/17 at 127:20-130:4, 134:16-18, 140:19-141:17, 191:16-192:2.

821. Kanaele testified that the TMT Project would degrade the water supply, but did not provide any credible or scientific evidence to support that assertion. Tr. 3/1/17 at 222:19-224:21. Kanaele presented no prior experience or knowledge of hydrology that would enable him to opine on the effect of the TMT Project on water resources.

822. UH Hilo witnesses established through reliable, probative, substantial, and credible evidence, including but not limited to the testimonies of Nance and Hayes, that Petitioners' and Opposing Intervenors' concerns about water issues are highly speculative and lack scientific basis or are otherwise not credible evidence.

823. The reliable, probative, substantial, and credible evidence demonstrates that the TMT Project will not have a substantial adverse impact on the water resources and hydrology of Mauna Kea, including Lake Waiau and the groundwater underlying Mauna Kea.

6. **Hazardous Waste, Solid Waste, and Wastewater**

824. Like other existing observatories, the TMT Observatory will utilize vehicle and generator fuel, alcohols used for optics and general cleaning, liquid adhesives for optics bonding, various metals used for coating deposition materials, lubricants, hydraulic fluid, glycol coolants, and small quantities of acids, paints, and solvents. No mercury will be used by or at the Observatory, and no hazardous waste is anticipated to be generated at the TMT Observatory. Ex. A-1/R-1 at 2-29 to 2-30; WDT Hayes at 23; Tr. 10/25/16 at 126:5-8.

825. The TMT Observatory will store all hazardous materials in a secondary containment area that will be inspected daily for leaks. Fuel storage and piping will also be double-walled and will be equipped with leak monitors. Therefore, the chance of a spill entering the surrounding environment is negligible. Ex. A-1/R-1 at 2-30; WDT Hayes at 23-24.

826. Like many of the other observatories, mirror washing will be the primary maintenance

activity associated with the TMT Observatory. Mirror washing wastewater is not a hazardous waste. However, the TMT Observatory has been designed to ensure that the possibility of mirror wash wastewater entering the surrounding environment will be negligible. Ex. A-1/R-1 at 2-31; WDT Hayes at 24.

827. The TMT Observatory design includes a separate mirror laboratory for mirror washing. The laboratory is designed to collect waste from the mirror washing and coating area floor drain and laboratory sinks into double contained piping. The piping will drain by gravity to a holding tank. The tank will either be double walled or will be placed in a concrete basin. The tank will be sized to accommodate at least one week's worth of normal use. Each point of exit from the mirror stripping area will have a trench drain that will drain to the storage tank. All exposed concrete in areas of chemical use will have a chemical resistant coating applied. Ex. A-1/R-1 at 2-31; WDT Hayes at 24.

828. A leak detection system will be installed and will monitor the double contained pipes and tank. A level control system will monitor the tank and will be equipped with an overfill alarm in the event that the level in the tank reaches 90 percent capacity. The waste collected from the mirror washing process will be collected, removed, and transported off site for treatment and disposal. It is estimated that such removal will occur approximately once a month (more often if needed), and the likelihood of an accident is slight. To minimize the potential for an accidental spill while wastes are in transit down the mountain to the proper disposal site, no tank or containers being transported will be filled to the top. To further ensure the safe transport and disposal of hazardous waste, the Observatory will utilize only Environmental Protection Agency-permitted and licensed contractors to transport hazardous wastes. Ex. A-1/R-1 at 2-30 to 2-31; WDT Hayes at 24-25; Tr. 1/3/17 at 75:21-76:9.

829. In compliance with existing regulations and requirements, TIO will develop and implement a SPRP. Both the SPRP and the engineering measures (such as double-walled pipes) will protect against the release of chemicals or fuel to the environment. The SPRP will require inspections to ensure that systems are working properly, no leaks are occurring, and any necessary maintenance measures are taken. The SPRP will also spell out protocols for proper handling, storage, use, and disposal of liquid and solid materials and wastes. Ex. A-1/R-1 at 2-30; WDT Hayes at 25.

830. As a result of the TMT Project's design plus implementation of the plans, programs, and built-in safeguards detailed in the TMT FEIS, all of which were designed to comply with applicable rules and requirements, the TMT Project's impact related to hazardous materials and hazardous waste will be negligible. The possibility of an accidental release to the environment of any hazardous materials or waste is extremely remote. WDT Hayes at 25; Ex. A-1/R-1 at 2-30.

831. The TMT Project will provide the training, equipment, and procedures for proper waste handling and disposal. The TMT Project will have a person on-site to monitor compliance. Tr. 1/3/17 at 196:12-197:19; 203:1-204:23. The TMT Project will: (1) collect all solid waste in secured and covered storage containers and truck it down the mountain for proper disposal at an off- site disposal facility; (2) implement a Materials

Storage/Waste Management Plan, a component of which will be the SPRP; and (3) implement a Waste Minimization Plan that includes an annual audit to identify waste produced by the Project and how that waste could be reduced, reused, or recycled, among other mitigation measures. These measures will be implemented during both construction and operational phases of the TMT Project. Ex. A-1/R-1 at 2-28 to 2-30; WDT Hayes at 25-26.

832. Several components of the Waste Management Plan will address the construction phase specifically, including the following requirements: (1) repacking large shipments of construction materials prior to transporting them to Mauna Kea so that only essential packing material is used for final transportation to the construction site, thus reducing the amount of waste generated at the construction site; (2) securing to the ground outdoor trash receptacles with attached lids, thus ensuring that the receptacles, their lids, and their contents will not be blown away; (3) storing hazardous materials, fuel, and waste in designated areas in containers suitable and appropriate for such storage; and (4) covering construction materials with heavy tarps and steel cables anchored to the ground to hold materials down. WDT Hayes at 26. Disposal of packing materials will be in accordance with rules and regulations. Tr. 1/3/17 at 203-04.

833. The TMT Project will use three 5,000-gallon tanks—one for water storage, one for domestic waste storage, and one double-walled for chemical waste storage. It will also have two 25,000-gallon tanks containing fire-suppression water and above-ground 5,000-gallon tank for storing diesel fuel to power the emergency generator. Those tanks will not have a substantial impact on the natural environment. Page 3 to 5 of Ex. B to Ex. A-1/R-1; Tr. 12/6/16 at 175:1-21.

834. Mandatory compliance with existing regulations and requirements will ensure that the TMT Project will not result in a significant impact to the environment due to its solid and hazardous waste management. The implementation of the identified mitigation measures, such as the Waste Minimization Plan, will further reduce the Project's potential impacts. WDT Hayes at 26.

835. Ward sits on the advisory OMKM Environment Committee, and testified that she did not have any concerns regarding the above-ground storage of liquids at TMT, but that her concerns were more focused on the transport of those liquids to and from the TMT Project site. However, Ward admitted that she was unaware of any previous spills on Mauna Kea resulting from vehicles overturning en route to the MKSR. Tr. 1/31/17 at 32:6-35:25, 41:3-24, 62:6-10.

836. Dr. Kahakalau, a witness for the Flores-Case 'Ohana, testified that because telescopes are cleaned with highly toxic chemicals, there are all kinds of pollution that is possible if an accident occurs. Tr. 1/9/17 at 124:15-18. Dr. Kahakalau did not provide any evidence to substantiate either that telescopes are cleaned with highly toxic chemicals or the general assertion that all kinds of pollution are possible if an accident occurred. In contrast, the University established through reliable, probative, substantial, and credible evidence, that the TMT Project will implement sufficient regulations and requirements to provide adequate safeguards.

837. As stated above, there is ample evidence that it is extremely unlikely that the TMT Project will cause the spills and leaks. To the extent there have been reports of alleged oil leaks from heavy machinery, Dr. Sanders's testimony established that those leaks were limited in nature and addressed immediately and thoroughly.

838. Townsend, appearing on behalf of KAHEA, believes the impact analysis and mitigation measures in the FEIS and CDUA are inadequate. Tr. 1/10/17 at 41:1-21, 50:24-51:3, 67:10-72:2, 75:2-76:2. Her belief is unpersuasive and biased in light of her admission that she would oppose the TMT Project even if there was minimal impact. Tr. 1/10/17 at 84:10-85:23. Her position is even less credible because despite her claims of inadequacy, she never formally challenged the FEIS for the TMT Project within the appropriate legal challenge time. Tr. 1/10/17 at 136:5-20. Townsend further admitted that she has never been designated as a land use expert in any proceeding, and that she was not a scientist, botanist, hydrologist, entomologist, or geologist. Tr. 1/10/17 at 80:25-81:16, 136:21-137:11.

839. Based on the above factual findings, the TMT Project will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region.

E. CRITERION FIVE: THE PROJECT IS COMPATIBLE WITH THE LOCALITY AND SURROUNDING AREAS AND IS APPROPRIATE TO THE PHYSICAL CONDITIONS AND CAPABILITIES OF THE PARCEL

840. The fifth criterion in HAR § 13-5-30(c)(5), provides: "The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels[.]"

841. The TMT Project, including buildings, structures, and facilities, is an astronomical facility that is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels, in satisfaction of HAR § 13-5-30(c)(5).

842. The appropriate locality to be considered is the summit area of Mauna Kea within the MKSR, and more specifically, the Astronomy Precinct of the MKSR.

843. Astronomy facilities in the locality of the TMT Project are expressly permitted uses under HAR § 13-5-24.

844. The Astronomy Precinct is the site of many existing astronomical observatories so the TMT Project will be compatible with existing land uses. WDT White at 9-10; Tr. 10/20/16 at 63:18-24, 94, 218:17-220:2; 10/24/16 at 22:11-23.

845. The TMT Project will be located on an approximately five acre site within the Astronomy Precinct of the MKSR, which is a clearly defined, highly specialized area set aside specifically for astronomical facilities, and was first leased to the University of Hawai‘i in 1968 for this express purpose. Ex. A-1/R-1, App. A at A-3.

846. The proposed location of the TMT Observatory is in relatively close proximity to the eleven other previously developed facilities for astronomy within the Astronomy Precinct, which is the only area now designated for astronomical facilities on Mauna Kea. Ex. A-31 at 3.

847. From most vantage points within the Astronomy Precinct where the TMT Project will be visible, other astronomy facilities are already visible. Ex. C-18.

848. The TMT Project will not be visible from the culturally sensitive areas of the summit of Kūkahauʻula, Lake Waiau, Puʻu Līlīnoe, and Puʻu Wēkiu. WDT Hayes at 7-8; Ex. A-36 at 2; Tr. 10/25/16 at 13:5-18.

849. No known customary or traditional uses or practices occur within the Area E location site of the TMT Observatory.

850. The TMT Project should be assessed in the physical context within which it is proposed to be built. The Astronomy Precinct encompasses 525 acres, and the MKSR covers 11,288 acres. Ex. A-9 at 3-1. Combined, the TMT Observatory and Access Way will result in the disturbance of approximately 8.7 acres, including 2.5 acres that were previously disturbed. Ex. A- 3 at S-6. The Project proposes disturbance of only 6.2 acres of previously undisturbed land. Ex. A-9 at 3-26. New disturbance for the TMT Project represents less than 1.2% of the 525-acre Astronomy Precinct, and only about 1/20th of 1% of the MKSR.

851. The summit of Mauna Kea and other parts of Mauna Kea are substantially developed. There are 13 telescopes and related roads, structures, and buildings on the summit of Mauna Kea along with the food service and dormitory facility for 500 people and the Visitor's Center at the approximately 9,000 foot elevation, as well as other parking facilities, roadways, and trails. Tr. 12/16/16 at 41:18-41:25.

852. Locating the TMT Observatory in Area E will not result in substantial adverse significant impacts on historic properties, identified cultural resources, and customary and traditional cultural practices, as well as on viewplanes, species habitat, and existing facilities. In addition, locating the TMT project in Area E avoids any substantial impact to any puʻu on Mauna Kea, including Kūkahauʻula.

853. The TMT Observatory dome will also be coated with a reflective aluminum-like finish which reflects the colors of the sky and ground, helping the dome to blend in with the surrounding setting. Ex. C-3. Furthermore, because the TMT Observatory will be purposely located at a lower elevation than most of the other observatories on Mauna Kea, the Observatory will not be visible from the significant historic properties of Lake Waiau, Puʻu Līlīnoe, and the summit of Mauna Kea. WDT White at 10; Tr. 10/25/16 at 124:3-125:17, 137:9-19; Ex. C-18.

854. Mauna Kea is particularly well suited for astronomy. Due to the stability of the atmosphere above Mauna Kea, low mean temperature, atmospheric clarity, distance from light pollution, and other factors identified above, the summit area of Mauna Kea is uniquely suitable for astronomical research and for a project like the TMT Observatory.

See supra at FOF Section II.F.

855. The existing access road from the summit ridge area to the TMT Project site follows an existing 4-wheel drive road that has existed since the 1960s. A section of approximately 200 feet of this 3,400-foot-long Access Way does not follow the current road alignment. Ex. A-1/R-1 at 1-11; Tr. 10/25/16 at 134:11-14. The Batch Plant Staging Area will be used in exactly the same manner as during past construction of other observatories and roads. Ex. A-1/R-1 at 1-13. Currently, utility services exist along the Mauna Kea Access Road to a point across the road from the SMA building. The necessary switch boxes to provide power and communication to the TMT Observatory will be placed above ground next to the existing ones across the road from the SMA building. To the extent possible utilities from that point will be placed beneath the road to reduce the footprint of disturbance. Ex. A-3/R-3 at 2-18. None of these uses will add any new elements that might be incompatible with the existing locality and surrounding areas.

856. The TMT Project should also be viewed in the context of the historical physical disturbance of the summit area by native Hawaiians. Directly adjacent to the Astronomy Precinct is the NAR, which contains most of the Mauna Kea Adze Quarry Complex, "the largest ancient quarry of its type, anywhere." Ex. A-9 at 3-15 n.9. As early as 1100 A.D., and continuing through the 1700s up until the time of Western contact, native Hawaiians utilized the mountain as a vital resource. They excavated the slopes of Mauna Kea for high quality durable stone to produce some of the best Neolithic tools in the Pacific. The Mauna Kea adze quarry, the largest in the world, offers conclusive evidence that the ancients recognized the importance of Mauna Kea's rich resources and its ability to serve its community by producing the tools to sustain daily life. They ventured to Mauna Kea, shaped the environment by quarrying rock, left behind evidence of their work, and took materials off the mountain to serve their communities, within the presence and with full consent of their gods. WDT Baybayan at 2; Ex. A-9 at 5-11 to 5-15.

857. The Mauna Kea Adze Quarry Complex "occupies an area of at least 4,800 acres." Ex. A-5/R-5, App. D at 33. Archaeological evidence indicates that the Mauna Kea Adze Quarry was used by prehistoric Hawaiians for obtaining basalt to make stone implements. Ex. A-9 at 3-15, n.9. The Adze Quarry Complex represents a physical disturbance of the summit area of Mauna Kea that is 774 times larger than the new disturbance proposed for the TMT Project. *Compare* Ex. A-5/R-5, App. D at 33 (noting the Adze Quarry Complex is at least 4,800 acres) *with* Ex. A-3/R-3 at S-6 (stating the TMT Project will disturb 8.7 acres, of which roughly 2.5 acres are previously disturbed).

858. Townsend claimed that the TMT Project constitutes desecration of a sacred place. Tr. 1/10/17 at 119:4-9. This testimony is unpersuasive. Ms. Townsend is not a native Hawaiian and does not engage in traditional or cultural practices related to Mauna Kea. Tr. 1/10/17 at 68:9-11. Ms. Townsend's assertion that the TMT Project constitutes desecration is contradicted by her own admission that the lower part of Mauna Kea was used as an adze quarry. Tr. 1/10/17 at 140:4-141:5. Ms. Townsend's testimony is unpersuasive based on her personal negative feelings against the TMT Project. She admitted that she would oppose the TMT Project even if there was minimal impact. Tr. 1/10/17 at 85:12-22. Ms. Townsend's credibility was questioned based on alleged

inconsistent statements. Ex. A-150; Tr. 3/1/17 at 123

859. Importantly, witnesses for the Petitioners and Opposing Intervenors admitted that the summit area was already substantially, if not completely, developed for astronomy use. Townsend described the summit as follows, "There are nearly a dozen telescopes crowded together creating an industrial park atmosphere. It is "urban sprawl and intensifying of land uses". Tr. 1/10/17 at 15:10-17. She goes on to say that there are 20-25 buildings at the summit and that it is "an industrial park up there." Tr. 1/10/17 at 95:13-19. Townsend also testified that during a site visit to Mauna Kea in June 2011, she observed that the landscape at the summit was dominated by industrial land uses, including many telescope facilities and ancillary structures. WDT Townsend at 2; Tr. 1/10/17 at 15:8-15, 67:4-22.

860. Flores is more direct, admitting that the Astronomy Precinct is substantially developed. Tr. 1/30/17 at 234:5-8.

861. Ward testified that she "went back in 1996, and [] was shocked at how much change there had been in terms of development of the telescopes and the roads and the trash". Tr. 1/31/17 at 109:4-7.

862. Similarly, Pisciotta claims that "[t]he summit area is developed so much so that the TMT cannot fit on it. And the development is now… falling off the side of the summit." Tr. 2/13/17 at 198:7-10.

863. Kihoi "had no idea that all of those structures and telescopes were – had been up there. I didn't know that there was that much". Tr. 2/14/17 at 117:12-14. She admitted there were already 13 observatories atop the mountain, paved roads, power lines, and parking spaces for the various observatories. Tr. 2/14/17 at 120:6-23.

864. Prof. J. Osorio testified that the Astronomy Precinct is an industrial park, and , essentially a developed area. Tr. 01/12/17 at 137:1-138:12. He also testified that the whole mountain is sacred, but that things are fluid and can change, noting that aliʻi can change things; practices can change as well. Tr. 01/12/17 at 140:1-13.

865. Dr. Kahakalau argued the TMT Project is not compatible with the locality and surrounding area because TMT is not compatible with a sacred place. Tr. 1/9/17 at 125:13-125:25. Although it is undisputed that some native Hawaiians view Mauna Kea as sacred, HAR § 13-5-24 expressly permits astronomical observatories and facilities to be constructed within the Astronomy Precinct. The Board cannot adopt Dr. Kahakalau's position that her native Hawaiian values and native Hawaiian beliefs concerning Mauna Kea should prevail over any "outsider" opinion. Tr. 1/9/17 at 95:8-95:12.

866. Dr. Abad's opinion that the CDUA does not meet the criterion stated in HAR § 13-5-30(c)(5) ("The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels") is based solely on her view that the CDUA does not meet HAR § 13-5-30(c)(4). Ex. B.08 (WDT Abad) at 20. As discussed above, the CDUA satisfies HAR § 13-5-30(c)(4).

867. Based on the above factual findings, the proposed TMT Project is compatible with the locality and surrounding areas and is appropriate to the physical conditions and capabilities of the area.

F. CRITERION SIX: THE PROJECT PRESERVES THE NATURAL BEAUTY AND OPEN SPACE CHARACTERISTICS OF THE PHYSICAL AND ENVIRONMENTAL ASPECTS OF THE LAND

868. The sixth criterion in HAR § 13-5-30(c)(6), states: "The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable[.]"

869. The evidence presented demonstrates that the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon by the TMT Project.

870. This criteria must be analyzed in the context of the purpose and goals of the resource subzone of the conservation district.

871. Visual or other impacts of a proposed project are site specific. In considering visual impacts here, the TMT Project provides information in the context of the preexisting conditions in the area proposed for a use. Ex. A-1/R-1 at 7-1 to 7-15.

872. The significance of the TMT Project's visual impacts have been assessed in light of the context where it will be built. The mere fact that an astronomic observatory will be constructed in Area E does not mean that it will adversely impact or be inconsistent with the surrounding area uses and conditions for astronomy.

873. The visual landscape in the summit area of Mauna Kea has already been substantially altered and impacted. Ex. A-1/R-1 at 7-1 to 7-2; WDT Hayes at 4-5. It will remain so with or without the TMT Project. The TMT Project, and its visual impacts, are assessed in that context. Adding the TMT to the existing physical context will not result in a substantial adverse impact. Clearly, the rules and regulations allowing the use recognize that astronomical observatories are typically large buildings that house telescopes.

874. Because certain resources such as a clear night time viewing sky location are available only in particular places, limited alternatives for locating properties requiring those resources would outweigh visual or other impacts, even if such impacts are "obvious." The location for the TMT Project is dictated by the combination of natural resources that makes the Project's site uniquely ideal for astronomical observation. *See supra* at FOF Section II.F.

875. High visibility land uses in less urbanized areas and off ridgelines are preferred because the visual impacts are smaller or could be more easily mitigated than in locations atop ridgelines and in high-population areas. Such factors favor the location of the TMT Project in the existing astronomical precinct.

876. Even with some potential environmental or visual impacts to the Conservation District,

the TMT Project incorporates appropriate measures and conditions to mitigate the project's adverse impacts. WDT Hayes at 7-22.

877. The "mitigation" of impacts does not require that impacts be eliminated altogether, but the TMT Project mitigation does appropriately consider measures designed to diminish and not eliminate altogether the impact of the project visually and in its effect on practices through its chosen location in Area E. Ex. A-1/R-1 at 4-26.

878. For visual impacts, "mitigation" is understood to require reducing adverse impacts, not eliminating them, which the TMT Project accomplishes here with its design. *See* Ex. C-6 (WDT Callies) at 8.

879. The governing rules do not provide for "invisibility-if-feasible standard" so the practice for consideration is whether the project includes reasonable minimization, not elimination, of visual impacts.

880. The mitigation measures discussed herein, including the location of the telescope, reduction of the dome to the smallest size physically possible, the finishing of the dome and supporting structure to reduce the visibility of the structures, and other measures, reduce the visual impacts for the TMT Project to the greatest extent feasible. WDT Hayes at 7-22.

881. Design of the TMT Project is consistent with (and in many aspects, improves upon) the design of the other existing telescopes within the Astronomy Precinct, which also includes various support buildings, roads and other facilities. Ex. A-1/R-1 at 4-30 to 4-31.

882. The size, dimensions and dome structure were conceived to minimize and enhance the natural beauty of the surrounding areas to the extent practicable. Ex. A-1/R-1 at 4-30.

883. Fluids such as gas, water, wastewater systems will be contained in underground tanks to minimize any possible contamination of the subsurface areas. Ex. A-1/R-1, App. D at D-2.

884. The structural design considered ways to minimize visual impacts to optimize viewpoints around the facility. Ex. A-1/R-1 at 7-13.

885. Given this context, and the many mitigation measures incorporated into the TMT Project specifically designed to minimize its visual impacts to the extent feasible, the sixth criterion is appropriately addressed and considered in the CDUA.

886. Petitioners and Opposing Intervenors, however, propose to read this criterion to literally require that the TMT Project "improve on the natural beauty or open space of the Northern Plateau." *See, e.g.* Petitioners' Collective PHS at 5.

887. Such an absolute and restrictive reading would mean no structure could be constructed in the Astronomy Precinct, which would be inconsistent with the subzone use designation.

888. Based on Petitioner's and Opposing Intervenor's interpretation of HAR 13-5-30(c)(6), no telescope could ever have been built on Mauna Kea, and nothing could be permissibly built on Conservation District land in the State of Hawai'i.

889. Such a reading would render "Astronomy facilities" in the Resource subzone meaningless.

890. The TMT Project will be consistent with and will preserve the existing physical and environmental aspects of the land directly and through the numerous mitigation commitments. The objective of the resource subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas. HAR § 13-5-13.

891. The TMT Project has been assessed in context of its surrounding environment – including the uses and development that has already occurred in the summit area.

892. This criterion focuses on the impacts of the proposed land use rather than the cumulative impacts of existing or past projects under other permits at the summit ridge area of Mauna Kea. Tr. 10/20/16 at 70:23-71:2.

893. The TMT Project will be an astronomy facility under an approved management plan with an expressly permitted land use in the Resource subzone, so the type of use in this area has already been considered when allowing observatories to be utilized in this environment, so long as there is an approved management plan in place. Tr. 10/20/16 at 61; Tr. 10/24/16 at 17-18.

894. The TMT Project is not proposed to be built on a bare mountaintop. Rather, it is being added to an Astronomy Precinct, and to a visual landscape, that has already been substantially altered and is already populated by numerous observatories and other related facilities. Tr. 10/25/16 at 125, 154, 230; Tr. 10/20/16 at 63, 94, 218-19. The addition of another observatory will not substantially alter the present physical characteristics of the surrounding area. Tr. 10/20/16 at 73-74.

895. Petitioners and Opposing Intervenors have acknowledged the developed nature of the summit, and practitioners like Pisciotta have adapted their practices due to the development on the summit of Mauna Kea. Tr. 2/13/17 at 198:4-198:13.

896. The University envisions a future of sustainable and responsible astronomy on the summit of Mauna Kea. This includes the decommissioning and deconstruction of observatories, site recycling, and the siting of observatories in certain areas so as to minimize the effects of astronomy-related development. The University recognizes that future plans for Mauna Kea require balanced management to preserve, protect, and enhance the cultural and natural resources of Mauna Kea. WDT White at 10; Tr. 10/20/16 at 59, 61-62.

897. The University's long-term goal is to eventually have fewer observatories in the summit region, while maintaining Mauna Kea's status as a world class center for education and research. This reduction in the number of telescopes will improve upon the physical and environmental aspects of the region by reducing the presence of the structures, physically

and visually, from the most culturally sensitive sites on Mauna Kea. WDT White at 10; Tr. 10/24/16 at 86-87. To that end, OMKM is in the process of evaluating CSO and Hoku Keʻa's filed notices of intent to decommission. Tr. 12/12/16 at 94:21-95:7, 97:9-97:22.

898. As set forth above, the decision to locate the TMT Project on Mauna Kea was the result of an extensive worldwide study to evaluate potential locations. A unique combination of environmental factors indicated the summit area of Mauna Kea as the best location for the Project. Ex. C-2 (WDT Sanders) at 10.

899. A next generation large telescope like the TMT would not be appropriate to be placed on a redeveloped existing observatory site. Ex. A-48 at IX-37; Ex. A-3/R-3 at 3-32.

900. The TMT Observatory site location – in Area E on the Northern Plateau of Mauna Kea – was in part chosen to avoid more culturally and visually sensitive areas. The TMT Observatory will not be visible from the summit of Mauna Kea, from Lake Waiau, or from Puʻu Līlīnoe. WDT Nagata at 9-10; Ex. A-48 at IX-37 – IX-39; Tr. 10/25/16 at 123; Tr. 10/20/16 at 62-63.

901. The TMT Observatory will be visible within the Northern Plateau and from the northern ridge of Kūkahauʻula; however, other observatories are already visible from those locations. Because other astronomical facilities are already located on the northern ridge of Kūkahauʻula, views there are presently dominated by other astronomical facilities including Subaru, Keck, and the CFHT observatory. WDT White at 10-11; WDT Hayes at 16-17; Tr. 10/25/16 at 124.

902. Current observatories are visible from 43 percent of Hawaiʻi Island's area. The TMT Project will increase that slightly to 44.2 percent. The TMT Observatory itself will be visible to approximately 15 percent of the Island's population, including from Waimea and along portions of Highway 250. The TMT Observatory will be visible among already visible existing observatories. WDT White at 11-12; WDT Hayes at 5-23; Tr. 10/25/16 at 120-21; Ex. A-3/R-3 at 3-80 to 3-103.

903. The TMT EIS incorporates a number of techniques to evaluate the existing visual resources and the potential impacts of the TMT Project, including reviewing community plans, view plans within the viewshed of the TMT Project, silhouette analysis, and photo simulations. Tr. 10/25/16 at 119.

904. Visual simulations in the EIS and used in the CDUA depict what the TMT Observatory would look like during most of the day. View studies show the TMT Observatory will not block views of Haleakalā, the setting sun, the shadow of Mauna Kea, the Southern Cross constellation from the northern ridge of Kūkahauʻula, or views from the summit of Puʻu Poliʻahu. Tr. 10/25/16 at 122-24; Ex. A-109.

905. The TMT Observatory will not be visible from Kūkahauʻula, Lake Waiau, and Puʻu Līlīnoe, which are the three traditional cultural properties designated by SHPD within the summit area. Tr. 10/25/16 at 123.

906. Prof. Fujikane, a witness for KAHEA, testified that locating the TMT Project in Area E should not be considered mitigation since native Hawaiian practitioners conduct ceremonies and look at viewplanes from all over the mountain, not just from these specific sites. WDT Fujikane at 4. Prof. Fujikane did not present any credible evidence in support of her generalized statement that the TMT Project will have a substantial negative impact on traditional or historic cultural practices and presented no credible evidence of what cultural practices are conducted at the TMT Project site and whether they constitute traditional cultural practices.

907. The University's evidence demonstrated that locating the TMT Project in Area E will mitigate the impact of visual impacts of the observatory that would otherwise exist at or near the more heavily used and recognized summit ridge cultural regions.

908. Although the TMT Project will add a visual impact to the Northern Plateau, numerous measures, involving both its location and its design, have been incorporated into the Project to minimize and integrate its visual impacts to the greatest extent feasible:

a. The TMT Observatory will be sited at a lower elevation than other observatories; therefore, it will not affect viewplanes vertically from the summit ridge areas. WDT White at 11; WDT Hayes at 13-14, 17-19; Tr. 10/25/16 at 122-23.

b. The TMT Observatory has been designed to have the lowest focal ratio possible, resulting in the shortest telescope possible to accommodate a mirror of its size. The dome has been designed to fit closely around the telescope, reducing the dome size. While the 30-meter mirror is larger than the mirrors of other observatories, the TMT Observatory's dome height is barely taller than existing observatories like Gemini and Subaru, the mirrors of which are 10 and 8 meters in diameter, respectively. WDT White at 11; WDT Hayes at 19; Tr. 10/25/16 at 124-25; Ex. A-3/R-3 at 3-101; Ex. A-1/R-1 at 7-13; Ex. C-23.

c. The TMT Observatory dome finish has been designed to minimize the Observatory's visibility. Although operationally and from a cost perspective it would have been preferable to color the dome white, the dome will have a reflective aluminum-like coating, which view studies show will be the least visible alternative. WDT White at 11; WDT Hayes at 20; Ex. A-3/R-3 at 3-103; Ex. A-1/R-1 at 7-13; Tr. 10/25/16 at 125.

d. The TMT Observatory's support facilities will be relatively small and low to the ground, and will use materials and natural colors designed to blend with the surrounding landscape. WDT White at 11; WDT Hayes at 20-21; Ex. A-1/R-1 at 7-13.

909. Additional mitigation measures will be employed that will improve upon the existing physical and environmental aspects of the land. The TMT Access Way will be rendered

less visible by shading the pavement in various areas to blend in with its surroundings. The existing utility pull boxes in certain locations will be camouflaged to reduce their visibility. The former jeep trail up Puʻu Poliʻahu, which was cut in 1964, will be restored to its natural state. Following completion of construction of the TMT Observatory, the Batch Plant Staging Area, which has been used for several prior observatory construction projects, will be partially re-naturalized. WDT White at 7; WDT Hayes at 22, 30-31.

910. For those wanting to access the Northern Plateau, improving the road is a benefit and advantage and improves upon the existing physical characteristics of the area. Tr. 01/04/17 at 80:13-20.

911. Hansen testified that, in his opinion, the CDUA does not meet criterion 6 because the development of the TMT Project will "dig into the mountain, move rocks and alter substrate." Ex. B.10a (WDT Hansen) at 2. As discussed above, Hansen's position is unreasonable, and the mere fact that a project will require excavation does not automatically disqualify a project from approval under HAR § 13-5-30(c). Since allowable uses in the Resource subzone specifically include "mining and extraction of any … natural resource…" his position is contradicted by regulations governing the conservation district. HAR § 13-5-24(c); R-6.

912. Placed in context with existing observatories and the minimal or nonexistent obstruction of existing views from the summit ridge region, the visual impact of the TMT Observatory will be less than significant. Therefore, when viewed from the perspective of the summit region, which already includes astronomy facilities, the physical and environmental aspects of Mauna Kea will be preserved by the TMT Project, and, in some respects, will be improved upon. WDT White at 7-8, 11-12; Ex. A-3/R-3 at 3-230 – 3-232; HAR § 13-5-30(c)(6).

913. Based on the above factual findings, the TMT Project satisfies Criterion Six due to its incorporation into the existing uses and natural surroundings for the area that has been approved for astronomical observatory uses.

G. CRITERION SEVEN: THE TMT PROJECT DOES NOT UTILIZE A SUBDIVISION OF LAND INCREASING THE INTENSITY OF LAND USES IN THE CONSERVATION DISTRICT

914. The seventh criterion in HAR § 13-5-30(c)(7), provides: "Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district[.]"

915. The TMT Project does not utilize a subdivision of land to increase the intensity of land uses in the conservation district.

916. HAR § 13-5-2 defines a "subdivision" as a "division of a parcel of land into more than one parcel."

917. As noted above, UH Hilo has not requested, and has not been granted, any subdivision of land for purposes of the TMT Project.

918. To develop subdivided land requires an application to subdivide a parcel pursuant to Hawai‘i law, as defined in Haw. Rev. Stat. § 484-1(2008) and the Hawai‘i County Code 23-2 (1983). No such process is being employed here for this project and none is required for the planned uses on the subject land parcel.

919. Petitioners and Opposing Intervenors contend, however, that the TMT Project does not satisfy HAR § 13-5-30(c)(7) because, in their view, the proposed sublease of land to TIO (and, indeed, each sublease for an existing observatory facility) "further separated areas of land use within the University's Astronomy Precinct resulting in the illegal subdivision of these lands." *See e.g.*, Petitioners' Collective PHS at 6.

920. Petitioners and Opposing Intervenors, however, offer no authority to support their position that a lease or sublease within MKSR legally constitutes a "division of a parcel of land into more than one parcel," and Petitioners' and Opposing Intervenors' arguments fail on that basis. *See e.g.*, Petitioners' Collective PHS at 6.

921. Typical purposes of subdivision ordinances, including applying and levying residential land development conditions relating to public facilities, ensuring that public infrastructure are compatible with facilities outside of the subdivision, and describing separately owned lots in multi-lot residential developments, are not applicable to the sublease for the TMT Project.

922. Construing every sublease as creating a subdivided parcel subject to the county subdivision code would subject every such sublease to ordinances designed to regulate residential developments and lead to absurd results.

923. Petitioners and Opposing Intervenors further contend that the "subdivision is illegal" because the State Land Use Commission did not create the Astronomy Precinct or separate project parcels. *See e.g.*, Petitioners' Collective PHS at 6.

924. Petitioners' and Opposing Intervenors' argument, however, is misplaced and illogical, because the Land Use Commission's authority does not extend to establishing or approving areas such as the MKSR or the Astronomy Precinct. The BLNR has the authority to manage conservation district lands including subdividing lands in the conservation district into more than one parcel.

925. The Astronomy Precinct is an area identified and described by the Mauna Kea Science Reserve Master Plan as a management and planning designation to reduce the area within the MKSR available for astronomy development.

926. The Astronomy Precinct does not divide the MKSR into more than one parcel in order to intensify the use of the MKSR. Instead, it identifies an area within the MKSR for planning and management of astronomical facilities.

927. The TMT Project satisfies this criterion because no land will be subdivided to construct and operate the TMT Project. WDT White at 2; Tr. 10/20/16 at 185.

928. As part of the process to approve the TMT Project use on the existing lands managed by

the University, the CDUA references that the University intends to sublease part of the Science Reserve for the project. The sublease does not require or utilize any form of subdivision for the planned uses.

929. Since no subdivision will be utilized for the TMT Project, the criteria involving subdivisions is not involved based on the submissions in the CDUA and FEIS.

930. Subdivision use is not required for this project. Codes like Hawai‘i County's evolved from state planning enabling statutes and plat acts as a method of simplifying the descriptions of lots in multi-lot residential developments, in order to avoid the complication of describing each lot in a proposed subdivision by metes and bounds. The inclusion of a legal description of the parcel to be subleased does not transform the sublease into a subdivision as every transfer of an interest in land either contains such a description or displays such an interest on a map. Ex. C-6 (WDT Callies) at 9.

931. Petitioners and Opposing Intervenors further contend that the TMT Project does not satisfy HAR § 13-5-30(c)(7) because, in their view, the TIO Sublease constitutes an impermissible "subdivision of land … utilized to increase the intensity of land uses in the conservation district." *See e.g.*, Petitioners' Collective PHS at 6.

932. Petitioners and Opposing Intervenors argue the University's subleases to observatories constitute a "subdivision" of land simply because they include references to use areas in parcel "metes and bounds descriptions." Ex. B.03a at 1 (asserting that the exhibits to Ms. Townsend's testimony "include maps denoting the metes and bounds of the land area to be demised"). The documents referenced by Petitioners and Opposing Intervenors do not, however, contain metes and bounds descriptions.

933. Designating areas within a parcel for uses by persons does not create a subdivision. The subdivision process requires a party to follow specific procedures and requirements to subdivide a parcel, pursuant to Hawai‘i law as defined in HRS § 484-1(2008) and the Hawai‘i County Code 23-2 (1983). No evidence exists that such process has been or will be used for the TMT Project.

934. It is undisputed that: the University has not sought a subdivision of land and none is required by the CDUA or FEIS. No evidence exists that any governmental agency has received a request to subdivide and the prior sublease document does not create or require a subdivision. Tr. 10/20/16 at 222-23.

935. No evidence exists of an increase in the intensity of land use in the astronomical precinct area. Hayes established that the parcel where the TMT Project site is located is already used for astronomical observatories and will continue to be used for astronomy as provided for by statute. Tr. 10/31/16 at 180-82. Moreover, the decommissioning measures associated with the TMT Project would offset any purported intensification of land use. Tr. 10/20/16 at 185-87.

936. Since there is no evidence of the utilization of a subdivision of land, the TMT Project complies with Haw. Admin. R. § 13-5-30(c)(7).

H. CRITERION EIGHT: THE PROPOSED LAND USE WILL NOT BE MATERIALLY DETRIMENTAL TO THE PUBLIC HEALTH, SAFETY, AND WELFARE

937. The eighth criterion in HAR § 13-5-30(c)(8), provides: "The proposed land use will not be materially detrimental to the public health, safety, and welfare."

938. The eighth criterion of Haw. Admin. R. § 13-5-30 only 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 reliable, probative, substantial, and credible evidence that several aspects of the TMT Project will be strongly beneficial to the public welfare. Ex. C-2 (WDT Sanders) at 13-15, 17-19.

939. The preponderance of the evidence showed that the TMT Project will not be materially detrimental to the public health, safety, and welfare.

940. While Petitioners and Opposing Intervenors contend that building the TMT Project on Mauna Kea will be harmful to the health of native Hawaiians and others, and some evidence does exist that specific individuals might suffer distress as a result of opposing this project, as a whole the TMT Project will not be materially detrimental to the public health, safety, and welfare.

941. Petitioners and Opposing Intervenors arguments to the contrary are not persuasive or are otherwise speculative or not supported by reliable, probative, substantial, or credible evidence. These positions are not given significant weight in evaluating this criterion.

942. Petitioners presented the testimony of Dr. Taualii, 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. Dr. Taualii 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. Taualii 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.

943. Dr. Taualii'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. Several factors contribute to this finding.

944. First, Dr. Taualii'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. Taualii'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. Taualii's assertions.

945. Second, Dr. Taualii's research was limited in scope, and does not address the welfare of the general public. Dr. Taualii'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.

946. Third, even if Dr. Taualii'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. Taualii 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.

947. Finally, Dr. Taualii's personal bias tainted the outcome of her research and opinion. Dr. Taualii 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. Taualii 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. Accordingly, less weight is afforded to Dr. Taualii's research and testimony.

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

949. Dr. Meyer, 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. Dr. 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.

950. Dr. 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. Meyer's testimony/theory is not supported by any empirical data. Ex. B.05a; Tr. 1/26/17 at 68:20-69:21. Dr. Meyer did not otherwise establish the validity of her theory. Dr. 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. Meyer's theories as factually true. Dr. Meyer conceded that she did not read the CDUA or related documents. Tr. 1/26/17 at 35:3-7. Accordingly, no significant weight is given to the opinions offered by Dr. Aluli-Meyer regarding the merits of the

CDUA.

951. Prof. J. 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. J. Osorio presented no evidence that the TMT Project will be mismanaged. To the contrary, Prof. J. 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.

952. Prof. Kaholokula is a professor of native Hawaiian health at the John A. Burns School of Medicine, University of Hawai‘i at Mānoa. Ex. F-7b (WDT Kaholokula). He 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.

953. 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 Kaholokula). 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.

954. 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. However, she did not provide any evidence to support that assertion. 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.

955. 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. Teale, however, did not provide any studies or other evidence to support her conclusions regarding these alleged trauma-related impacts of the TMT Project, and her opinions on these issues are speculative.

956. 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.

957. The evidence did not show that the public health, safety and welfare of the public as a whole will be materially impacted. Any psychological impact on certain portions of the general population would be isolated and capable of being mitigated or treated by counseling services.

958. 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.

959. The construction and use of astronomical features in the Astronomy Precinct alone does not create harm to the general health, safety and welfare of Hawai‘i's citizens.

960. The TMT Project construction does not rise to the level that would invoke traditional police power protections to protect the public from the proposed construction activities.

961. Any concern for the wellbeing of a segment of the general public is mitigated through the scientific, educational, and economic benefits to be derived from the TMT Project.

962. Petitioners and Opposing Intervenors have not shown that the TMT Project will be materially detrimental to the public health, safety, and welfare.

963. Petitioners and Opposing Intervenors also contend that "'public welfare" does not mean job-creation educational benefits or money generation, but instead refers to "aesthetics -- preserving Hawai‘i's unique natural beauty."

964. Plain language meaning of the words "public welfare" does not equate to Petitioners' and Opposing Intervenors' argument concerning impacts over "aesthetics." Job growth,

educational prestige and opportunities, and advancement of knowledge are plainly benefits to the "public welfare." Aesthetics do not implicate concerns for the general public with respect to the TMT Project design and planned construction.

965. A proposed land use is not required to be affirmatively beneficial to the public health, safety, and welfare – only that a project not be materially detrimental. Nonetheless, the TMT Project does provide benefits, in part as mitigation of any negative perceptions by the general public, but its proposed project is in no manner a threat to the overall general public health, welfare or safety.

966. The reliable, probative, substantial, and credible evidence demonstrates that the TMT Project will inject money into the local economy. It will bring job growth, educational prestige and opportunities, and significant advancement of knowledge. The TMT Project will benefit the "public welfare."

967. 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.

968. 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.

969. 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.

970. 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.

971. 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; Tr. 1/3/17 at 75:8-76:9; Ex. A-3/R-3 at 3-234.

972. 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. Tr. 1/3/17 at 23:22-25:16.

973. 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; 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). Tr. 02/16/17 at 213:24-214:1. Ms. Munroe took a sample of the alleged oil spills but never tested the sample. 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. Tr. 02/16/17 at 205:2-14, 206:1; *see* Exs. S-9, S-10, S-14c.

974. 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. Tr. 02/16/17 at 214:2-215:17.

975. 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. Tr. 02/16/17 at 213:19-23.

976. 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. Tr. 02/16/17 at 244:6-9.

977. 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. Tr. 02/16/17 at 223:22-231:3.

978. 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.

979. 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.

980. Identified noise-sensitive areas in the summit region, including the trailhead and summit of Puʻu Wēkiu/Kūkahauʻula, Lake Waiau, and Puʻu Līlīnoe, are more than 850 feet from the TMT Observatory HVAC system. WDT Hayes at 28; Ex. A-3/R-3 at 3-179.

981. 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.

982. 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. 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.

983. 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.

984. 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.

985. 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.

986. As an initial matter, the noise and traffic complained of by Townsend and Ward already exists and thus, cannot be the result of the TMT Project, which has yet to be built. Furthermore, Townsend's and Ward's complaints about noise and traffic are inconsistent with the Hearing Officer's own observations during the September 2016 site visit. 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.

987. Prof. Fujikane also 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. Prof. Fujikane's testimony is not persuasive on this issue as she has no background or expertise in evaluating waste management plans, nor did she present any credible evidence demonstrating any danger posed by the tanks to the aquifer and the land.

988. 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 anenometer (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. C. Freitas was unable to establish that crane operators would fail to comply with such instructions and thereby create a risk of crane-tipping.

989. 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. C. Freitas did not support her concerns with any evidence. Accordingly, C. Freitas's testimony does not establish that the use of a Manitowoc 2250 Crane for construction activities on Mauna Kea will pose a danger to public health, safety, and welfare.

990. Fergerstrom 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.

991. 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; Tr. 02/16/17 at 92:2-10; Tr. 02/16/17 at 183:12-20; Tr. 02/16/17 at 94:7-11; Ex. A-157; Ex. A-158; Ex. A-159. Those acts constituted public health and safety risks and were not legitimate worship or practices associated with any traditional practice in the area. 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.

992. 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 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. Tr. 10/20/16 at 109:24-110:6; WDT Hasinger at 3-4.

993. 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 Sanders) at 13-14; Ex. A-3/R-3 at 3-137 to 3-140; WDT Hasinger at 5-6.

994. 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 Sanders) at 14-15.

995. 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 Hasinger at 1-6.

996. Prof. Fujikane, despite her background in education, 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, nor did she provide any foundation for this generalized statement. The Hearing Officer cannot accept Prof. Fujikane's unsupported assertions that other people, much less entire groups of people, will likewise be negatively impacted. While Prof. Fujikane claimed that she personally may experience some negative impact, the extent of that personal impact is minimal, as 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.

997. 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 Sanders) at 13-15, 18; Ex. A-3/R-3 at 3- 136.

998. 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 been seen using Keck. 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 our Milky Way Galaxy. 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 Hasinger at 2.

999. Considering all of the evidence, including but not limited to the testimonies of Dr. Taualii, Dr. Meyer; Dr. 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.

1000. Based on these factual findings, the TMT Project is not materially detrimental to the public health, safety, and welfare. Thus, the TMT Project satisfies Haw. Admin. R. § 13-5-30(c)(8).

IV. PUBLIC TRUST DOCTRINE

1001. Prof. Callies, a witness for TIO, is one of the foremost recognized experts in planning and land use in Hawai‘i. He is an elected member of both the College of Fellows of the American Institute of Certified Planners and the American College of Real Estate Lawyers. He is a professor at the William S. Richardson School of Law, University of Hawai‘i at Mānoa and teaches courses focused on land use planning and development permitting at the local, state and national levels, with a particular emphasis on land use controls in Hawai‘i. He is the author of several publications concerning eminent domain, land use, and other real property issues. He is also the author of the Hawai‘i land use law treatise, *Regulating Paradise: Land Use Controls in Hawai‘i*. Ex. C-6 (WDT Callies) at 1.; Tr. 12/16/16 at 44:17-45:7.

1002. Prof. Callies reviewed numerous documents related to the CDUA for the TMT Project, including the appellate court pleadings and opinions in this matter. He is familiar with the issues presented to the BLNR and the Hearing Officer in this contested case hearing. Prof. Callies visited the TMT Project site in August 2016. Ex. C-6 (WDT Callies) at 2.

1003. Prof. Callies testified that "the public trust doctrine does not require pristine and absolute preservation." *Id.* at 2. "Instead, the public trust doctrine requires a balancing process between protection and conservation of public resources, on the one hand, and the development and utilization of these resources, on the other." *Id.* The public trust doctrine contemplates a balancing of private and public uses, and not the elimination of one at the expense of the other. *Id.* In other words "a public trust doctrine resource does not foreclose private uses of that public trust doctrine resource." *Id.* at 3.

1004. Prof. Callies also testified that not all public resources held in trust are impressed with or subject to the Public Trust Doctrine. He testified that while it is a truism to state that government holds resources for its public, its citizens, if all such resources were impressed with or held subject to the Public Trust Doctrine, government could never sell or exchange such resources since it is black letter law that resources held by government subject to the Public Trust Doctrine cannot be sold or transferred. This, according to Prof. Callies, would lead to an absurd result. *Id.* at 3-4; Tr. 12/16/16 at 45:8-22.

1005. Prof. Callies also testified that the public trust doctrine in Hawai‘i appears to have been "constitutionalized" to the extent that once a resource like water or submerged land is impressed with the public trust doctrine, Article XI, Section 1 of the Hawai‘i State Constitution reinforces the obligation of state and county agencies in their decision-making to carefully examine any proposed use of or on that resource to ensure that the public use of that resource remain paramount and intact. Ex. C-6 (WDT Callies) at 3.

1006. Prof. Callies testified that the eight criteria set forth in HAR § 13-5-30(c) already incorporate the considerations of the public trust doctrine. *Id.* at 3.

1007. Notwithstanding the above, Prof. Callies testified that in his opinion the public trust doctrine does not apply to the TMT Project because the TMT project is not located on land impressed with or subject to the Public Trust Doctrine nor does it restrict or impair any water resources. He noted that the public trust doctrine has traditionally been exclusively connected to water, and stated that the Hawai‘i Supreme Court has interpreted the scope of the public trust doctrine as applying to water resources. *Id.* at 4. He also stated that the applicable literature has almost never extended the public trust doctrine beyond water resources. *Id.* at 2.

1008. Prof. Callies further testified that if the land use is public or quasi-public, then the public trust doctrine would not require a balancing between public and private uses. *Id.* at 4. Prof. Callies noted that the TMT Project is not a private undertaking, but rather "involves public and quasi-public entities for an education use that will benefit the public and is consistent with the designated conservation use of that area." *Id.* at 4. Therefore, Prof. Callies concluded that based on his experience, "the TMT Project easily qualifies as a public or quasi-public use and is thus consistent with most, if not all, other public uses so that the need to balance public and private uses does not apply." *Id.* at 4.

1009. Prof. Callies testified that even if the public trust doctrine applied and the proposed TMT Project constitutes a private use of a public trust resource, the TMT Project is consistent with the public trust doctrine due to "[t]he absence of adverse impacts [to the public's use of a water resource] combined with the obvious benefits of the project to the public." *Id.* at 6.

1010. In rebuttal to Prof. Callies' testimony, KAHEA offered the testimony of Frankel, a Hawai‘i land use attorney with litigation experience in, *inter alia*, state land use law, conservation district law, the coastal zone management act, environmental impact statement law, and the public trust doctrine. Ex. B.53 (WDT Frankel) at 1-2. Frankel represented the appellant in the recent *Kilakila ‘O Haleakalā* case before the Hawai‘i

Supreme Court. The *Kilakila ʻO Haleakalā* case was the only case identified by Frankel in his written direct testimony that involved a CDUA. Tr. 1/11/17 at 43.

1011. In his testimony, Frankel testified to his disagreement with Prof. Callies' opinion that the public trust doctrine is exclusively connected to water. To support his argument, Frankel cites to dicta within a footnote in the Hawai‘i Supreme Court case, *Morgan v. Planning Dep't*, 104 Hawai‘i 173, 86 P.3d 982 (2004). There, the Hawai‘i Supreme Court stated that the scope of the public trust doctrine is set forth in Article XI, Section 1, which provides for the conservation and protection of "Hawai‘i's natural beauty and all natural resources, including land, water, air, mineral and energy sources…." Ex. B.53 (WDT Frankel) at 4; Tr. 1/11/17 at 29-30. Frankel also relies on the concurring opinion of the recent *Mauna Kea Anaina Hou* opinion, in which two members of the Hawai‘i Supreme Court stated that the public trust doctrine under the Hawai‘i State Constitution applied to conservation land and the summit of Mauna Kea. B.53 at 4 (quoting *Mauna Kea Anaina Hou v. Bd. of Land & Natural Res.*, 136 Hawai‘i 376,407 363 P.3d 224,255 (2015)(concurring opinion)). Ex. B.53 (WDT Frankel) at 4.

1012. In his testimony, Frankel also accused Prof. Callies of a pro-development bias. *Id.* at 2. Frankel, however, conceded that everyone has their biases, including himself. *Id.*; Tr. 1/11/17 at 39:10-17. He acknowledged that others may accuse him of having an anti-development bias. Tr. 1/11/17 at 39:18-22.

1013. Frankel also acknowledged that in his former position as an attorney for the Native Hawaiian Legal Corporation, he represented some of the Petitioners to this contested case, specifically Flores and Ching, in other matters. Tr. 1/11/17 at 36-39.

1014. The Hearing Officer will consider the merits of the positions set forth by Prof. Callies and Frankel based on the relevant statute, rules, regulation and precedent.

CONCLUSIONS OF LAW

I. INTRODUCTION

1. This contested case hearing requires the BLNR to consider whether the proposed land use as provided in the CDUA for the TMT Project, complies with: 1) the statutory and regulatory requirements for a development within the Conservation District; 2) Article XII, Section 7 of the Hawai‘i State Constitution and *Ka Pa‘akai O Ka ʻĀina v. Land Use Comm'n State of Hawai‘i,* 94 Hawai‘i 31, 7 P.3d. 1068 (2000); and, if applicable, 3) Article XI, Section 1 of the Hawai‘i State Constitution and the public trust doctrine.

2. In evaluating whether the proposed land use for the TMT Project is consistent with the statutory and regulatory requirements for a development within the Conservation District, the BLNR is required to consider and apply the eight criteria set forth in HAR § 13-5-30(c).

3. The following issues are not material or relevant to this proceeding:

a. the sovereignty of the Kingdom of Hawai‘i or any other issues relating to the purported existence of the Kingdom of Hawai‘i;

b. challenges to the legal status of the State of Hawai‘i; and

c. challenges to the State's ownership of, and title to, the lands related to this contested case hearing. Minute Order No. 19 [Doc. 281]

4. If any statement denominated a COL is more properly considered a FOF, then it should be treated as a FOF; and conversely, if any statement denominated as a FOF is more properly considered a COL, then it should be treated as a COL.

5. Certain facts set forth within specified criteria addressed herein may apply to one or more criteria, issue, or legal standard. To the extent such facts or findings are addressed within a particular heading or section below does not limit it to that heading or section, but instead all such facts or findings are incorporated by reference for each applicable criteria section, as if specifically set forth within that heading or section.

6. The Hearing Officer considered the testimony of all witnesses at the evidentiary hearings and all exhibits received into evidence. The mere fact that a particular witness testimony or exhibit may not be specifically referred to below does not and shall not be construed to mean that said testimony or exhibit was not considered. Rather, specific reference to said witness testimony or exhibit was excluded because, after due consideration of said testimony or exhibit, it was determined to be: (i) immaterial, (ii) irrelevant, (iii) contrary to law, (iv) less credible or persuasive, and/or (v) cumulative of other testimonies or exhibits specifically referred to below

II. JURISDICTION AND STANDING

A. JURISDICTION

7. This contested case is before the BLNR pursuant to the Supreme Court of Hawai‘i's December 2, 2015 opinion in *Mauna Kea Anaina Hou v. Board of Land and Natural Resources*, 136 Hawai‘i 376, 363 P.3d 224 (2015) and the Circuit Court of the Third Circuit, State of Hawai‘i's Order for Remand filed February 22, 2016, in Civil No. 13-1-0349.

8. The CDUA for the TMT Project involves land designated in the Resource subzone of the Conservation District.

9. The BLNR has jurisdiction and authority over lands designated in the Resource subzone of the Conservation District pursuant to HRS Chapter 183C, and HAR chapters 13-1 and 13-5.

10. The BLNR has the authority and jurisdiction, pursuant to HRS chapter 183C to act upon and approve a CDUA.

11. The BLNR has authority and jurisdiction to conduct this contested case hearing pursuant

to HRS Chapter 183C, HRS § 91-9, and HAR § 13-1-28.

12. The BLNR has the authority and jurisdiction to approve the CDUA for the TMT Project as a conditional use of the Conservation District.

13. The State of Hawai‘i is the lawful government of the Hawaiian Islands. *See State v. Kaulia*, 128 Hawai‘i 479, 487, 291 P.2d 377, 385 (2013).

14. The State of Hawai‘i’s title to ceded land is unclouded; it holds title in such lands in “absolute fee,” and by extension, the BLNR has jurisdiction over the land subject to this proceeding. *Hawai‘i v. Office of Hawaiian Affairs*, 556 U.S. 163, 174 (2009); HRS § 183C-3.

15. The BLNR lacks subject matter jurisdiction to consider issues relating to the overthrow of the Kingdom of Hawai‘i and the legality of the annexation of the Hawaiian Islands by the United States, as those issues are nonjusticiable political questions. *See Baker v. Carr,* 369 U.S. 186, 212 (1962); *Sai v. Clinton*, 778 F.Supp.2d 1, 6 (D.D.C. 2011), *aff’d sub nom. Sai v. Obama*, No. 11-5142, 2011 WL 4917030 (D.C. Cir. Sept. 26, 2011).

16. Even if these issues were justiciable, the BLNR has no statutory authority to adjudicate these issues. *See* HRS § 183C-3 (Powers and duties of the board and department).

B. STANDING OF THE PARTIES

17. HAR § 13-1-2 defines “Petitioner” as “the person or agency on whose behalf a petition or application is made,” and a “Person” as “appropriate individuals, partnerships, corporations, associations, or public or private organizations of any character other than agencies.”

18. HAR §§ 13-1-31(b) and (c) set forth the standards for admission of persons and agencies as parties in a contested case proceeding.

19. HAR § 13-1-31(b) sets forth the standard for the mandatory admission of persons or agencies as parties:

> The following persons or agencies shall be admitted as parties:
>
> (1) All government agencies whose jurisdiction includes the land in question shall be admitted as parties upon timely application.
>
> (2) All persons who have some property interest in the land, who lawfully reside on the land, who are adjacent property owners, or who otherwise can demonstrate that they will be so directly and immediately affected by the requested action that their interest in the proceeding is clearly distinguishable from that of the general public shall be admitted upon timely application.

20. HAR § 13-1-31(c) sets forth the standard for the discretionary admission of persons or agencies as parties:

> Other persons who can show a substantial interest in the matter may be admitted as parties. The board may approve such requests if it finds that the requestor's participation will substantially assist the board in its decision making. The board may deny any request to be a party when it appears that:
>
> (1) The position of the requestor is substantially the same as the position of a party already admitted to the proceedings; and
>
> (2) The admission of additional parties will not add substantially new relevant information or the addition will make the proceedings inefficient and unmanageable.

21. HAR § 13-1-10 sets out the standard for who can appear in a representative capacity in proceedings before the BLNR. It states in relevant part:

> (a) A person may appear in the person's own behalf, a partner may represent the partnership, an officer, trustee, or authorized employee of a corporation may represent the corporation, trust or association, and an officer or employee of an agency may represent the agency in any proceeding before the board.
>
> (b) A person may be represented by counsel in any proceeding under these rules.
>
> (c) A person shall not be represented in any proceeding before the board or a Hearing Officer except as stated in subsections (a) or (b).

22. Standing is an aspect of justiciability focusing on the party seeking a forum rather than the issues the party wants adjudicated. *Life of the Land v. Land Use Comm.*, 63 Haw. 166, 172 (1981).

23. The Hawai‘i Supreme Court has been liberal in recognizing standing in land use cases. *Id.*

C. TIO'S STANDING

24. Several of the parties challenged TIO's standing as a party, particularly in light of the Circuit Court's decision to vacate BLNR's consent to the sublease between TIO and the University. *See, e.g.*, [Docs. 427 and 429]. However, TIO's admission as an intervenor was not predicated on the status of the sublease consent. Rather, TIO's motion to intervene was granted "due to TIO's substantial interest in the subject matter and because TIO's participation will substantially assist the Hearing Officer in her decision making." Minute Order 13 at 4 [Doc. No. 115]. TIO still has a valid sublease with the University and will be the entity responsible for building and operating the TMT Observatory, if it is built. Thus, TIO still has a substantial interest in the subject matter. Moreover, TIO's participation has substantially helped the Hearing Officer in her decision making. Therefore, TIO is properly a party to the contested case hearing.

D. HEARING OFFICER WITNESSES

25. Pursuant to Minute Order No. 41 [Doc. 446], on January 26, 2017, the Hearing Officer scheduled the testimony of the remaining witnesses that had yet to testify at the contested case hearing.

26. On January 26, 2017, Holi was given a hearing date for her live testimony to be scheduled in February 2017. Ms. Holi subsequently testified on February 23, 2017.

27. No other Hearing Officer Witness appeared on January 26, 2017 and, as a result, no other Hearing Officer Witness was given a hearing date for their live testimony.

28. Prior to the close of the contested case hearing on March 2, 2017, none of the Hearing Officer Witnesses other than Holi provided the Hearing Officer with their availability to testify nor did they request to testify after they were not given a hearing date for their live testimony on January 26, 2017.

29. On April 20, 2017, Minute Order No. 44 [Doc. 553] was issued to address the admission of documentary evidence. In that Minute Order, the Hearing Officer noted that Holi was the only Hearing Officer witness to testify during the hearing.

30. On April 24, 2017, TIO filed its *Motion for Clarification, or in the Alternative, Reconsideration Re: Minute Order No. 44 [Doc. No. 553]*, requesting confirmation that the remaining Hearing Officer witnesses, Kealamakia., McIntosh, and West, had waived any right to testify at the contested case hearing or to claim they were deprived of an opportunity to provide their position and information as part of these proceedings. [Doc.. 555]. TIO's motion was served by e-mail and certified mail on Hearing Officer Witnesses Kealamakia, McIntosh, and West.

31. On April 24, 2017, UH Hilo filed its substantive joinder to TIO's motion for clarification, in which UH Hilo argued that the Hearing Officer witnesses had ample notice and opportunity to formally raise an objection or otherwise make a claim there were precluded from testifying or presenting evidence at the hearing, if that is what they believed. [Doc. 556]. UH Hilo also served its substantive joinder on Hearing Officer Witnesses Kealamakia, McIntosh, and West by email and certified mail.

32. Hearing Officer Witnesses Kealamakia, McIntosh, and West did not file any response to either TIO's motion for clarification or UH Hilo's joinder.

33. On May 8, 2017, TIO and UH Hilo filed proof of service of the motion for clarification and substantive joinder, respectively, confirming receipt by certified mail by Hearing Officer Witnesses Kealamakia, McIntosh, and West. [Docs. 625 & 626].

34. On May 23, 2017, Minute Order No. 51 was issued to address, in part, *Motion for Clarification, or in the Alternative, Reconsideration Re: Minute Order No. 44* [Doc. 433]. In that Minute Order the Hearing Officer ordered that Minute Order 44 will be amended to reflect that Hearing Officer Witnesses Kealamakia, McIntosh, and West have waived any right to testify at the contested case hearing or to claim they have been deprived of an

opportunity to provide their position and information as part of these proceedings.

35. Minute Order No. 44 was subsequently amended as noted in Minute Order No. 51. [Doc. 649].

III. DENIAL OF OUTSTANDING MOTIONS

36. Any motions made by any party, either oral or written, that have not been specifically addressed herein and that have not yet been specifically ruled upon are hereby denied.

IV. GENERAL AUTHORITY OF HEARING OFFICER

37. Under HAR Title 13, Chapter 1, a Hearing Officer has broad authority over the conduct of a contested case hearing including, but not limited to, powers to: examine witnesses; certify to official acts; issue subpoenas; rule on offers of proof; receive relevant evidence; hold conferences; rule on objections or motions; fix times for submitting documents and briefs; limit rebuttal evidence; limit the number of witnesses; limit the extent of direct or cross examination, or the time for testimony upon a particular issue to "avoid unnecessary or repetitive evidence"; and "dispose of other matters that normally and properly arise in the course of a hearing authorized by law that are necessary for the orderly and just conduct of a hearing." HAR § 13-1-32.

38. The Hearing Officer may also "exercise discretion in the admission or rejection of evidence and the exclusion of immaterial, irrelevant, or unduly repetitious evidence as provided by law with a view of doing substantial justice." HAR § 13-1-35(a).

39. Under the BLNR rules, a Hearing Officer also has the authority to formulate or simplify the issues and determine "such other matters as may expedite the orderly conduct and disposition of the proceeding as permitted by law." HAR § 13-1-36(a).

40. A Hearing Officer has discretion in exercising the authority vested under HAR Title 13, Chapter 1 to implement the generally more flexible procedures typical for an administrative proceeding, as long as those procedures do not affect the substantial rights of the parties. *See Cariaga v. Del Monte Corp.*, 65 Haw. 404, 409, 652 P.2d 1143, 1147 (1982) ("The administrative tribunal or agency has been created in order to handle controversies arising under particular statutes. It is characteristic of these tribunals that simple and non-technical hearings take the place of court trials and informal proceedings supersede rigid and formal pleadings and processes.") *See also Application of Wind Power Pac. Investors–III,* 67 Haw. 342, 343, 686 P.2d 831, 832-33 (1984) (refusing to reverse a Public Utilities Commission decision based on procedural irregularities because the irregularities complained of did not prejudice the substantial rights of the appellant) (citing HRS § 91–14(g)); *Survivors of Timothy Freitas, Dec. v. Pac. Contractors Co.*, 1 Haw. App. 77, 85, 613 P.2d 927, 933 (1980) (finding that the Labor and Industrial Relations Appeals Board's failure to state whether it had applied presumption that claim was for covered work injury did not prejudice substantial rights where there was no reasonable doubt that employee's fatal accident was not work connected) (citing HRS § 91–14(g)).

41. Adverse rulings, without more, are insufficient to establish bias or prejudice of an administrative officer. *See Peters v. Jamieson*, 48 Hawai‘i 247, 264, 397 P.2d 575, 586 (1964) (“We adhere to the rule that mere erroneous or adverse rulings by the trial judge do not spell bias or prejudice and cannot be made the basis for disqualification.”)

42. Although it is well-established that “pro se litigants are not excused from following court rules,” *Briones v. Riviera Hotel & Casino*, 116 F.3d 379, 382 (9th Cir. 1997), and that they “must follow the same rules of procedure that govern other litigants,” *King v. Atiyeh*, 814 F.2d 565, 567 (9th Cir. 1987), *overruled on other grounds* (citation omitted), here, the *pro se* status of the Petitioners and Opposing Intervenors was fully considered in this matter in establishing and administering the procedures for the hearing to ensure that all parties were afforded adequate due process.

43. As set forth in the findings of fact above, reasonable procedures within the scope of authority were set under HAR Title 13, Chapter 1 in order to expedite the orderly conduct and disposition of this proceeding for all parties, while also ensuring that all parties had an opportunity to present evidence and argument on all material issues without prejudicing any substantial rights.

V. EVIDENTIARY STANDARDS

44. Under HRS § 91-10(1):

> Except as provided in section 91-8.5, any oral or documentary evidence may be received, but every agency shall as a matter of policy provide for the exclusion of irrelevant, immaterial, or unduly repetitious evidence and no sanction shall be imposed or rule or order be issued except upon consideration of the whole record or such portions thereof as may be cited by any party and as supported by and in accordance with the reliable, probative, and substantial evidence. The agencies shall give effect to the rules of privilege recognized by law[.]

45. Consistent with the Hawai‘i Administrative Procedures Act, HRS Chapter 91 (“**HAPA**”), the administrative rules governing procedures before the BLNR broadly provide that the Hearing Officer “may exercise discretion in the admission or rejection of evidence and the exclusion of immaterial, irrelevant, or unduly repetitious evidence as provided by law with a view of doing substantial justice.” HAR § 13-1-35.

46. “The rules of evidence governing administrative hearings are considerably more relaxed than those governing judicial proceedings.” *Price v. Zoning Bd. of Appeals*, 77 Haw. 168, 176 n.8, 883 P.2d 629, 637 n.8 (1994).

47. This means, for example, that hearsay which would be inadmissible in court proceedings is nonetheless admissible in administrative hearings.

48. In construing the HAPA (and specifically, HRS § 91-10), the Hawai‘i Supreme Court noted that the act’s mandate that “[a]ny oral or documentary evidence may be received” by an agency *must be liberally construed*. *Dependents of Cazimero v. Kohala Sugar Co.*,

54 Haw. 479, 482, 510 P.2d 89, 92 (1973) (emphasis added).

49. The court in *Cazimero* observed that the legislative history of HAPA also supported the liberal admission of evidence, as the history indicated "that the direction chosen [by the Legislature] was towards the admission of *any and all evidence* [in administrative hearings] limited *only* by considerations of relevancy, materiality and repetition." *Id.* at 482-83, 510 P.2d at 92 (emphasis added).

50. The standard for determining relevancy in agency proceedings under Chapter 91 is that of Haw. R. Evid. (HRE) 401. *See Loui v. Bd. of Med. Examiners*, 78 Haw. 21, 31, 889 P.2d 705, 715 (1995). HRE Rule 401 defines relevant evidence as "evidence having any tendency to make the existence of *any fact that is of consequence* to the determination of the action more probable than it would be without the evidence." HRE 401 (emphasis added); *Loui*, 78 Haw. at 31, 889 P.2d at 715 (quoting Rule 401).

51. Because the rules of evidence applied in administrative hearings are more relaxed than in court proceedings, doubts about admissibility are to be resolved in favor of admitting the evidence:

> [W]hen an agency is faced with evidence of doubtful admissibility, it is preferable that it allow the admission of such evidence rather than to exclude the same, for the very practical reason stated in *Donnelly Garment Co. v. National Labor Relations Board*, 123 F.2d 215, 224 (8th Cir. 1941), as follows: "If the record on review contains not only all evidence which was clearly admissible, but also all evidence of doubtful admissibility, the court which is called upon to review the case can usually make an end of it, whereas if evidence was excluded which that court regards as having been admissible, a new trial or rehearing cannot be avoided.

Cazimero v. Kohala Sugar Co., 54 Haw. 479, 483, 510 P.2d 89, 93 (1973).

52. The liberal standard of the admissibility of evidence in administrative hearings is also reflected in the established rule that even when ostensibly irrelevant or incompetent evidence is admitted during a hearing, the admission of such evidence alone is not grounds for reversal if there is "substantial evidence in the record to sustain the agency's determination" and the aggrieved party is not prejudiced. *Shorba v. Board of Education*, 59 Haw. 388, 398, 583 P.2d 313-19 (1978). Stated another way, unless an aggrieved party can show prejudice resulting from the admission of ostensibly irrelevant or incompetent evidence, admission of such evidence alone is not grounds for reversal. *Id.*

53. Although the admission of evidence in administrative hearings is less formal than those governing judicial proceedings, the Hearing Officer still has the authority to limit or entirely exclude evidence that does not meet the basic criteria of relevancy, materiality and avoidance of repetition. HRS § 91-10(1).

54. As reflected in the record, the Hearing Officer provided numerous notices and reminders to the parties that testimony and other evidence had to meet the basic evidentiary standards of relevancy, materiality and avoidance of repetition. *See, e.g.*, Tr. 08/29/16 at

45:20-46:2 (requiring offer of proof for all witnesses prior to testimony); Tr. 10/25/16 at 49:3-50:1 (repeatedly sustaining objections to repetitious questions and requesting party to ask another question); Tr. 10/26/16 at 64:18-21 (instructing questioning party that questions have to be designed to lead to a material point); Tr. 10/27/16 at 52:21-22 (noting that Hearing Officer must have information to make a decision on the relevancy and materiality of evidence); Tr. 12/01/16 at 143:1-13 (reminding party that Hearing Officer will allow relevant testimony beyond time limits, but will not permit time to be wasted); Tr. 01/23/17 at 157:18-22 (reminding party that "we had many discussions" about issues that are material to the hearing).

55. As reflected in the findings of fact above, the Hearing Officer's factual determinations fully considered the admissibility of evidence under the liberal standards in contested case hearings, while also limiting or excluding evidence that did not meet the basic criteria of relevancy, materiality, and avoidance of repetition.

56. None of the witnesses in this proceeding were formally received or qualified as expert witnesses because the written direct testimony of each witness was admitted into evidence for consideration; the Hawai'i Rules of Evidence did not govern the proceedings; and under the authorities cited above, the rules of evidence governing administrative hearings are considerably more relaxed than those governing judicial proceedings.

57. Although none of the witnesses in this proceeding were formally received or qualified as expert witnesses, certain witnesses represented that they had expertise in one or more subject areas through their experience, training and/or education.

58. "[T]he competence, credibility and weight" of the testimony of all witnesses (including witnesses who represent that they have expertise in one or more subject areas), "is exclusively in the province of the trier of fact." *See Hawai'i Prince Hotel Waikiki Corp. v. City & County of Honolulu*, 89 Hawai'i 381, 390, 974 P.2d 21, 30 (1999) (quoting *State v. Pioneer Mill Co.*, 64 Haw. 168, 179, 637 P.2d 1131, 1139 (1981)).

59. Thus, there is no obligation to accept the opinion of any witness simply because the witness represents that he or she has expertise in one or more areas.

60. As with the testimony of any witness, a Hearing Officer can believe or disbelieve the testimony of a witness claiming to have expertise in one or more areas, in whole or in part, and to give such testimony the weight the Hearing Officer deems appropriate.

61. Determining the weight, if any, to be given to the opinions and testimony of a witness claiming subject matter expertise is within the discretion of the Hearing Officer, just as it is within the discretion of the Hearing Officer to determine the weight to be given the testimony of any witness.

62. In addition, even though a witness represents that he or she has expertise in one or more areas, such proffered "expert" testimony – as with all admissible and reliable evidence -- must also meet the basic requirement that such evidence is material, relevant and non-repetitious. HAR § 13-1-35.

63. As reflected in the findings of fact above, determinations regarding the admissibility, weight and credibility of the testimony and opinions of the various witnesses in this matter were fully weighed and considered in conjunction with the evidence received on a case-by-case basis to determine whether such testimony and opinions are logical, credible, persuasive, and supported by evidence.

VI. CROSS EXAMINATION PROCEDURES

64. The Hearing Officer may limit the "extent of direct or cross examination or the time for testimony upon a particular issue" to avoid repetitive or unnecessary evidence. HAR § 13-1-32(h).

65. Based on the Hearing Officer's inherent discretion, the parties were permitted considerable latitude to conduct cross examination (including extensive "friendly" cross examination) of all witnesses who appeared in this matter. Cross-examination was properly and reasonably limited where appropriate to avoid repetitive, unnecessary and irrelevant evidence.

66. On October 31, 2016 (after observing the parties' cross examinations over the first five hearing days in which a total of two witnesses had completed their testimony) a thirty minute time limit on cross examinations was created, subject to extensions of the time for good cause shown. The time limit was imposed pursuant to HAR § 13-1-32(h), in order to avoid repetitive or unnecessary evidence, and is consistent with due process. *See Korean Buddhist Dae Won Sa Temple of Hawai'i v. Sullivan*, 87 Hawai'i 217, 243, 953 P.2d 1315, 1341 (1998) ("Determination of the specific procedures to satisfy due process requires a balancing of several factors."); *Martin v. C. Brewer & Co., Ltd.*, Civ. No. 03-1-0186, 2013 WL 639320, at *6 (Haw. Ct. App. Feb. 21, 2013) ("The Circuit Court did not abuse its discretion by imposing time limits on the presentation of evidence and cross-examination of Defendant's witnesses.")

VII. REBUTTAL WITNESSES

67. A party's right to submit rebuttal evidence is not absolute and is "subject to limitations" by the Hearing Officer. HAR § 13-1-32(g).

68. Under HAR § 13-1-35(a), "[t]he [hearing] officer may exercise discretion in the admission or rejection of evidence and the exclusion of immaterial, irrelevant, or unduly repetitious evidence as provided by law with a view of doing substantial justice."

69. It is well established that "the introduction of evidence in rebuttal and in surrebuttal is a matter within the discretion of the trial court[.]" *Takayama v. Kaiser Foundation Hosp.*, 82 Hawai'i 486, 495, 923 P.2d 903, 912 (1996) (citing *Yorita v. Okumoto*, 3 Haw.App. 148, 156, 643 P.2d 820, 826 (1982)).

70. In addition, as a general rule with respect to the admission of rebuttal evidence, "in the interests of expediency and limiting surprise, all evidence in support of a party's position should be presented when the issue it addresses is first presented." *Takayama*, 82 Hawai'i at 497, 923 P.2d at 914.

71. Although a party is not required "to call every conceivable witness who might contradict a potential defense witness," it is also generally true that "[a] party cannot, as a matter of right, offer in rebuttal evidence which was proper or should have been introduced in chief, even though it tends to contradict the adverse party's evidence and, while the court may in its discretion admit such evidence, it may and generally should decline to admit the evidence." *Takayama*, 82 Hawai'i at 497, 923 P.2d at 914 (emphasis added) (quoting *Gassen v. Woy*, 785 S.W.2d 601, 605 (Mo. Ct. App. 1990)).

72. As reflected in the findings of fact above, and based on sound discretion, certain witnesses proposed or sought to be called as rebuttal witnesses in this proceeding were properly precluded from testifying.

VIII. OFFICIAL NOTICE

73. The DLNR's Rules of Practice and Procedure provide that during contested case proceedings, "[o]fficial notice may be taken of such matters as may be judicially noticed by the courts of the State of Hawai'i." HAR § 13-1-35(i).

74. HRE Rule 201 provides that judicial notice is properly taken of "adjudicative facts." "Adjudicative facts" are "the kind of facts that are ordinarily decided by the trier of fact . . . ." *Estate of Herbert*, 90 Hawai'i at 466, 979 P.2d at 62 (citations omitted).

75. Under HRE Rule 201, "if requested by a party and supplied with the necessary information," "[a] court *shall* take judicial notice" of a fact that "is not subject to reasonable dispute in that it is either (1) generally known within the territorial jurisdiction of the trial court, or (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned." HRE 201(b), (d) (emphasis added). If a court is supplied with the necessary information and the information meets the criteria stated in the Rule, judicial notice is mandatory.

76. Judicial notice of certain adjudicative facts was taken in this proceeding.

77. Judicial notice of certain representations in this proceeding was not accepted because those representations did not meet the standard under HRE Rule 201.

IX. LEGAL FRAMEWORK

A. BURDEN OF PROOF

78. The BLNR rules provide that "[t]he applicant shall have the burden of demonstrating that a proposed land use is consistent with" the criteria set forth in HAR § 13-5-30(c). As the party proposing a land use in the Conservation District, UH Hilo is clearly the "applicant" in this matter.

79. HAPA states that, "[e]xcept as otherwise provided by law, the party initiating the proceeding shall have the burden of proof, including the burden of producing evidence as well as the burden of persuasion. The degree or quantum of proof shall be a preponderance of the evidence." HRS § 91-10(5).

80. HAR § 13-1-35(k) similarly provides:

> The party initiating the proceeding and, in the case of proceedings on alleged violations of law, the department, shall have the burden of proof, including the burden of producing evidence as well as the burden of persuasion. The quantum of proof shall be a preponderance of the evidence.

81. A "proceeding" is defined as:

> the board's consideration of the relevant facts and applicable law and action thereon with respect to a particular subject within the board's jurisdiction, initiated by a filing or submittal or request or a board's notice or order, and shall include but not be limited to:
>
> * * *
>
> (3) Petitions or applications for the granting or declaring of any right, privilege, authority, or relief under or from any provision of law or any rule or requirement made pursuant to authority granted by law . . . .

HAR § 13-1-2.

82. UH Hilo has the initial burden of proof in showing that its CDUA warrants approval upon consideration of the criteria in HAR § 13-5-30(c).

83. Petitioners and Opposing Intervenors are required to carry the burden of proof on issues asserted by them. In particular, to the extent that Petitioners and Opposing Intervenors are claiming to assert native Hawaiian rights based on customary and traditional practices, the burden is on them to establish that the claimed right is constitutionally protected as a customary and traditional native Hawaiian practice. The standards for establishing constitutional protection of practices that are claimed to be customary and traditional are set forth in *State v. Hanapi*, 89 Hawai'i 177, 186, 970 P.2d 485, 494 (1998) and *State v. Pratt*, 127 Hawai'i 206, 277 P.3d 300 (2012), and are discussed in detail below.

B. STATE CONSTITUTIONAL AUTHORITY

84. Article XI, section 1 of the Hawai'i State Constitution provides:

> For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawai'i's natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State.

85. Article XI, section 9 of the Hawai'i State Constitution provides: "Each Person has the right to a clean and healthful environment, as defined by laws relating to environmental

quality, including control of pollution and conservation, protection and enhancement of natural resources. . . ."

86. Article XII, section 7 of the Hawai'i State Constitution provides: "The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the rights of the State to regulate such rights."

87. In explaining this proviso, the framers of Article XII, section 7 explained that, while the state has the power and obligation to protect native Hawaiian traditional and customary practices, the state also has the power to regulate those rights: "Your Committee did not intend these rights to be indiscriminate or abusive to others. While your Committee recognizes that, historically and presently, native Hawaiians have a deep love and respect for the land, called aloha aina, reasonable regulation is necessary to prevent possible abuse as well as interference with these rights." Stand. Comm. Rep. No. 57, reprinted in 1 *Proceedings of the Constitutional Convention of Hawai'i of 1978*, at 639.

C. STATUTE AND ADMINISTRATIVE RULES

88. Under Hawai'i's Land Use Law, HRS Chapter 205, the Conservation District is defined to include:

> areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous or endemic plants, fish and wildlife, including those which are threatened or endangered; preventing floods and soil erosion; forestry; open space and areas whose existing openness, natural condition or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept.

HRS § 205-2(e).

89. The DLNR administers public lands "through appropriate management and use" within the Conservation District pursuant to Chapter 183C of the Hawai'i Revised Statutes. Chapter 183C articulates this public policy:

> The legislature finds that lands within the state land use conservation district contain important natural resources essential to the preservation of the State's fragile natural ecosystems and the sustainability of the State's water supply. It is therefore, the intent of the legislature to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare.

HRS § 183C-1.

90. In evaluating the merits of a proposed land use in the Conservation District, the Board shall consider the following eight criteria found in HAR § 13-5-30(c):

    a. The proposed land use is consistent with the purpose of the conservation district;

    b. The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;

    c. The proposed land use complies with provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management", where applicable;

    d. The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region;

    e. The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;

    f. The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;

    g. Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and

    h. The proposed land use will not be materially detrimental to the public health, safety, and welfare.

91. Conservation District lands are categorized into subzones. HAR § 13-5-10.

92. The TMT Project is proposed to be located in the Resource subzone. The Resource subzone includes, *inter alia*, lands (1) necessary for providing future parkland and lands presently used for national, state, county, or private parks; (2) suitable for growing and harvesting of commercial timber or other forest products; and (3) suitable for outdoor recreational uses. HAR § 13-5-13.

93. Under the version of HAR § 13-5-13 that was in effect when the CDUA was submitted to the BLNR, the stated objective of the Resource subzone was to develop, with proper management, areas to ensure sustained use of the natural resources of areas within that subzone. Under the recently amended version of that Section, the stated objective of the Resource subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas.

94. Identified permissible land uses in the Resource subzone include, among others, the following: (1) aquaculture; (2) artificial reefs; (3) sustainable commercial forestry; (4) marine construction, such as dredging and filling; (5) mining and extraction of natural

resources; and (7) single family residences. HAR § 13-5-24.

95. Astronomy facilities are expressly identified permissible land uses in the Resource subzone (R-3). HAR § 13-5-24.

96. The legislature specifically enacted statutes intended to ensure that land development in the State is "for those uses for which they are best suited[.]" S. Stand. Comm. Rep. 104, 1961 Senate Journal 1027; *accord* HRS § 183C-3 (giving DLNR the authority to zone and define land use within conservation districts).

97. In so doing, the legislature specifically defined "land use" as including "[t]he construction, reconstruction, demolition, or alteration of any structure, building, or facility on land[.]" HRS § 183C-2; *accord* HAR § 13-5-2. In keeping with the legislative intent and specific delegation of authority, DLNR identified astronomy facilities within the Resource subzone. HAR § 13-5-24(a), (c).

98. In other words, when the governing administrative rules and the legislative intent and plain language of the statute are read together, it is clear that astronomy facilities were identified by DLNR precisely because they are uses for which land within the Resource subzone is "best suited." *See, e.g.*, S. Stand. Comm. Rep. 104, 1961 Senate Journal 1027; *accord* HRS § 183C-3; HAR § 13-5-24(a).

99. Astronomy facilities in the Resource subzone require a BLNR permit and an approved management plan. HAR § 13-5-24. Under the recently amended version of HAR § 13-5-24, a management plan "approved simultaneously with the permit" is required.

D. CASE LAW

1. ***PASH***

100. In *Public Access Shoreline Hawai'i v. Hawai'i County Planning Comm'n*, 79 Haw. 425, 903 P.2d 1246 (1995) ("***PASH***"), the Hawai'i Supreme Court stated:

> The State's power to regulate the exercise of customarily and traditionally exercised Hawaiian rights . . . necessarily allows the State to permit development that interferes with such rights in certain circumstances . . . . Nevertheless, the State is obligated to protect the reasonable exercise of customary and traditionally exercised rights of Hawaiians to the extent feasible.

PASH, 79 Haw. at 450 n.43, 903 P.2d at 1271 n.43 (citations omitted).

101. Under *PASH,* to fall within the protection of Hawai'i law, Hawaiian customary usage must have been established in practice by November 25, 1892. *Id.* at 447, 903 P.2d at 1268. Moreover, the ancient Hawaiian usage must be based on actual traditional practice in a particular area of undeveloped land, and cannot be based on assumptions or conjecture. *Id.* at 449, 903 P.2d at 1270. *See also id.* at 447, 903 P.2d at 1268 ("We stress that unreasonable or non-traditional uses are not permitted under today's ruling.").

102. The State therefore retains the ability to reconcile competing interests under article XII, Section 7, and the Court in *PASH* recognized that even certain traditional and customary practices may be subject to regulation. *See id* at 447, 903 P.2d at 1268 (citing *United States v. Winans*, 198 U.S. 371, 379 (1905) (noting that the trial court held that it would not be justified in issuing process to compel land owner to permit Native Americans to make a camping ground while engaged in fishing permitted by treaty). *See, also id.* at 447 n. 38, 903 P.2d at 1268 no. 38 (citing *Lyng v. Northwest Cemetery Protective Ass'n.*, 485 U.S. 439 (1988) (holding that attempts by religious practitioners to exclude all other uses, including timber harvesting, from sacred areas of public lands unreasonable traditional practice); *Oregon v. Smith*, 494 U.S. 872 (1990) (holding that the use of the hallucinogenic drug peyote unreasonable traditional practice)).

103. Thus, the Hawai'i Supreme Court recognized in *PASH* that the rights granted under Article XII, Section 7 are not absolute, and the "State is authorized to impose appropriate regulations to govern the exercise of native Hawaiian rights in conjunction with permits issued for the development of land previously undeveloped or not yet fully developed." *Id.* at 451, 903 P.2d at 1272.

2. ***Hanapi***

104. In *State v. Hanap*i, 89 Hawai'i 177, 970 P.2d 485 (1998) ("***Hanapi***"), the Hawai'i Supreme Court ruled that a person claiming constitutional protection for a right under *PASH* has the burden of proving the existence of such a right.

105. To prove the existence of a right that is entitled to constitutional protection under *PASH*, the party claiming that right must show, at a minimum, the following three factors:

> First, he or she must qualify as a "native Hawaiian" within the guidelines set out in *PASH*. . . . *PASH* stated that those persons who are "descendants of native Hawaiians who inhabited the island prior to 1778," and who assert otherwise valid customary and traditional Hawaiian rights are entitled to [constitutional] protection, regardless of their blood quantum.
>
> Second, once [a person claiming a *PASH* right] qualifies as a native Hawaiian, he or she must then establish that his or her claimed right is constitutionally protected as a customary or traditional native Hawaiian practice. . . .
>
> Finally, a [person] claiming his or her conduct is constitutionally protected must also prove that the exercise of the right occurred on undeveloped or "less than fully developed property."

Hanapi, 89 Hawai'i at 177, 970 P.2d at 494 (citations and emphasis omitted).

106. Under the Hawai'i Supreme Court's holding in *Hanapi*, "[t]o establish the existence of a traditional or customary native Hawaiian practice, . . . there must be an adequate foundation in the record connecting the claimed right to a firmly rooted traditional or customary native Hawaiian practice." *Id.* at 187, 970 P.2d at 495 (footnote omitted).

3. ***Pratt***

107. In *State v. Pratt*, 127 Hawai‘i 206, 277 P.3d 300 (2012) (“***Pratt***”) the Hawai‘i Supreme Court held that even if a person meets all three elements of the *Hanapi* test, the rights articulated in article XII, section 7 are not absolute and are explicitly “subject to the right of the State to regulate such rights.” *Id.* at 214, 277 P.2d at 308.

108. The Court observed that “A common thread tying all of these cases together [*i.e.*, *PASH; Kalipi v. Hawaiian Trust Co., Ltd.*, 66 Haw. 1, 656 P.2d 745 (1982); and *Pele Defense Fund v. Paty*, 73 Haw. 578, 837 P.2d 1247 (1992)] is an attempt to balance the protections afforded to Native Hawaiians in the State, while also considering countervailing interests.” *Pratt*, 127 Hawai‘i at 215, 277 P.2d at 309.

109. Under *Pratt*, the balancing of interests must consider the *totality of the circumstances*, including *all* of the parties’ respective interests. *Id.* at 217, 277 P.3d at 311.

4. ***Ka Pa‘akai***

110. In *Ka Pa‘akai o Ka ‘Āina v. Land Use Comm’n*, 94 Hawai‘i 31, 7 P.3d 1068 (2000) (“***Ka Pa‘akai***”), the Hawai‘i Supreme Court provided an analytical framework “to effectuate the State’s obligation to protect native Hawaiian customary and traditional practices while reasonably accommodating competing private interests[.]” *Id*. at 46-47, 7 P.3d at 1083-84.

111. Under *Ka Pa‘akai*, an agency, in order to fulfill its duty to preserve and protect customary and traditional native Hawaiian rights to the extent feasible, must examine, and make specific findings and conclusions as to:

> (1) the identity and scope of “valued cultural, historical, or natural resources in the [application] area, including the extent to which traditional and customary native Hawaiian rights are exercised in the [application] area; (2) the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken by the [agency] to reasonably protect native Hawaiian rights if they are found to exist.

Id. at 47, 7 P.3d at 1084 (footnotes omitted).

112. A *Ka Pa‘akai* analysis may be conducted by an agency within the context of a contested case hearing. *See generally, id.* (analyzing the Land Use Commission’s findings of fact and conclusions of law following contested case hearing).

5. ***Morimoto***

113. In *Morimoto v. BLNR*, 107 Hawai‘i 296, 113 P.3d 172 (2005) (“***Morimoto***”), the Hawai‘i Supreme Court held:

> [W]hen an applicant submits its application for a CDUP, the public and interested parties know that BLNR will evaluate the application in accordance with the eight criteria in HAR § 13-5-30(c), that BLNR will look to any draft EIS or EA that must be submitted as part of the application, and that BLNR will incorporate any representations in the EIS or EA (relevant to mitigation) as a condition of the CDUP. These rules provide sufficient guidance to CDUP applicants and the public, offsetting the threat of "unbridled discretion."

Morimoto, 107 Hawai'i at 304, 113 P.3d at 180 (citation omitted).

114. BLNR may properly consider mitigation measures in an EIS when reviewing an application for a CDUP to determine if it is consistent with the criteria set forth in HAR § 13-5-30(c). *Id.* at 302-04, 113 P.3d at 178-80.

6. ***Mauna Kea Anaina Hou***

115. In *Mauna Kea Anaina Hou v. Board of Land and Natural Resources*, 136 Hawai'i 376, 363 P.3d 224 ("***Mauna Kea Anaina Hou***"), the Hawai'i Supreme Court held that where a party is entitled to a contested case hearing before the BLNR on a CDUA, due process requires that the contested case hearing be held prior to the BLNR voting on the issuance of a CDUP.

7. ***Kilakila 'O Haleakalā***

116. In *Kilakila 'O Haleakalā v. Bd. of Land and Natural Resources*, 138 Hawai'i 383, 382 P.3d 195 (2016) ("*Kilakila*"), the Hawai'i Supreme Court affirmed the BLNR's findings and conclusions with respect to the issuance of a CDUP for a proposed advanced solar telescope in the general subzone of the conservation district near the summit of Haleakalā and within the 18.166 acre Haleakalā High Altitude Observatory ("**HO**").

117. The Court held that the BLNR properly analyzed all eight criteria under HAR § 13-5-30(c), and that the evidence supported BLNR's findings and conclusions with respect to the five criteria in HAR § 13-5-30(c) at issue on appeal: HAR § 13-5-30(c)(1), (2), (4), (5), and (6). *Id*. at 402-08, 382 P.3d at 214-20.

118. With respect to HAR § 13-5-30(c)(1) and (2) ("The proposed land use is consistent with the purpose of the conservation district" and "The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur"), the Court held that BLNR, regardless of a telescope's physical characteristics, may properly determine that a telescope is consistent with the purpose of the conservation district and applicable subzone since the BLNR rules specifically permit astronomy facilities in certain subzones and "do not specify a limit as to size, appearance, or other characteristics" of an astronomy facility. *Kilakila*, 138 Hawai'i at 408, 382 P.3d at 220. The Court further held that BLNR may properly conclude that a telescope complies with the broad purposes of the statutes and rules regulating conservation districts, including BLNR's mandate to manage natural and cultural resources to "promote their long-term sustainability and the public health, safety, and welfare". *Id.*

119. With respect to HAR § 13-5-30(c)(4) ("The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region"), the Court held that:

a. While the BLNR was required to consider the findings of the project EIS, "it was not bound by these findings and still retained discretion over its decision." *Kilakila*, 138 Hawai'i at 402, 382 P.3d at 214 (citing *Mauna Kea Power Co. v. Bd. Of Land & Natural Res.*, 76 Hawai'i 259, 265, 874 P.2d 1084, 1090 (1994) (affirming the BLNR's decision despite conflicting conclusions in EIS));

b. The impacts of a project must be viewed within the context of the applicable area *Id.* at 403, 382 P.3d at 215 (upholding the BLNR's analysis that the impact of the ATST Telescope on cultural and visual resources would be incremental and not substantial because the ATST Telescope "must be viewed in the context of the HO," which housed astronomy facilities since the 1950s, was created specifically for astronomy uses, and currently housed eleven facilities.);

c. The BLNR may consider that the level of impacts on natural resources of a project would be substantially the same even in the absence of the project;

d. The BLNR may consider the various mitigating measures proposed for a project including the compact design of the telescope, creating a native Hawaiian working group, setting aside areas solely for use by native Hawaiians, removing unused facilities, and decommissioning the ATST Telescope within 50 years. *Id.* at 404, 382 P.3d at 216);

e. The BLNR may consider the scientific, cultural, and educational benefits of a project as mitigating effects under HAR § 13-5-30(c)(4) (*i.e.*, the "scientific, economic, and educational benefits" of the ATST Telescope, the expected "advancement of scientific knowledge" and the opportunity to "foster a better understanding of the relationships between native Hawaiian culture and science"), even if those factors are not specifically set forth in HAR § 13-5-30(c) *Id.*

120. With respect to HAR § 13-5-30(c)(5) ("The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels"), the Court held that under this criterion, the BLNR may focus its analysis on the permitted land use within the context of a specific area within a Conservation District designated for similar uses (*i.e.*, the Court concluded that the BLNR's interpretation of its own rule as limiting its consideration only to the "locality" of the telescope site and the HO area as the "surrounding area" was not clearly erroneous because the telescope would be located in a small subsection of the HO site, which is a clearly defined, specialized area set aside for astronomical purposes, is the only site within Haleakalā used for that purpose, and the BLNR was not required to consider the

broader "surrounding area" of Haleakalā National Park). *Id.* at 406-07, 382 P.3d at 218-19.

121. With respect to HAR § 13-5-30(c)(6) ("The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable"), the Court held that even though the BLNR may conclude that a project, standing alone, does not "enhance the natural beauty or open space characteristics" of a specific site, the BLNR may properly consider whether the project is similar to existing facilities (and thus will preserve the existing physical and environmental aspects of the land), and the BLNR may also properly consider the project's mitigation commitments in determining whether the proposed land use meets this criteria.

8. **BLNR Decisions**

122. In its decisions, the BLNR recognizes that the visual or other impacts of any proposed project are site specific. The BLNR has observed its greater willingness to allow high visibility land uses (such as electric transmission lines) under Chapter 13-5 of the Hawai‘i Administrative Rules in less urbanized areas and off ridgelines because the visual impacts were smaller or could be more easily mitigated than in locations atop ridgelines and in high-population areas. *Findings of Fact, Conclusions of Law, Decision and Order, In re Conservation District Use Application for Hawaiian Electric Company, Inc. to Construct a 138-kV Transmission Line at Wa‘ahila Ridge, Honolulu, Hawai‘i,* DLNR File No. OA-2801 (June 28, 2002) ("***Wa‘ahila Ridge***") at 65 n.17.

123. When considering visual impacts, the BLNR does not ignore any preexisting conditions in the area proposed for a use, regardless of whether those existing land uses predated the current regulatory scheme. *Id.* at 65-66 n.17.

124. The BLNR also takes into consideration whether, because certain resources are available only in particular places, the fact that there are limited alternatives for where to locate a proposed land use may outweigh visual or other impacts, even if such impacts are "obvious." *Id.* at 66 n.17 (location for wind generated energy facility was necessarily "dictated by the wind").

125. The BLNR has recognized that it may approve a proposed land use despite some environmental impacts to the Conservation District, provided that the project incorporates appropriate mitigation measures and conditions. *Id.* at 64 n.13; *see also Morimoto*, 107 Hawai‘i at 305-06, 113 P.3d at 181-82; *Stop H-3 Ass’n v. State Dep’t of Transp*., 68 Haw. 154, 158, 706 P.2d 446, 449 (1985). In the BLNR's view, structures and land uses that impact a public viewplane of a significant natural feature like a pu‘u or ridge should propose adequate mitigation or make some showing of the lack of reasonable and practicable alternatives. *Wa‘ahila Ridge* at 64 n.13

X. DISCUSSION AND CONCLUSIONS

A. THE TMT PROJECT SATISFIES THE EIGHT CRITERIA OF HAR § 13-5-30(C)

126. HAR § 13-5-30(c) states that "[i]n evaluating the merits of a proposed land use, the department or board shall apply the following criteria," and enumerates the list of eight criteria quoted above.

127. Based upon the findings of fact and conclusions of law contained herein, the TMT Project is consistent with the eight criteria of HAR § 13-5-30(c), and UH Hilo has proven by a preponderance of the evidence that it meets the requirements for the granting of the CDUP for the TMT Project.

1. The TMT Project Satisfies the First Criterion

128. The first criterion, set forth in HAR § 13-5-30(c)(1), states: "The proposed land use is consistent with the purpose of the conservation district[.]"

129. The purpose of the Conservation District is "to conserve, protect and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare." HRS § 183C-1.

130. The purpose of the Conservation District rules is "to regulate land-use in the conservation district for the purpose of conserving, protecting, and preserving the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare." HAR § 13-5-1.

131. The Conservation District rules do not prohibit development within the Conservation District; rather, the rules expressly contemplate development, and the purpose of the Conservation District rules is to appropriately regulate and manage land uses.

132. Therefore, the issue under the first criterion is whether the proposed land use will be appropriately managed and used to protect, preserve and promote the long-term sustainability of important natural resources, public health, safety and welfare.

133. The 11,288 acre MKSR is within the Conservation District, and the proposed TMT Project is within the MKSR's 525 acre Astronomy Precinct, which currently houses eight optical and/or infrared observatories, and three submillimeter observatories.

134. The proposed use within the already-developed Astronomy Precinct is consistent with the purpose of the Conservation District to conserve, protect, preserve and promote the long-term sustainability of the surrounding areas within the MKSR.

135. In addition, the TMT Project provides for "appropriate management and use" that promotes the long-term sustainability of resources and the public health, safety, and welfare within the Conservation District.

136. As noted in the findings of fact above and in these conclusions, the TMT Project will promote the health, safety and welfare of the public through the advancement of scientific study, providing educational benefits in the form of telescope viewing time for the University students and researchers, advancing STEM educational opportunities for Hawai‘i residents through the community benefits package, and other measures.

137. The TMT Project will be subject to management through the BLNR-approved CMP and sub-plans, TMT Management Plan, which complies with Ex. 3 of Section 13-5 of the Hawai‘i Administrative Rules, and the BLNR-imposed conditions to the CDUP, as well as the University's internal Master Plan. The TMT Project is consistent with the foregoing plans, and this comprehensive management framework appropriately addresses cultural and natural resources, public access, and the ultimate decommissioning of the Project and restoration of its site.

138. By following the applicable provisions of the various relevant plans, sub-plans, and permit conditions, UH Hilo and the TIO will conserve, protect, and preserve the important natural and cultural resources of the State, will promote the long-term sustainability of those resources, and will promote the health, safety, and welfare of the public.

139. By following the applicable provisions of the various relevant plans, sub-plans, and permit conditions, the TMT Project will comply with the Conservation District rules and applicable laws and regulations.

140. The characteristics that make Mauna Kea uniquely suitable for astronomy (including its altitude, stable atmospheric clarity and absence of light pollution), which make it arguably the single best location in the northern hemisphere to conduct astronomical research, are also "important natural resources of the State" that must be appropriately managed and used to "promote their long-term sustainability and the public health, safety, and welfare."

141. Given the TMT Project's design, mitigation efforts, planned financial contributions to the management of MKSR, and consistency with the objectives and provisions of the applicable plans, the TMT Project will conserve, protect and promote these unique and important astronomical natural resources of the State.

142. For all of these reasons, and for the reasons set forth in the findings of fact above, the TMT Project is therefore consistent with the broad purposes of the Conservation District, in satisfaction of HAR § 13-5-30(c)(1). *See Kilakila*, 138 Hawai‘i at 408, 382 P.3d at 220.

2. **The TMT Project Satisfies the Second Criterion**

143. The second criterion, set forth in HAR § 13-5-30(c)(2), states: "The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur[.]"

144. The TMT Project is consistent with the objectives of the subzone of the land on which the use will occur, in satisfaction of HAR § 13-5-30(c)(2).

145. The TMT Project is located in the Resource subzone.

146. Under the version of HAR § 13-5-13(a) that was in effect when the CDUA was submitted to the BLNR, "[t]he objective of this [Resource] subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas." The current version of HAR 13-5-13(a) states: "The objective of this subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas."

147. Thus, the Resource subzone expressly contemplates and permits use and development within the subzone, and the TMT Project, as an astronomy facility, is specifically and expressly permitted as an allowed use within the Resource subzone of the Conservation District. HAR § 13-5-24(c) R-3.

148. As noted in the findings of fact above and conclusions herein, although the BLNR has reviewed and considered the physical characteristics of the TMT Project and proposed mitigation measures in connection with its analysis of various criteria, the BLNR notes that for purposes of the criteria in HAR § 13-5-30(c)(1) and (c)(2), these rules do not specify limits as to the size, appearance or other characteristics of an astronomy facility within the subzone.

149. As an astronomy facility, the TMT Project falls under an appropriate use and is not inconsistent with the purposes of the Resource subzone.

150. One of the objectives of the subzone is to develop and promote science through astronomy facilities constructed in the approved geographic areas, including Area E within the Mauna Kea Astronomy Precinct.

151. The TMT Project develops, with proper management, the areas involved in the Project to ensure sustained use of the natural resources of those areas. These include the elevation, clear skies, humidity, minimal light pollution, and stable wind flow.

152. Under the version of HAR § 13-5-24(c) that was in effect when the CDUA was submitted to the BLNR, "Astronomy facilities under an approved management plan" are permitted in the Resource subzone. Astronomy facilities under a management plan approved by the Board are also permitted in the Resource subzone under the current version of the HAR.

153. Under the version of HAR § 13-5-2 that was in effect when the CDUA was submitted to the BLNR, "'Management plan' means a comprehensive plan for carrying out multiple land uses."

154. The CMP, with its sub-plans, is a comprehensive plan for carrying out multiple land uses that had already been approved by the BLNR and was in place when the CDUA for the TMT Project came before the BLNR.

155. The TMT Project is consistent with the provisions of the CMP and sub-plans.

156. Under the amended version of HAR § 13-5-13(a) that is currently in place, "[t]he objective of this [Resource] subzone is to ensure, with proper management, the

sustainable use of the natural resources of those areas."

157. The TMT Project ensures, with proper management, the sustainable use of the natural resources of the areas involved in the Project.

158. Under the amended version of HAR § 13-5-24(c) that is currently in place, "Astronomy facilities under a management plan approved simultaneously with the permit" are permitted in the Resource subzone.

159. Under the amended version of HAR § 13-5-2 that is currently in place, "'Management plan' means a project or site based plan to protect and conserve natural and cultural resources."

160. The TMT Management Plan, which is a project or site based plan to protect and conserve natural and cultural resources, was appended to the CDUA.

161. The TMT Management Plan is consistent with the CMP and sub-plans, and provides for implementation of all relevant action items and plans of the CMP and sub-plans on a site-specific basis.

162. Thus, under both versions of HAR § 13-5-24(c), the requirement of a management plan has been satisfied.

163. Furthermore, the proposed use does not significantly, adversely, or cumulatively impact the natural resources present in the Mauna Kea Summit Region Historic District, alpine stone desert, or other land area designation that encompasses either the breadth or endemic suite of resources present on Mauna Kea. *See* HAR § 13-5-1

164. For all these reasons, and for the reasons set forth in the findings of fact above, the proposed land use is consistent with the objectives of the subzone of the land on which the use will occur.

3. **The TMT Project Satisfies the Third Criterion**

165. The third criterion, set forth in HAR § 13-5-30(c)(3), states: "The proposed land use complies with provisions and guidelines contained in chapter 205A, HRS, entitled 'Coastal Zone Management', where applicable[.]"

166. The TMT Project complies with provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management", in satisfaction of HAR § 13-5-30(c)(3).

167. Under HRS § 205A-1, "'Coastal zone management area' means all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the United States territorial sea."

168. Under HRS § 205A-22, "'Special management area' means the land extending inland from the shoreline as delineated on the maps filed with the authority as of June 8, 1977, or as amended pursuant to section 205A-23."

169. The TMT Project is not in the special management area, and Part II of Chapter 205A, HRS §§ 205A-21 – 205A-33, which applies only to lands within the special management area, does not apply to the TMT Project.

170. Many of Chapter 205A's objectives, such as protection of historic resources, scenic and open space resources, and recreational resources, parallel the objectives of the Conservation District.

171. For the same reasons that the TMT Project is consistent with the purpose of the Conservation District, and given the mitigation measures to reduce and minimize the impacts of the project on surrounding areas as discussed in the findings of fact above and conclusions herein, it is also consistent with the objectives of Chapter 205A.

172. The TMT Project satisfies all of the applicable objectives of Chapter 205A that do not overlap with the Conservation District but are unique to Chapter 205A.

173. Specifically, Chapter 205A describes objectives relating to coastal ecosystems (including the impact of upland areas on coastal ecosystems), which are intended to promote and protect water quality.

174. As noted in the findings of fact above, the TMT Project will have no significant or adverse impact on water resources, including no significant impacts upon Lake Waiau and ground water, and no significant effects upon the surrounding areas through surface water runoff or through wastewater (which will be collected and transported off the summit for treatment and disposal).

175. Therefore, the TMT Project satisfies all of the objectives of Chapter 205A as to water quality issues.

176. Based on the above findings and applicable law, the proposed land use is consistent with provisions and guidelines contained in Chapter 205A, HRS, entitled "Coastal Zone Management," where applicable.

4. **The TMT Project Satisfies the Fourth Criterion**

177. The fourth criterion, set forth in HAR § 13-5-30(c)(4), states: "The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region[.]"

178. The TMT Project will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region, in satisfaction of HAR § 13-5-30(c)(4).

179. Under the version of HAR § 13-5-2 that was in effect when the CDUA was submitted to the BLNR, "Natural resource" is defined as meaning "resources such as plants, aquatic life and wildlife, cultural, historic and archeological sites, and minerals." The amendment added to this definition "recreational" and "geologic" sites, "scenic areas, sociologically significant areas," and "watersheds."

180. By mandating that BLNR consider impacts to the resources that are "existing," within the surrounding area, this criterion requires that a proposed project be assessed in the context of what is already there.

181. The impacts of the TMT Project must therefore be viewed in the context of the Astronomy Precinct, which is within the MKSR that was specifically established by the community and the State for astronomy uses on Mauna Kea, has housed astronomy facilities since the 1960's, and currently has eight optical / infrared observatories, three submillimeter observatories and a radio telescope.

182. All of the current astronomy facilities (except the radio telescope), as well as the proposed site of the TMT Project, are within the 525 acre Astronomy Precinct, which is less than five percent of the 11,288 acre MKSR.

183. Under the MKSR Master Plan, astronomy development is further restricted to a defined 150 acre portion within the Astronomy Precinct.

184. It is undisputed that without the TMT Project, the cumulative effects of astronomical development and other uses in the summit area of Mauna Kea have previously resulted in impacts that are substantial, significant and adverse.

185. The TMT Observatory will not tip the balance of any existing impact from a level that is currently less than significant to a significant level. Tr. 10/25/16 at 181:6-10.

186. Petitioners and Opposing Intervenors have argued repeatedly that because UH Hilo acknowledges that the summit area of Mauna Kea has already sustained significant and adverse impacts, it "admits" the TMT Project will itself have substantial adverse impacts. Petitioners and Opposing Intervenors misconstrue UH Hilo's position. The UH Hilo has never made such an admission, and, as set forth in these findings of fact and conclusions of law, the TMT Project will not cause substantial adverse impacts.

187. By arguing that the summit area of Mauna Kea has suffered "unlawful" significant and adverse impacts in the past, Petitioners and Opposing Intervenors also imply that no project can be undertaken in that area without first *reducing* the *existing* cumulative impacts to a level that is less than significant and adverse. Petitioners' and Opposing Intervenors' arguments are legally unsupported.

188. In other jurisdictions, where projects have been proposed for locations that were already substantially impacted by previous development, courts have assessed the proposed new projects on their own merits, found impacts not to be significant, and approved the projects without first requiring the existing impacts in the surrounding area to be reduced to a less-than-substantial level. *See, e.g.*, *Geer v. Fed. Highway Admin.*, 975 F. Supp. 47, 73-74 (D. Mass. 1997) ("although there were noise and visual impacts those impacts were not substantial given the urban context of the project and the existing impacts under a no-build option").

189. Moreover, the Hawai'i Supreme Court recognizes the difference between developed and undeveloped land, and acknowledges the treatment of resources (specifically including

cultural resources) varies depending upon whether land is developed or undeveloped. *See, e.g.*, *Kalipi*, 66 Haw. at 8-9, 656 P.2d at 749-50.

190. Specifically, HAR § 13-5-30(c)(4) does not require an analysis of whether (and how) *existing* cumulative impacts should be mitigated. Rather, the proper analysis is whether, viewed within the context of such existing cumulative impacts – and under the assumption that such cumulative impacts will continue – a new proposed land use will cause substantial adverse impacts to existing natural resources in the applicable area. *See Kilakila*, 138 Hawai‘i at 402-05, 382 P.3d at 214-17.

191. The plain language of the criterion itself directs BLNR to consider whether the "proposed land use" itself – *not* other existing uses and/or conditions – will cause "substantial adverse impact to *existing* natural resources within the surrounding area, community, or region[.]" HAR § 13-5-30(c)(4).

192. The reliable, probative, substantial, and credible evidence, specifically including but not limited to the testimonies of White, Hayes, Nees, Dr. Smith, Nance, Dr. Sanders, and Rechtman, and applicable exhibits, demonstrates that the TMT Project will not cause substantial adverse impact to existing plants, aquatic life and wildlife, cultural, historic, and archaeological sites, minerals, recreational sites, geologic sites, scenic areas, ecologically significant areas, and watersheds.

193. Petitioners and Opposing Intervenors did not offer reliable, probative, substantial, and credible evidence, whether from witnesses or exhibits, that would support the conclusion that the TMT Project would cause substantial adverse impact to existing plants, aquatic life and wildlife, cultural, historic, and archaeological sites, minerals, recreational sites, geologic sites, scenic areas, ecologically significant areas, or watersheds.

194. The surrounding pāhoehoe lava rock upon which the structure will be constructed is a common lava foundation feature for the surrounding areas upon which existing astronomy facilities have been constructed.

195. Under HAR § 13-5-30(c)(4), BLNR may properly consider that the level of impacts on natural resources of a proposed land use would be substantially the same even in the absence of the project.

196. The level of impacts on natural resources within the Astronomy Precinct of the MKSR would be substantially the same even in the absence of the TMT Project within the Astronomy Precinct of the MKSR.

197. The incremental nature of a project's impacts, standing alone, cannot endlessly justify development within an existing developed area (*See Kilakila*, 138 Hawai‘i at 404-05, 382 P.3d at 216-17); however, for the TMT Project, given the specific findings of fact herein, and based on the weight of the reliable, probative and substantial evidence, there is no proof demonstrating that it will cause substantial adverse impact to existing natural resources within the surrounding area, community, or region. HAR § 13-5-30(c)(4).

198. The reliable, probative, substantial, and credible evidence demonstrates that the TMT

Project will not cause substantial adverse impacts to cultural, historical, and archaeological sites.

199. Under the definition of "Natural resource" in HAR § 13-5-2, cultural, historical, and archaeological "sites" are "natural resources"; but cultural *practices* are not necessarily.

200. In accordance with the express language of the Conservation District Rules, cultural practices are not "natural resources" and so are not required to be considered in an analysis of HAR § 13-5-30(c)(4).

201. In any case, while the presence of the TMT Project in the Astronomy Precinct will introduce a new element in the Northern Plateau for certain cultural practitioners and may affect the setting in which certain contemporary practices occur, given the findings above, the reliable, probative, substantial, and credible evidence demonstrates that the TMT Project will not cause substantial adverse impacts to cultural practices established prior to 2015.

202. No existing critical habitat, natural resources, or customary and traditional native Hawaiian practice can be considered endangered or substantially impacted in the specified area for the TMT Project site.

203. There is no credible proof that any historic feature, traditional practice, or viewplane will be substantially or adversely impacted by construction at the proposed TMT Project site.

204. The Hawai‘i Supreme Court has instructed that in assessing a proposed land use under HAR § 13-5-30(c)(4), mitigation measures for a project may be considered even if "mitigation" is not expressly stated in the rule. *See Morimoto*, 107 Hawai‘i at 302-04, 113 P.3d at 178-80; *see also Kilakila*, 138 Hawai‘i at 402-04, 382 P.3d at 214-16 (finding it appropriate to consider mitigation measures as part of the assessment of impacts under this criterion).

205. Petitioners and Opposing Intervenors, many of whom conceded during cross-examination that they had not reviewed *Kilakila*, claimed in this proceeding that the proposed mitigation measures for the TMT Project could not be considered in connection with HAR § 13-5-30(c)(4) because those mitigation measures, in their view, do not specifically address the environmental and cultural impacts of the project. *See e.g.* Petitioners' Collective Prehearing Statement at 4.

206. Petitioners' and Opposing Intervenors' argument is factually and legally incorrect.

207. As noted in the findings of fact above, numerous proposed mitigation measures for the TMT Project are specifically designed to address the environmental and cultural impacts of the TMT Project, including, but not limited to:

a. The site selection and physical design of the project itself and related infrastructure to mitigate its visual, cultural and environmental impact;

b. The TMT Access Way design;

c. Implementing a cultural and natural resources training program;

d. Developing educational exhibits;

e. Restoring of Puʻu Poliʻahu;

f. Providing a sense of place within the TMT facilities;

g. Providing financial contributions to support cultural programs;

h. Implementing specific cultural and community outreach efforts;

i. Implementing cultural observance days;

j. Continuing consultation with the State Historic Preservation Division and Kahu Kū Mauna Council regarding the protocols for the relocation of the modern shrine at the 13N site;

k. Implementing arthropod monitoring;

l. Working with OMKM to develop and implement a wēkiu bug habitat restoration study;

m. Developing and implementing an invasive species prevention and control program; and

n. Continuing consultations with cultural practitioners.

208. Moreover, under *Morimoto*, the Hawaiʻi Supreme Court held that all mitigation measures set forth in an EIS (regardless of whether direct or indirect) must be made part of the conditions of the CDUP. *See Morimoto*, 107 Hawaiʻi at 303-04, 113 P.3d at 179-80.

209. *Morimoto* suggests that where mitigation measures have been accepted as part of a final EIS, those mitigation measures – which are required to be made conditions of the CDUP – will also satisfy HAR § 13-5-30(c)(4). But more importantly, *Morimoto* clearly holds that *all* mitigation measures may be considered.

210. As noted above, the unchallenged FEIS for the TMT Project identifies an abundance of mitigation measures, both direct and indirect, that are aimed at ameliorating potential impacts on the environment and cultural practices. Taking into account the many measures proposed to mitigate the Project's potential impacts on the environment and cultural practices confirms that the TMT Project will not cause substantial adverse impact to these areas.

211. In addition, under *Kilakila*, the Hearing Officer may take into consideration the scientific, economic and educational benefits of the TMT Project in determining that the project meets the criteria of HAR § 13-5-30(c)(4). *See Kilakila*, 138 Hawaiʻi at 405-06, 382 P.3d at 217-18 (noting that consideration of relevant scientific,

economic and educational benefits of project does not conflict with the BLNR's duty to protect natural and cultural resources through "appropriate management and use to promote their long-term sustainability and the public health, safety and welfare").

212. As noted in the findings of fact above and herein, the scientific and educational benefits of the TMT Project are material, substantial, and highly unique.

213. As noted by the testimony of Dr. Stone and other evidence, the TMT Project is designed to be a world-class telescope that will provide a much more advanced and powerful ground-based observatory than currently exists anywhere on Earth. The TMT Project is designed to investigate and answer some of the most fundamental questions regarding our universe, including studies relating to the formation of stars and galaxies shortly after the Big Bang and how the universe evolved to its present form.

214. Further, TIO has committed to a substantial community benefits package that has provided over $2.5 million to date for grants and scholarships for STEM education to benefit Hawai‘i students, and TIO has committed to providing $1 million annually for this program.

215. TIO will also pay sublease rent to the University (the first telescope developer to do so on Mauna Kea), and these funds will be used for the management of Mauna Kea through the Mauna Kea Special Management Fund, administered by OMKM.

216. For these and all other reasons noted in the findings above, the TMT Project will substantially improve the interests of the surrounding area, community, region, and public welfare by advancing public higher education in the State, ensuring that the University remains a premier institution for astronomy research throughout the world, and will bring other significant educational, economic and scientific benefits to Hawai‘i and its residents.

217. Accordingly, the TMT Project satisfies the fourth criterion, HAR § 13-5-30(c)(4).

5. **The TMT Project Satisfies the Fifth Criterion**

218. The fifth criterion, set forth in HAR § 13-5-30(c)(5), states: "The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels[.]"

219. The TMT Project, including buildings, structures, and facilities, is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels, in satisfaction of HAR § 13-5-30(c)(5).

220. The appropriate locality to be considered is the summit area of Mauna Kea within the MKSR, and more specifically, the Astronomy Precinct of the MKSR. *See Kilakila*, 138 Hawai‘i at 406-07, 382 P.3d at 218-19.

221. Astronomy facilities in the locality of the TMT Project are an expressly permitted use under HAR § 13-5-24.

222. As noted above, the TMT Project will be located on an approximately five acre site within the Astronomy Precinct of the MKSR, which is a clearly defined, highly specialized area set aside specifically for astronomical facilities, and was first leased to the University in 1968 for this purpose.

223. The proposed location of the TMT Project is in relatively close proximity to the eleven other previously developed facilities for astronomy within the Astronomy Precinct, which is the only area now designated for astronomical facilities on Mauna Kea.

224. From most vantage points within the Astronomy Precinct where the TMT Project will be visible, other astronomy facilities are already visible.

225. The TMT Project will not be visible from the culturally sensitive areas of the summit of Kūkahauʻula, Lake Waiau, Puʻu Līlīnoe, and Puʻu Wēkiu.

226. For all these reasons, and for the reasons set forth in the findings of fact above, the proposed land use, including buildings, structures, and facilities, is compatible with the locality and surrounding areas, and appropriate to the physical conditions and capabilities of the specific parcel or parcels. Thus, the TMT Project satisfies the fifth criterion, HAR § 13-5-30(c)(5).

6. **The TMT Project Satisfies the Sixth Criterion**

227. The sixth criterion, set forth in HAR § 13-5-30(c)(6), states: "The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable[.]"

228. The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon by the TMT Project, in satisfaction of HAR § 13-5-30(c)(6).

229. The relevant land area to be considered in connection with this criterion is the Astronomy Precinct within the MKSR.

230. The visual or other impacts of any proposed project are site specific; and, accordingly, when considering visual impacts, the BLNR does not ignore any preexisting conditions in the area proposed for a use. *Waʻahila Ridge* at 65-66 n.17.

231. The BLNR's interpretation of its own rules is generally entitled to deference unless plainly erroneous or inconsistent with the underlying legislative purpose. *Kilakila*, 138 Hawaiʻi at 396, 382 P.3d at 208 (citing *Panado v. Bd. of Trs., Emps.' Ret. Sys.*, 134 Hawaiʻi 1, 11, 332 P.3d 144, 154 (2014)).

232. The BLNR's interpretation and approach to this issue is consistent with other jurisdictions, which, like the BLNR, recognize that the significance of a project's visual

impacts must be assessed in light of the context where it occurs. *See, e.g., Bowman v. City of Berkeley*, 122 Cal. App. 4th 572, 589, 18 Cal. Rptr. 3d 814, 828 (2004) ("To conclude that replacement of a virgin hillside with a housing project constitutes a significant visual impact says little about the environmental significance of the appearance of a building in an area that is already highly developed."); *Geer*, 975 F. Supp. at 73-74 (project would have some visual impacts in river basin, but impacts were not significant given existing context, where "substantial" visual impacts were already present).

233. As Petitioners and Opposing Intervenors have repeatedly emphasized, the visual landscape in the summit area of Mauna Kea has already been substantially altered and impacted, and it will remain so with or without the TMT Project. The TMT Project, and its visual impacts, must be assessed in that context. Adding the TMT to the existing physical context will not result in a substantial adverse impact.

234. The BLNR takes into consideration whether, because certain resources are available only in particular places, limited alternatives for locating properties requiring those resources may outweigh visual or other impacts, even if such impacts are "obvious." *Wa'ahila Ridge* at 66 n.17 (location for wind generated energy facility was necessarily "dictated by the wind"). Here, the location for the TMT Project is dictated by the combination of natural resources described in detail above that makes the Project's site uniquely ideal for astronomical observation.

235. The BLNR has expressed greater willingness to allow high visibility land uses under HAR Chapter 13-5 in less urbanized areas and off ridgelines because the visual impacts were smaller or could be more easily mitigated than in locations atop ridgelines and in high-population areas. *Id.* at 65 n.17. Those factors favor the location of the TMT Project.

236. The BLNR may approve a proposed land use despite some environmental impacts to the Conservation District, provided that the project incorporates appropriate measures and conditions to mitigate the project's adverse impacts. *See Morimoto*, 107 Hawai'i at 305-06, 113 P.3d at 181-82; *Stop H-3 Ass'n*, 68 Haw. at 157-62, 706 P.2d at 449-52; *Wa'ahila Ridge* at 64 n.13.

237. Hawai'i law requires the "mitigation" of impacts; it does not require that impacts be eliminated altogether. *See Morimoto*, 107 Hawai'i at 305-06, 113 P.3d at 181-82 (finding that BLNR appropriately considered the effect of mitigation measures designed to "diminish" – not eliminate altogether – "the impact of the project upon the Palila").

238. Specifically regarding visual impacts, "mitigation" is understood to require reducing adverse impacts, not eliminating them. *See, e.g.*, *Las Virgenes Homeowners Fed'n, Inc. v. Cnty. of Los Angeles,* 177 Cal. App. 3d 300, 308-09, 223 Cal. Rptr. 18, 25 (1986) (where Environmental Impact Report for mixed-use development project discussed numerous mitigation measures and project was conditioned on reducing project's size and using design, landscaping, and contouring to reduce adverse visual impact, mitigation measures were found to "exceed those required by law").

239. Courts have construed regulatory language similar to that contained in HAR § 13-5-30(c)(6) to require "minimization of visibility and impacts," not elimination of visual impacts altogether. *See McCallister v. Calif. Coastal Comm'n*, 169 Cal. App. 4th 912, 955, 887 Cal. Rptr. 3d 365, 398 (2009) (where county land use plan required that siting of structures "shall not detract from natural beauty of the undeveloped skylines, ridgelines, and the shoreline," court found that regulations "require that visibility and visual impacts be minimized" to the extent reasonably feasible, but did not require reduction of visibility to the point of elimination). The BLNR could have imposed an "invisibility-if-feasible standard" if it had desired; the fact that it did not do so suggests that it intended to require reasonable minimization, not elimination, of visual impacts. *See id.*

240. Through significant mitigation measures discussed above, including the location of the telescope, reduction of the dome to the smallest size physically possible, the finishing of the dome and supporting structure to reduce the visibility of the structures, and other measures, the visual impacts for the TMT Project have been reduced to the greatest extent feasible.

241. Moreover, the design of the TMT Project is consistent with (and in many aspects, improves upon) the design of the other existing telescopes within the Astronomy Precinct, which also includes various support buildings, roads and other facilities.

242. The size, dimensions and dome structure were conceived to minimize the structure's impacts and to enhance the natural beauty of the surrounding areas to the extent feasible.

243. Fluids such as gas, water, and wastewater will be contained in above ground and underground tanks to minimize any possible contamination of the surface and subsurface areas.

244. The structural design considered ways to minimize visual impacts and to optimize viewpoints around the facility.

245. Given this context, and the many mitigation measures incorporated into the TMT Project specifically designed to minimize its visual impacts to the extent feasible, the sixth criterion is satisfied.

246. Petitioners and Opposing Intervenors, however, propose to read this criterion to literally require that the TMT Project "improve on the natural beauty or open space of the Northern Plateau." *See e.g.* Petitioners' Collective Prehearing Statement at 5.

247. Although Petitioners and Opposing Intervenors claim that this literal reading "would not meet with absurd results," Petitioners and Opposing Intervenors are incorrect. Applying Petitioners' and Opposing Intervenors' interpretation would lead to an absurd result -- an absolute exclusion of any construction of astronomy facilities that are an explicitly permissible use in the Resource subzone.

248. If HAR § 13-5-30(c)(6) is read the way Petitioners and Opposing Intervenors suggest, no telescope could ever have been built on Mauna Kea. Indeed, following this proposed interpretation to its logical conclusion, nothing could ever be, or have been, permissibly

built on any Conservation District land anywhere in the State of Hawai‘i.

249. HAR § 13-5-30(c)(6) cannot be read that way. If it were, HAR § 13-5-24(c)(4), which expressly allows “Astronomy facilities” in the Resource subzone, would be rendered meaningless.

250. In addition, HAR § 13-5-30(c)(6) must be read in the context of all subzones, including the objectives of each subzone (and the permitted uses in each subzone).

251. The Conservation District is not homogenous; rather, the Conservation District is comprised of four distinct subzones: Protective, Limited, Resource and General.

252. Petitioners and Opposing Intervenors incorrectly interpret the rules as though the entire Conservation District on Mauna Kea is in the Protective subzone, the most restrictive of the subzones.

253. Under rules of statutory interpretation, courts are required to avoid rendering any provision redundant or superfluous. *See Aluminum Shake Roofing, Inc. v. Hirayasu*, 110 Hawai‘i 248, 253, 131 P.3d 1230, 1235 (2006); *Okada Trucking Co. v. Bd. of Water Supply*, 101 Hawai‘i 68, 77, 62 P.3d 631, 640 (App. 2002) (“We will not construe a statute so that it is rendered meaningless.”). Moreover, courts “may depart from a plain reading of a statute where a literal interpretation would lead to absurd and/or unjust results.” *See, e.g.*, *Morgan v. Planning Dep’t, Cnty. of Kaua‘i,* 104 Hawai‘i 173, 185, 86 P.3d 982, 994 (2004) (citing *Iddings v. Mee-Lee*, 82 Hawai‘i 1, 15, 919 P.2d 263, 277 (1996)) (finding that the Legislature could not have intended that the Planning Commission would need to file lawsuit each time a special management area use permit needs modification, so, despite the plain language of HRS § 205A-29, the statute had to be interpreted to avoid that “absurd result”).

254. Finally, *Kilakila* confirms that HAR § 13-5-30(c)(6) should be interpreted and applied in the context of Astronomy Precinct within the MKSR and in light of the mitigation measures proposed in connection with the TMT Project. *See Kilakila*, 138 Hawai‘i at 407, 382 P.3d at 219 (affirming BLNR’s findings and conclusions that the solar telescope project met the sixth criterion because the project “will be consistent with and will preserve the existing physical and environmental aspects of the land (the Haleakalā High Altitude Observatory site, which housed other existing observatories), and further noting that BLNR properly considered the numerous mitigation commitments for the project with respect to this criterion).

255. Therefore, HAR § 13-5-30(c)(6) can only make sense by interpreting it as requiring that the TMT Project, and specifically its visual impacts, be assessed in the manner set forth above, in the context of its surrounding environment – including the uses and development that has already occurred.

256. For all these reasons, and for the reasons set forth in the findings of fact above, the proposed land use is not inconsistent with existing uses and preserves or improves upon the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, and therefore satisfies the sixth criterion.

7. **The TMT Project Satisfies the Seventh Criterion**

257. The seventh criterion, set forth in HAR § 13-5-30(c)(7), states: "Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district[.]"

258. The TMT Project will not utilize subdivision of land to increase the intensity of land uses in the Conservation District, in satisfaction of HAR § 13-5-30(c)(7).

259. HAR § 13-5-2 defines a "subdivision" as a "division of a parcel of land into more than one parcel."

260. Petitioners and Opposing Intervenors contend, however, that the TMT Project does not satisfy HAR § 13-5-30(c)(7) because, in their view, the proposed sublease of land to TIO (and, indeed, each sublease for an existing observatory facility) "further separated areas of land use within the University's Astronomy Precinct resulting in the illegal subdivision of these lands."

261. Petitioners and Opposing Intervenors, however, offer no authority to support their position that a sublease within MKSR legally constitutes a "division of a parcel of land into more than one parcel" within the meaning of HAR § 13-5-30(c)(7).

262. The Master Plan identified specific and discrete sites for future development on Mauna Kea, including an appropriate site for a Next Generation Large Telescope (Area E). Ex. A-001 at 1-6.

263. The sublease of a parcel within the Astronomy Precinct of the MKSR that was previously planned and specifically identified as an appropriate location for a Next Generation Large Telescope, such as the TMT Project, does not constitute a division of a parcel into more than one parcel for the purpose of increasing the intensity of land use within the conservation district as contemplated by HAR § 13-5-30(c)(7).

264. Moreover, as noted above, UH Hilo has not requested, and has not been granted, any subdivision of land for purposes of the TMT Project, and, in any event, the conservation district is not subject to county land use laws. HRS § 205-5; HRS Chapter 183C.

265. Thus, construing every sublease within the conservation district as creating a subdivided parcel subject to the county subdivision code would be contrary to HAR § 13-5-30(c)(7) and HRS § 205-5, and subject every such sublease to county ordinances designed to regulate residential developments and lead to absurd results.

266. Accordingly, for these reasons and all reasons stated herein, the Petitioners' and Opposing Intervenors' arguments relating to the effect of the sublease for the TMT Project is rejected. *See, e.g.*, *Morgan*, 104 Hawai'i at 185, 86 P.3d at 994.

267. Petitioners and Opposing Intervenors further contend that the "subdivision is illegal" because the State Land Use Commission did not create the Astronomy Precinct or separate project parcels. *See, e.g.* Petitioners' Collective PHS at 6.

268. Petitioners' and Opposing Intervenors' argument, however, is misplaced and illogical, because the Land Use Commission's authority does not extend to establishing or approving areas such as the MKSR or the Astronomy Precinct – it is undisputed that the BLNR has the authority to manage Conservation District lands, including subdividing lands in the Conservation District into more than one parcel. *See* HRS Chapter 183C.

269. In addition, the Astronomy Precinct is an area identified and described by the MKSR Master Plan as a management and planning designation to reduce the area within the MKSR available for astronomy development.

270. Thus, the clear intent of the designation of the Astronomy Precinct was not to divide the MKSR into more than one parcel in order to intensify the use of the MKSR, but rather to identify an area within the MKSR for planning and management of astronomical facilities.

271. Moreover, Petitioners' and Opposing Intervenors' proposed interpretation would mean nothing could ever be built in a Conservation District, because adding anything would always increase, in some measure, the intensity of land use. That interpretation would lead to an absurd result, and is rejected. *See, e.g.*, *Morgan*, 104 Hawai'i at 185, 86 P.3d at 994.

272. For all these reasons, and for the reasons set forth in the findings of fact above, the proposed land use will not utilize subdivision of land to increase the intensity of land uses in the Conservation District, and therefore satisfies the seventh criterion, HAR § 13-5-30(c)(7).

8. **The TMT Project Satisfies the Eighth Criterion**

273. The eighth criterion, set forth in HAR § 13-5-30(c)(8), states: "The proposed land use will not be materially detrimental to the public health, safety, and welfare."

274. The TMT Project will not be materially detrimental to the public health, safety, and welfare, in satisfaction of HAR § 13-5-30(c)(8).

275. The construction and use of astronomy facilities alone do not create material harm to the general health, safety, or welfare of Hawai'i's citizens.

276. The construction of astronomy facilities does not require invoking traditional police power protections to protect the public from the proposed construction activities.

277. Any concern for the well-being of a segment of the general public, including Native Hawaiians, can be mitigated through the scientific, educational, and economic benefits to be derived from the Project, in accordance with similar considerations in *Kilakila*.

278. As set forth above, Petitioners and Opposing Intervenors contend that building the TMT Project on Mauna Kea will be harmful to the health of native Hawaiians and others. As stated above, Petitioners' and Opposing Intervenors' position that the TMT Project will be materially detrimental to the public health, safety, and welfare has not been supported

by reliable, probative, substantial, or credible evidence, and is far too speculative to be given any significant weight.

279. Although, for example, Dr. Taualii provided opinions as to her research on a causal link between alleged "desecration" to a sacred space and the impact upon cultural identity and health of native Hawaiians, Dr. Taualii did not provide the data on her study in this hearing; she 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 still undergoing the independent scrutiny of the peer review process; and she testified to her own bias, as she personally opposes the TMT Project. *See* Tr. 1/24/17 at 37, 48, 132-137

280. Similarly, while Prof. Kaholokua offered testimony regarding the ostensible psychological impacts upon native Hawaiians from the activities on Mauna Kea, he did not do any research directly relating to the TMT Project, did not perform any clinical examinations of opponents of the TMT Project, and he was not aware of studies regarding partitioning the cause of stress allegedly from TMT and Mauna Kea from all other stress-causing factors for native Hawaiians, including poverty, single parenthood, and systemic diseases. Tr. 2/23/17 at 121-23, 143, 164-168, and 175.

281. The public as a whole will not be detrimentally impacted, and the alleged psychological impact on certain narrow portions of the general population would be isolated and capable of being mitigated. Surveys referenced during the hearing demonstrated that a majority of residents supported the construction of the TMT Project, notwithstanding the protests of a select few who claim political or other reasons outside of the traditional concepts of public health, safety, and welfare.

282. To the extent that there may be an impact on certain individuals from the TMT Project as the Petitioners and Opposing Intervenors claim, the evidence adduced in this hearing is that, as a general historical matter, native Hawaiian health and welfare has also been impacted by numerous other causes of stress, including poverty, lack of educational opportunities, systemic diseases, single parenthood, family abuse, and other societal displacements. Tr. 2/23/17 at 164-68 (Joseph Keaweaimoku Kaholokula, Ph.D.).

283. Dr. Kaholokula testified that he was not aware of any study with regard to apportioning the cause of alleged stress from the TMT Project on Mauna Kea from the other historic factors affecting native Hawaiian health and welfare, and his opinions were not based on any studies or analyses of the individuals opposing the TMT Project. Tr. 2/23/17 at 175-76 (Joseph Keaweaimoku Kaholokula, Ph.D.)

284. Thus it would be speculative to conclude, in light of the historical issues affecting native Hawaiian health and welfare in general, and the lack of evidence in this hearing apportioning the cause of the various stressors, that the TMT Project, in and of itself, is detrimental to the health, safety and welfare of the public, including native Hawaiians opposing the TMT Project.

285. In short, Petitioners and Opposing Intervenors have not shown that the Project will be detrimental to the public health, safety, and welfare, much less that it will be materially

detrimental.

286. Petitioners and Opposing Intervenors also contend that "public welfare" does not mean job-creation educational benefits or money generation, but instead refers to "aesthetics – preserving Hawai'i's unique natural beauty." That position is legally unsound.

287. Under rules of statutory interpretation, where language is plain and ambiguous, it must be given its "plain and obvious meaning." *Awakuni v. Awana*, 115 Hawai'i 126, 133, 165 P.3d 1027, 1034 (2007) (citation omitted). Courts will attempt to construe the meaning of words in a statute according to their "general or popular use or meaning." HRS § 1-14. If the words at issue are not defined, "[l]egal and lay dictionaries are extrinsic aids which may be helpful in discerning the meaning of statutory terms." '*Olelo: The Corp. for Cmty. Television v. Office of Info. Practices*, 116 Hawai'i 337, 349, 173 P.3d 484, 496 (2007) (citations omitted).

288. No one would reasonably understand "public welfare" to refer specifically to "aesthetics." According to Merriam-Webster's online dictionary, "welfare" means "the state of doing well especially in respect to good fortune, happiness, well-being, or prosperity." www.merriam-webster.com/dictionary/welfare. And the "plain and obvious" meaning of a benefit to "public welfare" is something that is good for the public. Job growth, educational prestige, and advancement of knowledge are plainly benefits to the "public welfare."

289. Furthermore, the Hawai'i Supreme Court has held that consideration of relevant scientific, economic, and educational benefits are proper in the context of a CDUA as such benefits impact long-term sustainability and public welfare. *See Kilakila*, 138 Hawai'i at 405; 382 P.3d at 217.

290. HAR § 13-5-30(c)(8) does not require that a proposed land use be affirmatively beneficial to the public health, safety, and welfare – only that a project not be materially detrimental. Therefore, this criterion is satisfied with or without a finding of affirmative benefit to public welfare.

291. However, the reliable, probative, substantial, and credible evidence demonstrates that the TMT Project will inject money into the local economy, and will bring with it job growth, educational prestige and opportunities, and significant advancement of knowledge. In short, the Project will benefit the "public welfare."

292. For all these reasons, and for the reasons set forth in the findings of fact above, the proposed land use will not be materially detrimental to the public health, safety, and welfare.

293. In sum, UH Hilo has borne its burden of proving that the TMT Project satisfies all of the criteria set forth in HAR § 13-5-30(c).

B. THE TMT PROJECT SATISFIES THE PUBLIC TRUST DOCTRINE, AND CUSTOMARY AND TRADITIONAL NATIVE HAWAIIAN RIGHTS ARE APPROPRIATELY PROTECTED

294. In assessing the Project and determining whether the criteria of HAR § 13-5-30(c) have been satisfied, the State must protect the public trust and the customary and traditional rights and practices of native Hawaiians.

1. The Public Trust Doctrine

295. The public trust doctrine has been adopted in Hawai‘i as a "fundamental principle of constitutional law." *In re Water Use Permit Applications*, 94 Haw. 97, 132, 9 P.3d 409, 444 (2000) ("***Waiahole***").

296. Separately, Article XI, section 1 of the Hawai‘i Constitution provides that public natural resources are held in trust by the state:

> For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawai‘i's natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State.
>
> All public natural resources are held in trust by the State for the benefit of the people.

297. As explained in *Waiahole*, under the public trust doctrine, the State acting through its agencies has a duty to "'protect' natural resources and to promote their 'use and development.'" 94 Hawai‘i at 138-39, 9 P.3d at 450-51. This duty prevents public trust resources from being irrevocably transferred to private parties. *Id.* at 139, 9 P.3d at 451. The public trust doctrine also requires the "reasonable and beneficial use" of public trust resources "to maximize their social and economic benefit." *Id.*

298. Thus, the public trust doctrine does not require absolute preservation of natural resources, but rather requires a balancing between "1) protection and 2) maximum reasonable and beneficial use." *Id.* The State must apply a rule of reasonableness in which environmental costs and benefits are balanced against economic, social, and other factors. *See id.* at 140-43, 9 P.3d at 453-55.

299. The Hawai‘i Supreme Court has made it clear that the public trust doctrine's mandate with respect to "conservation" does not prohibit development; rather, the doctrine requires that protection of a resource must also be consonant with assuring the "highest economic and social benefits" of the resource. As the Court explained in *Waiahole*:

> The framers deemed it necessary to define "conservation" and agreed on the following: "the protection, improvement and use of natural resources according to principles that will assure their highest economic or social

> benefits." *See* Stand. Comm. Rep. No. 77, in 1978 Proceedings, at 685-86 (emphases added). The second clause of article XI, section 1 thus resembles laws in other states mandating the maximum beneficial or highest and best use of [trust] resources. *See, e.g.*, Cal. Const. art. X, § 2; N.D. Cent. Code § 61-04-01.1.1 (Supp. 1999). . . . [A]rticle XI, section 1's mandate of "conservation"-minded use recognizes "protection" as a valid purpose consonant with assuring the "highest economic and social benefits" of the resource. . . . In short, the object is not maximum consumptive use, but rather the most equitable, reasonable, and beneficial allocation of [trust] resources, with full recognition that resource protection also constitutes "use."

94 Hawai'i at 139-40, 9 P.3d at 451-52.

300. The scope of the public trust doctrine has traditionally been limited to water resources, and the reliable, credible and substantial evidence establishes that the TMT Project will not restrict or otherwise impair any water resource. *Id*. at 133, 9 P.3d at 445.

301. Therefore, the public trust doctrine does not apply to consideration of the TMT Project.

302. Even assuming the public trust doctrine applies, however, the use of the summit area of Mauna Kea for the TMT Project is consistent with the public trust doctrine.

303. The use of the summit area of Mauna Kea for the TMT Project promotes the "maximum reasonable and beneficial use" of the combination of natural resources that is unique to that location.

304. The use of the combination of natural resources that is unique to the summit area of Mauna Kea for the scientific study and investigation and the advancement of knowledge that will result from the TMT Project is consistent with the public trust doctrine.

305. UH Hilo is not a private commercial user, and its proposed use of the land in question is not a private commercial use. On the contrary, the TMT Project will advance knowledge, foster educational opportunities in Hawai'i's public institutions of higher learning, and maintain Hawai'i's place as a leader in scientific research. These are public or quasi-public land uses, and valid public trust uses.

306. That the purposes of the TMT Project are valid public trust uses is confirmed by reference to Section 5(f) of the Admission Act of 1959, which specifies public educational institutions as beneficiaries of public trust lands and their proceeds, and Article X, section 5 of the Hawai'i Constitution, which creates the University and gives it title to all real property conveyed to it, "which shall be held in public trust for its purposes, to be administered and disposed of as provided by law."

307. UH Hilo's public trust uses are "superior to" the private interests discussed in *Waiahole*. 94 Hawai'i at 138, 140, 9 P.3d at 450, 452; *see In re Contested Case Hearing on Water Use* ("***Waiola***"), 103 Hawai'i 401, 429, 83 P.3d 664, 692 (2004).

308. In addition, the fact that the TMT Project will be constructed and operated under a

sublease from UH Hilo to a non-profit consortium of educational and research institutions for research and educational use (and not by a for-profit entity for private use), further supports the conclusion that the proposed use of the land for the TMT Project is a public, or at a very minimum, a quasi-public, use of the land.

309. Even assuming the TMT Project is construed as a private use, however, the University remains the lessor of the land on which the TMT Project will be built, and at the end of the TMT Project's useful life or of a lease permitting its continued occupancy of its site (whichever comes first), the TMT Project is required to be decommissioned.

310. The TMT Project does not involve the irrevocable transfer of public trust land and resources to others, and the "protection" element of the public trust doctrine is therefore satisfied.

311. Accordingly, for all of the reasons herein, although the privately operated TMT Project involves the use of government land, the proposed use is consistent with the public trust doctrine regardless of whether the TMT Project is construed as a public, quasi-public, or a private use of land.

312. Different valid public trust uses for the same land must be balanced; native Hawaiian uses have been recognized as valid public trust uses. *Waiahole*, 94 Hawai'i at 137, 9 P.3d at 449. The evidence in this proceeding demonstrated a dearth of native Hawaiian uses of the specific location of the TMT Project, and further demonstrated that, as to the summit region of Mauna Kea in general, astronomy and native Hawaiian uses have (for many years) – and in fact, do – co-exist, and that the TMT Project will not curtail or restrict native Hawaiian uses.

313. "[T]he public trust assigns no priorities or presumptions in the balancing of public trust purposes." *Waiahole*, 94 Hawai'i at 142 n.43, 9 P.3d at 454 n.43. The BLNR "must ensure that all public trust purposes are protected to the extent feasible," requiring a balancing of competing public trust uses on a case-by-case basis. *Id.*

314. The evidence supports the conclusion that in proposing the TMT Project, UH Hilo has balanced the public trust obligations for this public purpose, and has protected native Hawaiian interests to the extent feasible.

315. The public trust doctrine must be viewed in the context of the relevant statute or rules at issue in a proceeding. Public trust principles, and an agency's public trust obligations, may already be incorporated into the statute or rules at issue. *See Waiahole*, 94 Hawai'i at 130-33, 9 P.3d at 442-45 (agency's public trust obligations were incorporated into Water Code).

316. Here, the public trust principles have been incorporated into the Conservation District statute. That law's stated purpose is "to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare." HRS § 183C-1.

317. The Conservation District rules likewise provide:

> The purpose of this chapter is to regulate land-use in the conservation district for the purpose of conserving, protecting, and preserving the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare.

HAR § 13-5-1.

318. The criteria set out in HAR § 13-5-30(c) expressly promote these public trust objectives. As specific examples: (1) HAR § 13-5-30(c)(1) requires that any proposed land use in the Conservation District be consistent with the purpose of HRS Chapter 183C and its implementing regulations; (2) HAR § 13-5-30(c)(4) requires that the proposed land use not cause substantial adverse impacts to the existing natural resources within the surrounding area, community, or region; and (3) HAR § 13-5-30(c)(8) requires that the proposed land use not be materially detrimental to the public health, safety, and welfare.

319. Because the criteria set out in HAR § 13-5-30(c) embody and implement the public trust doctrine, a thorough and diligent assessment of those criteria necessarily addresses the concerns that doctrine protects. *See Morimoto*, 107 Hawai‘i at 308, 113 P.3d at 184 (where the BLNR properly concluded that project would not cause substantial adverse impact on natural resources of project area, claim that the BLNR's decision violated Article XI, section 1 and the public trust doctrine "present[s] no new arguments" and "does not implicate any error on the part of BLNR"). *See also*, *Kilakila*, 138 Hawai‘i at 410-11, 382 P.3d at 222-23 (McKenna, J., concurring) (noting that the BLNR's findings and conclusions regarding the criteria of HAR § 13-5-30(c) as outlined in the majority opinion "illustrate that the BLNR carefully considered and applied the applicable constitutional considerations.")

320. Thus, the Conservation District rules do not supplant the protections of the public trust doctrine, but they do embody and implement them. Petitioners and Opposing Intervenors have not identified any public trust obligation that is not already reflected in the eight criteria of HAR § 13-5-30(c). Therefore, the conclusion that those criteria are satisfied – for the reasons set forth in detail above – is a compelling indication that the public trust obligations of both UH Hilo and the BLNR are satisfied as well.

321. Whether the public trust obligations are viewed as being encompassed within the eight criteria of HAR § 13-5-30(c) or as independent of those criteria, the approval of the CDUA here is consistent with and satisfies the public trust obligations of both UH Hilo and the BLNR to protect Hawai‘i's natural resources and to promote their development and utilization in a manner consistent with their conservation and in furtherance of the State's self-sufficiency.

322. Viewed in light of the public trust obligations described above, and the implementation of those obligations through HAR § 13-5-30(c), the TMT Project satisfies all public trust legal obligations as it is "the most equitable, reasonable, and beneficial allocation of state [trust] resources." *Waiahole*, 94 Hawai‘i at 140, 9 P.3d at 452.

323. The TMT Project provides for the development and utilization of natural resources for scientific and educational purposes for the benefit of the people of the State. It satisfies the obligations of protection and maximizing reasonable and beneficial use, and it is consistent with the constitutional, statutory, and regulatory mandates of "conservation."

2. **The Protection of Customary and Traditional Native Hawaiian Rights**

a. ***Article XII, section 7 of the Hawai'i Constitution and the Ka Pa'akai Analysis***

324. The Hawai'i Constitution also mandates that the State recognize and protect customary and traditional native Hawaiian rights. Article XII, section 7 provides:

> The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.

325. Under *Ka Pa'akai*, an agency, in order to fulfill its duty to preserve and protect customary and traditional native Hawaiian rights to the extent feasible, must examine, and make specific findings and conclusions as to:

> (1) the identity and scope of "valued cultural, historical, or natural resources in the [application] area, including the extent to which traditional and customary native Hawaiian rights are exercised in the [application] area; (2) the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken by the [agency] to reasonably protect native Hawaiian rights if they are found to exist. *Ka Pa'akai*, 94 Hawai'i at 47, 7 P.3d at 1084 (footnotes omitted).

326. This analytical framework ensures that a state agency properly effectuates its "obligation to protect native Hawaiian customary and traditional practices while reasonably accommodating competing private interests," and fulfills its duty "to preserve and protect customary and traditional native Hawaiian rights to the extent feasible[.]" *Ka Pa'akai*, 94 Hawai'i at 46-47, 7 P.3d at 1083-84.

327. The utmost respect is afforded the Petitioners and Opposing Intervenors regarding their beliefs and practices; however, to the extent that they claim such practices constitute traditional and customary rights under *PASH* and its progeny, those rights are subject to regulation by the laws of the State of Hawai'i. Haw. Const. art. XII, § 7; *State v. Pratt*, 127 Hawai'i at 217, 277 P.2d at 311.

328. The Hawai'i Supreme Court has confirmed that the practices that are protected by Article XII, section 7 are those "associated with the ancient way of life" that have been continued, without harm to anyone. *Kalipi*, 66 Haw. at 10, 656 P.2d at 751. In other

words, to be constitutionally protected, such practices must have been "customarily and traditionally held by ancient Hawaiians." *Pele Defense Fund v. Paty*, 73 Haw. at 619, 837 P.2d at 1271.

329. Some "customary and traditional" native Hawaiian rights are codified either in Article XII, section 7 of the Hawai'i Constitution or in HRS §§ 1-1 and 7-1. *Id.* at 618-19, 837 P.2d at 1271. Practices that are not codified in Article XII, section 7 or HRS §§ 1-1 and 7-1 will still be entitled to constitutional protection as "customary and traditional" if it is proven that those practices were established by Hawaiian usage by November 25, 1892. *PASH*, 79 Haw. at 447, 903 P.3d at 1268 (citing *State v. Zimring*, 58 Haw. 106, 115 n.11, 566 P.2d 725, 732 n.11 (1977)).

330. Under Hawai'i law, "it is the obligation of the person claiming the exercise of a native Hawaiian right to demonstrate that the right is protected." *Hanapi*, 89 Hawai'i at 185-186, 970 P.2d at 493-494.

331. As a threshold matter, an individual claiming that his or her conduct is constitutionally protected as a native Hawaiian right has the burden of proving that he or she is a descendant of native Hawaiians who inhabited the Hawaiian islands prior to 1778. *Hanapi*, 89 Hawai'i at 186, 970 P.2d at 494.

332. Although not all of the Petitioners and Opposing Intervenors presented specific evidence with respect to this requirement, there was also no dispute that certain Petitioners (including Petitioners Ching, Neves, Pisciotta and representatives of the Flores-Case 'Ohana), and the Opposing Intervenors, are native Hawaiian, and the Hearing Officer concludes there is sufficient evidence to find that the applicable Petitioners and the Opposing Intervenors satisfy this threshold requirement.

333. Each of the Petitioners and Opposing Intervenors also are required to "establish that [his or her] claimed right is constitutionally protected as a *customary or traditional* native Hawaiian practice." *Hanapi*, 89 Hawai'i at 185-186, 970 P.2d at 493-494 (emphasis added).

334. Under *Hanapi*, Petitioners and Opposing Intervenors had the burden to establish "an adequate foundation in the record connecting a claimed right to a *firmly rooted* traditional or customary native Hawaiian practice." *Hanapi*, 89 Hawai'i at 187, 970 P.2d at 495 (emphasis added).

335. Thus, distinguishing between traditional and customary practices and contemporary practices is important, because while the Hawai'i Constitution affords special protection to traditional and customary practices by native Hawaiians, Article XII, section 7 does not protect contemporary cultural practices. *Hanapi*, 89 Hawai'i at 187, 970 P.2d at 495.

336. The BLNR, through consideration of the CDUA and through the testimony and evidence in this proceeding, conducted a thorough review and analysis of the identity and scope of "valued cultural, historical or natural resources" in the TMT Project application area, including the extent to which traditional and customary native Hawaiian rights are exercised in the application area. *Ka Pa'akai*, 94 Hawai'i at 47, 7 P.3d at 1084.

337. As reflected in the TMT Project CDUA and in the testimony and documents admitted into evidence in the contested case proceeding, a detailed inventory of known and valued cultural, historical, and natural resources was taken in the application area, including the extent to which traditional and customary native Hawaiian rights may be exercised in the TMT Project area and the Astronomy Precinct. This is reflected in detail in FOF Nos. 433-839 above.

338. In addition, as noted in FOF Nos. 611-774 above, although Petitioners and Opposing Intervenors identified various areas in the summit region of Mauna Kea in which they engage in contemporary native Hawaiian cultural practices, they did not offer reliable, probative, substantial and credible evidence or testimony sufficient to establish that any of their cultural or religious practices– whether characterized as contemporary, or customary and traditional – were conducted at the five-acre site on which the TMT Project is proposed to be located until after the TMT Project was proposed, and in many instances, not until after the first contested case hearing in this matter.

339. Even assuming the Petitioners' and Opposing Intervenors' met their burden to prove that their claimed practices in areas within or outside of the five-acre TMT Project site are "firmly rooted" traditional or customary native Hawaiian practices under *Hanapi* (and are thus entitled to constitutional protection), the Hearing Officer, through consideration of the CDUA and through the testimony and evidence in this proceeding, conducted a thorough review and analysis of the extent to which traditional and customary native Hawaiian rights will be affected or impaired by the TMT Project. *Ka Pa'akai*, 94 Hawai'i at 47, 7 P.3d at 1084.

340. As reflected in the CDUA and in the testimony and documents admitted into evidence in the contested case proceeding, UH Hilo has evaluated in great detail the extent to which valued cultural, historical, and natural resources in the application area, including traditional and customary native Hawaiian rights, will be affected or impaired by the Project. This is reflected in FOF Nos. 433-839 above.

341. Petitioners and Opposing Intervenors have not established by reliable, probative, substantial and credible evidence that their practices – whether characterized as contemporary, customary or traditional –will be adversely affected by the TMT Project, or that such practices cannot continue at the summit, Lake Waiau, or Pu'u Līlīnoe, or elsewhere.

342. While Petitioners and Opposing Intervenors did introduce evidence regarding viewplanes from various sites at Mauna Kea, Petitioners and Opposing Intervenors did not make the factual showing necessary to demonstrate that any ostensible practices involving viewplanes from Mauna Kea are native Hawaiian traditional and customary practices entitled to constitutional protection, nor that the presence of the TMT Project will substantially and adversely impact those practices given the long history and presence of the other telescopes in the Astronomy Precinct and continuation of their practices in the presence of those telescopes.

343. Petitioners and Opposing Intervenors also had the burden to establish that any practices

for which they seek protection have occurred on undeveloped or less than fully developed land on Mauna Kea. *Hanapi*, 89 Hawai‘i at 186-87, 970 P.2d at 494-95.

344. According to Petitioners' and Opposing Intervenors' testimony, rather than being "undeveloped" or "less than fully developed," the landscape of the summit area of Mauna Kea is developed as it is "dominated by industrial land uses, including many telescope facilities and ancillary structures [including] . . . modern structures . . . heavy machinery, construction material, the clatter of telescope operations, and trafficked roads." WDT Townsend at 2; *see also* Tr. 01/12/17 at 137:1-12, 137:13-138:12. Petitioners further describe the summit as a place where "[t]he noise of observatory air conditioning, blowers, generators, associated vehicles and industrial activity is present and disturbing to recreational users who hope for the pristine silence of wilderness." WDT Ward at 2-3.

345. Evidence also supports the conclusion that at least some native Hawaiian practices are facilitated, rather than hindered, by the existence of the observatories and infrastructure on Mauna Kea. *See, e.g.*, WDT Naea Stevens at 3 (noting access to Mauna Kea facilitated through "roads maintained by the astronomy community.")

346. Petitioners and Opposing Intervenors have not met their burden to show that any of their practices – whether contemporary, or traditional and customary – occurred at the location of the TMT Project site prior to the proposal of the TMT Project and the designation of the site.

347. Since Petitioners and Opposing Intervenors have not met their burden to show that they conduct any protected traditional and customary practices at the location of the TMT Project site prior to the proposal of the TMT Project and the designation of the site, they necessarily cannot meet their burden under the third *Hanapi* factor, as they cannot establish that any of their traditional and customary practices take place at the TMT Project Site – regardless of whether the site is considered "undeveloped," "less than fully developed," or "developed."

348. Even assuming every Petitioner and Opposing Intervenor established that he or she engages in practices that are customary and traditional, and so are entitled to constitutional protection under the *Hanapi* test, the BLNR, through consideration of the CDUA and through the testimony and evidence in this proceeding, conducted a thorough review and analysis of the "feasible action, if any," to be taken by the BLNR to reasonably protect native Hawaiian rights if they are found to exist. *Ka Pa‘akai*, 94 Hawai‘i at 47, 7 P.3d at 1084.

349. Article XII, section 7 confirms that ancient traditional and customary native Hawaiian rights are to be protected "subject to the right of the State to regulate such rights."

350. Under *PASH*, the State is obligated "to protect the reasonable exercise of customary and traditionally exercised rights of Hawaiians to the extent feasible." 79 Haw. at 450 n.43, 903 P.2d at 1271 n.43. Likewise, in *Ka Pa‘akai*, the Court held that the State (and its agencies) must "preserve and protect customary and traditional native Hawaiian rights to the extent feasible." 94 Hawai‘i at 47, 7 P.3d at 1084.

351. Therefore, under *Pratt*, even if a person meets all three elements of the *Hanapi* test, the rights articulated in Article XII, section 7 (protecting native Hawaiian practices) are *not* absolute and are explicitly "subject to the rights of the State to regulate such rights." *Pratt*, 127 Hawai'i 206, 277 P.3d 300. The Court observed that a common thread in Article XII, section 7 jurisprudence is a balance between "protections afforded to Native Hawaiians in the State, while also considering countervailing interests." *Id.* at 215, 277 P.3d at 309. Thus, under *Pratt*, the balancing of interests must consider the *totality* of the circumstances, including *all* of the parties' respective interests. *Id.* at 216-17, 277 P.3d at 310-11.

352. As reflected in the TMT Project CDUA and in the testimony and documents admitted into evidence in the contested case proceeding, numerous measures are designed to reasonably protect native Hawaiian rights in connection with the TMT Project, including measures relating to the design, construction and operation of the telescope to minimize the impact upon, and protect, native Hawaiian rights. This is reflected in detail in FOF Section II.K and FOF Nos. 684 to 695 above.

353. Approval of the CDUP for the TMT Project is consistent with and satisfies the BLNR's and UH Hilo's obligations under Article XII, section 7 to recognize and protect customary and traditional native Hawaiian rights to the extent feasible. *Ka Pa'akai*, 94 Hawai'i at 47, 7 P.3d at 1084; *Hanapi*, 89 Hawai'i at 187, 970 P.2d at 495.

354. Even if every Petitioner and Intervenor had satisfied his or her burden of establishing a customary and traditional practice, and even if any of their practices relating to Mauna Kea are deemed to be traditional and customary practices entitled to constitutional protection, considering the totality of the facts and circumstances relating to Petitioners' and Opposing Intervenors' asserted practices, and then balancing the interests of *all* parties as described in detail in the Criterion Four section of the Findings of Fact above, the TMT Project preserves and protects the reasonable exercise of Petitioners' and Opposing Intervenors' practices to the extent feasible in compliance with Article XII, section 7 of the Hawai'i Constitution. *See supra* at FOF Section III.D.

b. ***Religious Freedom / Religious Establishment***

355. Belief in an area's religious sacredness does not make development of that area an unconstitutional infringement of religion, and does not give the believer a legal right to stop the development. *See Dedman v. BLNR*, 69 Haw. 255, 261-62, 740 P.2d 28, 32-33 (1987); *Lyng v. Northwest Cemetery Protective Ass'n*, 485 U.S. 439 (1988); *see also PASH*, 79 Haw. at 447 n.38, 903 P.2d at 1268 n.38 (citing *Lyng* for this proposition).

356. Constitutional protection means protection against *unreasonable interference* with religious practices; such protection does *not* prevent interference with religious *beliefs*. *See Dedman*, 69 Haw. at 260-61, 740 P.2d at 31-32 (noting that analysis focuses on unconstitutional infringement of religious *practices* even where the legitimacy and sincerity of religious *beliefs* is undisputed).

357. To determine if there is an unconstitutional infringement of religious rights, the inquiry

focuses on *practices* rather than *beliefs*:

> [I]t is necessary to examine whether or not the *activity* interfered with by the state was motivated by and rooted in a legitimate and sincerely held religious belief, whether or not the parties' free *exercise* of religion had been burdened by the regulation, the extent or impact of the regulation on the parties' religious *practices*, and whether or not the state had a compelling interest in the regulation which justified such a burden.

Dedman, 69 Haw. at 260, 740 P.2d at 32 (citations omitted; emphasis added). "[T]he United States Supreme Court has 'long recognized a distinction between the freedom of individual belief, which is absolute, and the freedom of individual conduct, which is not absolute.'" *Id.* (citations omitted).

358. Thus, a person claiming a violation of the constitutional right to free exercise of religion must "show the coercive effect of the [law] as it operates against him in the *practice* of his religion." *Id.* (brackets in original, emphasis added, citations omitted). To demonstrate that a project will result in an unconstitutional infringement of rights, a petitioner must show a "substantial burden" on his or her religious practices. *Id.* at 261, 740 P.2d at 33.

359. Moreover, even if proposed governmental action would adversely affect claimants' religious practices, the right of free exercise of religion is not violated unless the affected individuals would "be coerced by the Government's action into violating their religious beliefs" or the governmental action would "penalize religious activity by denying any person an equal share of the rights, benefits, and privileges enjoyed by other citizens." *Lyng*, 485 U.S. at 449.

360. Petitioners and Opposing Intervenors claim broadly that, in essence, their beliefs should give them veto power over any proposed land use on Mauna Kea. *See* Tr. 1/11/17 at 232, 239-240 (B. Pualani Case); Tr. 1/23/17 at 15-25 (Michael Lee); Tr. 1/23/17 at 213-16, 230-31 (Harry Fergerstrom); Tr. 1/30/17 at 173-74 (E. Kalani Flores); Tr. 2/13/17 at 37 (Kealoha Pisciotta); Tr. 1/9/17 at 95, 100-101 (Kahakalau); Tr. 2/27/17 at 42-43 (Tajon). The law does not support that view.

361. The constitutional right to free exercise of religion "must apply to all citizens alike, and it can give to none of them a veto over public programs that do not prohibit the free exercise of religion." *Lyng*, 485 U.S. at 452. "[G]overnment simply could not operate if it were required to satisfy every citizen's religious needs and desires." *Id.* Giving any objector the power to stop a project based upon his or her personal beliefs would violate the establishment clauses of both the federal and state Constitutions. *See* U.S. Const. amend. 1; Haw. Const. art. I, § 4.

362. As the United States Supreme Court has held, native religious practitioners may well feel that they require "an unobstructed view" and that they "must be surrounded by *undisturbed* naturalness" – but "such beliefs could easily require *de facto* beneficial ownership of some rather spacious tracts of public property." *Lyng*, 485 U.S. at 453

(emphasis in original). "Whatever rights [native practitioners] may have to the use of the area, however, those rights do not divest the Government of its right to use what is, after all, *its* land." *Id.* (emphasis in original, citation omitted).

363. According to the evidence adduced in this proceeding, the Petitioners and Opposing Intervenors have not demonstrated a need to conduct or participate in religious ceremonies on the proposed TMT Project site; they have not identified practices that will be substantially interfered with; and the BLNR's approval of the TMT Project will not threaten practitioners with sanctions if they engage in religiously motivated conduct. Moreover, except for actual construction areas while the Project is being built (and, once it is completed, the TMT Observatory site), Petitioners, Opposing Intervenors, and everyone else will have continued access to the summit area of Mauna Kea, for religious practices and for any other permitted activity.

364. In addition, the evidence demonstrates that for all of the Petitioners and Opposing Intervenors, telescopes and related infrastructure have existed on Mauna Kea for the entirety of their adult lives – if not the entirety of their lives – and the Petitioners and Opposing Intervenors have continued to exercise their religious practices in the presence of these facilities. The evidence presented also supports the conclusion that at least some of these religious and traditional and customary practices would not be practiced but for the observatories being built and the construction and maintenance of the Mauna Kea Observatory Access Road. *See, e.g.*, Tr. 12/05/16 at 63:5-15 (K. Ching testifying that kūpuna his age would rather have the road continue as it is so that they can drive up to the top of Puʻu Poliʻahu because they cannot walk up there).

365. Therefore, while the Petitioners' and Opposing Intervenors' believe in the sacredness and religious aspects of Mauna Kea, they have failed to show "the kind of objective danger to the free exercise of religion that the First Amendment was designed to prevent." *Dedman*, 69 Haw. at 261-62, 740 P.2d at 33 (citation omitted).

366. To withhold approval of the TMT Project "based on the mere assertion of harm to religious practices would contravene the fundamental purpose of preventing the state from fostering support of one religion over another." *Id.* at 262, 740 P.2d at 33.

367. Under these circumstances, as a matter of law, BLNR's approval of the Project does not and will not unreasonably interfere with Petitioners' and Opposing Intervenors' exercise of religious freedoms.

368. Petitioners' and Opposing Intervenors' religious practices also implicate the establishment clauses of the United States and Hawaiʻi constitutions.

369. The Establishment Clause of the First Amendment of the United States Constitution provides that "Congress shall make no law respecting an *establishment of religion*, or prohibiting the free exercise thereof." (Emphasis added.)

370. The Establishment Clause of Article 1, Section 4 of the Hawaiʻi Constitution provides that "[n]o law shall be enacted respecting an *establishment of religion*, or prohibiting the free exercise thereof, or abridging the freedom of speech or of the press or the right of the

people peaceably to assemble and to petition the government for a redress of grievances."

371. Petitioners' and Opposing Intervenors' arguments that their religious beliefs and practices require that the CDUA for the TMT Project be denied, and that nothing be built on Mauna Kea to "protect" and further the Petitioners' and Opposing Intervenors' religious practices essentially requires the State to recognize an exclusive religious servitude over public land in violation of the establishment clauses of the state and federal constitutions.

372. Here, the Free Exercise Clause is limited by the Establishment Clause: Petitioners and Opposing Intervenors cannot use the Free Exercise Clause to create a ***religious servitude*** over state land where the University seeks to build the TMT Project; creating that religious servitude would violate the Establishment Clause. *See Lyng*, 485 U.S. at 476 ("Should respondents or any other group seek to force the Government to protect their religious practices from the interference of private parties, ***such a demand would implicate*** not only ***the concerns*** of the Free Exercise Clause, but also those ***of the Establishment Clause*** as well.") (Brennan, dissenting) (emphasis added).

373. As the Hawai'i Supreme Court observed in *Dedman*, "[t]o invalidate the Board's actions based on the mere assertion of harm to religious practices would contravene the fundamental purpose of preventing the state from fostering support of one religion over another. . . . 'The First amendment . . .gives no one the right to insist that in pursuit of their own interests others must conform their conduct to his own religious necessities. . . . We must accommodate our idiosyncrasies, religious as well as secular, to the compromises necessary in communal life.'" *Dedman*, 69 Haw. at 262, 740 P.2d at 33 (quoting *Otten v. Baltimore & Ohio R. Co.*, 205 F.2d 58, 61 (2d Cir. 1953)).

374. Similarly, in *Korean Buddhist Dae Won Sa Temple of Hawai'i v. Sullivan*, the Hawai'i Supreme Court noted that "[t]he Temple cannot force the City to zone according to its religious conclusion that a particular plot of land is 'holy ground.'" 87 Hawai'i 217, 248, 953 P.2d 1315, 1346 (1998).

375. Hawai'i jurisprudence on the Establishment Clause is consistent with the findings and rationale in other jurisdictions that preferential government treatment for "sacred sites" is a violation of the Establishment Clause. *See Badoni v. Higginson*, 638 F.2d 172, 179 (10th Cir. 1980) ("The First Amendment . . .gives no one the right to insist that in pursuit of their own interests others must conform their conduct to his own religious necessities. . . . We must accommodate our idiosyncrasies, religious as well as secular, to the compromise necessary in communal life."); *Inupiat Cmty. v. United States*, 548 F. Supp. 182, 189 (D. Alaska 1982) (observing "that the relief sought by the Inupiat creates serious Establishment Clause problems" and explaining that "a free-exercise claim cannot be pushed to the point of awarding exclusive rights to a public area"); *Crow v. Gullet*, 541 F. Supp. 785, 794 (D. S.D. 1982) (noting that "the government risks being hauled into court by others who claim that the same rights of the general public are being unduly burdened, or that state government has become 'excessively entangled' with religion").

376. As set forth above, Petitioners and Opposing Intervenors assert that the TMT Project should not be placed in any part of the summit area of Mauna Kea or the Astronomy

Precinct because it is a sacred site according to their beliefs. *See, e.g.*, Tr. 1/11/17 at 81:1-83:2 (Fujikane); Tr. 1/23/17 at 24:25-25:8 (Michael Lee); Tr. 1/23/17 at 213:5-216:15, 230:5-231:10 (Harry Fergerstrom); Tr. 1/30/17 at 173:4-180:21 (E. Kalani Flores); WDT Pisciotta at 9, 16; Tr. 2/15/17 at 97:5-98:6 (Aloua); Tr. 2/27/17 at 208:8-210:21 (Kakalia).

377. For example, Case goes to the summit of Mauna Kea to pray. She likens it to a church, a temple, or a sacred place. The TMT Project would have an impact on her cultural practices no matter where the TMT Project was located in the Astronomy Precinct or the Mauna Kea Science Reserve. Tr. 1/11/17 at 231:17 – 232:23; *see also id.* at 239:4-240:22.

378. When asked whether the telescopes are clean enough for the summit of Mauna Kea, Kanaele responded "No, because the summit of Mauna Kea… should be wao akua, a place where only the akua and the elements are…" [B]uildings and activity of men should stay down at Wao Kanaka." Tr. 1/24/17 at 158:16 – 159:1.

379. Dr. Kahakalau, another Hawaiian elder called by Petitioners also affirmed the religious beliefs of certain native Hawaiians. "[B]uilding a TMT on Mauna Kea does not follow our value system…. [A] Hawaiian Mauna Kea is clearly sacred. It is clearly the realm of akua. It is clearly a place that is reserved for the akua." "[W]e leave the wao akua to our deities." Tr. 1/9/17 at 34:6-35:7. Dr. Kahakalau goes to say that "The Mauna is sacred." "[T]he wao akua, the places where the Gods reside, are considered sacred areas." "It is as sacred as any cathedral, as any temple, as any other sacred place in the world…" "So it is a place that needs to be undisturbed, that needs to remain in the state that it was created." Tr. 1/09/17 at 38:20-39:18; *see also id.* at 125:8-22, 173:14-174:5, 195:8-17.

380. Prof. J. Osorio, also called as a witness by Petitioners, also opposed the TMT Project because of the religious beliefs of native Hawaiians. "[B]ecause our people look at this place as sacred, and they have based practices and rituals on that place and are appealing to the state to exercise forbearance in the building of this…" The religious servitude that Prof. J. Osorio argues for is the whole mountain of Mauna Kea, not just the summit. Tr. 1/12/17 at 138:20 – 139:12.

381. In fact, certain Petitioners and Opposing Intervenors assert that they should be able to control who accesses the summit, according to their beliefs. Tr. 1/23/17 at 233:7 - 234:9 (Harry Fergerstrom); Tr. 1/9/17 at 95:8-16, 100:19-101:7, 104:12-19, 177:17-178:5, 197:5-10 (Kahakalau). The law does not support that view.

382. Under the foregoing, to withhold approval of the TMT Project based on the Petitioners' and Opposing Intervenors' arguments that their religious beliefs and practices should hold veto power over all uses of the lands of Mauna Kea would violate the Establishment Clause of the federal and state constitutions, and is hereby rejected.

c. ***Contemporary Practices***

383. As set forth above, *Ka Pa'akai* is concerned with the preservation and protection of customary and traditional native Hawaiian rights, not with contemporary cultural

practices. Nonetheless, UH Hilo's extensive efforts to identify cultural practices, potential impacts on or impairment of those practices, and feasible actions to be taken to reasonably protect the native Hawaiian rights that exist, set forth above, encompass not only customary and traditional practices, but contemporary practices as well.

384. As described above, Petitioner Flores claims that the CDUA is incomplete and should be denied because it fails to identify certain "find spots." For the reasons articulated in the above findings of fact, Petitioner Flores' claims are factually unfounded and therefore do not provide a basis for the BLNR to deny the CDUA.

385. In any event, HRS § 343-2 relates to the Environmental Assessment / Environmental Impact Statement phase of a project. As described above and below, the time for any challenge to the FEIS for the TMT Project expired long ago and no challenges were made. Consequently, any argument under HRS § 343-2 would be untimely and cannot be raised now.

C. PETITIONERS' AND OPPOSING INTERVENORS' OTHER ARGUMENTS

1. Waiver of Challenges to the FEIS

386. As noted in the findings of fact above, a number of the Petitioners and Opposing Intervenors actively participated in the HRS Chapter 343 EIS process for the TMT Project, including submitting comments on the DEIS, and consulting for the cultural impact assessment. *See supra* at FOF Section II.D.

387. The time limit for making challenges to an FEIS is set out in Haw. Rev. Stat § 343-7.

388. It is undisputed that the time for challenges to the Governor's acceptance of the FEIS for the TMT Project ended on August 7, 2010, and that neither Petitioners and Opposing Intervenors nor anyone else made a timely challenge – or, indeed, any challenge at all – to the TMT Project's FEIS.

389. Absent intervening changed environmental circumstances, no one is allowed a "second chance at administrative and judicial review when they failed to timely appeal the original" EIS. *See Oregon Natural Res. Council v. U.S. Forest Serv.*, 834 F.2d 842, 847 (9th Cir. 1987).

390. Petitioners and Opposing Intervenors have not credibly shown any intervening changed environmental circumstances here, and there are no facts in the record suggesting any such materially changed circumstances exist.

391. Having failed to timely challenge the FEIS for the TMT Project, Petitioners and Opposing Intervenors may not use this contested case proceeding to assert any such challenge, and all arguments seeking to challenge the adequacy, sufficiency, findings and/or conclusions of the FEIS are hereby rejected.

2. **Alleged Desecration**

392. Opposing Intervenor Temple, and other Opposing Intervenors and Petitioners, claim that development of the TMT Project—within the Astronomy Precinct and within an established Resource subzone in the Conservation District—would constitute a violation of HRS § 711-1107. The statute provides:

> (1) A person commits the offense of desecration if the person intentionally desecrates:
>
> (a) Any public monument or structure; or
>
> (b) A place of worship or burial; or
>
> (c) In a public place the national flag or any other object of veneration by a substantial segment of the public.
>
> (2) "Desecrate" means defacing, damaging, polluting, or otherwise physically mistreating in a way that the defendant knows will outrage the sensibilities of a person likely to observe or discover the defendant's action.
>
> (3) Any person convicted of committing the offense of desecration shall be sentenced to a term of imprisonment of not more than one year, a fine of not more than $10,000, or both.

393. The Petitioners' and Opposing Intervenors' claims that development of the TMT Project constitutes "desecration" under HRS § 711-1107 is meritless.

394. The BLNR does not have jurisdiction to adjudicate violations of the Hawai'i Penal Code. Hawai'i law is very clear that administrative agencies have only those powers expressly granted by statute. *Morgan v. Planning Dep't*, 104 Hawai'i 173, 184, 86 P.3d 982, 993 (2004). Nothing in the Hawai'i Penal Code or the BLNR's enabling statutes provides the BLNR with jurisdiction over criminal offenses. Instead, HRS § 603-21.5 confers upon the circuit courts of the State of Hawai'i jurisdiction over all "criminal offenses cognizable under the laws of the State," except for those offenses "otherwise expressly provided." On the basis of the foregoing, the alleged desecration claims fail.

395. Even if the desecration claim could be considered on its merits, there is simply no evidence whatsoever of a violation, and the claim fails as a matter of law.

396. HRS § 711-1107 lists the types of activities that constitute desecration as "defacing, damaging, polluting, *or otherwise physically mistreating*" a site. *Id.* (emphasis added).

397. Under the established principle of statutory construction, *ejusdem generis*, "where general words follow specific words in a statute, the general words are construed to embrace only objects similar in nature to those objects enumerated in the preceding specific words." *Singleton v. Liquor Comm'n, Cty. of Hawai'i*, 111 Haw. 234, 243 n.14, 140 P.3d 1014, 1023 n.14 (2006) (quoting *Peterson v. Hawaii Elec. Light Co.*, 85

Hawai‘i 322, 328, 944 P.2d 1265, 1271 (1997) (citing *Richardson v. City & County of Honolulu*, 76 Hawai‘i 46, 74, 868 P.2d 1193, 1201 (1994)).

398. Stated another way, "Under this established rule of statutory construction [*ejusdem generis*], where words of general description follow the enumeration of certain things, those words are restricted in their meaning to objects of like kind and character with those specified." *Richardson v. City & Cnty. of Honolulu*, 76 Haw. 46, 74, 868 P.2d 1193, 1221 (1994) (Klein, J., dissenting) (quoting *Jones v. Hawaiian Elec. Co., Inc.*, 64 Haw. 289, 294, 639 P.2d 1103, 1108 (1982)).

399. Thus, the general clause in HRS § 711-1107(2) that desecration requires conduct of "otherwise physically *mistreating*" a site makes it clear that the more specific listed conduct of "defacing, damaging, [and] polluting" must be motivated by the ill-intent of "mistreatment" and/or be unauthorized.

400. This ill-intent of mistreatment requires "conscious object to engage in certain conduct or cause a certain result." Commentary to HRS § 702-206(1).

401. Accordingly, the *mens rea* for the crime of desecration necessarily requires a specific intent to mistreat a protected site. HRS § 711-1107(2).

402. Thus, this situation is clearly distinguishable from the intent and types of conduct that desecration statutes are designed to address. *See e.g., Pistorino & Co., Inc. v. U.S.*, 82 Cust. Ct. 168 (1979) (discussing desecration in the context of statues as objects of veneration); *American Atheists, Inc. v. Port Authority of New York and New Jersey*, 760 F.3d 227, 240 (2d Cir. 2014) (discussing desecration within the context of whether or not the display of a cross at Ground Zero is simply as an artifact that tells the story of 9/11 or as an "object of veneration"); *R. B. Tyler Company v. Kinser*, 346 S.W.2d 306 (Ky. Ct. App. 1961) (discussing alleged desecration of a grave).

403. There is no evidence in this matter that an entity or "person" involved in this proceeding has the specific ill-intent to mistreat Mauna Kea through defacing, damaging or polluting the mountain through the development of the TMT Project, and the Hearing Officer specifically finds that the University and TIO have no such intent.

404. It is illogical that the University and TIO can be found to have the requisite specific intent to "mistreat" Mauna Kea by the development of the TMT Project, where it is undisputed that the project has been proposed for the Astronomy Precinct within the Resource subzone of the Conservation District, in which by law, "astronomy facilities" are expressly permitted – and in fact currently exist.

405. Moreover, this entire process relating to the CDUA for the development of the TMT Project, which has involved numerous and extensive studies, the preparation of the application, numerous consultations, review and analysis by the DLNR staff, and this contested case hearing itself, completely negates any argument that the University and TIO could have the requisite specific ill-intent to "mistreat" Mauna Kea. To the contrary, the participation by the University and TIO in the preparation and consideration of the CDUA and their participation in this proceeding demonstrates the complete opposite: an

intent and commitment to participate in a legal process designed to carefully consider the merits of the development of the TMT Project consistent with the eight criteria set forth in HAR § 13-5-30(c) as they apply to the Astronomy Precinct within the Resource subzone of the Conservation District on Mauna Kea.

406. To hold that HRS § 711-1107 applies to a land use expressly contemplated by law, and to a legal proceeding to consider the merits of that land use, would effectively eviscerate all land use controls and regulations, including HAR § 13-5-30(c).

407. The foregoing sufficiently addresses Petitioners' and Opposing Intervenors' claims of alleged desecration, without the need to make any findings or conclusions regarding any other element of the statute, including whether the summit of Mauna Kea meets any of the definitions under HRS § 711-1107(1)(a), (b) or (c). Petitioners' and Opposing Intervenors' alleged claims are not within BLNR's jurisdiction, are unsupported by any evidence, and are therefore rejected.

3. **Vacatur of Consent to Sublease**

408. The Petitioners and Opposing Intervenors sought the dismissal of TIO as a party in this proceeding due to the Third Circuit Court's decision in a separate matter to vacate the consent to the sublease for the TMT Project. *See* Order Granting in Part and Denying in Part Appellees State of Hawai'i, Board of Land and Natural Resources, Department of Land and Natural Resources, and Chairperson Suzanne D. Case's Motion for Stay of Proceedings, or in the Alternative for the Court to Issue its Decision on Appeal, Filed October 25, 2016; Vacating Consent to Sublease and Non-Exclusive Easement Agreement Between TMT International Observatory LLC and The University of Hawai'i Under General Lease No. S-4191; and Remanding Matter to the Board of Land and Natural Resources, Filed January 6, 2017 in *E. Kalani Flores v. Board of Land and Natural Resources, et al.*, Civil No. 14-1-00324, In the Circuit Court of the Third Circuit, State of Hawai'i ("**Flores Appeal**").

409. The Petitioners and Opposing Intervenors argued that TIO lacked standing because TIO no longer had a property interest due to the vacatur of the consent to the Sublease. *See* Temple of Lono's Motion to Dismiss TIO as Intervenor or, Alternatively, Stay this Proceeding [DOC-427] and Mr. Harry Fergerstrom's Motion to Remove TMT/TIO as a Party, for Lack of Standing, Including Any and All Submissions into the Evidentiary Library [DOC-429].

410. The motions to dismiss were properly denied and TIO is a proper party in this proceeding based on TIO's initial motion to intervene.

411. TIO was admitted as a party to this proceeding pursuant to HAR § 13-1-31(c), which provides that the BLNR may, in its discretion, admit as parties:

> Other persons who can show a substantial interest in the matter. . . . The board may approve such requests if it finds that the requestor's participation will substantially assist the board in its decision making. . . .

HAR § 13-1-31(c).

412. "After full consideration of the record, arguments, representations, motions, [and] applications," TIO's motion to intervene as a party was granted "due to TIO's substantial interest in the subject matter and because TIO's participation will substantially assist the Hearing Officer in her decision making." Minute Order No. 13 (July 21, 2016) at 4 [Doc. 115]. The order granting TIO's intervention did not reference, much less rely upon, the existence or validity of the Sublease, as it was not material to the Hearing Officer's decision to admit TIO as a party under HAR § 13-1-31(c).

413. Given the foregoing, the Circuit Court's Order in the Flores Appeal did not change the basis for the admission of TIO as a party to this proceeding. TIO, as the developer of the TMT Project, continued to have a "substantial interest" in the subject matter of this contested case hearing even after the entry of the Circuit Court's Order: the consideration of the CDUA for the TMT Project on Mauna Kea.

414. There was also no reasonable dispute that TIO's participation assisted the Hearing Officer in the decision on the CDUA. TIO was in a unique position, for example, to provide detailed evidence to the Hearing Officer regarding plans for the TMT Project, including the telescope's physical characteristics, the substantial public and scientific benefits of the project, TIO's mitigation plans and other facts that are relevant and material to the criteria that the Hearing Officer must consider pursuant to HAR § 13-5-30(c) for issuance of the CDUP.

415. Accordingly, the motions to dismiss TIO were properly denied notwithstanding the vacatur of the consent to the Sublease in the Flores Appeal.

4. **UH Hilo Authority to Execute CDUA**

416. Petitioners and Opposing Intervenors sought to strike the CDUA under the premise that since HAR § 13-5-31(b) provides that applications for CDUPs require the signature of the "landowner" (and in the case of state and public lands, "the State of Hawaii or government entity with management control over the parcel shall sign as landowner") and the University is the lessee of the MKSR, UH Hilo could not have day-to-day management over the land, and thus only the President of the University had the authority to sign the CDUA. *See* Petitioners' Motion to Strike Conservation District Use Application, HA-3568, dated September 2, 2010, and/or Motion for Summary Judgment, filed July 18, 2016 [Doc. 94] ("**Motion to Strike CDUA**").

417. Under HRS § 304A-101, the University is an organization consisting of multiple campuses, including UH Hilo.

418. Under University policy and practice, the University may delegate day-to-day management to specific campuses, and in 2000, the University formally delegated management control of MKSR to UH Hilo. *See generally*, WDT Nagata at 2-3; Tr. 12/8/18 at 27:6-39:19; Ex. A-48.

419. Accordingly, as a matter of law, UH Hilo is the proper signatory to the CDUA pursuant

to HAR § 13-5-31(b), so Petitioners' motion to strike the CDUA was properly denied.

5. CDUA Reference to TMT Corporation v. TIO

420. Petitioners and Opposing Intervenors argued that the CDUA should be voided because it references the TMT Corporation rather than TIO.

421. Mr. Ching offered his legal opinions regarding, inter alia, TMT Corporation and TIO, and the alleged affect that the different entities had on the CDUA. Ex. B. 19a (Ching WDT) and B. 19d (Ching Supplemental WDT). Mr. Ching is currently not a licensed attorney. Tr. 1/26/17 at 235:12-17. He was suspended from the practice of law for two years by the Hawai'i Supreme Court on or about April 14, 1993. Exs. C-41 and C-42. Per the Hawai'i Supreme Court's Order of Suspension, one of Mr. Ching's conditions of reinstatement is to successfully apply for and complete the Hawai'i bar examination. Ex. C-42 at 2. Mr. Ching did not present any evidence that he has successfully applied for and completed the Hawai'i bar examination since his suspension. Given the foregoing, the legal opinions given by Mr. Ching are disregarded and given no weight.

422. As Petitioners and Opposing Intervenors acknowledged, UH Hilo, not TIO, is the CDUA Applicant.

423. It is also undisputed that under any sublease for the MKSR, UH Hilo and any sublessee must comply with all terms of the CDUP.

424. Accordingly, although it is undisputed that TMT Corporation and TIO are different legal entities, that fact does not affect the validity of the CDUA.

425. Furthermore, although TMT Corporation and TIO are different entities for the purposes of corporation law, it was always contemplated that TMT's interests, assets and personnel were transferred to TIO once a CDUP had been obtained and construction was to commence. That transfer took effect after the conclusion of the prior contested case hearing.

426. Therefore, UH Hilo, as the applicant of the CDUA, was not required to resubmit the CDUA, reapply, or otherwise amend the CDUA to reflect the creation of TIO or the change from TMT Corporation to TIO.

6. NHPA Section 106 Review / National Environmental Policy Act

427. A number of the Petitioners and Opposing Intervenors claimed that TIO and UH Hilo had an obligation under NHPA Section 106 to independently determine whether the TMT Project or the National Science Foundation's activities and funding related to the TMT Project constituted an undertaking under NHPA Section 106, and that a Section 106 review of the TMT Project was required.

428. Petitioners and Opposing Intervenors are incorrect that NHPA Section 106 applies to this matter.

429. NHPA Section 106 is codified in the United States Code ("**U.S.C.**"), Title 54, Section 306108.

430. The implementing regulations for NHPA Section 106 are found in the Code of Federal Regulations ("**CFR**"), Title 36, Part 800, entitled "Protection of Historic Properties."

431. NHPA Section 106, 54 U.S.C. § 306108, titled "Effect of undertaking on historic property[,]" provides:

> The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, shall take into account the effect of the undertaking on any historic property. The head of the Federal agency shall afford the Council a reasonable opportunity to comment with regard to the undertaking.

432. NHPA Section 106 "requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Council a reasonable opportunity to comment on such undertakings." 36 CFR § 800.1.

433. The term "undertaking" as used in NHPA Section 106 means:

> a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including –
>
> (1) those carried out by or on behalf of the Federal agency;
>
> (2) those carried out with Federal assistance;
>
> (3) those requiring a Federal permit, license, or approval; and
>
> (4) those subject to State or local regulation administered pursuant to a delegation or approval by a Federal agency.

54 U.S.C. § 300320; 36 CFR § 800.16(y).

434. The term "Council" as used in NHPA Section 106 means the Advisory Council on Historic Preservation ("**ACHP**"). *See* 54 U.S.C. § 300303.

435. Review under NHPA Section 106 is required when there is an "undertaking" by a Federal agency that may affect historic properties. "The agency official shall determine whether the proposed Federal action is an undertaking." 36 CFR § 800.3(a). "It is the statutory obligation of the Federal agency to fulfill the requirements of section 106." *Id.* at § 800.2(a).

436. The NSF is a Federal agency under NHPA Section 106. *See* 54 U.S.C. §300301; 5

U.S.C. § 551. NSF concluded that its activities and funding related to the TMT Project did not constitute an "undertaking" requiring review under NHPA Section 106. *See* Exhibits A-124; A-125; and A-126.

437. In reviewing NSF's conclusions relating to NHPA Section 106, the ACHP "[saw] no basis for objecting to NSF's conclusions." Ex. A-125; *see also* Ex. A-126 (relating to NSF's conclusion that "there is no basis for NSF to engage in consultations with the project proponent with regard to Section 106 implications").

438. Review of the TMT Project under NHPA Section 106 was not required.

439. Neither TIO nor UH Hilo had an obligation or authority under NHPA Section 106 to independently determine whether the TMT Project or NSF's activities and funding related to the TMT Project constituted an undertaking under NHPA Section 106.

440. Neither TIO nor UH Hilo had an obligation or authority to engage in a Section 106 review of the TMT Project.

441. NHPA Section 106 is irrelevant and immaterial to the issue before the BLNR of whether or not to grant the CDUA.

442. NEPA governs the preparation of environmental impact statements and other procedures by federal agencies to assess the environmental effects of proposed federal action. *See* 42 U.S.C. § 4331.

443. Although none of the Petitioners and Opposing Intervenors claimed in this proceeding that the TMT Project is subject to NEPA (and the Hearing Officer affirmatively concludes that the TMT Project is not subject to NEPA), the Petitioners and Opposing Intervenors claimed that the evaluation of the cumulative impacts and proposed mitigation measures of the TMT Project should be guided by the approach applied by federal agencies pursuant to NEPA. *See* Ex. B.01s.

444. Inasmuch as NEPA does not apply to the TMT Project and the preparation of the EIS and other documents related to the project, and does not apply to the analysis of the cumulative impacts and proposed mitigation measures at issue in this proceeding, NEPA (and the approach employed by federal agencies under NEPA) is irrelevant and immaterial to the issue before the BLNR of whether or not to grant the CDUA.

XI. SUMMARY

445. The BLNR approved the CMP, CRMP, NRMP, PAP, and Decommissioning Plan on April 9, 2009 and March 25, 2010. These documents are the State of Hawai'i's management documents for the UH Management Area on Mauna Kea.

446. The activities that would be carried out if the TMT Project is approved and implemented are consistent with the management actions described in the CMP and sub-plans. This provides consistency and viability of management objectives, which include ensuring the sustained use of natural resources in the Resource subzone under HAR § 13-5-13.

447. A project-specific management plan has been developed for the TMT Project that adopts the approach, goals, objectives and management strategies and actions of the CMP and sub-plans in their entirety. The TMT Management Plan implements all relevant action items and plans of the CMP and sub-plans on a site-specific basis, ensuring that the management actions called for in the CMP and sub-plans which are applicable to the TMT Project are effectively and responsibly implemented.

448. Protection of native Hawaiian practitioners' exercise of customary and traditional practices on the summit area of Mauna Kea and within the area covered by the CDUA can be accomplished through implementation of the following conditions:

449. Implementation of a Cultural and Natural Resources Training Program that will require all construction managers, contractors, supervisors, construction workers, and TMT staff to be trained annually regarding the potential impact to cultural and archaeological resources and measures to prevent such impact.

450. Development and implementation of an Archaeological Monitoring Plan that will be submitted to SHPD for review and approval. Such plan shall provide for the employment of an archaeologist during the construction of the TMT Project who shall be on site during construction to insure minimal disturbance to any native Hawaiian cultural sites, practices and access to historical and cultural resources.

451. Development and implementation of an Archaeological Mitigation Plan pursuant to HAR § 13-284-8(a)(2). Such plan will be developed in consultation with native Hawaiian organizations, including the Office of Hawaiian Affairs.

452. Employment of a cultural resource specialist to work in conjunction with the archaeological monitor at all times and in all places or situations where on-site archaeological monitoring is required.

453. Regular consultation with Kahu Kū Mauna and other community groups regarding cultural resources.

454. Development of exhibits regarding cultural, natural, and historic resources in coordination with OMKM and ʻImiloa that could be used at the Mauna Kea VIS, ʻImiloa, TMT facilities, and other appropriate locations.

455. Reduced TMT Observatory operations to minimize daytime activities on up to four days per year in observance of native Hawaiian cultural practices.

456. The protection of the natural resources of the Mauna Kea summit and the area covered by the application for the CDUP can be accomplished through implementation of the following conditions:

457. Implementation of a Cultural and Natural Resources Training Program that will require all construction managers, contractors, supervisors, construction workers, and TMT staff to be trained annually regarding the potential impact to cultural and archaeological resources and the measures to prevent such impact.

458. Development and implementation of an Invasive Species Prevention and Control Program which will ensure: (1) all material shipments will be repacked off of the proposed TMT Project site so that only essential packing material is used for final transportation to the TMT Project site; (2) the washing and cleaning of all materials, clothing, construction vehicles, and heavy equipment off of the TMT Project site; (3) inspection of construction materials, equipment, crates, and containers and packing materials by a full-time trained biologist selected by OMKM and approved by the DLNR to assure no invasive plants or animals are introduced to the Mauna Kea summit areas; (4) weekly monitoring of the TMT Project sites by a trained biologist for the presence of invasive species; and (5) implementation of control measures by a trained biologist selected by OMKM and approved by the DLNR.

459. Monitoring of arthropods in the area of the TMT Access Way prior to, during, and for two years after construction of the Access Way.

460. Implementation of a Ride-Sharing Program that will limit vehicle trips to the summit, thus reducing the amount of dust generated along the unpaved sections of the Mauna Kea Access Road and TMT Access Way.

461. Development of exhibits regarding cultural, natural, and historic resources in coordination with OMKM and ʻImiloa that could be used at the Mauna Kea VIS, ʻImiloa, TMT facilities, and other appropriate locations.

462. Procurement of a National Pollutant Discharge Elimination System permit prior to the start of construction of the TMT Project from the State of Hawaiʻi Department of Health.

463. Implementation and coordination of the applicable provisions of the CRMP as related to the TMT construction and operation.

464. Implementation and coordination of the applicable provisions of the PAP as related to the TMT construction and operation.

465. The TMT Management Plan, Archaeological Monitoring Plan, Construction Plan, Historical and Archaeological Site Plan, Arthropod Access Way Monitoring Plan, and all other existing plans and agreements designed to protect the natural and cultural resources of Mauna Kea shall be complied with by the permittee.

466. Based upon the evidence and testimony presented in this contested case hearing, and the files and records herein, UH Hilo has proven by a preponderance of the evidence that it meets the requirements for the granting of the CDUA for the TMT Project. HAR § 13-5-30(c).

467. The proposed land use meets the criteria for issuance of a CDUP.

468. The proposed land use reasonably protects identified native Hawaiian rights and practices.

469. The Hearing Officer recommends that the BLNR grant the CDUA for the TMT Project,

subject to the conditions noted below.

470. Provided that the special conditions discussed above and as set forth below, and the standard conditions set forth in HAR § 13-5-42, as modified below, are imposed:

471. The proposed land use will be consistent with the purpose of the Conservation District;

472. The proposed land use will be consistent with the objectives of the Resource subzone;

473. The proposed land use will comply with provisions and guidelines contained in Chapter 205A, where applicable;

474. The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region;

475. The proposed land use, including buildings, structures, and facilities, will be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;

476. The existing physical and environmental aspects of the land will be reasonably preserved or improved upon, whichever is applicable;

477. Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and

478. The proposed land use will not be materially detrimental to the public health, safety, and welfare.

479. The Hearing Officer recommends that the BLNR approve the Findings of Fact, Conclusions of Law, and Decision and Order in this matter and also approve the TMT Management Plan.

480. Therefore, the proposed land use meets the criteria for issuance of a Conservation District Use Permit. The proposed land use also reasonably protects identified native Hawaiian rights.

481. Any proposed conclusion of law that is not specifically included above is hereby rejected.

482. If any of the above conclusions of law shall be determined to be findings of fact, it is intended that every such conclusion of law shall be construed as a finding of fact. Conversely, if any of the above findings of fact shall be determined to be conclusions of law, it is intended that every such finding of fact shall be construed as a conclusion of law.

RECOMMENDED DECISION AND ORDER

Based on the foregoing findings of fact and conclusions of law, the CDUA and the TMT Management Plan is recommended for approval. A CDUP should be issued by the BLNR,

subject to the following conditions:

(1) UH Hilo shall comply with all applicable statutes, ordinances, rules, regulations, and conditions of the Federal, State, and County governments, and applicable parts of the HAR § 13-5 et seq.;

(2) UH Hilo shall obtain appropriate authorization from the Department for the occupancy of state lands, if applicable;

(3) UH Hilo shall comply with all applicable Department of Health administrative rules;

(4) Any work done or construction to be done on the land shall be initiated within two (2) years of the approval of such use, in accordance with construction plans that have been signed by the Chairperson, and, unless otherwise authorized, shall be completed within twelve (12) years of the approval. The UH Hilo shall notify the Department in writing when construction activity is initiated and when it is completed;

(5) Before proceeding with any work authorized by the Board, UH Hilo shall submit four copies of the construction and grading plans and specifications to the Chairperson or his authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Three of the copies will be returned to UH Hilo. Plan approval by the Chairperson does not constitute approval required from other agencies;

(6) All representations relative to mitigation set forth in the Environmental Impact Statement and Conservation District Use Application are incorporated as conditions of the permit;

(7) All mitigation measures and management actions contained in the Historic Preservation Mitigation Plan, Construction Plan, Historical & Archaeological Site Plan, Maintenance Plan, and Arthropod Monitoring Plan, are incorporated as conditions of this permit;

(8) The TMT Project will comply with any terms and conditions outlined in the Comprehensive Management Plan and associated sub-plans; and

(9) The TMT Management Plan is approved, including all specific management actions articulated in the TMT Management Plan including, Cultural Resources Management, Natural Resources Management, Education & Outreach, Astronomical Resources, Permitting and Enforcement, Infrastructure and Maintenance, Construction Guidelines, Site Recycling, Decommissioning, Demolition & Restoration, Future Land Uses, and Monitoring, Evaluation & Updates. These management actions and their associated mitigation measures are incorporated as conditions of this permit.

The following additional conditions shall be implemented by OMKM and TIO:

(1) Ensuring that employees attend mandatory cultural and natural resources training;

(2) Working with the ʻImiloa Astronomy Center and OMKM to develop informational exhibits for visitors regarding the natural, cultural and archaeological resources of Mauna Kea;

(3) Funding the re-naturalization of the closed access road on Puʻu Poliʻahu, partial re-naturalization of the batch plant staging area after construction has been completed, and camouflaging of the utility pull boxes in certain locations to reduce the visual impact from the summit area;

(4) Implementing an invasive species control program;

(5) Working with OMKM to develop and implement a wēkiu bug habitat restoration study;

(6) Implementing the "Zero Waste Management" policy;

(7) Filling employment opportunities locally to the greatest extent possible;

(8) Mandating that employees traveling beyond Hale Pōhaku take part in a ride-sharing program using project vehicles;

(9) Using energy savings devices such as solar hot water systems, photovoltaic power systems, energy efficient light fixtures, and Energy Star rated appliances;

(10) Providing $1 million annually, adjusted for inflation, for "Community Benefits Package" which will commence with construction and continue through the term of the sublease. The package will be administered via The Hawaiʻi Island New Knowledge (THINK) Fund Board of Advisors;

(11) Partnering with other institutions to implement a Workforce Pipeline Program, headed by at least one full-time position through the Community Outreach office, to prepare local residents for jobs in science, engineering, and technical fields;

(12) The University will ensure that the survey of the power line corridor easement complies with DLNR standards and is in accordance with the conditions contained in the grant of easement (including the Mauna Kea Ice Age Natural Area Reserve) that was approved by the BLNR in August 1985. The University will provide copies of the survey to DOFAW;

(13) OMKM will consult with the U.S. Fish and Wildlife Service and experts who are advising OMKM, including representatives from the DLNR regarding surveys of the wēkiu bug and invertebrates along the utility corridor, including Puʻu Hau Kea and the puʻu west of the Parking Area 1;

(14) The construction contractor will be required to minimize the visual changes to land within the utility line right-of-way during utility upgrades. Any disturbance outside of the easement area of the construction corridor will be restored to the extent possible;

(15) UH Hilo will present a plan for handling recreational parking during construction to the OCCL for review and approval prior to beginning construction;

(16) Following construction, TMT shall keep their area clean and free of trash or unattended tools and equipment, unless authorized by OMKM and OCCL;

(17) The Archaeological Monitoring Plan will be submitted to the State Historic Preservation Division for review and approval prior to the onset of construction;

(18) TIO will pay a "substantial" amount for sublease rent. The rent would be deposited into the Manna Kea Land Fund, and only used for management of Mauna Kea.

(19) UH Hilo will notify OCCL of the date of the twice-annual inspections of the project site and allow Department staff to attend if available;

(20) UH Hilo will provide OCCL and BLNR a copy of their annual report to OMKM;

(21) UH Hilo will allow BLNR to name a DLNR representative to participate in the CMP five-year management review process;

(22) When provided or required, potable water supply and sanitation facilities shall have the approval of the Department of Health and the county Board of Water Supply;

(23) UH Hilo understands and agrees that this permit does not convey any vested rights or exclusive privilege;

(24) In issuing this permit, the Department and Board have relied on the information and data that UH Hilo has provided in connection with this permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Department may, in addition, institute appropriate legal proceedings;

(25) Where any interference, nuisance, or harm may be caused, or hazard established by the use, UH Hilo shall be required to take the measures to minimize or eliminate the interference, nuisance, harm, or hazard;

(26) Should historic remains such as artifacts, burials or concentration of charcoal

be encountered during construction activities, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact the State Historic Preservation Division (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary; the Applicant will also notify the Office of Hawaiian Affairs at the same time;

(27) During construction, appropriate mitigation measures shall be implemented to minimize impacts to off-site roadways, utilities, and public facilities;

(28) No construction work shall be initiated until the Applicant demonstrates compliance with all preconstruction conditions and mitigation measures outlined in this report. Once this condition has been satisfied, the Department will issue notice to proceed with construction;

(29) TIO shall set aside funds annually in a sufficient amount to allow for site observatory and access way site restoration;

(30) Daytime activities at TMT will be minimized on up to four days per year, as identified by Kahu Kū Mauna;

(31) Other terms and conditions as may be prescribed by the Chairperson; and

(32) Failure to comply with any of these conditions shall render this Conservation District Use Permit null and void.

DATED: Honolulu, Hawai‘i, May 30, 2017

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Index of Select Defined Terms

Defined Term	Definition
13N	13 North site
ACHP	Advisory Council on Historic Preservation
AIS	Archaeological inventory survey
AO	Adaptive optics
ASM	ASM Affiliates, Inc.
BLNR or Board	Board of Land and Natural Resources
BOR	University Board of Regents
Caltech	California Institute of Technology
CBP	Community Benefits Package
CDUA	Conservation District Use Application
CDUP	Conservation District Use Permit
CFHT	Canada-France-Hawai‘i Telescope
CFR	Code of Federal Regulations
Chairperson	Chairperson of BLNR
CMP	Comprehensive Management Plan
COL	Conclusions of Law
CRMP	Cultural Resources Management Plan
CSO	Caltech Submillimeter Observatory
CZMA	Hawai‘i Coastal Management Area
Decommissioning Plan	Decommissioning Plan for the Mauna Kea Observatories
DEIS	Draft Environmental Impact Statement
DLNR or Department	Department of Land and Natural Resources
DOE	Department of Education
EISPN/EA	Environmental Impact Statement Preparation Notice/Environmental Assessment
FEIS	Final Environmental Impact Statement
Flores Appeal	*E. Kalani Flores v. Board of Land and Natural Resources, et al.*, Civil No. 14-1-00324, In the Circuit Court of the Third Circuit, State of Hawai‘i
FOF	Findings of Fact
FWS	United States Fish & Wildlife Service
Gemini	Gemini North Observatory
General Lease	General Lease No. S-4191
Hanapi	*State v. Hanap*i, 89 Hawai‘i 177, 970 P.2d 485 (1998)
HAPA	Hawai‘i Administrative Procedures Act, HRS Chapter 91
HAR	Hawai‘i Administrative Rules
HawCC	Hawai‘i Community College
Hearing Officer or Judge Amano	Judge (Ret.) Riki May Amano
HELCO	Hawai‘i Electric and Light Company
HIBC	Hawai‘i Island Burial Council
Historic District	Geographically definable area possessing a significant concentration, linkage, or continuity of contributing properties – sites, buildings, structures, or objects united by past events or

	aesthetically by plan or physical development
Historic Property	Any building, structure, object, district, area, or site, including heiau and underwater sites, which is over fifty years old
HRS	Hawai‘i Revised Statutes
IfA	Institute for Astronomy
‘Imiloa	UH Hilo’s ‘Imiloa Astronomy Center
IRTF	NASA Infrared Telescope Facility
JCMT	James Clark Maxwell Telescope
Ka Pa‘akai	*Ka Pa‘akai o Ka ‘Aina v. Land Use Comm’n*, 94 Hawai‘i 31, 7 P.3d 1068 (2000)
KAHEA	Petitioner KAHEA: The Environmental Alliance
Keck I	First Phase of W.M Keck Observatory
Keck II	Second Phase of W.M Keck Observatory
Master Plan	Mauna Kea Science Reserve Master Plan
Mauna Kea Anaina Hou	*Mauna Kea Anaina Hou v. Board of Land and Natural Resources*, 136 Hawai‘i 376, 363 P.3d 224 (2015)
MISMP	Maunakea Invasive Species Management Plan
MKAH	Petitioner Mauna Kea Anaina Hou
MKMB	Mauna Kea Management Board
MKSR	Mauna Kea Science Reserve
MKWC	Mauna Kea Weather Center
Morimoto	*Morimoto v. BLNR*, 107 Hawai‘i 296, 113 P.3d 172 (2005)
Motion to Strike CDUA	Petitioners’ Motion to Strike Conservation District Use Application, HA-3568, dated September 2, 2010, and/or Motion for Summary Judgment, filed July 18, 2016 (Doc. 94)
NAR	Mauna Kea Ice Age Natural Area Reserve
NEPA	National Environmental Policy Act
NHPA Section 106	Section 106 of the National Historic Preservation Act
NOI	Notice of Intent
Non-Appearing Applicants	Ana Nawahine-Kaho‘opi‘i, Edward Akiona, Wai‘ala Ahn, Holonaikaipuna Mikala-Jiro Fukutomi, Michael Kumukauoha Lee, Keahi Tajon, Eric Hansen, Rick Cassiday, Linda Namauu, Joy Keahipuakauikawekiu Mills-Ferren, and Michelle Cabalse
NRMP	Natural Resources Management Plan
OCCL	DLNR, Office of Conservation and Coastal Lands
OEQC	State of Hawai‘i Department of Health’s Office of Environmental Quality Control
OHA	Office of Hawaiian Affairs
OMKM	Office of Mauna Kea Management
Opposing Intervenors	Meha Kihoi, C.M. Kaho‘okahi Kanuha, Harry Fergerstrom, Joseph Kualii Lindsey Camara, Jennifer Leina‘ala Sleightholm, Maelani Lee, Cindy Freitas, William Freitas, Temple, Kalikolehua Kanaele, Stephanie-Malia:Tabbada, Tiffnie Kakalia, Glen Kila, Dwight Vicente, and Brannon Kamahana Kealoha
PAP	Public Access Plan for the UH Management Area on Mauna Kea

PASH	*Public Access Shoreline Hawai'i v. Hawai'i County Planning Comm'n*, 79 Haw. 425, 903 P.2d 1246 (1995)
PCSI	Pacific Consulting Services, Inc.
Petitioners	Petitioners MKAH, Kealoha Pisciotta, Clarence Kukauakahi Ching, the Flores-Case 'Ohana, Paul Neves, Debora Ward, and KAHEA
PHS	Prehearing Statement
Pratt	*State v. Pratt*, 127 Hawai'i 206, 277 P.3d 300 (2012)
Preliminary Draft CIA	Preliminary Draft of the Cultural Impact Assessment
Prior Contested Case	DLNR Docket No. HA-11-05
PUEO	Perpetuating Unique Educational Opportunities, Inc.
ROOK	Royal Order of Kamehameha
SDRP	Site Deconstruction and Removal Plan
SHPD	State Historic Preservation Division
SIHP	Statewide Inventory of Historic Places
SMA	Submillimeter Array
SPRP	Spill Prevention and Response Plan
SRP	Site Restoration Plan
STEM	Science, technology, engineering, and mathematics
Subaru	Subaru Observatory
Supreme Court	Hawai'i Supreme Court
TCP	Traditional cultural property
Temple	Temple of Lono
TIO	TMT International Observatory, LLC
TIO Sublease	Executed, written sublease between the University and TIO for a portion of the UH Management Area
TMK	Tax Map Key
TMT Corporation	TMT Observatory Corporation
TMT Project	Thirty Meter Telescope at the MKSR
U.S.C.	United States Code
UH Hilo	University of Hawaii at Hilo
UH Management Area	MKSR, the Hale Pōhaku mid-level facilities, and the Summit Access Road (between Hale Pōhaku and the MKSR, including 400 yards on either side of the road, excluding the NAR)
UHERO	University of Hawai'i Economic Research Organization
UKIRT	United Kingdom Infrared Telescope
University	University of Hawaii
UST	Underground Storage Tanks
VIS	Mauna Kea Visitor Information Station
VLBA	Very Long Baseline Array
Wa'ahila Ridge	Findings of Fact, Conclusions of Law, Decision and Order, In re Conservation District Use Application for Hawaiian Electric Company, Inc. to Construct a 138-kV Transmission Line at Wa'ahila Ridge, Honolulu, Hawai'i, DLNR File No. OA-2801 (June 28, 2002)
Waiahole	*In re Water Use Permit Applications*, 94 Haw. 97, 9 P.3d 409

	(2000)
Waiola	*In re Contested Case Hearing on Water Use* ("*Waiola*"), 103 Hawai'i 401, 83 P.3d 664 (2004)
WDT	Written Direct Testimony
WMP	Waste Minimization Plan
WPP	Workforce Pipeline Program

APPENDIX A

DOC. NO.	DATE FILED	DOCUMENT NAME	RESPONSIVE FILINGS	DISPOSITION
Doc. 5	April 15, 2016	Petitioners' **Objections to Selection Process and to Appointment of Hearing Officer Made Pursuant to Minute Order No. 1**	UH Hilo's Response [Doc. 8, filed 4/21/16] Petitioners' Response and Supplemental Objection [Doc. 13, filed 5/2/16] Petitioners' Motion for Reconsideration and/or Motion to Strike Selection Process and to Disqualify Various Members and Hearing Officer [Doc. 31, filed 5/13/16] UH Hilo's Statement of Position [Doc. 43, filed 5/25/16]	**Denied** by Minute Order No. 4 [Doc. 14, filed 5/6/16] **Motion for Reconsideration denied** by Minute Order No. 9 [Doc. 63, filed 6/3/16]
Doc. 15	May 6, 2016	Petitioners' **Objections Regarding Procurement Committee and Process and Committee Member/BLNR Board Member**		**Denied** by BLNR Member Christopher Yuen's Response [Doc. 42, filed 5/25/16]
Doc. 78	June 21, 2016	Temple of Lono **Motion for Partial Summary Judgment**	UH Hilo's Opposition [Doc. 135, filed 8/1/16] TIO's Joinder to UH Hilo's Opposition [Doc 142, filed 8/1/16] PUEO's Joinder to UH Hilo's Opposition [Doc. 154, 8/1/16] Temple's Reply to the UH Hilo's Opposition [Doc. 176, filed 8/3/16] UH Hilo's Proposed Order Denying Motion [Doc. 315, filed 10/5/16] C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16] Temple's Response to Proposed Order [Doc. 334, filed 10/7/16]	**Denied** by oral ruling [Tr. 8/5/16 at 27:19-45:22] **Denied** by Minute Order No. 23 [Doc. 346, filed 10/10/16]
Doc. 79	June 22, 2016	Temple's **Kingdom of Hawaii Notice of Absence of Necessary and Indispensable Parties**	TIO's Opposition [Doc. 151, filed 8/1/16] Temple's Reponses to TIO's Opposition [Doc. 175, filed 8/3/16]	**Denied** by oral ruling [Tr. 8/5/16 at 111:23]
Doc. 80	June 24, 2016	Vicente's **Motion to Disqualify Judge Amano (Ret.); State of Hawaii Lack of Jurisdiction to**	Temple's Response in Support [Doc. 132, filed 7/27/16] Tabbada's Support [Doc. 239, filed 8/22/16]	**Denied** by Minute Order No. 14 [Doc. 124, filed 7/22/16]

		Hear the Contested Case Hearing		
Doc. 81	July 11, 2016	Petitioners' **Request for Continuance on Submissions and Next Hearing Date**	Petitioner's Supplement [Doc. 83, filed 7/12/16]	**Denied** by oral ruling [Tr. 8/5/16 at 25:13] **Denied** by Minute Order No. 27 [Doc. 350, filed 10/10/16]
			TIO's Opposition [Doc. 85, filed 7/14/16]	
			The UH Hilo's Opposition [Doc. 86, filed 7/14/16]	
			Petitioners' Reply to TIO's and the UH Hilo's Responses [Doc. 87, filed 7/14/16]	
			Kanaele's Joinder [Doc. 88, filed 7/15/16]	
			C. Freitas' Reply to TIO's and the UH Hilo's Responses [Doc. 114, filed 7/20/16]	
			William Freitas' Reply to TMT International Observatory LLC's and the UH Hilo's Responses [Doc. 125, filed 7/21/16]	
			UH Hilo's Proposed Order Denying Motion [Doc. 319, filed 10/5/16]	
			C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16]	
Doc. 84	July 13, 2016	Lee's **Motion to Intervene**	UH Hilo's Opposition [Doc. 136, filed 8/1/16]	**Denied** by oral ruling [Tr. 8/5/16 at 76:7-78:6] **Denied** by Minute Order No. 26, [Doc. 349, filed 10/10/16]
			TIO's Opposition [Doc. 146, filed 8/1/16]	
			UH Hilo's Proposed Order Denying Motion [Doc. 322, filed 10/5/16]	
			C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16]	
Doc. 89	July 18, 2016	C. Freitas' **Request for Continuance on Witness List and Next Hearing Date**	C. Freitas' Motion for Reconsideration [Doc. 205, filed 8/11/16]	**Denied** by oral ruling [Tr. 8/5/16 at 20:07, 25:13]
			W. Freitas' Joinder to Cindy Freitas' Motion for Reconsideration [Doc. 207, filed 8/11/16]	
			C. Freitas' Motion to Withdraw Motion for Reconsideration [Doc 212, filed 8/16/16]	
Doc. 90	July 18, 2016	W. Freitas' **Request for Continuance on Witness List and Next Hearing Date**		**Denied** by oral ruling [Tr. 8/5/16 at 20:07, 25:13]
Doc. 91	July 18, 2016	Kila's **Request for Continuance on Witness List and Next Hearing**		**Denied** by oral ruling [Tr. 8/5/16 at 20:07, 25:13]

		Date		
Doc. 92	July 18, 2016	Sleightholm's **Request for Continuance on Witness List and Next Hearing Date**		**Denied** by oral ruling [Tr. 8/5/16 at 20:07, 25:13]
Doc. 94	July 18, 2016	Petitioners' **Motion to Strike Conservation District Use Permit Application**, HA-3568, dated September 2, 2010, and/or **Motion for Summary Judgment**	UH Hilo's Opposition [Doc. 137, filed 8/1/16]	**Denied** by Minute Order No. 37 [Doc. 388, filed 10/19/16]
			TIO's Opposition [Doc. 148, filed 8/1/16]	
			Camara's Joinder [Doc. 181, filed 8/8/16]	
			TIO's Objection to Camara's Joinder [Doc. 183, filed 8/8/16]	
			The UH Hilo's Joinder to TIO's Objections to Camara's Joinder [Doc. 199, filed 8/11/16]	
			Tabbada's Support [Doc. 239, filed 8/22/16]	
Doc. 95	July 18, 2016	Petitioners' **Motion to Disqualify BLNR's and Hearing Officer's Counsel**	UH Hilo's Opposition [Doc. 138, filed 8/1/16]	**Denied** by Minute Order No. 38 [Doc. 389, filed 10/19/16]
			TIO's Opposition [Doc. 147, filed 8/1/16]	
			PUEO's Joinder to the UH Hilo's Opposition [Doc. 153, filed 8/1/16]	
			Attorney General Douglas S. Chin, The Department of the Attorney General, and Deputy Attorneys General in their capacity as counsel for the Board of Land and Natural Resources and Hearing Officer's, Memorandum in Opposition [Doc 157, filed 8/1/16]	
Doc. 96	July 18, 2016	Fergerstrom's **Motion to Reconsider all Motions, Application, and/or Request for Admission or Intervention as a Party or Other Parties in this Matter; Motion to strike all motions, Applications, Decisions, etc: Essentially Making Moot the Entire Hearing; Motion to Remove Hearing Officer Riki May Amano, Attorney General Julie China, and Director of Coastal and Conservation**	Kanaele's Motion to Join [Doc. 122, filed 7/22/16]	**Denied** by oral ruling (Tr. 8/5/16 at 92:6-103:9) **Denied in part** by Minute Order No. 17 [Doc. 245, filed 8/26/16] **Denied in part** by Minute Order No. 22, [Doc. 345, filed 10/10/16]
			DeLeon's Motion to Join [Doc. 123, filed 7/22/16]	
			TIO's Opposition [Doc. 144, filed 8/1/16]	
			TIO's Proposed Order Denying Motion [Doc. 309, filed 10/5/16]	
			C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16]	

		Lands Michael Cain		
Doc. 97	July 18, 2016	Tabbada's **Motion to Vacate Entire Process for Violation of BLNR and UH Hilo of Hawaii Fiduciary Trust, Rights, Responsibilities, Breach of Contract, Etc. Mandated by the Law of the Land**	UH Hilo's Opposition [Doc. 139, filed 8/1/16]	**Denied** by oral ruling (Tr. 8/5/16 at 79:6-81:4) **Denied** by Minute Order No. 25 [Doc. 348, filed 10/10/16]
			TIO's Joinder to the UH Hilo's Opposition [Doc. 142, filed 8/1/16]	
			Tabbada's Response to the UH Hilo's Oppositions [Doc. 239, filed 8/22/16]	
			UH Hilo's Proposed Order Denying Motion [Doc. 316, filed 10/5/16]	
			C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16]	
Doc. 98	July 18, 2016	Kihoi's **Motion to Deny the Intervention of Perpetuating Unique Educational Opportunities as a Party to the Contested Case Hearing**	TIO's Opposition [Doc. 145, filed 8/1/16]	**Denied** by oral ruling [Tr. 8/5/16 at 81:5-88:22] **Motion for Reconsideration denied** by oral ruling [Tr. 8/29/16 at 9:3-9:8] **Denied** by Minute Order No. 28 [Doc. 351, filed 10/10/16]
			PUEO's Opposition [Doc. 155, filed 8/1/16]	
			Sleightholm's Joinder [Doc. 192, filed 8/10/16]	
			UH Hilo's Objection to Sleightholm's Joinder [Doc. 197, filed 8/11/16]	
			TIO's Objection to Sleightholm's Joinder [Doc. 204, filed 8/11/16]	
			Kihoi's Motion for Reconsideration [Doc. 209, filed 8/12/16]	
			Kealoha's Joinder to Motion for Reconsideration [Doc. 228, filed 8/22/16]	
			Sleightholm's Joinder to Motion for Reconsideration [Doc. 236, filed 8/22/16]	
			TIO's Opposition to Motion for Reconsideration [Doc. 232, filed 8/22/16]	
			PUEO's Opposition to Motion for Reconsideration [Doc. 234, filed 8/22/16]	
			UH Hilo's Joinder to TIO's Opposition [Doc. 226, filed 8/22/16]	
			Tabbada's Response to the UH Hilo's Opposition [Doc. 239, filed 8/22/16]	

			PUEO's Proposed Minute Order Denying Kihoi's Motion [Doc. 308, filed 10/5/16]	
			Kihoi's Motion for Reconsideration [Doc. 380, filed 10/15/16]	
			Kanaele's Joinder to Motion for Reconsideration [Doc. 390, filed 10/18/16]	
			PUEO's Opposition to Motion for Reconsideration [Doc. 396, filed 10/19/16]	
			Kihoi's Proposed Minute Order No. __ Objection to Proposed Minute Order No. __ Denying Mehana Kihoi's Motion to Deny the Intervention of Perpetuating Unique Educational Opportunities as a Party in the Contested Case Hearing [Doc. 327, filed 10/6/16]	
Doc. 99	July 18, 2016	PUEO's **Motion to Set the Issues**	Temple's Oppositions [Doc. 119, filed 7/20/16]	**Granted** by Minute Order No. 19 [Doc. 281, filed 9/23/16]
			UH Hilo's Substantive Joinder [Doc. 140, filed 8/1/16]	
			TIO's Substantive Joinder [Doc. 152, filed 8/1/16]	
			Petitioners' Position Statement [Doc. 164, filed 8/1/16]	
			Fergerstrom's Opposition [Doc. 186, filed 8/9/16]	
			Sleightholm's Joinder to Fergerstrom's Opposition [Doc. 210, filed 8/8/16]	
			Kihoi's Joinder to Fergerstrom's Opposition [Doc. 195, filed 8/10/16]	
			UH Hilo's Objections to Fergerstom's Opposition and Sleightholm's and Kihoi's Joinders [Doc. 196, filed 8/11/16]	
			Vicente's Objection [Doc. 222, filed 8/19/16]	
			Tabbada's Response to the UH Hilo's Opposition [Doc. 239, filed 8/22/16]	
			UH Hilo's Supplemental Comments [Doc. 242, filed 8/22/16]	
			PUEO's Proposed Minute Order Granting PUEO Motion to Set Issues [Doc. 256, filed 9/9/16]	
			Temple's Proposed Issues [Doc. 265, filed 9/17/16]	
			Fergerstrom's Opposition to PUEO's Proposed Order [doc. 266, filed 9/18/16]	
			UH Hilo's Response in Support of PUEO's Proposed Order [Doc. 267, filed 9/19/16]	
			TIO's Response to PUEO's Proposed Order [Doc. 268, filed 9/19/16]	
			Camara's Response to PUEO's Proposed Order [Doc. 269, filed	

			9/19/16]	
			Petitioners' Response to PUEO's Proposed Order [Doc. 270, filed 9/19/16]	
			W. Freitas' Response to Issue that all Should be Considered [Doc. 271, filed 9/19/16]	
			Vicente's Objection [Doc. 272, filed 9/19/16]	
			Kakalia's Addition to PUEO's Motion [Doc. 273, filed 9/19/16]	
			Tabbada's Response to PUEO's Proposed Order [Doc. 275, filed 9/19/16]	
			C. Freitas' Respond to Proposed Doc 256 All Issues Should Also be Considered [Doc. 297, filed 10/3/16]	
			Kanaele's Joinder to Petitioners' Response [Doc. 298, filed 10/3/16]	

APPENDIX B

DOC. NO.	DATE FILED	DOCUMENT NAME	RESPONSIVE FILINGS	DISPOSITION
Doc. 126	July 22, 2016	Temple of Lono's **Motion to Dismiss for Lack of Jurisdiction Based on Unresolved Land Claims**	TIO's Proposed Order Denying Motion [Doc. 310, filed 10/5/16] C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16] Temple's Response to Proposed Order [Doc 335, filed 10/7/16]	**Denied** by oral ruling [Tr. 8/5/16 at 30:22-46:8] **Denied** by Minute Order No. 29 [Doc. 352, filed 10/10/16]
Doc. 127	July 22, 2016	Temple of Lono's **Motion to Vacate Ruling and Supplement Response Time**	TIO's Opposition [Doc. 150, filed 7/22/16] Vicente's Motion to Support [Doc 169, filed 8/1/16] Tabbada's Motion to Support [Doc. 174, filed 8/1/16] Temple's Reply to TIO's Opposition [Doc. 177, filed 8/3/16]	**Denied** by Minute Order No. 17 [Doc. 245, filed 8/28/16]
Doc. 130	July 26, 2016	Petitioners' **Renewal of Objections to Hearing Officer Selection Process and Hearing Officer Appointment, and Supplemental Arguments on Motion to Disqualify BLNR's and Hearing Officer's Counsel**		**Denied** by Minute Order No. 17 [Doc. 245, filed 8/26/16]
Doc. 173	July 29, 2016	Kanaele's **Motion to Exclude/Remove PUEO, TMT, UH Manoa/Hilo, and all Petitioners Seeking for Permit for TMT by circumvention of Religious Protections of the Hawaii Constitution Article XII and HRS 7-11-1107 Committing Desecration**	UH Hilo's Proposed Minute Order Denying Kalikolehua Kanaele's Motion to Exclude/Remove PUEO, TMT, UH Manoa/Hilo, and all Petitioner's Seeking for Permit [Doc. 321, filed 10/5/16]	**Denied** by Minute Order No. 24 [Doc. 347, filed 10/10/16]
Doc. 141	August 1, 2016	UH Hilo's **Objection to Immaterial, Irrelevant, and Unduly Repetitious**		

		Witness Testimony		
Doc. 161	August 1, 2016	Brannon Kamahana Kealoha's **Quo Warranto, Demand of Jurisdiction**	Kealoha's Motion Invoking Quo Warranto [Doc. 180, filed 8/8/16]	**Denied** by Minute Order No. 30 [Doc. 353, filed 10/10/16]
			TIO's Opposition [Doc. 184, filed 8/9/16]	
			Kealoha's Response [Doc. 189, filed 8/10/16]	
			UH Hilo's Joinder to TIO's Opposition [Doc. 202, filed 8/11/16]	
			Fergerstrom's Opposition to TIO's Opposition [Doc. 206, filed 8/11/16]	
			Tabbada's Response to the UH Hilo's Joinder and Motion in Support [Doc. 239, filed 8/22/16]	
			Kealoha's Motion for Reconsideration [Doc. 379, filed 10/15/16]	
			TIO's Opposition to Kealoha's Motion for Reconsideration [Doc. 393, filed 10/19/16]	
			TIO's Proposed Order Denying Motion [Doc. 311, filed 10/5/16]	
			C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16]	
Doc. 178	August 7, 2016	Temple's **Motion for Reconsideration of Judge Amano's Oral Ruling that the Status of the State of Hawaii will not be an Issue in this Contested Hearing**	TIO's Objection [Doc. 183, filed 8/9/16]	**Withdrawn** by Temple's Motion to Withdraw Motion [Doc. 211, 8/15/16]
			UH Hilo's Joinder to TIO's Objection [Doc. 199, filed 8/11/16]	
			UH Hilo's Opposition [Doc. 200, filed 8/11/16]	
			Tabbada's Response [Doc. 239, filed 8/22/16]	
Doc. 179	August 8, 2016	Temple of Lono's **Motion to File Out of Time**	TIO's Objection [Doc. 183, filed 8/9/16]	**Denied** by oral ruling [Tr. 8/29/16 at 28:9-28:12] **Denied** by Minute Order No. 33 [Doc. 356, filed 10/10/16]
			Sleightholm's Joinder [Doc. 193, filed 8/10/16]	
			UH Hilo's Objection [Doc. 194, filed 8/10/16]	
			UH Hilo's Joinder to TIO's Objection [Doc. 199, filed 8/11/16]	
			UH Hilo's Objection to Sleightholm's Joinder [Doc. 198, filed 8/11/16]	
			Kila's Memorandum in Support [Doc. 221, filed 8/19/16]	
			Sleightholm's Memorandum in Support [Doc. 235, filed 8/22/16]	

			Tabbada's Response to the UH Hilo's Opposition [Doc. 239, filed 8/22/16]	
			Fergerstrom's Memorandum in Support [Doc. 244, filed 8/25/16]	
			Temple's Supplement [Doc. 337, filed 10/7/16]	
			UH Hilo's Proposed Order Denying Motion [Doc. 318, filed 10/5/16]	
			C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16]	
			Temple's Response to Proposed Order [Doc 336, filed 10/7/16]	
Doc. 182	August 8, 2016	BLNR's **Motion for Protective Order for the Honorable David Y. Ige, Suzanne Case and Stanley Roehrig**	Petitioner's Motion to Strike [Doc 187, filed 8/10/16]	**Denied** by oral ruling [Tr 8/29/16 at 52:14-52:20 and 72:1-72:14] **Denied** by Minute Order No. 31 [Doc. 354, filed 10/10/16] **Motion to Strike denied** by Minute Order No. 32 [Doc. 355, filed 10/10/16]
			UH Hilo's Joinder [Doc. 201, filed 8/11/16]	
			TIO's Objection to the Untimely Motions and Joinders [Doc. 203, filed 8/11/16]	
			Vicente's Objection [Doc. 208, filed 8/11/16]	
			BLNR's Opposition to Petitioners' Motion to Strike [Doc. 224, filed 8/22/16]	
			Petitioners' Opposition [Doc. 233, filed 8/22/16]	
			Tabbada's Response to the UH Hilo's Joinder and Response to Motion [Doc. 239, filed 8/22/16]	
			UH Hilo's Joinder to TIO's Objection [Doc. 241, filed 8/22/16]	
			TIO's Proposed Order Denying Motion [Doc. 312, filed 10/5/16]	
			TIO's Proposed Order Denying Motion to Strike [Doc. 314, filed 10/5/16]	
			C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16]	
Doc. 188	August 10, 2016	Petitioners' **Request for Simultaneous Hearings on Petitioner's Motions to Disqualify Hearing Officer and to Recuse BLNR and Hearing Officer's Counsel and Request to Stay**		

		Proceedings.		
Doc. 190	August 10, 2016	Kealoha's **Demanding Redress to the Fact that we are Being Rushed, Coerced, and Intimidated through this Process by the Hearing's Officer and through Silence and Verbal Prodding as well as through Silence and Lack of Action of the Attorney General's Office**	TIO's Objection to the Untimely Motions and Joinders [Doc. 203, filed 8/11/16] UH Hilo's Joinder to TIO's Opposition [Doc. 225, filed 8/22/16] TIO's Opposition [Doc. 231, filed 8/22/16] UH Hilo's Joinder to TIO's Objection [Doc. 241, filed 8/22/16]	
Doc. 191	August 10, 2016	Kealoha's **Motion Demanding Inventory of the So-Called Ceded Lands Containing the Specific Land and Parcel the TIO Plans to be Sub-Leased by UH who Leases Said Lands from the BLNR, a Survey of these Lands also**	TIO's Joinder to UH Hilo's Opposition [Doc. 237, filed 8/22/16] UH Hilo's Opposition [Doc. 243, filed 8/22/16] UH Hilo's Proposed Order Denying Motion [Doc. 317, filed 10/5/16] C. Freitas' Objection to Proposed Order [Doc. 332, filed 10/7/16] UH Hilo's Joinder [Doc. 241, filed 8/22/16]	**Denied** by oral ruling [Tr. 8/29/16 at 56 1-56:3] **Denied** by Minute Order No. 34 [Doc. 363, filed 10/11/16]
Doc. 227	August 22, 2016	Cindy Freitas' **Motion to File Motion Out of Time**		
Doc. 246	August 26, 2016	TIO's **Request for the Board to act upon denial of intervention pursuant to HAR Sect. 13-1-31(G)**		
Doc. 248	August 29, 2016	Fergerstrom's **Notice of the Appearance of Administrative Bias**		
Doc. 252	September 2, 2016	Fergerstrom's **Notice of Family Burial Claim Under the Proposed TMT Site**		
Doc. 254	September 8, 2016	Petitioners' **Request for Further Status Conference and/or Consideration of Proposed Scheduling**	Fergerstrom's Memorandum in Support [Doc. 257, filed 9/11/16] W. Freitas' Memorandum in Support [Doc. 258, filed 9/12/16] C. Freitas' Memorandum in Support [Doc. 259, filed 9/12/16] Kihoi's Memorandum in Support [Doc. 261, filed 9/14/16]	**Granted in part, denied in part** by Minute Order No. 45 [Doc. 590, filed May 2, 2017].

			UH Hilo's Objections [Doc. 294, filed 9/30/16] Temple's Support [Doc. 296, filed 10/3/16] Kanaele's Joinder [Doc. 299, filed 10/3/16]	
Doc. 262	September 17, 2016	Temple of Lono's **Motion to Recuse Hearing Officer**	UH Hilo's Opposition [Doc. 434, filed 12/30/16] Temple's Motion to Strike UH Hilo's Opposition [Doc. 436, filed 12/31/16] UH Hilo's Opposition to Temple's Motion to Strike [Doc. 536, filed 3/22/17] TIO's Joinder to UH Hilo's Opposition to Temple's Motion to Strike [Doc. 544, filed 3/23/17] Temple's Motion to Reconsider [Doc 610, filed 5/4/17] UH Hilo's Opposition to Temple's Motion for Reconsideration [Doc. 638, filed 5/17/17] TIO's Joinder to UH Hilo's Opposition to Temple's Motion for Reconsideration [Doc. 639, filed 5/17/17]	**Denied** by Minute Order No. 46 [Doc. 595, filed May 2, 2017]
Doc. 263	September 17, 2016	Temple of Lono's **Motion for Summary Judgment (Disqualification)**	UH Hilo's Opposition [Doc. 433, filed 12/30/16] Temple's Motion to Strike UH Hilo's Opposition [Doc. 435, filed 12/31/16] UH Hilo's Opposition to Temple's Motion to Strike [Doc. 536, filed 3/22/16] TIO's Joinder to UH Hilo's Opposition to Temple's Motion to Strike [Doc 544, filed 3/23/17] Temple's Motion to Reconsider [Doc 619, filed 5/5/17] UH Hilo's Opposition to Temple's Motion to Reconsider [Doc. 641, filed 5/18/17]	**Denied** by Minute Order No. 47 [Doc. 609, filed May 4, 2017]
Doc. 264	September 17, 2016	Temple of Lono's **Motion for Summary Judgment (Desecration)**	UH Hilo's Opposition [Doc. 473, filed 2/22/17] Temple's Motion to Strike [Doc. 474, filed 2/22/17] TIO's Joinder to UH Hilo's Opposition [Doc. 484, filed 2/28/17] Temple's Motion to Strike TIO's Joinder [Doc 490, filed 3/2/17]	

			UH Hilo's Opposition to Temple's Motion to Strike [Doc. 536, filed 3/22/17] TIO's Joinder to UH Hilo's Opposition to Motion to Strike and Opposition to Temple's Motion to Strike TIO's Opposition [Doc. 544, filed 3/23/17]	
Doc. 277	September 21, 2016	W. Freitas' **Motion to Amend Doc. 274 Site Visit**		
Doc. 278	September 21, 2016	C. Freitas' **Motion to Amend Doc. 274 Site Visit**		
Doc. 279	September 22, 2016	Kihoi's **Memorandum re: Site Visit**		
Doc. 280	September 22, 2016	Sleightholm's **Motion of Opposition and Request to Amend Minute Order No. 18 Doc 274**		
Doc. 285	September 26, 2016	Cindy Freitas' **Motion to Object to Phone Call by Michael Cain on 9/23/16 that was Instructed by Hearing Officer Judge Riki Amano (ret.)**		
Doc. 286	September 26, 2016	Temple of Lono's **Motion for Reasoned Explanations and Extensions of Time**		
Doc. 287	September 26, 2016	Camara's **Response** [to Minute Order No. 18]		
Doc. 283	September 26, 2016	W. Freitas' **Motion to Amend Doc. 281 Minute Order No. 19**		
Doc. 284	September 26, 2016	C. Freitas' **Motion to Amend Doc. 281 Minute Order No. 19**		
Doc. 288	September 26, 2016	Petitioners' **Objections to Site Visit and Minute Order No. 18**		
Doc. 291	September 28, 2016	Camara's **Motion to Reconsider Minute Order No. 19**	W. Freitas' Joinder [Doc. 292, filed 9/28/16] UH Hilo's Opposition [Doc. 303, filed 10/3/16]	
Doc. 293	September 29, 2016	Temple's **Motion for Reconsideration** [of Minute Order No. 19]	TIO's Opposition [Doc. 301, filed 10/3/16] UH Hilo's Joinder to TIO's Opposition [Doc. 302, filed 10/3/16]	
Doc. 304	October 4, 2016	W. Freitas' **Motion for Extension of Time for Filing of Motions, Witness and Exhibit Lists and Direct**		

		Testimonies and Pre-Hearing Statement		
Doc. 305	October 4, 2016	C. Freitas' **Motion for Extension of Time for Filing of Motions, Witness and Exhibit Lists and Direct Testimonies and Pre-Hearing Statement**		
Doc. 306	October 4, 2016	Kihoi's **Motion for Extension of Time for Filing of Motions, Witness and Exhibit Lists and Direct Testimonies and Pre-Hearing Statement**	Kihoi's Motion for Extension of Filing Motions, Witness and Exhibit Lists, Direct Testimonies and Pre-Hearing Statements [Doc. 323, filed 10/5/16]	
Doc. 324	October 6, 2016	Temple's **Motion to Schedule Pending Motions.**		
Doc. 326	October 6, 2016	Sleightholm's **Motion for a Motion for Extension of Filing Motions, Witness and Exhibit Lists, Direct Testimonies and Pre-Hearing Statements**		
Doc. 328	October 6, 2016	Kealoha's **Essential Extension of Time for Filing Motions and Witness and Exhibit Lists and Direct Testimonies and Pre-Hearing Statements and Request/Demand for Reconciliation on Following Items**		
Doc. 329	October 7, 2016	Temple's **Motion for Extension of Time for Filing of Final Witness List and Prefiled Testimony, Exhibit List and Exhibits, Pre-Hearing Statement, and Motions**		
Doc. 331	October 7, 2016	C. Freitas' **Objection to Minute Order No. __ that Hearing Officer Order on October 3, 2016**		
Doc. 338	October 8, 2016	Kanaele's **Motion for More Time of 1 Month, for Due Process in this Instant Case, and Final Order for Motion to Exclude Pro Desecration**		

		PUEO/TMT/UH from Promoting Desecration of a Conservation District		
Doc. 339	October 8, 2016	Camara's **Response to Amended Notice of Contested Case Hearing**		
Doc. 340	October 10, 2016	Petitioners' **Renewed Motion to Disqualify Hearing Officer**	Temples' Substantive Joinder and Supplement [Doc. 343, filed 10/10/16]	**Denied** by Minute Order No. 39 [Doc. 406, filed 10/28/16]
			Temples' Second Supplement [Doc. 360, filed 10/11/16]	
			Temples' Third Supplement [Doc 361, filed 10/11/16]	
			Kihoi's Joinder [Doc. 358, filed 10/11/16]	
			W. Freitas' Substantive Joinder [Doc. 359, filed 10/13/16]	
			UH Hilo's Statement of Position [Doc. 369, filed 10/13/16]	
			Petitioners' Response to UH Hilo's Statement of Position [Doc 383, filed 10/17/16]	
			Temple's Response to UH Hilo's Statement of Position [Doc 386, filed 10/17/16]	
			Temple's Motion to Vacate Minute Order No. 39 or, Alternatively, to Partially Reconsider Minute Order No. 39 [Doc. 409, filed 11/6/16]	
			UH Hilo's Opposition to Temple's Motion to Vacate [Doc. 417, filed 11/17/16]	
Doc. 364	October 12, 2016	Temple's **Motion to Strike for Failure to Serve or Extension of Time and Rescheduling of Hearing**	Temple's Supplement [Doc. 367, filed 10/13/16]	
			Temple's Second Supplement [Doc. 368, filed 10/13/16]	
			TIO's Opposition [Doc. 374, filed 10/14/16]	
			KAHEA's Joinder [Doc. 387, filed 10/17/16]	
			TIO's Opposition to KAHEA's Joinder [Doc. 395, filed 10/19/16]	
Doc. 370	October 13, 2016	UH Hilo's **Statement of Position re Scheduling**	C. Freitas' Support [Doc. 372, filed 10/14/16]	
			Temple's Response [Doc. 373, filed 10/14/16]	
			Petitioners' Response [Doc. 384, filed 10/17/16]	
			Kanaele's Joinder to Petitioners' Response [Doc.	

			397, filed 10/19/16]	
Doc. 371	October 14, 2016	Temple's **Unresolved Matters**		
Doc. 377	October 14, 2016	Flores-Case Ohana's **Motion for 30 Day Extension of State of Contested Case Hearing**	Temple's Joinder [Doc. 378, filed 10/15/16]	**Withdrawn** by Flores-Case Ohana's Motion to Withdraw Motion [Doc. 385, filed 10/17/16]
Doc. 381	October 16, 2016	Sleightholm's **Motion to Accept Pre-Hearing Statement, Witness Testimony, Witness and Exhibit List**		
Doc. 382	October 16, 2016	Sleightholm's **Motion to Clarify Minute Order 16**		**Denied** by Minute Order No. 40 [Doc. 407, filed 10/28/16]
NA	October 16, 2016	Fergerstrom's **Oppositions to All Motions/Reconsiderations/Minute Orders, Granting the Same, that Stand in Opposition to All of the Parties Who Have Stood in Opposition to the Representatives of Organizations Who Have Supported or Otherwise Advocated for the Permit to Construct the TMT, including UH Hilo, TMT, TIO, PUEO**		
Doc. 391	October 18, 2016	C. Freitas' **Motion to Dismiss Contested Case Hearing**		
Doc. 394	October 19, 2016	TIO's **Memorandum re Standard for Admissibility of Evidence**	UH Hilo's Joinder and amended Joinder [Docs. 402, 404, filed 10/24/16] TIO's Supplemental Memorandum [Doc. 405, filed 10/27/16]	
Doc. 398	October 19, 2016	Fergerstrom's **Need for Published Change in Hearing Dates**		
Doc. 401	October 19, 2016	Vicente's **Objection to Not Receiving Witness Testimony and Exhibits by**		

		Mail		

APPENDIX C

DOC. NO.	DATE FILED	DOCUMENT NAME	RESPONSIVE FILINGS	DISPOSITION
Doc. 400	October 20, 2016	Kanaele's **Join In Objections of Mauna Kea Anaina Hou, Hank Fergerstrom, Dwight Vicente**		
Doc. 410	November 7, 2016	Temple's **Motion to Restore Cross-Examination Rights**	UH Hilo's Opposition [Doc. 415, filed 11/16/16] TIO's Joinder to the UH Hilo's Opposition [Doc 416, filed 11/17/16]	
Doc. 411	November 14, 2016	Kanaele's **Motion for No Can Come**		
Doc. 412	November 13, 2016	Fergerstrom's **Notice of Dates in January 2017**		
Doc. 413	November 15, 2016	Fergerstrom's **Statement of Harry Fergerstrom**		
Doc. 419	November 17, 2016	Kanaele's **Motion for No Can Come**		
NA	December 7, 2016	Fergerstrom's **Opposition to UH Hilo of Hawaii Confirmation of exhibits and Direct Written Testimonies of Witnesses to be Entered into Evidence; Motion to Recall Mr. Perry White**	UH Hilo's Opposition [Doc. 430, filed 12/23/16]	**Withdrawn** by oral motion [Tr. 1/11/17 at 13:22-14:2]
Doc. 422	December 8, 2016	Kanuha's **He Koi I Ka Luna Hookolokolo e Imi I Palapala Olelo Hooholokolo Oleleo Hawaii**		
Doc. 427 and 428	December 15, 2016 and December 16, 2016	Temple's **Motion to Dismiss TIO as Intervenor or Alternatively, Stay this Proceeding**	UH Hilo's Objection [Doc. 440, filed 1/10/17] TIO's Opposition [Doc. 441, filed 1/17/17]	
Doc. 429	December 16, 2016	Fergerstrom's **Motion to Remove TMT/TIO as a Party for Lack of Standing**	UH Hilo's Objection [Doc. 440, filed 1/10/17] TIO's Opposition [Doc. 441, filed 1/17/17]	
Doc. 431	December 23, 2016	KAHEA's **Motion for Production of TIO Decommissioning Funding Plan**	TIO's Opposition [Doc. 432, filed 12/30/16]	**Withdrawn** by oral motion (document

				provided) [Tr. 1/3/17 at 8:8-9:5]
Doc. 437	January 3, 2017	Kanaele's **Motion for No Can Come**		
Doc. 438	January 8, 2017	Temple's **Request for Witness Subpoena for David Lassner, President of the UH Hilo of Hawaii System**	UH Hilo's Motion to Quash [Doc. 445, filed 1/19/17] UH Hilo's Proposed Minute Order Denying Request [Doc. 457, filed 2/1/17]	**Denied** by oral ruling [Tr. 1/26/17 at 12:12-12:24]
Doc. 439	January 8, 2017	Temple's **Request for DLNR Employee to Testify on Whether DLNR has a Form to Fill-Out Requesting Permission to Build an Altar on Mauna Kea**	UH Hilo's Proposed Minute Order Denying Request [Doc. 458, filed 2/1/17]	**Denied** by oral ruling [Tr. 1/26/17 at 12:12-12:24]
Doc. 447	January 25, 2017 (refiled)	Flores-Case Ohana's **Request for Witness Subpoena for "John Doe" and for a Subpoena Duces Tecum to Disclose Unidentified Maunakea Observatories Support Services Employee Involved with the Destruction of Ahu (Shrine) on Mauna Kea in August 2015**	UH Hilo's Motion to Quash [Doc. 443, filed 1/19/17] UH Hilo's Proposed Minute Order Denying Request [Doc. 456, filed 2/1/17]	**Denied** by oral ruling [Tr. 1/26/17 at 13:2-13:10]
Doc. 448	January 25, 2017 (refiled)	Flores-Case Ohana's **Request for Witness Subpoena for Samuel Lemmo, Administrator, Office of Conservation and Coastal Lands, DLNR, State of Hawaii**	UH Hilo's Motion to Quash [Doc. 444, filed 1/19/17] Flores-Case Ohana's Amended Request [Doc. 452, filed 1/27/17] KAHEA's Joinder [Doc. 455, filed 1/31/17] MKAH's Joinder [Doc. 477, filed 2/24/17]	**Granted** by oral ruling [Tr. 1/30/17 at 27:16-27:22] **Granted** by Minute Order No. 42 [Doc. 464, filed 2/17/17]
Doc. 449	January 26, 2017	Sleightholm's **Motion to Appear by Phone**		
Doc. 450	January 26, 2017	Kealoha's **Motion Reserving Right to Participate**		
Doc. 453	January 28, 2017	Camara's **Motion to Present Witness Testimony**		

Doc. 454	January 31, 2017	Fergerstrom's **Demand for a Written Explanation for the Denial of Testimony of Professor Williamson Chang from Richardson School of Law, UH Hilo of Hawaii, Manoa**	Fergerstrom's Second Demand [Doc. 496, filed 3/7/17]	
Doc. 459	February 13, 2017	KAHEA's **Motion to Permit Live Testimony of Rebuttal Witness Brian Cruz**	UH Hilo's Objection [Doc. 469, filed 2/20/17] TIO's Joinder to UH Hilo's Objection [Doc. 471, filed 2/21/17] KAHEA's Proposed Order Granting Motion [Doc. 478, filed 2/24/17]	**Granted** by oral ruling [Tr. 2/21/17 at 28:5-28 14]
Doc. 460	February 13, 2017	Kanaele's **Motion for No Can Come**		
Doc. 461	February 13, 2017	UH Hilo's **Motion for Leave to Present Rebuttal Testimony**	Flores-Case Ohana's Response [Doc. 465, filed 2/16/17] KAHEA's Response and Partial Joinder to Flores-Case Ohana's Response [Doc. 466, filed 2/17/17] UH Hilo's Proposed Order Granting Motion in Part [Doc. 479, filed 2/24/17]	**Granted** by oral ruling [Tr. 2/21/16 at 28:20-28 24]
Doc. 462	February 13, 2017	MKAH's **Motion to Bring on Rebuttal Witness on Behalf of Kealoha Pisciotta and Mauna Kea Anaina Hou**	KAHEA's Joinder [Doc. 467, filed 2/17/17] TIO's Opposition [Doc. 468, filed 2/20/17] UH Hilo's Joinder to TIO's Opposition [Doc. 470, 2/20/17] UH Hilo's Proposed Order Denying Motion [Doc. 475, filed 2/24/17]	**Denied** by oral ruling [Tr. 2/21/17 at 29:24-30:12]

APPENDIX D

DOC. NO.	DATE FILED	DOCUMENT NAME	RESPONSIVE FILINGS	DISPOSITION
Doc. 442	January 17, 2017	UH Hilo's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	UH Hilo's Supplement [Doc. 506, filed 3/9/17] C. Freitas' Opposition [Doc. 512, filed 3/16/17] Flores-Case Ohana's Response [Doc. 513, filed 3/16/17] C. Freitas' Errata to Opposition [Doc. 519, filed 3/21/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 451	January 23, 2017	TIO's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	TIO's Supplement [Doc. 476, filed 2/24/17] TIO's Second Supplement [Doc 508, filed 3/9/17] Ching's Opposition to Admission of Exhibits C-41 and C-42 [Doc. 510, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 463	February 16, 2017	Temple's **Exhibits Entered into Evidence**	Temple's Motion to Admit Opening Statement, Pre-Filed Testimony, and Exhibits into Evidence [Doc. 491, filed 3/3/17] TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 472	February 21, 2017	KAHEA's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	KAHEA's First Supplemental [Doc. 486, filed 2/28/17] KAHEA's Second Supplemental [Doc. 505, filed 3/9/17] TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17] KAHEA's Errata [Doc. 517, filed 3/20/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 480	February 26, 2017	W. Freitas' **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	W. Freitas' First Supplemental [Doc. 493, filed 3/6/17] W. Freitas' Second Supplemental [Doc 501, filed 3/8/17] TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 481	February 26, 2017	C. Freitas' **Motion to Admit Exhibits and Written Direct Testimony into**	C. Freitas' First Supplemental [Doc. 492, filed 3/3/17]	**Granted in part, denied in part** by

		Evidence	TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 482	February 26, 2017	MKAH's **Exhibits and Written Direct Testimony Offered into Evidence**	MKAH's First Supplement [Doc 509, filed 3/9/17] TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 483	February 28, 2017	Ward's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	Ward's First Supplement [Doc 507, filed 3/9/17] TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 485	February 28, 2017	PUEO's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**		**Granted** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 487	February 28, 2017	Flores-Case Ohana's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	Flores-Case Ohana's First Supplement [Doc. 500, filed 3/8/17] TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 488	March 1, 2017	Ching's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	Ching's Supplemental Motion [Doc 497, filed 3/8/17] TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 489	March 1, 2017	Kanaele's **Motion for Acceptance of Exhibits M-1-2, M-A, M-4, M-E, M-7, M-I-5**		**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 494	March 6, 2017	Fergerstrom's **Motion to Move All Documents in Evidentiary Hearing Submittals, Identified by Letter "D"**	TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17] Fergerstrom's Clarification [Doc. 515, filed 3/18/17]	**Granted** by Minute Order No. 44 [Doc. 553,

		into Evidence	Fergerstrom's Opposition to UH Hilo's Opposition [Doc. 520, filed 3/21/17] Fergerstrom's Opposition to TIO's Opposition [Doc. 521, filed 3/21/17]	filed 4/20/17]
Doc. 495	March 7, 2017	Camara's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17] Camara's Response to UH Hilo's and TIO's Oppositions [Doc. 525, filed 3/22/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 498	March 8, 2017	Vicente's **Motion to Admit Exhibits into Evidence**	TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17] Vicente's Objection to TIO's Opposition [Doc. 533, filed 3/22/17] Vicente's Objection to UH Hilo's Opposition [Doc. 534, filed 3/22/17]	**Denied** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 499	March 8, 2017	Kanaele **Motion for Admittance of Exhibits and Prehearing Statement as My Written Direct Testimony into Evidence**	TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 502	March 9, 2017	Kihoi's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 503	March 9, 2017	Kakalia's **Motion to Admit Exhibits and Written Direct Testimony into Evidence**	TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]
Doc. 504	March 9, 2017	Sleightholm's **Motion to Enter Pre-Hearing Statement, Witness Testimony, and Exhibits into Evidence**	TIO's Opposition [Doc. 511, filed 3/16/17] UH Hilo's Objections [Doc. 514, filed 3/16/17]	**Granted in part, denied in part** by Minute Order No. 44 [Doc. 553, filed 4/20/17]

Doc. 516	March 19, 2017	Temple's **Motion to BLNR to Dismiss HA-3568**	Fergerstrom's Joinder [Doc. 518, filed 3/20/17]	
			W. Freitas Joinder [Doc. 523, filed 3/21/17]	
			C. Freitas' Joinder [Doc. 529, filed 3/22/17]	
			Kanaele's Joinder [Doc. 531, filed 3/22/17]	
			Ching's Joinder [Doc. 537, filed 3/22/17]	
			MKAH's Joinder [Doc. 542, filed 3/23/17]	
			Ward's Joinder [Doc. 543, filed 3/23/17]	
			UH Hilo's Opposition [Doc. 549, filed 4/4/17]	
Doc. 522	March 21, 2017	MKAH's **Requesting Time to Respond to Exhibit Objections and Related Matters**	Fergerstrom's Joinder [Doc. 524, filed 3/21/17]	
			Temple's Joinder [Doc. 526, filed 3/22/17]	
			Ward's Joinder [Doc. 527, filed 3/22/17]	
			Kanaele's Joinder [Doc. 528, filed 3/22/17]	
			C. Freitas' Joinder [Doc. 530, filed 3/22/17]	
			Flores-Case Ohana's Joinder [Doc. 532, filed 3/22/17]	
			W. Freitas' Joinder [Doc. 535, filed 3/22/17]	
			Ching's Joinder [Doc. 538, filed 3/22/17]	
			Kihoi's Joinder [Doc. 539, filed 3/22/17]	
			Kakalia's Joinder [Doc. 540, filed 3/22/17]	
			KAHEA's Joinder [Doc. 541, filed 3/23/17]	
			Ward's Joinder [Doc. 545, filed 3/23/17]	
Doc. 546	March 24, 2017	Temple's **Motion for Protective Order**	Fergerstrom's Joinder [Doc. 547, filed 3/24/17]	
			C. Freitas, W. Freitas, and Ching's Joinder [Doc. 548, filed 3/25/17]	
Doc. 550	April 6, 2017	Fergerstrom's **Reservation of all Rights for All the Intervenors, Suspended by Lack of Action by Hearings Officer**		
Doc. 554	April 23, 2017	Fergerstrom's **Motion to Reconsider (Doc 553, Minute Order 44); Recently Found Document No Previously Uploaded to Doc Library, WDT (Copy Attached); Motion to Upload WDT into Evidentiary Submittals, and then**	TIO's Statement of Position [Doc. 588, filed 4/28/17]	**Granted** by Minute Order No. 51 [Doc. 647, filed 5/25/17]
			UH Hilo's Joinder to TIO's Statement of Position [Doc 589, filed 5/1/17]	

		Moved into Evidence		
Doc. 555	April 24, 2017	TIO's **Motion for Clarification or, in the alternative, Reconsideration re Minute Order No. 44**	UH Hilo's Substantive Joinder [Doc. 556, filed 4/24/17]	**Granted** by Minute Order No. 51 [Doc. 647, filed 5/25/17]
			TIO's Proof of Service [Doc. 625, filed 5/8/17]	
			UH Hilo's Proof of Service [Doc. 626, filed 5/8/17]	
Doc. 557	April 25, 2017	C. Freitas **Motion for Reconsideration of Minute Order 43**	C. Freitas' Errata [Doc. 562, filed 4/26/17]	**Denied** by Minute Order No. 50 (Doc. 646, filed 5/23/17)
			UH Hilo's Joinder to TIO's Opposition [Doc. 593, filed 5/2/17]	
			TIO's Opposition [Doc. 596, filed 5/2/17]	
Doc. 558	April 25, 2017	Flores-Case Ohana's **Motion to Reconsider Minute Order 43**	UH Hilo's Opposition [Doc. 592, filed 5/2/17]	**Denied** by Minute Order No. 50 (Doc. 646, filed 5/23/17)
			TIO's Joinder to UH Hilo's Opposition [Doc. 597, filed 5/2/17]	
Doc. 559	April 25, 2017	Temple's **Motion for Reconsideration of Minute Order 43**	Ward's Joinder [Doc. 560, filed 4/25/17]	**Denied** by Minute Order No. 50 (Doc. 646, filed 5/23/17)
			MKAH, Pisciotta, Neves' Joinder [Doc. 561, filed 4/25/17]	
			Kihoi's Joinder [Doc. 563, filed 4/26/17]	
			MKAH Joinder [Doc. 564, filed 4/26/17]	
			Sleighthom's Joinder [Doc. 565, filed 4/26/17]	
			Kealoha's Joinder [Doc. 567, filed 4/26/17]	
			Ching's Joinder [Doc. 572, filed 4/27/17]	
			UH Hilo's Opposition [Doc. 594, filed 5/2/17]	
			TIO's Joinder to UH Hilo's Opposition [Doc. 598, filed 5/2/17]	
Doc. 566	April 26, 2017	Fergerstorm's **Motion to Reconsider (Doc 553, Minute Order 44); Motion to Include WDT and Pre-Hearing Statement into Evidence; Motion to Include as a Submission of Record, the Testimony of Williamson Chang**	TIO's Statement of Position and Opposition [Doc. 605, filed 5/3/17]	**Denied** by Minute Order No. 51 [Doc. 647, filed 5/25/17]
			UH Hilo's Joinder to TIO's Statement of Position and Opposition [Doc. 606, filed 5/3/17]	
Doc. 568	April 26, 2017	W. Freitas' **Motion to Reconsideration of Minute Order No. 43**	TIO's Opposition [Doc. 604, filed 5/3/17]	**Denied** by Minute Order No. 50 (Doc. 646, filed 5/23/17)
			UH Hilo's Joinder to TIO's Opposition [Doc. 607, filed 5/3/17]	
			W. Freitas' Response [Doc. 628, filed 5/10/17]	
Doc. 569	April 26, 2017	Temple's **Motion to Reconsideration**	Fergerstrom's Joinder [Doc. 570, filed 4/26/17]	**Denied** by Minute

		to Minute Order 44	Sleightholm's Joinder [Doc. 576, filed 4/27/17]	Order No. 51 [Doc. 647, filed 5/25/17]
			MKAH's Joinder and Objections [Doc. 578, filed 4/27/17]	
			Kihoi's Joinder [Doc. 580, filed 4/27/17]	
			Ward's Joinder [Doc. 581, filed 4/28/17]	
			Ching's Joinder and Joinder to MKAH's Joinder [Doc. 587, filed 4/28/17]	
			Temple's Response to MKAH's Joinder and Objections [Doc. 591, filed 5/2/17]	
			UH Hilo's Opposition [Doc. 599, filed 5/3/17]	
			TIO's Joinder to UH Hilo's Opposition to MKAH's Joinder and Objections [Doc. 601, filed 5/3/17]	
			TIO's Joinder to UH Hilo's Opposition [Doc. 603, filed 5/3/17]	
			UH Hilo's Opposition to MKAH's Joinder and Objections [Doc. 608, filed 5/3/17]	
Doc. 571	April 26, 2017	C. Freitas' **Motion to Reconsideration to Minute Order 44**	TIO's Opposition [Doc. 613, filed 5/4/17]	**Granted in part, Denied in part** by Minute Order No. 51 [Doc. 647, filed 5/25/17]
			UH Hilo's Joinder to TIO's Opposition [Doc. 617, filed 5/4/17]	
Doc. 573	April 27, 2017	Temple's **Emergency Motion to Board to Stay Proceedings**	Ward's Joinder [Doc. 582, filed 4/28/17]	**Denied** by Minute Order No. 48 [Doc. 631, filed 5/12/17]
			Sleightholm's Joinder [Doc. 583, filed 4/28/17]	
			MKAH's Joinder [Doc. 584, filed 4/28/17]	
			W. Freitas' Joinder [Doc. 585, filed 4/28/17]	
			UH Hilo's Opposition [Doc. 600, filed 5/3/17]	
			TIO's Joinder to UH Hilo's Opposition [Doc. 602, filed 5/3/17]	
			Flores-Case Ohana's Joinder [Doc. 624, filed 5/7/17]	
Doc. 574	April 27, 2017	Vicente's **Motion to Reconsider [Minute Order No. 44]**	TIO's Opposition [Doc. 612, filed 5/4/17]	**Denied** by Minute Order No. 51 [Doc. 647, filed 5/25/17]
			UH Hilo's Joinder to TIO's Opposition [Doc. 618, filed 5/4/17]	
Doc. 575	April 27, 2017	W. Freitas' **Motion to Reconsideration of Minute Order**	TIO's Opposition [Doc. 614, filed 5/4/17]	**Denied** by Minute Order No. 51
			UH Hilo's Joinder to TIO's Opposition [Doc. 616,	

		No. 44	filed 5/4/17] W. Freitas' Response [Doc. 628, filed 5/10/17]	[Doc. 647, filed 5/25/17]
Doc. 577	April 27, 2017	Flores-Case Ohana's **Motion to Reconsider Minute Order No. 44 and Notice of Spoliation of Evidence**	Ching's Joinder [Doc. 587, filed 4/28/17] UH Hilo's Opposition [Doc. 615, filed 5/4/17] Flores-Case Ohana Response to UH Hilo's Opposition [Doc. 623, filed 5/7/17]	**Granted in part, Denied in part** by Minute Order No. 51 [Doc. 647, filed 5/25/17]
Doc. 579	April 27, 2017	UH Hilo's **Motion to Reconsider Minute Order No. 44**	C. Freitas' Opposition [Doc. 611, filed 5/4/17]	**Granted** by Minute Order No. 51 [Doc. 647, filed 5/25/17]
Doc. 586	April 28, 2017	KAHEA's Motion for **Reconsideration of Minute Order No. 44**	TIO's Statement of Position [Doc. 620, filed 5/5/17] UH Hilo's Joinder to TIO's Statement of Position [Doc. 621, filed 5/5/17]	**Granted** by Minute Order No. 51 [Doc. 647, filed 5/25/17]
Doc. 622	May 5, 2017	MKAH's **Petition to the BLNR for Online Access to the Transcripts**	TIO's Opposition [Doc. 627, filed 5/10/17] UH Hilo's Joinder to TIO's Opposition [Doc. 630, filed 5/11/17] MKAH's Opposition to UH Hilo's Joinder [Doc. 632, filed 5/12/17] Flores-Case Ohana's Joinder [Doc. 635, filed 5/16/17] MKAH's Motion for Reconsideration [Doc. 643, filed 5/20/17]	**Denied** by Minute Order No. 49 [Doc. 637, filed 5/17/17]
Doc. 629	May 11, 2017	Protector/Parties' **Petition to Board for Declaratory Judgment and Motion to Vacate Minute Order 43**	Flores-Case Ohana's Joinder [Doc. 636, filed 5/16/17] UH Hilo's Joinder to TIO's Opposition [Doc. 642, filed 5/18/17] TIO's Opposition [Doc. 645, filed 5/18/17]	Denied by Minute Order No. 52 [Doc. 650, filed 5/26/17]
Doc. 633	May 13, 2017	W. Freitas' **Motion to Procedural Clarification Concerning Transcript Errors**	TIO's Position Statement [Doc. 644, filed 5/22/17]	
Doc. 634	May 15, 2017	Flores-Case Ohana's **Motion for Clarification or, in the alternative, Reconsideration re Minute Orders**	Fergerstrom's Joinder [Doc. 640, filed 5/17/17]	

		No. 43 and 44		

BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAI‘I

IN THE MATTER OF Contested Case Hearing Re Conservation District Use Application (CDUA) HA-3568 for the Thirty Meter Telescope at the Mauna Kea Science Reserve, Ka‘ohe Mauka, Hāmakua, Hawai‘i, TMK (3) 4-4-015:009	Case No. BLNR-CC-16-002 CERTIFICATE OF SERVICE

CERTIFICATE OF SERVICE

The undersigned certifies that the above-referenced document was served upon the following parties by email unless indicated otherwise:

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