

Deborah J Ward, pro se
P.O. Box 918
Kurtistown HI 96760
(808-769-2403)
cordylinecolor@gmail.com

BOARD OF LAND AND NATURAL RESOURCES
STATE OF HAWAII

A Contested Case Hearing Re Conservation) DLNR File No. HA-CC 16-002
District Use Application HA-3568 for the) (CDUA HA-3568)
Thirty Meter Telescope on the Northern)
Plateau in the Mauna Kea Conservation) **DEBORAH J WARD PROPOSED**
District, Ka`ohe, Hamakua District, Island of) **FINDINGS OF FACT,**
Hawai`i TMK (3) 4-4-015:009) **CONCLUSIONS OF LAW,**

 DECISION AND ORDER, COS

DEBORAH J WARD PROPOSED FINDINGS OF FACT,
CONCLUSIONS OF LAW, DECISION AND ORDER

The University of Hawaii at Hilo, an entity of the state University of Hawaii (hereinafter referred to as “The University” or “Applicant”), filed an application for a Conservation District Use Permit (hereinafter referred to as “CDUA”) on September 2, 2009, pursuant to chapter 183C of the Hawaii Revised Statutes (hereinafter “HRS”) and chapter 13-5 of the Hawaii Administrative Rules (hereinafter “HAR”) for the construction of a Thirty Meter Telescope (hereinafter referred to as “TMT” or “project”) on the northern plateau of the conservation district on Mauna Kea in the Mauna Kea Science Reserve, Ka`ohe Mauka, Hamakua, Hawai`i, TMK (3) 4-4-015:009.

The State of Hawaii Board of Land and Natural Resources (hereinafter referred to as “BLNR”), having heard and examined the testimony, evidence, and arguments of all parties, hereby makes the following Findings of Fact, Conclusions of Law, and Decision and Order denying CDUA HA-3568 for the Thirty Meter Telescope (TMT).

Table of Contents

I. INTRODUCTION.....	5
II. FINDINGS OF FACT.....	5
A. FIRST PROCEEDING - PROCEDURAL MATTERS	5
PUBLIC HEARINGS	5
HEARING OFFICER FOR FIRST CONTESTED CASE	6
PRE-HEARING MATTERS.....	6
PARTIES.....	6
EVIDENCE AND EXPERTS	6
B. SECOND PROCEEDING - PROCEDURAL FINDINGS OF FACT.....	7
SECOND CONTESTED CASE HEARING IN 2016-2017	7
HEARING OFFICER APPOINTMENT.....	7
PRE-HEARING CONFERENCES	7
PARTIES/INTERVENERS.....	9
HEARING OFFICER WITNESSES	9
PARTY: APPLICANT UNIVERSITY OF HAWAI`I AT HILO	10
PETITIONER DEBORAH J. WARD	10
PRE-HEARING MATTERS, MOTIONS, AND MINUTE ORDERS	12
Representation	12
EVIDENTIARY HEARING MOTIONS	12
Motions filed by Mauna Kea Hui Petitioners	12
Motions filed by Deborah J Ward pro se.....	15
CONDUCT OF CONTESTED CASE HEARING	15
Exhibit Admittance and Numbering: due process violation.....	15
Issues to be Decided.....	17
C. EVIDENTIARY HEARING.....	17
THE CONSERVATION DISTRICT OF MAUNA KEA	17
NATURAL RESOURCES OF MAUNA KEA	20
Aeolian Ecosystem.....	20
Floral Communities	21
Arthropod Fauna	25
Water resources	26
RECREATIONAL RESOURCES OF MAUNA KEA.....	29
CULTURAL RESOURCES OF MAUNA KEA	31
OVERSIGHT OF UH ACTIVITIES ON MAUNA KEA	31
General Lease	31
Scope of the Mauna Kea Conservation District.....	32
Mauna Kea Plan, May 1977.....	32
The 1995 Revised Mauna Kea Management Plan.....	33
2000 Master Plan	34
The University's Comprehensive Management Plan (UH CMP)	35
LEGISLATIVE AUDITOR'S REPORTS REGARDING MANAGEMENT	38

THE THIRTY METER TELESCOPES OBSERVATORY PROPOSAL.....	39
IMPACTS OF THE PROPOSED PROJECT <i>THREATS POSED BY THE TMT PROJECT TO THE NATURAL ENVIRONMENT</i>	42
Aeolian Ecosystem Impacts	42
Impact to Floral Community	43
Impacts to Arthropods	45
Habitat loss	45
Alien arthropods.....	48
Water Resources	49
Human Threats to high level aquifers on Mauna Kea	49
History of Hazardous Materials Release (Examples).....	50
Impacts of proposed TMT to Water Resources.....	52
TMT Resource Use and Waste.....	53
Accidental spills from TMT chemical storage tank.....	54
Hazardous/Non-Hazardous waste.....	54
Impacts to Air Quality.....	55
Visual Impacts.....	55
Noise	56
CULTURAL IMPACTS OF THE PROPOSED TMT PROJECT	57
MITIGATION.....	57
III. CONCLUSIONS OF LAW	60
A. TMT MEETS REGULATORY DEFINITION OF “SIGNIFICANT EFFECT”	60
B. B. APPLICANT MISSTATES THE STANDARD FOR ASSESSING SIGNIFICANT EFFECT.....	61
“STRONG MANAGEMENT FRAMEWORK” INADEQUATE	65
S. REDUCED DOME SIZE	65
PAINTING TMT SILVER.....	65
T. MAUNA KEA LANDS FUND IS NOT MITIGATION	66
U. RENATURALIZING POLIAHU ROAD, MONITORING WEKIU.....	67
V. COMMUNITY BENEFITS PACKAGE NOT RELEVANT TO RESOURCE PROTECTION OR RESTORATION	67
W. DECOMMISSIONING	68
X. C. TMT FAILS TO SATISFY HAR 13-5-24.....	68
NOT COMPREHENSIVE.....	69
NO QUANTITATIVE LIMIT ON DEVELOPMENT	69
NOT ENFORCEABLE	70
D. TMT PROPOSAL NOT CONSISTENT WITH CDUA PERMIT CRITERIA.....	70
1. NOT CONSISTENT WITH PURPOSE OF CONSERVATION DISTRICT HAR 13-5-30(c)(1)	71
2. NOT CONSISTENT WITH SUBZONE DESIGNATION HAR 13-5-30(c)(2).....	72
3. NOT CONSISTENT WITH CZM PROVISIONS IN HRS 205A HAR 13-5-30(c)(3)	73
X. TMT IS IN THE COASTAL MANAGEMENT AREA	73
XI. B) TMT UNDERMINES CZM OBJECTIVE TO PROTECT HISTORIC RESOURCES	73
XII. C. TMT UNDERMINES CZM OBJECTIVES TO PROTECT SCENIC AND OPEN SPACES.....	74
4. CONTRIBUTES TO EXISTING SUBSTANTIAL ADVERSE IMPACTS HAR 13-5-30(c)(4)	74
5. LAND USE IS NOT COMPATIBLE WITH THE LOCALITY AND SURROUNDING AREA.....	77
6. UNDERMINES OPEN SPACE AND NATURAL BEAUTY OF MAUNA KEA HAR 13-5-30(c)(6).....	77
7. TMT PROJECT IS INCONSISTENT PROHIBITION ON SUBDIVISION HAR 13-5-30(c)(7).....	78
A.THE ASTRONOMY PRECINCT IS A “SUBDIVISION” IN VIOLATION OF HAR 13-5-30(c)(7).....	79
B. TMT SUBLEASE WOULD BE A “SUBDIVISION” OF LAND IN VIOLATION OF HAR 13-5-30(c)(7)	80

TMT VIOLATES CONSTITUTIONAL PROTECTIONS FOR TRADITIONAL AND CUSTOMARY PRACTICES	85
BLNR ILLEGALLY DELEGATED ITS AUTHORITY TO THE UNIVERSITY	85
THE CULTURAL PRACTITIONER PETITIONERS ENGAGE IN CONSTITUTIONALLY PROTECTED TRADITIONAL AND CUSTOMARY PRACTICES	87
BLNR MUST REASONABLY PROTECT TRADITIONAL AND CUSTOMARY PRACTICES	87
VI. VIOLATIONS OF SURETY, LEASE, AND OBLIGATIONS TO PUBLIC AND NATIVE HAWAIIAN BENEFICIARIES	88
<u>DECISION AND ORDER.....</u>	<u>91</u>

I. INTRODUCTION

Pursuant to the opinion of the Supreme Court filed on December 2, 2015 in Mauna Kea Anaina Hou et al vs. Board of Land and Natural Resources et al 136 Hawaii 376 (2015) and the Judgment on Appeal filed by the Supreme Court on December 29, 2015 and Order of Remand filed by the Third Circuit Court on February 22, 2016, the Hearings Officer has heard and considered the evidence presented, and being fully apprised of the premises, makes the following Findings of Fact and Conclusions of Law.

These Findings of Fact and Conclusions of Law shall be construed as follows:

- (1) If it is later determined that a Finding of Fact should be properly deemed to be a Conclusion of Law, the Hearings Officer so concludes on those legal issues.
- (2) If it is later determined that a Conclusion of Law should properly be deemed to be a Finding of Fact, the Hearings Officer so finds on those factual issues.
- (3) To the extent that any of the following Findings of Fact and Conclusions of Law include a mix of finding of fact and conclusion of law, each shall be given full effect.

II. FINDINGS OF FACT

A. First Proceeding - Procedural Matters

Public Hearings

1. Public hearings on CDUA HA-3568 for the proposed Thirty Meter Telescope (TMT) in the Mauna Kea Conservation District, Mauna Kea Science Reserve, Ka`ohe Mauka, Hamakua, Hawai`i, TMK (3) 4-4-015:009 were held:
2. on December 2, 2010 at the Hawaii County Council Room, 25 Aupuni Street in Hilo, on December 3, 2010, at the Natural Energy Laboratory in Kona. (Ex. A059)
3. On February 25, 2011, the Board of Land and Natural Resources (BLNR) held a public hearing in Honolulu and voted to approved the CDUA HA-3568 for the Thirty-Meter Telescope in the Mauna Kea Conservation District, Mauna Kea Science Reserve, Ka`ohe Mauka, Hāmakua, Hawai‘i. (Ex. A059)
4. On February 25, 2011 and March 7, 2011, the Office of Conservation and Coastal Lands (OCCL) received seven requests for a contested case hearing on CDUA-HA-3568, in compliance with HAR 13-1-28, from Mo‘oinanea (represented by E. Kalani Flores), the Flores-Case ‘Ohana, Deborah J. Ward, Paul K. Neves (as an individual and as representative of the Royal Order of Kamehameha I (ROOK)),

Clarence Kūkauakahi Ching, KAHEA: The Hawaiian-Environmental Alliance (represented by Marti Townsend), and Mauna Kea Anaina Hou (represented by Kealoha Pisciotta). (Ex. A059)

5. On February 25, 2011, the board granted the permit with conditions, one of which was that a contested case be conducted, thus “putting the cart before the horse”, as later described by the Hawaii State Supreme Court. (Ex A059)

Hearing Officer for first contested case

6. On April 15, 2011, the BLNR Chairperson appointed Mr. Paul Aoki as the presiding officer over the contested case hearing (hereinafter Mr. Aoki is referred to as “Hearing Officer” or “HO”). (Min. Ord. 1, April 15, 2011)

Pre-hearing matters

7. On May 13, 2011, a pre-hearing conference was held on Cдуа HA-3568 in Hilo. (Min. Ord. 1, April 15, 2011; Aoki, Tr. May 13, 2011, 4:1).
8. At the pre-hearing conference, the issue of the Petitioners’ standing was discussed. Applicant did not object to the standing of petitioners Mauna Kea Anaina Hou, Paul K. Neves, Deborah J. Ward, Clarence Kūkauakahi Ching, or KAHEA: The Hawaiian-Environmental Alliance. (Aoki, Tr. May 13, 2011, 6:17-20; Pisciotta, Tr. May 13, 2011, 43:24-46:25)

Parties

- a. Applicant University of Hawai‘i at Hilo
- b. Petitioner Mauna Kea Anaina Hou
- c. Petitioner Kumu Hula Paul K. Neves
- d. Petitioner Deborah J. Ward
- e. Petitioner Clarence Kūkauakahi Ching
- f. Petitioner Flores-Case Ohana
- g. Petitioner KAHEA: The Hawaiian-Environmental Alliance

Evidence and Experts

9. On August 25, 2011, Petitioners Neves, Ching, Pisciotta, and Flores were recognized as Native Hawaiian cultural practitioners and experts in the traditional and customary practices of Native Hawaiians. (Lui Kwan, Tr. August 25, 2011, 28:4-30:6)
10. On September 26, 2011, Flores was also recognized as expert in Native Hawaiian traditions and culture. (Flores, Tr. September 26, 2011, 4:25-6:25)
11. The first contested case was conducted in 2011, and after seven days of testimony, the hearing closed, and the Applicant and Petitioners (combined) filed findings of fact, conclusions of law and decision and order. Each party provided the Hearing Officer with responses to the other’s document, and a year later the

Hearing Officer issued a decision. BLNR held a public hearing regarding the Hearing Officer's recommendation, but made the decision to (again) grant the permit outside of public scrutiny.

12. The BLNR approval of the permit was vacated in 2015 by the Hawai'i Supreme Court, which remanded the case back to the BLNR for further proceedings. *Mauna Kea Anaina Hou v. Bd. of Land & Nat. Res.*, 136 Hawai'i 376, 363 P.3d 224 (2015).

B. Second Proceeding - Procedural Findings of Fact

Second Contested Case Hearing in 2016-2017

13. BLNR failed to hold a new public hearing to revisit the application filed six years earlier and the Final Environmental Impact Statement accepted seven years earlier, nor was anyone in the public invited to comment, call for participation in a contested case hearing, or given the opportunity to establish standing in accordance with the Hawaii Administrative Rules.. Instead the BLNR issued an RFP for applications for the position of Hearing Officer for a second contested case hearing process.

Hearing Officer Appointment

14. Hearing Officer Riki May Amano was appointed, and in spite of opposition from both the Applicant and the original petitioners, (Doc) the Board elected not to recuse Hearing Officer Riki May Amano.
15. The Hearing Officer called for a prehearing conference on Oahu, with less than the required notice, and six petitioners, not notified in a timely manner, were unable to attend. Attorney Richard Naiwiehu Wurdeman represented petitioners at the pre-hearing conference.

Pre-Hearing Conferences

16. DOC 016/MO 5 dated May 6, 2016 set May 16, 2016, for the first 1st pre-hearing conference to be held in Honolulu at the DLNR office in the Kalanimoku Board Room located on the first floor, Makai side, of the Kalanimoku Building at 1151 Punchbowl Street, Honolulu, Hawaii. The conference was held to establish Record for contested case hearing; set schedule regarding applications, motions, requests to intervene as a party; set hearing on interventions and 2nd pre-hearing conference for June 17, 2016 (Minute Order Nos. 7 and 8) TR V. i Titled "Prehearing Conference".

17. The first 1st pre-hearing conference was not noticed to parties in a timely manner. According to Minute Order 5, dated May 6, 2016, a pre-hearing conference was set for Monday, May 16, 2016. Notice requirements in Ch 91-9.5 (a) states: Unless otherwise provided by law, all parties shall be given written notice of hearing by registered or certified mail with return receipt requested at least 15 days before the hearing.
18. DOC 49/MO 08 Dated May 27, 2016 set a second 2nd Pre-Hearing Conference to be held on June 17, 2016 at the Hilo State Office Rooms A, B, and C. 75 Aupuni Street, Hilo, Hawaii 96720. Minute order titled “Minute Order 8: Order setting hearings on motions to intervene and 2nd pre-hearing conference; COS (3)”. Tr. Vol ii
19. Also, on June 17, 2016, as part of the 2nd pre-hearing conference, there was a scheduling discussion on how many witnesses the parties would be calling, establishing a date for site inspection, deadlines for pre-hearing motions, deadlines for subpoenas.
TR VOL ii Titled: “Request for Admission and Motions”.
20. The new parties were expected to discuss or state their case on how many witnesses they would be calling for example, when they had no access to any motions filed and were not informed that they needed to come prepared with that information because they were not a party up until that point. All new parties except TIO and P.U.E.O were pro se.
21. Hearing Officer stated she will be filing a minute order describing the filing procedures. TR VOL iii Titled: “Request for Admission and Motions” - P 7: 4-6.
22. On August 5, 2016, a third 3rd pre-hearing conference was held at the YMCA building to hear motions. 300 West Lanikaula Street, Hilo, Hawaii 96720.
TR VOL iv Titled “Motions Hearing”.
23. August 12, 2016, the fourth 4th pre-hearing conference was held at Hawaii Community College Cafeteria, 1175 Manono St, Hilo, Hawaii 96720 to argue motions.
TR VOL v. Titled “Motions Hearing”.
24. August 29, 2016, the fifth 5th pre-hearing conference was held at Hawaii Community College Cafeteria, 1175 Manono, Hilo, Hawaii, 96720. Further Motions were heard.
TR VOL vi. Titled “Motions Hearings”.
25. October 3, 2016 the sixth 6th pre-hearing conference was held at the Grand Naniloa Hotel, Crown Room, 93 Banyan Drive, Hilo, Hawaii 96720.
TR VOL vii. Titled “Motions Hearing”.

26. October 17, 2016, the seventh 7th pre-hearing conference was held at the Grand Naniloa Hotel, Crown Room, 93 Banyan Drive, Hilo, Hawaii 96720. TR VOL viii. Titled “Prehearing”.

Parties/Interveners

27. The Applicant and six petitioners were the original parties in the first contested case.

- a. Applicant University of Hawai‘i at Hilo
- b. Petitioner Mauna Kea Anaina Hou and Kealoha Pisciotta
- c. Petitioner Kumu Hula Paul K. Neves
- d. Petitioner Deborah J. Ward
- e. Petitioner Clarence Kukauakahi Ching
- f. Petitioner Flores-Case Ohana
- g. Petitioner KAHEA: The Hawaiian-Environmental Alliance

- h. Intervenor Thirty Meter Telescope International Observatory LLC
- i. Intervenor Harry Fergerstrom
- j. Intervenor Mehana Kihoi
- k. Intervenor C. M. Kaho‘okahi Kanuha
- l. Intervenor Joseph Kualii Lindsey Camara
- m. Intervenor J. Leina‘ala Sleightholm
- n. Intervenor Maelani Lee
- o. Intervenor The Temple of Lono
- p. Intervenor Kalikolehua Kanaele
- q. Intervenor Perpetuating Unique Educational Opportunities, Inc.
- r. Intervenor Stephanie Malia Tabbada
- s. Intervenor Tiffnie Kakalia
- t. Intervenor Glen Kila
- u. Intervenor Dwight J. Vicente
- v. Intervenor Brannon Kamahana Kealoha
- w. Intervenor Cindy Freitas
- x. Intervenor William Freitas
- y. Intervenor Perpetuating Unique Educational Opportunity (P.U.E.O.)

Hearing Officer Witnesses

- z. Wilma Holi
- a. Several others, who had intended to be parties, agreed to be witnesses for the Hearing Officer as well.

Party: Applicant University of Hawai'i at Hilo

28. The Applicant, University of Hawai'i at Hilo (UH-Hilo), is seeking a Conservation District Use Permit (CDUP) relative to CDUA HA-3568 on behalf of TMT Observatory Corporation ("TMT"). Ex A001 p.13, K-1 (CDUA)
29. The Agent (signatory) for the Applicant UH-Hilo on CDUA HA-3568 is Dr. Donald Straney, Chancellor. Dr. Donald Straney is the Chancellor of UH-Hilo. UH-Hilo is a subdivision of the University of Hawaii System. (Ex A001 p1 of Item K-1, Ex. A009, 3-9)
30. The University of Hawaii System was established as an institution of higher education. Its purpose is: "to give thorough instruction and conduct research in, and disseminate knowledge of, agriculture, mechanic arts, mathematical, physical, natural, economic, political, and social sciences, languages, literature, history, philosophy, and such other branches of advanced learning as the board of regents from time to time may prescribe and to give such military instruction as the board of regents may prescribe and that the federal government requires..." (HRS §304A-102)
31. Conservation land management is not listed as a purpose of the University system. HRS 304A-102.

Petitioner Deborah J. Ward

32. On May 27, 2011, the HO issued Minute Order 6 granting Ms. Ward standing in the 2011 contested case hearing. (Min. Ord. 6; Aoki)
33. Petitioner Deborah J. Ward is a recreational hiker who has been walking for 40 years on Mauna Kea to experience the trails and visit the summit of Mauna Kea, during the 1970's through to present, for recreation, wilderness experience, unfettered vistas, silence, spiritual peace, natural beauty, and cultural significance. (Ex. B.17a, page 2).
34. Ms. Ward has led hikes on Mauna Kea for groups including the Honolulu Botanic Gardens, since the 1970's, and Hawaii Community College, 4-H Youth Development Program, and (Sierra Club) High School Hikers, as a UH faculty member since the 1980's. (Exhibit B.17a , page 1)
35. Ms. Ward has experienced the cumulative impact of the destruction of habitat, widespread waste accumulation, obstruction of viewplanes, constant sound, alteration of the geology, and negative impact to the cultural practice during 40 years of recreational hiking and teaching on Mauna Kea. (Ex. B.17a, page 2)
36. Ms Ward states that development of six acres of industrial infrastructure with twice the County of Hawaii's allowable height limit (FEIS calls it a "new visual

- element on the northern plateau”) on the last remaining unobstructed view plane facing Haleakala will significantly negatively affect her recreational practices. (Ex. B.17a, page 3)
37. Ms. Ward’s stated goal is to preserve and protect the natural resources from degradation. Her recreational practices and scientific interests and longstanding history in this issue are distinct from that of the general public. (Ex. A029, page 47)
 38. Ms. Ward brought her concerns to this case because, as a long-time recreational user, she felt it was her citizen’s responsibility to participate in hearings and meetings held to review, plan and propose appropriate management of the natural resources associated with Mauna Kea. She contributed hundreds of hours as a volunteer to this effort without monetary compensation. (Ex. B.17a, page 5)
 39. Ms. Ward demonstrated she has knowledge and information useful to the BLNR in making an informed decision regarding the protecting the Mauna Kea Conservation District. (Ex. B.17a, page 5)
 40. Ms. Ward noted that the Applicant’s characterization of the TMT as a “new visual element on the northern plateau” is a significant understatement. The development of over 5 acres of industrial infrastructure for the TMT on the last remaining unobstructed view plane facing Haleakala would significantly undermine her recreational practices. (Ex. B.17a, page 5)
 41. Ms. Ward testified that the cumulative impact of intensified industrial land use at the summit, the destruction of habitat, widespread waste accumulation, obstruction of viewplane, constant sound, and alteration of the geology, has impacted her recreational enjoyment and spiritual practice. (1.31.17 Tr. Vol 33 p:1)
 42. Ms. Ward has experienced the noise of observatory air conditioning, blowers, generators, associated vehicles and industrial activity and has found it disturbing to recreational users. (1.31.17 Tr. Vol 33 p:1)
 43. Ms. Ward stated that the multiple telescope domes on the summit of Mauna Kea are visual obstructions from any vantage point, and cause adverse impact to the natural beauty of Mauna Kea, which thereby undermines recreational enjoyment of the mountain. (Ex. B.17a, page 3)
 44. Ms. Ward maintains that the proposal to build the TMT on the northern plateau of Mauna Kea’s summit region would further degrade, despoil, and irrevocably harm her rights to a clean and healthful environment. B.17a p 2
 45. Ms. Ward observed first-hand actions by the University’s Institute for Astronomy (IfA) and Department of Land and Natural Resources (DLNR) staff that directly

violated conditions set forth in the BLNR- approved Mauna Kea Management Plan in 1996. These actions included alteration to slopes and filling of inner cinder cone of Pu`u Hau Oki, and trenching of the outer slopes, affecting high quality Wekiu bug habitat. ((Ex. B.17a, page 3))

46. Ms. Ward has served at the request of the Office of Mauna Kea Management (OMKM) on the OMKM Environment Committee since December 2000. (Ex. B.17a, page 4)
47. Ms. Ward worked with a committee of scientists working in the fields of biology, geology and environmental management, who together formulated recommendations for biological inventory and monitoring in 2002, and refined the natural resource monitoring and protection actions needed in 2005. (Ex. B.17a, page 4)

Pre-Hearing Matters, Motions, and Minute Orders

Representation

48. Petitioners Mauna Kea Anaina Hou and Kealoha Pisciotto, Clarence Kauakahi Ching, Paul Neves, Deborah J Ward, and Flores Case Ohana, and KAHEA: The Environmental Alliance (hereinafter “Mauna Kea Hui Petitioners”) were represented by attorney Richard Naiwieha Wurdeman from May to October 10, 2016.
49. Thereafter, Mauna Kea Anaina Hou and Kealoha Pisciotto, Clarence Kauakahi Ching, Paul Neves, Deborah J Ward, and Flores Case Ohana represented themselves pro se, and KAHEA: The Environmental Alliance was represented by attorneys Yuklin Aluli and Dexter Kaiama.

Evidentiary Hearing Motions

Motions filed by Mauna Kea Hui Petitioners

50. By motion dated April 15, 2016, Mauna Kea Hui Petitioners filed [Doc. 6] Petitioners’ objections to selection process and to appointment of Hearing Officer made pursuant to Minute Order No. 1, dated March 31, 2016.
51. By motion dated May 6, 2016, Mauna Kea Hui Petitioners filed [Doc. 15] Petitioners’ objections regarding procurement committee and process and committee member / BLNR Board member.
52. By motion dated May 13, 2016, Mauna Kea Hui Petitioners filed [Doc. 17] Petitioners’ motion for reconsideration of Minute Order No. 4, filed on May 6,

2016 and/or motion to strike selection process and to disqualify various members and hearing officer.

53. By motion dated May 31, 2016, Mauna Kea Hui Petitioners filed [Doc. 52] Petitioners' submissions and positions on record; Exhibit "A."
54. By motion dated June 16, 2016, Mauna Kea Hui Petitioners filed [Doc. 69] Petitioners' memorandum in opposition to Perpetuating Unique Educational Opportunities, Inc.'s motion to intervene, dated May 16 2016.
55. By motion dated June 13, 2016, Mauna Kea Hui Petitioners filed [Doc. 70] Petitioners' memorandum in opposition to TMT's motion to have TMT International Observatory, LLC admitted as a party in the contested case hearing.
56. By motion dated July 11, 2016, Mauna Kea Hui Petitioners filed [Doc. 81] Petitioners Mauna Kea Anaina Hou et al.'s request for continuance on submissions and next hearing date.
57. By motion dated July 12, 2016, Mauna Kea Hui Petitioners filed [Doc. 83] Petitioners Mauna Kea Anaina Hou et al.'s supplement to request for continuance on submissions and next hearing date.
58. By motion dated July 14, 2016, Mauna Kea Hui Petitioners filed [Doc. 87] Petitioners Mauna Kea Anaina Hou et al.'s supplement to request for continuance on submissions and next hearing date.
59. By motion dated July 18, 2016, Mauna Kea Hui Petitioners filed [Doc. 94] Petitioners Mauna Kea Anaina Hou et al.'s motion to strike Conservation District Use Application, HA-3568, dated September 2, 2010, and/or motion for summary judgement.
60. By motion dated July 18, 2016, Mauna Kea Hui Petitioners filed [Doc. 95] Petitioners Mauna Kea Anaina Hou et al.'s motion to disqualify BLNR's and Hearing Officer's counsel.
61. By motion dated July 18, 2016 Mauna Kea Hui Petitioners filed [Doc. 103] Petitioners Mauna Kea Anaina Hou et al.'s witness list.
62. By motion dated July 18, 2016, Mauna Kea Hui Petitioners filed [Doc. 104] Petitioners Mauna Kea Anaina Hou et al.'s supplemental witness list.
63. By motion dated July 26, 2016, Mauna Kea Hui Petitioners filed [Doc. 130] Petitioners Mauna Kea Anaina Hou et al.'s: (1) Renewal of objections to hearing officer selection process and hearing officer appointment, and (2) supplemental arguments on motion to disqualify BLNR's and Hearing Officer's counsel, filed on July 18, 2016.

64. By motion dated August 1, 2016, Mauna Kea Hui Petitioners filed [Doc. 163] Mauna Kea Anaina Hou, et. al. Petitioners' initial objections to witnesses designated by other parties
65. By motion dated August 1, 2016, Mauna Kea Hui Petitioners filed [Doc. 165] (email) Note for the record.
66. By motion dated August 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 188] Wurdeman correspondence addressed to Hearing Officer Judge (Ret.) Riki May Amano and BLNR Chair Suzanne Case re: Hearing on Petitioners' motion to disqualify BLNR's and Hearing Officer's counsel, Filed on July 18, 2016, filed on August 10, 2016.
67. By motion dated August 17, 2016, Mauna Kea Hui Petitioners filed [Doc. 218] Petitioners Mauna Kea Anaina Hou, et al.'s site visit recommendations
68. By motion dated August 22, 2016, Mauna Kea Hui Petitioners filed [Doc. 233] Petitioners Mauna Kea Anaina Hou, et al.'s memorandum in opposition to motion for protective order for the Honorable David Y. Ige, Suzanne Case and Stanley Reohrig, filed on August 8, 201.
69. By motion dated September 8, 2016, Mauna Kea Hui Petitioners filed [Doc. 254] Petitioners Mauna Kea Anaina Hou, et al.'s request for further status conference and/or consideration of proposed scheduling.
70. By motion dated September 19, 2016, Mauna Kea Hui Petitioners filed [Doc. 270] Mauna Kea Anaina Hou, et al. Petitioners' response to P.U.E.O., Inc.'s proposed minute order granting P.U.E.O., Inc.'s motion to set issues.
71. By motion dated September 23, 2016, Mauna Kea Hui Petitioners filed [Doc. 282] Correspondence regarding notice of contested case hearing.
72. By motion dated September 26, 2016, Mauna Kea Hui Petitioners filed [Doc. 288] Petitioner Mauna Kea Anaina Hou, et al.'s objections to site visit and Minute Order No. 18.
73. By motion dated October 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 340] Petitioners Mauna Kea Anaina Hou, et al.'s renewed motion to disqualify hearing officer.
74. By motion dated October 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 341] Notice of withdrawal of counsel.
75. By motion dated October 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 342] Petitioners Mauna Kea Anaina Hou and Kealoha Pisciotta, Clarence Kukauakahi

Ching; Flores Case Ohana, Deborah J. Ward, Paul K. Neves, and Kahea: The Environmental Alliance list of e-mail addresses for service of process.

76. By motion dated October 17, 2016, Mauna Kea Hui Petitioners filed [Doc. 383] Petitioners' Statement of Position in Response to the University's Statement Re Petitioners Renewed Motion to Disqualify Hearing Officer Document 369.

Motions filed by Deborah J Ward pro se

77. By motion dated February 28, 2017, Deborah Ward filed [Doc.483] Deborah Ward's Motion to Admit Exhibits and Written Direct Testimony Into Evidence; Memorandum in Support of Motion.
78. By motion dated March 9, 2017, Deborah Ward filed [Doc. 507] Deborah Ward's first supplemental motion to admit exhibits and written direct testimony into evidence: Memorandum in support of motion.
79. By motion dated March 22, 2017, Deborah Ward filed [Doc. 527] Deborah Ward's joinder to Mauna Kea Anaina Hou motion requesting time to respond to exhibit objections.
80. By motion dated March 23, 2017, Deborah Ward filed [Doc.545] Deborah J. Ward joinder to Mauna Kea Anaina Hou motion requesting time to respond to exhibit objections.
81. By motion dated March 23, 2017, Deborah Ward filed [Doc. 543] Deborah J Ward's motion for joinder in Temple of Lono motion to Board of Land and Natural Resources to dismiss HA-3568.
82. By motion dated April 25, 2017, Deborah Ward filed [Doc. 560] Deborah J Ward joinder to Temple of Lono motion for reconsideration of Minute Order 43.
83. By motion dated April 28, 2017, Deborah Ward filed [Doc. 582] Deborah J. Ward joinder to Temple of Lono emergency motion to Board to stay proceedings.
84. By motion dated April 28, 2017, Deborah Ward filed [Doc. 581] Deborah J. Ward joinder to Temple of Lono motion to reconsider Minute Order 44.

Conduct of Contested Case Hearing

Exhibit Admittance and Numbering: due process violation

85. The Hearing Officer ordered Applicant and Petitioners to submit Witness Written Direct Testimony and Exhibits simultaneously on or by October 11, 2016.

86. Later, the petitioners were made aware that a documents library had been set up online, where Shared Exhibits Numbers R-8 were added to the Mauna Kea Documents Library Evidentiary Hearing Submittals. At the beginning of the evidentiary hearings, there were several duplications of exhibits from the various parties.
87. During the hearings references were made to the duplicated documents by number, as reflected in the transcripts. No attempt was made at any time to resolve the duplication, nor was there an opportunity to compare documents or rectify discrepancies between documents and the various versions. The parties did not have the opportunity to compare the documents and collectively agree on the documents to be used.
88. The Officer also received in to evidence the Applicant's document(s) over the Shared documents uploaded by BLNR's librarian. Consequently, at the close of the hearing, the Hearing Officer verbally expressed her intent to accept all exhibits to be judged by her on weight. Following the close of the evidentiary hearing, petitioners relied upon her assertions, made few objections, assuming that statements regarding weight would be issued in the findings of fact.
89. However, the Applicant(s) UH/TIO offered a barrage of objections to the exhibits petitioners had relied on throughout the evidentiary hearing process. Petitioners were not extended the opportunity to respond to objections to defend our own exhibits, and Hearing Officer made her decisions on admissibility based in part, if not primarily, on the the Applicants' arguments.
90. On Mar 2, 2017 the Hearing Officer stated on March 23, "I will by Minute Order identify all exhibits that I will be receiving onto evidence". (Tr. Mar 2, 2017, Vol 44:288:1-22). After accepting objections on March 16, it wasn't until April 20, 2017, Minute order 44 was issued.
91. Based on the HO representation (Tr. 3.2.17) petitioners expected that there would be a full list of accepted exhibits with which to establish Findings of Fact. Instead petitioners received multiple uncollated lists (MO 44/Doc 553), which included responses to Applicants' objections. On the last working day (May 26, 2017) prior to the filing deadline for Findings, the Hearing Officer issued a revised set of admitted exhibits. (MO 59/Doc 647, MO Amended 44/Doc 649).
92. The Hearing Officer had countervailing positions regarding what docs should be admitted or not. For example, in some instances she required that laws that were relied on in witness testimony to entered as an exhibit, while later she denied that document's receipt into evidence.
93. More importantly, Minute Order 44 (Doc 553) issued 4.20.2017 regarding documentary evidence clearly demonstrates the problem. The Order is contradictory, in that on one page several exhibits are received, while on another

page the same exhibits are denied. For example, in Minute Order 44 see pages 28 and 33 to compare the decisions on exactly the same documents; on one page they are received, and on the other, they are denied.

94. Therefore, petitioner asserts the due process injuries are as follows:
As of this date (last working day before for submission of these findings of fact), the record is incomplete because there are outstanding dispositive motions, and motions for reconsideration regarding exhibits.
95. The references from the transcript do not match the exhibits admitted by the Hearing Officer.
96. Some exhibits offered by witnesses who had already testified were later not received into evidence by the hearing officer.
97. Citations to exhibits may be inconsistent throughout the record and the Findings of Fact will reflect the confusion.

Issues to be Decided

98. During the August 29, 2016 hearing, the petitioners articulated on the record a number of issues to be addressed in the contested case hearing. While some of these issues were address in P.U.E.O.'s proposed order, the proposed order failed to include a number of issues important in this case.

C. EVIDENTIARY HEARING

The Conservation District of Mauna Kea

99. The Mauna Kea summit region is designated as part of the State of Hawaii Conservation District Resource subzone and as such, uses on the land are subject to the Conservation District rules (HAR 13-5) and permit conditions. The conservation district is administered by the State of Hawaii Department of Land and Natural Resources (DLNR) as directed by the Board of Land and Natural Resources (BLNR). Effective January 1, 1968, the BLNR leased the land (General Lease S-4191) to the University of Hawaii; the lease terminates on December 31, 2033. A001 p 1-1
100. The Conservation District is comprised of areas in which natural resource conservation is a recognized concern on Mauna Kea, encompassing at least 106,000 acres (11,308 acres of UH managed lands, 3,894 acres of NAR, 52,500 Mauna Kea Forest Reserve, and 38,300 acres of the Hakalau Refuge). A010, NRMP, 1-11, 1-12.
101. Extending into a portion of the Mauna Kea Science Reserve is the Mauna Kea Ice Age Natural Area Reserve, between 10,400 and 13,200 feet elevation.

The NAR designation was approved by the BLNR on November 9, 1978, a CDUA for the area was approved in 1981, and the executive order establishing the reserve was signed in that year. A012, Public Access Subplan, 2-2.

National Natural Landmark: **Geologic features**

103. “Rising nearly 33,000 feet from the ocean floor, with a peak elevation of 13,796 feet, Mauna Kea is the highest point in the Pacific Basin and the highest island mountain in the world. Ex A009 CMP Appendix 4, p. 9.
104. Mauna Kea was listed as a National Natural Landmark in 1972. One of the reasons given for placing the mountain on this register by the National Park Service is that Mauna Kea is the “Most majestic expression of shield volcanism in the Hawaiian Archipelago, if not the world.” Ex A009 CMP Appendix 4, p. 9.
105. Since 1972, Mauna Kea has been designated as a National Natural Landmark and listed in the registry of National Natural Landmarks as a result of its singular topography, morphology, and geology. Ex A003 FEIS, p. 3-106.
106. “Few sites posses [*sic*] better credentials to justify their national significance than does Mauna Kea.” Ex A003 FEIS, p. 3-106, quoting a Mauna Kea NNL program.
107. Abundant evidence of glacial striae, boulders, police and grooves shows that an ice cap covered Mauna Kea’s summit during the Pleistocene era. Ex A003 FEIS Vol. 1, p. 3-106 (citing the U.S. National Park Service’s description of Mauna Kea National Natural Landmark).
108. “Mauna Kea is currently estimated to be between 600,000 and 1.5 million years old and is considered by the U.S. Geological Survey (USGS) to be an active post-shield volcano. While there has been no recent volcanic activity at Mauna Kea, volcanologists believe that it “is likely to erupt again”. Ex A009 CMP, p. 5-24 – 5-25
109. . First and foremost, Mauna Kea is the exposed portion of the highest insular mountain in the United States, rising up over 30,000 feet above its submerged base in the Pacific Ocean. Second, on its slopes is found Lake Waiau, the highest lake in the United States. Third, though located in the tropics, indisputable evidence of glaciations is present above the 11,000 foot level. Lastly, possibly transcending all of these nationally significant qualities, is the fact that Mauna Kea is the most majestic expression of shield volcanism in the Hawaiian Archipelago if not in the world. Rory Westberg, Acting Regional Director, NPS Ex A004 FEIS Vol II p 4 of 531
110. The objectives of the NNL program are fourfold: to encourage the preservation of sites illustrating the geological and ecological character of the

United States; to enhance the scientific and educational value of the sites thus preserved; to strengthen public appreciation of natural history; to foster a greater concern for the conservation of the nation's natural heritage. Laura Thielen, Chair, DLNR Ex A003FEIS Vol II p 19 of 531

111. . Though located in the tropic, indisputable evidence of glaciation is present above the 11,000 foot level. Lastly, possible transcending all of these nationally significant qualities is the fact that Mauna Kea is the most majestic expression of shield volcanism in the Hawaiian Archipelago if not in the world. Ex. A003 (TMT EIS Vol. II), p.3-6
112. The Mauna Kea National Natural Landmark is held in trust by the State of Hawai'i, and its 83,900 acre boundary incorporates the lands within the conservation district, including the Mauna Kea Science Reserve, Ice Age Natural Area Reserve and the Mauna Kea Forest Reserve. Ex. A003(TMT EIS Vol. II), p.3-6
113. . Other unique geologic features of Mauna Kea include numerous cinder cones (*pu'u*) that rise above lavas of the upper plateau, and evidence of glaciers that covered nearly 27-square miles of the summit region during the Pleistocene Epoch (Ice Ages) approximately 18,000 years before present.” Ex A009 CMP Appendix 4, p. 9.
114. “Because of its elevation, Maunakea's summit was repeatedly glaciated during the past few hundred thousand years, and preserves the best glacial record of any oceanic volcano on Earth.” Ex A003 FEIS, p. 3-105.
115. Hawaiian Hotspot' magmas, pushed up through the oceanic crust, began building Mauna Kea approximately 750,000 years ago. Throughout its building stages, a'a and pahoehoe lavas flowed from three main rift zones, forming a volcano resembling a warrior's shield. Towards the end of the post-shield stage eruptions became more explosive, discharging magma referred to as tephra. These eruptions created the numerous cinder cones dotted across the highest elevations of Mauna Kea. Ex A009 CMP Appendix 4, p. 9.
116. . “Three cinder cones (*pu'u*) make up the summit of Mauna Kea (*Pu'u Hau'oki*, *Pu'u Wēkiu*, *Pu'u Haukea*), collectively referred to as *Pu'u o Kūkahau'ula*, a traditional deity associated with fisherman families. There are additional cinder cones (e.g., *Pu'u Keonehehe'e*, *Pu'u Makanaka*, *Pu'u Poepoe*, *Pu'u Poli'ahu*, *Māhoe*, and *Pu'u Waiau*) below the summit.” Ex A009 CMP Appendix 4, p. 9.
117. . Mauna Kea has two series of volcanic rocks. The older Hamakua series, mostly composed of olivine basalts, forms the bulk of the mountain. The Laupahoehoe series consists of “hawaiites” and comprises a veneer that overlays the upper part of the mountain. Ex A048 2000 Master Plan, p. IV-1.

118. Subglacial volcanic eruptions gave rise to lava flows that cooled quickly, yielding a fine grained, dense black rock called obsidian, prized by Hawaiians for adzes, at a site known as Keanakako'i. Ex A048 2000 Master Plan, p. IV-2.
119. Due to glaciation during the last ice age of the Pleistocene era, ice covered approximately 27 square miles of the summit and ranged in thickness from 200-350 feet, to elevations of 10,500 feet, where ash and cinder were scraped away by glacial flow erosion. (Ex. A048, p. IV-1)
120. . Glacial moraine and meltwater deposits of fine sediments, and glacially sculpted features of cinder cones are evidence of summit glaciation that led to the formation of Lake Waiau, one of the highest lakes in the United States. (Ex. A048, IV-2)
121. The proposed TMT location is entirely underlain by a single lava flow. A single chemical analysis of this lava flow shows the flow to be of typical "hawaiite" composition (a type or alkali-rich basalt). Ex A003 FEIS, Vol. 1 p. 108.

Natural Resources of Mauna Kea

Aeolian Ecosystem

122. "The summit of Mauna Kea (12,800 to 13,796 ft) is considered an Alpine Stone Desert. Several species of mosses and lichens, an unknown number of species of algae, some vascular plants constitute the plant community in this region. "Most of the species of plants found in the region are endemic (occurring only in Hawai'i) or indigenous (native to Hawai'i but occurring elsewhere). A few non-native plant species have also become established here, even at the summit." Ex A009 CMP, p. 5-37- 5-38.
123. During the Pleistocene era, an ice cap covered approximately 27 square miles of the upper regions of Mauna Kea and "scour[ed]" the area it covered. Ex A048 2000 Master Plan, p. IV-1.
124. Classic terminal, polished rock outcrops, and glacial till deposits resulted from glacial-scouring. These features, combined with snowfall and wind patterns of the summit area, "support various forms of plant and animal life." Ex A048 2000 Master Plan, p. IV-1 and IV-2.
125. The landscape that exists today [on Mauna Kea] was formed by volcanic and glacial activity and is a unique environment for insects, spiders, lichens, ferns, and mosses. Rocky outcrops, loose cinder, and smooth lava flows make up

habitats that combine with snowfall and wind patterns of the summit area to support various forms of plant and animal life.” Ex A048 2000 MP p. IV-1.

126. “The Maunakea summit area is well above the atmospheric temperature inversions that occur around 7,000-feet. Particulates and aerosols like vog (volcanic gas), smog, dust, smoke, salt particles, and water vapors generated below the inversion level are “capped” by the temperature inversion, so they do not rise above the inversion level and do not cause any interference at the summit.” Ex A003 FEIS, p. 3-182.
127. High winds are common at the summit, but wind velocities usually range from 10 to 30 miles per hour. Winds gust up to 100 miles per hour in the upper regions of Mauna Kea, creating an aeolian (influenced by wind) ecosystem. Ex A003 FEIS Vol. 1, p. 3-183.
128. Anabatic winds occasionally penetrate the inversion layer, bringing insects and small volumes of air from lower elevations. Ex A003 FEIS Vol. 1, p. 3-183 to 3-184.
129. “Wind vectors (direction and speed) across the summit area play a large role in the aeolian environment, transporting small debris including bugs from lower elevations up to the summit area. Obstructions to wind flow such as at the crests of the pu‘u can redirect the wind or slow it, creating eddies or small vortexes that reduce the energy, or holding capacity, of the wind, allowing debris in the air parcel to fall out. The aeolian environment of the summit area is unique, the persistent wind forcing resident fauna to adapt (see Section 2.2.2.2).” Ex A010 CMP NRMP, p. 2.1-43.
130. Winter temperatures in the upper regions of Mauna Kea range from 10-40 degrees Fahrenheit. Summer temperatures range approximately between 30 to 60 degrees. Ex A003 FEIS Vol. 1, p. 3-183.
131. The 300 feet wide, approximately 10 foot deep, alpine lake, Wai‘au, is “unique and revered.” Ex A009 2000 Master Plan, p. IV-2.
132. The southern rim of Lake Wai‘au is the rim of a subglacially-formed cinder cone, Pu‘u Wai‘au. A003 FEIS, Vol. 1, p. 3-115.

Floral Communities

133. Seemingly barren, desolate, and unchanging, the natural environment of the upper slopes and summit area are actually very much alive, revealing through its topography, geology, and climate an impressive history of geomorphic process and ecosystem development. Ex A009 CMP, p. 5-24.

134. Although it may appear barren to the casual observer, the summit of Mauna Kea supports an interesting variety of species, many of which are found nowhere else in the world. Ex A009 CMP, p. 5-38.
135. UH Management Areas on Mauna Kea contain two ecosystems: the Alpine Stone Desert above 12,800 feet and the Alpine Shrublands and Grasslands from roughly 9,500 feet to 12,800 feet. Ex A003 FEIS Vol. 1, S-4.
136. Vegetation above 12,800 feet in the upper regions of Mauna Kea consists primarily in the lichens, moss, and ferns that have adapted to its severe climatic conditions. Ex A003 FEIS Vol. 1, p. 3-80.
137. An unknown number of algal species and some vascular plants of species found at lower elevations also inhabit the summit region. Ex A009 CMP, p. 5-37.
138. Native grass species (Hawaiian bentgrass (*Agrostis sanwicensis*) and pili uka (*Trisetum glomeratum*) and fern species ('iwa'iwa (*Asplenium adiatum-nigrum*) and Douglas' bladderfern (*Cystopteris douglasii*) are found at elevations above 12,800 feet as well. Ex A009 CMP, p. 5-38.
139. The highest density of the 21 known species of lichens in the alpine stone desert region of Mauna Kea grow on north and west faces of rocks, away from direct morning sunlight. Ex A003 FEIS Vol. 1, p. 3-61.
140. In 1982, 25 lichen species were found on Mauna Kea. Half of those species are endemic to Hawai'i, two of which occur only on Mauna Kea. Ex A048 2000 Master Plan, p. IV-3.
141. Twelve species of mosses have adapted to the alpine stone desert region and tend to cluster under rock overhangs, where moisture concentrates. Two indigenous species of mosses were detected in a recent botanical survey of the proposed Northern Plateau site for the TMT. Ex A003 FEIS Vol. 1, p. 3-61.
142. Of the 25 different lichens found in 1982, half of the species were endemic to Hawaii, with two occurring only on Mauna Kea. Of the twelve mosses found in the summit area, less than a quarter were endemic. The fern *Cystopteris douglasii* was one of six vascular plants found at the summit, and the Mauna Kea Silversword, a sub-species unique to the mountain, was once reported in the summit region. (Ex. A048 2000 Master Plan, p.IV-2,3)
143. Lichens at the summit of Mauna Kea are the dominant element of the vegetation even though they provide only a trace of cover in this severe essentially unvegetated landscape. It appears that the only limiting factor of lichen growth is the physical environment. Ex B. 64 Appendix D1

144. Lichens in the TMT area include a macrolichen community dominated by foliose *Umbilicaria decussate*; where it occurs it is growing over 50% of vertical surfaces with a north to northeast aspect. *Umbilicaria decussate* is nearly always accompanied by *Pseudephebe miniscula* and *Rhizocarpon geographicum* and *Lecidea baileyi* on vertical rock faces of andesite blocks which suggests that special conditions allow growth there and not elsewhere. Ex. B.64, APP D-5,6
145. The most common species in the Mauna Kea crustose flora are *Lecanora polytropa*, *Lecidea baileyi* and *Candelariella vitellina*, which are widely dispersed throughout the area. Ex B.64 APP-D5
146. There are four principal environmental factors that determine the lichen and moss vegetation and species composition: substrate, moisture, temperature, and ultraviolet radiation. Ex. B.64 APP D2
147. There are four principal substrate types in the summit area :
a) Andesite slabs and blocks of grey rock, with few blisters, which form the large lava flows; water drains off rapidly;
b) Glaciated pahoehoe with numerous blisters where water can accumulate; lichens can accumulate
c) Glacial rubble, rocks under the surface layer often have lichen growing
d) Cinder and ash is too unstable to support lichen growth
Ex. B.64 APP D2
148. In May of 2011, Eric Hansen, witness for KAHEA, began working as the field crew leader for the Mauna Kea baseline botanical survey commissioned by the Office of Mauna Kea Management. B.10a at 1, B.10b at 3, Tr. 01/19/2017, V. 27 p 143:12-14, 144:22-25, 145: 1-3, 150: 9-15, 19-21
149. Mr Eric Hansen was responsible for leading a field crew in conducting an intensive study of the entire Mauna Kea Science Reserve in the alpine and subalpine zones, and he helped establish vegetation survey transects.
150. Mr Hansen testified that eleven of the 67 plant species identified in the OMKM Botanic Baseline Survey (Exhibit 64) were recorded in the summit region. Tr. 01/19/2017, V. 27 p157:18-21
151. During the time of the 2011 baseline botanical study, fieldwork for a subcontracted lichen study of the proposed Thirty-Meter Telescope site (Area E) was also conducted by Mr. Hansen's field crew for Pacific Analytics, a subcontractor of Parson's Brinkerhoff who were contracted by UH Hilo. The lichen study (authored by Dr Cliff Smith) is included as Appendix D to the OMKM Botanical Baseline Survey (2011) of the University of Hawai'i's Managed Lands on Mauna Kea (Exhibit B.64). B.10a at 1, Tr. 01/19/2017 Vol 27:145:18-24 Vol. 27: 146: 16-25, 147: 1-6, 155: 15-18, 178: 18-21, 179: 1-6.

152. While performing the lichen study at the proposed TMT site, Mr. Hansen and his crew also documented non-lichen species in the region; these included two endemic (only found in Hawai'i) grasses, *Agrostis sandwicensis* and *Trisetum glomeratum* and two endemic ferns, *Cystopteris douglasii* and *Asplenium trichomanes*; as well as three indigenous (naturally arrived to Hawai'i on their own but found in other places) ferns, *Asplenium adiantum-nigrum*, *Dryopteris wallichiana*, and *Pellaea ternifolia*. B.10a at 1, Tr. 01/19/2017, V. 27 at 146: 16-25, 147: 1-6, 155: 15-18, 178: 18-21, 179: 1-6.
153. Currently considered a species of concern by the USFWS, the Douglas' bladderfern (*Cystopteris douglasii*), are known to occur in the Maunakea summit region. The Douglas' bladderfern was found throughout Area E. Ex. A005 (TMT FEIS), p. 3-65
154. Species of Concern are those species about which regulatory agencies have some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act. Ex. A005, (TMT FEIS), p. 3-65
155. Though not apparent at a distance, when examined closely, unique assemblages of botanical communities exist at the proposed TMT site (Area E). B.10a at 1, Tr. 01/19/2017, V. 27 at 147: 7-14, 151: 24-25, 152:1, 155: 10-18, 156: 4-16, 157: 9-17, 183: 7-13.
156. During the 2011 Botanical Baseline Survey fieldwork, Mr. Hansen and his team did not find the distinct assemblage of botanical species found at Area E in other areas at the same or similar elevations of Mauna Kea. B.10a at 2, Tr. 01/19/2017, V. 27 at 147: 15-17, 194: 4-6.
157. The presence of large boulders in Area E (including the site of the proposed TMT) that have small pockets where moisture (include melted snow) can collect beneath them allows for unique botanical assemblages; these pockets are shaded, protected from direct exposure to the sun and high winds which allows for lower evapotranspiration rates. B.10a at 2, Tr. 01/19/2017, V. 27 at 147: 18 -25, 151: 15-23, 152: 4-19, 155:10-18, 156: 4-16, 20-24, 170:20-25, 171:1-3, 179: 7-12.
158. The substrate in Area E which includes a pahoehoe lava flow and other pohaku that are unique from the cinder substrate of the pu'u of Mauna Kea. Tr. 01/19/2017, V. 27 at 154: 3-18, 156:25, 157:1-8, 184:3-11, 185:11-15.
159. (Unlike the TMT project area), Cinder cones are not conducive for providing habitat for species of botanical origins. Tr. 01/19/2017, V. 27 at 180: 14-16

Arthropod Fauna

160. The only resident animal species in the summit area are arthropods. At least ten indigenous Hawaiian arthropod species are residents of this area: wēkiu bugs (*Nysius wēkiuicola*), lycosid wolf spiders (*Lycosa* sp.), two sheetweb spiders (genus *Erigone*), two mites (Family Aystidae and Family Eupodidae), two springtails (Family Entomobryidae), a centipede of the *Lithobius* species, a noctuid moth (*Agrotis* sp.). Ex A001 UH/TMT Cдуа, p. 3-6.
161. Despite their rarity, critical habitat for arthropod species is unknown or poorly defined because very little is known about their life cycle, population size, fecundity, and area distribution. (Ex. A048, p. XI-22)
162. Little information exists about the habits of arthropod species in the summit area, except the wēkiu bug. Ex A0101CMP, p. 5-39.
163. Wēkiu bugs have adapted to Mauna Kea's aeolian ecosystem; their food supply consists of insects blown from lower elevations towards the summit. Ex A-308 3-62
164. Wēkiu bugs are generally concentrated on the cinder cones in the summit area, habitats include snow patches (Type 1), tephra ridges and slopes (Type 2), loose, steep tephra slopes on the outer flanks of the cones, known as Type 3 habitat, Lava flows (Type 4) talus slopes and rock outcrops (Type 5) and compacted fine-grained material (Type 6). Ward WDT B.17a p 11
165. Dust can impact lichens, mosses, and ferns and is believed to degrade Wēkiu bug habitat. Ex. A005, App. K, p. 31, A003 FEIS Vol. 1, p. 3-70.
166. It has become clear that while Wēkiu bugs can range broadly over the summit when food sources and climate are favorable, the prime habitat is rims and inner craters of cinder cones. These are ice-free areas that rose above the once surrounding glacier (nunataks), as described by Englund and Porter 2006, sometimes on the flanks and base where cinder has accumulated (Eiben 2010).
167. Arthropod and Botanical Inventory and Assessment, by Pacific Analytics, L.L.C., Ex A-005 Appendix K FEIS Vol III
168. Information on relationships between wind and climate variables and wēkiu bug food availability is lacking. Ex A-010 CMP NRMP, p. 2.1-44.
169. In 1982, wēkiu bugs were found in abundance above 13,450 ft and on undisturbed areas on Pu'u Wēkiu and Pu'u Ha'oki and on stable accumulations of loose cinders and tephra rocks with interstitial spaces that allowed the bugs to access moisture and shelter. Ex A-010 CMP NRMP, p. 2.2-34.

170. Such hospitable environments for wēkiu bugs are found on cinder cones on the Mauna Kea summit as well as the flanks and bases of cinder cones. Ex A009 CMP, p. 5-39.

Water resources

171. On an ocean island two thousand miles from the next nearest land mass, fresh water is the source of life. Protection of the aquifer is tantamount to providing the generations to come with life-giving sustenance. The summit of Mauna Kea, the highest point in the Pacific, is the apex of the aquifers that radiate from the summit.
172. The regional aquifer beneath the summit of Mauna Kea is entirely fresh water. As evidenced by most seeps and springs, shallow groundwater does exist in the mountains flanks below the summit area. Analysis of spring water shows it to be recent and identical to rainfall at the summit. at least some of the water percolates downward to ultimately discharge as a spring or seep. Ex A003 FEIS Section 3.7 Water Resources and Wastewater p 3-115, 117
173. The Astronomy Precinct is located entirely above the Waimea Aquifer. A010 NRMP 2.1-38
174. Applicant's evidence indicates that, except for Lake Waiau, which has an impermeable layer beneath it, rainwater and snowmelt at the summit "continues its downward migration to the regional aquifer" of Hawaii Island. A003 FEIS Section 3.7 Water Resources and Wastewater p 3-115
175. Applicant's evidence indicates that drainage at the summit occurs through percolation of rainfall through cinder and broken rock substrates. Ex A003 FEIS Section 3.7 Water Resources and Wastewater p 3-117
176. Applicant states that "In the summit region, annual precipitation ranges from approximately 20 inches at the Very Long Baseline Array (VLBA) at an altitude of 12,600 feet to approximately 15.5 inches (including snowfall) at the Subaru Observatory at an altitude of 13,575 feet. Storms, including wintertime cold-fronts, upper-level and surface low-pressure systems, tropical depressions, and hurricanes provide the majority of annual precipitation over a very short period of time." A003 FEIS Vol. 1 at 3-183
177. Significant snowfall is known to occur during any month of the year, but is concentrated during January through March. A003 FEIS Vol. 1 at 3-183
178. Buried ground ice in two of the summit cinder cones show that permafrost exists near the summit. A048 2000 Master Plan at IV-1

179. Applicant's evidence also indicates that surface runoff at the summit does not extend below an elevation of 6,000 feet, which means that "the majority of the water ultimately ends up percolating and becoming groundwater recharge with only a small amount lost to evaporation." Ex A003 FEIS section 3.16 Cumulative Impacts p 3-219
180. The Island of Hawaii contains high water levels in the rift zones of Kilauea and Kohala Volcanoes. High water levels, possibly associated with a buried rift zone of Hualalai Volcano or fault scarps draped with lava flows, are also present along the western coast. Areas of high water levels also are found along the northern flank and eastern flanks of Mauna Kea and on the southeastern flank of Mauna Loa. These high water levels are not fully understood. (emphasis added) Exhibit B17w USGS Groundwater in Hawaii p. 3
181. Four components of the hydrology of the Mauna Kea summit region remain unknown: 1) watershed calculations of snow-water distribution, 2) outcomes of leachate and liquid waste from septic and cesspool systems, 3) distribution and impacts of permafrost, and 4) groundwater maps of water levels, flow paths, and recharge rates. Ex A010 CMP NRMP, p. 2.1-39.
182. Applicant states that Groundwater transportation rates in the summit region of Mauna Kea are unknown, and no flow paths have been identified. It is generally believed that groundwater flows along the direction of the ground surface slope, although the presence of variable subsurface features, such as dikes and sills, with low hydraulic conductivity, likely alter groundwater flow rates and flow paths. Groundwater flow-paths are important to understanding the potential movement of leachate from underground waste water systems. Exhibit A009 CMP 5-32 (pdf p 82)
183. Although the amount of precipitation that infiltrates into the ground is unknown, it is generally accepted, and is reported by the NRCS (Sato et al. 1973), that surface infiltration rates in the summit region are high, and that during heavy precipitation events, water reaching the ground surface infiltrates quickly. The depth and rate of transmission of water that infiltrates is unknown and most likely varies depending on the rock type and the subsurface structure. Exhibit A009 CMP 5-32 (pdf p 82)
184. Applicant states that the regional aquifer beneath the summit is what is referred to in Hawai'i as "high-level," which means that the aquifer is entirely fresh water, not fresh water floating on salt water, and geologic structures, such as volcanic sills and dikes, isolate the water. A003 FEIS Vol I 3-115 (pdf p 203)
185. The surface runoff does not extend to or below an elevation of 6,000 feet, which means that the majority of the water ultimately ends up percolating and

becoming groundwater recharge with only a small amount lost to evaporation. A003 FEIS Vol I 3-219 (pdf p 307)

186. As evidenced by modest spring and seeps, shallow groundwater does exist in the mountain's flanks below the summit area. The most prominent of these springs and seeps are the series of springs found near Pōhakuloa and Waikahalulu Gulches... This indicates that at least some of the rainfall and snow melt at the summit percolates downward to a perching layer to ultimately discharge at the ground surface as a spring or seep. A003 FEIS Vol I 3-117 (pdf p 205)
187. Groundwater flowing downslope is the water source for seeps and streams found between 8,500 and 11,000 ft (2,591 and 3,353 m), near Pōhakuloa and Waikahalulu Gulches (Woodcock 1980; Arvidson 2002). Exhibit A009 CMP 5-30 (pdf p 80)
188. There is evidence that the water discharging at the seeps and springs is derived from recent rainfall and snow melt across the upper slopes of Mauna Kea (Arvidson 2002; Ehlmann et al. 2005). Exhibit A009 CMP 5-30 (pdf p 80)
189. Hydrologic conditions were strikingly different from those predicted by conventional models for ocean islands: the formation was dry down to only ~150 m where the first, thin, perched aquifer was encountered; a second, more substantial, perched aquifer was reached at only ~220 m depth that extended to ~360 m where a sequence of (remarkably thin) perching formations were recovered in the core down to about 420 m where unsaturated rocks were again encountered. Initial analysis of the core suggests that thin, clay-rich, perching formations in the shallow stratigraphic column play a much larger role in groundwater transport than has generally been recognized. (emphasis added) B.17x SAO Mauna Kea Aquifer studies on PTA p 2.
190. Aquifers formed of postshield- stage rocks have been generally regarded to have lower permeability than shield-stage lava flows, but the very young postshield rocks on the Big Island have some of the highest hydraulic conductivities (tens of thousands of feet per day) reported for volcanic rocks in the Hawaiian Islands. B.17y Hawaii Volcanic Rock Aquifer Study p 3
191. Volcanic intrusives, or dikes, on Mauna Kea create compartments which are essentially permeable (sic, transcript error) so when you get recharge (or runoff) it is deposited in dike-confined compartments. That's what we call the existence of high-level groundwater, and its relative impermeability of these intruded dikes that create high level groundwater. Nance Tr.12.13.16 V16
192. Mr Nance stated that an aquifer is a groundwater body defined by boundaries, high-level or basal. How they fit together on this island he couldn't say. There are more aquifers than there are regulated aquifer systems. Nance Tr.12.13.16 V16 p. 112:19-25, 113:1-2.

193. Three potable wells are tapped into high level dike-confined groundwater. Nance Tr.12.13.16 V16 at 113:7-8.

Recreational Resources of Mauna Kea

194. *Mauna Kea kuahiwi ku ha'o i ka mālie* (Mauna Kea is the astonishing mountain that stands in the calm). Ōlelo No'eau. A001 CMP
195. The views of Mauna Kea and the view from Mauna Kea are significant and have been for centuries. Ex A-010 CMP NRMP, p. 2.1-47.
196. The unique topography, location and views draw many hikers to Mauna Kea to explore the few established, but unmarked trails in the summit region. A001 CDUA TMT Mgt Plan 2-5
197. Residents from around the island value the changing colors of Mauna Kea throughout the day, with people from the eastern side describing the mountain's beauty at sunrise, while those on the northwestern side experience the sunsets. Ex A-302 CMP NRMP, p. 2.1-47, quoting Kepā Maly (1999).
198. Approximately 72 percent of the Hawai'i Island population resides in an area impacted by views of telescopes on Mauna Kea. Ex A-308 FEIS, p. 3-82.
199. Numerous recreational activities take place on Mauna Kea. Visitors come to Mauna Kea each year to sightsee, view the stars, tour the world-class observatories. A001 CDUA TMT Mgt Plan 2-5
200. Different categories of people that view Mauna Kea (E.G. residents, sightseers, and cultural practitioners) have differing expectations, and these differences greatly affect their perception of the observatories. A001 p 7-2
201. The Applicant concedes that the visual impact of past actions on Mauna Kea, such as the 11 observatories currently located within the Astronomy Precinct, is considered substantial, significant and adverse. Ex A-308 FEIS Section 3.5 Visual and Aesthetic Resources p 3-101
202. Sierra Club member Mae Mull was an ardent advocate for a Mauna Kea Master Plan for long term land use and natural resource protection. She said "The primary goals of the master plan should be permanent protection of Mauna Kea's natural beauty and rare native ecosystems and to provide for public recreational use." "Big island residents, conservationists, hunters, public planners and most of Hawaii's people have special regard and respect for Maun Kea. ...To destroy the unique natural values of the mountain for the sake of astronomical observation of outer space is not progress by any measure." "Just because other countries won't permit desecration of their mountaintops...these are not good reasons to turn our

precious mountain into a playground for astronomers.” (Exhibit B.17 n Mae Mull Elepaio 1974)

203. Several trails traverse the Mauna Kea summit region. Among these are the Mauna Kea Humu’ula Trail and the Mauna Kea Umikoa Trail. The Mauna Kea Humu’ula Trail begins near Hale Pohaku and ends near Lake Waiau. A modern trail around the western side of Puu Haukea connects the Mauna Kea Humu’ula Trail with the Mauna Kea Access Road close to the Batch Plant Staging Area. Proposed TMT-related use of the Batch Plant Staging Area will be visible to trail users during the construction period. Ex A001 CDUA p.2-4
204. Based on the large number of shrines in the summit area it is clear that Hawaiians went to the top of the mountain with a sacred purpose in mind, but it is doubtful that large numbers were involved at any one time. The ritual landscape that exists today is almost certainly the result of journeys by a number of families and adze makers over many generations. The cluster of overlapping cinder cones that forms the “summit” of Mauna Kea, including those now called Pu’u Wekiu, Pu’u Kea, Pu’u Hau Oki and others that are not easily distinguished as discrete landforms (Porter 1979), has been designated an historic property (Site 21438) based on ethnographic information and archaeological data. Ethnographic information suggests that the “summit,” as just defined, was most probably known in the past by a single name, Kūkahau’ula, that on present evidence referred to both a legendary figure and to a character in traditional histories and genealogies. The latter includes references to Kūkahau’ula as the husband of Līlinoe and as an ‘aumakua (family deity) of fishermen. The place name evidence thus indicates that the “summit” was at the very least a legendary place (wahi pana Pukui and Elbert 1971, 1986). The archaeological evidence indicates that it was much more than that. While there is little archaeological evidence of human activity on the “summit” itself, the large numbers of shrines that encircle the mountain, just below indicate that the top of the mountain was the focal point of ritual practices. There is no knowledge of what these practices entailed, but it is reasonable to infer that they were centered on the worship of local mountain gods and goddesses, such as Poli’ahu and Līlinoe, and presumably Kūkahau’ula as well. The summit is thus interpreted to have been the focal point of a major pilgrimage site or center. A122 Archaeological Survey of Mauna Kea NAR p 7-12,13
205. The cumulative impact of intensified industrial land use at the summit has impacted my recreational enjoyment and spiritual practice. The cumulative impact of the destruction of habitat, widespread waste accumulation, obstruction of viewplane, constant sound, alteration of the geology, and negative impact to the cultural practice of my colleagues is a source of personal grief. The summit would be silent if there was no development at all. It is not silent. The 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. B.17a Ward WDT p 2

206. Noise level in the vicinities of the existing observatories varied from 38 dBA to 77dBA Leq, and 40-78 dBA L10, with noise levels at or below 60 dBA Leq beyond a distance of 50 feet from HVAC exhausts. The loudest noise levels of 68 and 77 dBA Leq and 69 and 78 dBA L10, were measured at locations within 15 feet of HVAC exhaust outputs. A003 FEIS Section 3.13 Noise p 3-175, 176
207. Threats to Mauna Kea's air quality and sonic environment primarily revolve around the presence of humans and their levels of activity. Potential future increases in the number of people visiting, working, and recreating at the UH Management Areas may increase the levels of these impacts. Ex A-010 CMP NRMP p. 2.1-46.

Cultural Resources of Mauna Kea

This section will be best addressed by other parties in this hearing.

Oversight of UH Activities on Mauna Kea

General Lease

208. The site on which the TMT is proposed is within the Mauna Kea Science Reserve (the "Science Reserve"}, which the University holds and manages pursuant to General Lease No. S-4191 (the "Master Lease"} from the BLNR. The University also holds and manages the Hale Pohaku Mid-Level Facilities under General Lease No. S-5529 and the Summit Access Road under Grant of Easement No. S-4697.
209. The General Lease (S-4191), dated June 21, 1968, states that the university 12.) "shall not damage, remove excavate, disfigure, deface, or destroy and object of antiquity, prehistoric ruin, or monument of historic value." Exhibit B.17f, General Lease (S-4191) p5
210. The General Lease (S-4191) requires that 5.) "The lessee shall not sub-lease, subrent, assign or transfer any rights there under without the prior written approval of the BLNR." Exhibit B.17f, General Lease (S-4191) p 4
211. The General Lease (S-4191) states that 2.) "The lessee shall keep the demised premises and improvements in a clean, sanitary, and orderly condition. Ex B.17f p 3
212. The General Lease (S-4191) states that "improvements shall be such improvements may be abandoned in place.... removed or disposed of by the Lessee at the expiration or sooner termination of the lease, provided, that with the approval of the Chairman requires that items be removed before the lease

termination, or be abandoned with prior approval from the BLNR. Ex. B.17f, page 4

213. The General Lease (S-4191) states that 1a) "No activity shall be permitted which will result in the pollution of the waters of Lake Waiau" Ex B.17f p2

214. General Lease S-4191 from DLNR to the University for the use of the Mauna Kea Science Reserve does not confer an expectation of exclusivity onto the University. Ex B.17f p4

Scope of the Mauna Kea Conservation District

215. "Because living things, ecosystem processes, and cultural practices are not usually confined by administrative boundaries, it is important for the NRMP for the UH Management Areas to consider the user activities, management issues and regulations (or lack thereof) on lands adjacent to the focus area." Ex A-010 CMP NRMP, p. 1-11.

216. The 1977 Management Plan for Mauna Kea (see below) identified the scope of the Mauna Kea conservation district as from the summit down to the 6,000-foot elevation and including all lands from the summit to Saddle Road, including the Mauna Kea Forest Reserve and Game Management Area, and Kahohe Game Management Area. (Ex. B.17g, page 1)

217. The Mauna Kea Ice Age Natural Area Reserve (NAR) was established in 1981 and is comprised of two parcels that abut the Mauna Kea summit region. One is 143.5 acres and a larger, triangle shaped parcel is 3,750 acres. These areas contain Lake Waiau and the Mauna Kea Adze Quarry. Ex A-010 CMP NRMP, p. 1-12.

218. The approximately 52,500 acre Mauna Kea Forest Reserve surrounds the UH managed areas and the NAR, and contains critical māmane habitat for the endangered Palila bird. Ex A-010 CMP NRMP, p. 1-12.

219. The Hakalau Forest National Wildlife Refuge encompass 33,000 acre Hakalau forest Unit and the 5,300 acre Kona Forest Unit. Ex A-010 CMP NRMP, p. 1-12.

220. Pōhakuloa Training Area (PTA) lands total 108,863 acres that extend up the lower slopes of Mauna Kea to an approximate altitude of 6,800 ft. PTA contains critical Palila bird habitat, fifteen federally listed threatened and endangered plants, three federally listed endangered bird species, and one federally listed bat species. Ex A-010 CMP NRMP, p. 1-12.

Mauna Kea Plan, May 1977

221. In 1974, George Ariyoshi expressed concerns that “social pressures for more intensive use of Mauna Kea for scientific, recreational, and other purposes pose a threat to the priceless qualities of that mountain...” He wrote to Sunao Kido, then Chairman of the BLNR, directing that the agency “develop and promulgate, as expeditiously as possible, a Master Plan for all of Mauna Kea above the Saddle Road.” This Master Plan was directed to include provide for Plan enforcement and amendment. Ex. B.17g DLNR, The Mauna Kea Plan (May 1977), p. 2.
222. The plan was prepared by DLNR staff, and approved on February 11, 1977 following two public hearings. Ex. B.17g p 2-3
223. The Mauna Kea Plan is a policy guide on land use and management adopted by the board of Land And Natural Resources; the plan shall be reviewed annually, and any proposed amendments shall be in accordance with procedures adopted by the Board. Ex D-3 p 10
The area covered by this plan extends from the summit down to about 6,000 feet, and includes all conservation district land from the summit of Mauna Kea down to the Saddle Road. Ex. B.17g p 1
224. The objectives of the plan were to determine the capability of Mauna Kea’s resources to accommodate various uses without unacceptable damage to biotic and other natural values and historic values, and the visual appearance of the mountain, and to recognize the significance of MK’s summit for astronomical research and let a limitation on facilities based on need and environmental concerns. Ex D-3 p 1
225. Any use of the lands will be, however subject to regulations under County, State and Federal laws. Ex. B.17g p 5
226. No application for 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. Ex. B.17g p 5

The 1995 Revised Mauna Kea Management Plan

227. In 1995 the BLNR and the University sought to amend the MKSRCDP to address Commercial Use and Public Access. It states “This revised public access management plan supersedes and replaces the management plan approved by BLNR on Feb. 22, 1985 in CDUA HA1573. This plan differs from the plan approved in 1985 in the following manner”:
228. Management and enforcement of public and commercial use of MK is the responsibility of DLNR except for specific rights reserved for UH.

229. Permitted Commercial uses and management controls are incorporated in the Plan.
230. Some controls are eliminated and/or modified and new ones added to reflect UH's experience in the past ten years, especially since the major portions of the road have been paved. The primary criterion for controls, however, has been and continues to be public safety. Ex D-10 p (i) 1995 Management Plan
231. The 1995 Management Plan, in turn, directly relies on the 1977 DLNR Mauna Kea Plan, the (1983) Science Reserve Complex Development Plan, and the Hale Pokaku Master Plan, for astronomy related uses. Ex. B.17h p 7 1995 Management Plan
232. DLNR has the authority to determine permitted public and commercial uses of the UH Management Area-subject to terms of Lease between UH and DLNR. Management and enforcement of public and commercial use of Mauna Kea is the responsibility of DLNR—except for specific rights reserved to UH. Ex. B.17h 1995 Management Plan P 1
233. The 1995 Revised Plan --Part III: Management and Controls on page 7, states: "Astronomy-related uses in the UH Management Area are controlled by the 1977 DLNR Mauna Kea Plan, the Hale Pohaku Master Plan, the SRCDP, and the CDUA process." Ex. B.17h p 7 1995 Management Plan

2000 Master Plan

234. The 2000 Master Plan was never adopted nor approved by BLNR. Ex A003 FEIS p 3-146
235. In the 2000 Master Plan, the University concluded that there was a need for a single entity to manage the comprehensive plan for the Science Reserve. Ex A009 CMP P 3.8
236. The objective of the 2000 Master Plan is to preserve and protect the cultural, natural, recreational and scientific resources on UH lands. Ex A048 p
237. The 2000 Master Plan calls for the management organization to be housed within the University system and funded as an ongoing program unit of the University of Hawai'i at Hilo (UH-Hilo). Ex A-009 CMP P 3.8
238. In accordance with the 2000 Master Plan, UH-Hilo Chancellor established the OMKM on August 1, 2000. (Ex A-009 CMP P 3.8)
239. OMKM is the office charged with ensuring compliance with and implementation of the 2000 Master Plan. (Ex A-009 CMP P 3.8)

240. The 2000 Master Plan acknowledged that joint management by DLNR and the University, and layers of management requirements and recommendations outlined in historical leases, plans, permits and written or verbal commitments, have created a complex and often confusing pattern of management responsibility (Group 70 International 2000). (Ex A-009 CMP P 3.9)
241. The acceptance of the 2000 Master Plan by the UH Board of Regents prompted the creation of OMKM, the MKMB, and Kahu Kū Mauna. (Ex A-009 CMP P 3.9)
242. Under the 2000 Master Plan, at least some of MKSS' services are to be transferred to OMKM, but no deadline was specified and the transfer has not occurred. (Ex A009 CMP P 3-11)
243. The University's 2000 Master Plan for the UH Management Area designated approximately 525 acres (212 ha) of the leased land as an "Astronomy Precinct," where development is to be consolidated to maintain a close grouping of astronomy facilities, roads and support infrastructure (Group 70 International 2000). Ex A-009 CMP P 3-1
244. Any future development would occur within the Astronomy Precinct portion of the UH Management Areas, as delineated in the 2000 Master Plan (Group 70 International 2000). Ex A-3009 CMP P 6-8
245. Any potential future observatories will be located inside the Astronomy Precinct. The goal of this process is to refine telescope siting areas defined in the 2000 Master Plan based on updated cultural and natural resource information (see Section 7.1.1 and Section 7.1.2). (Ex A-009 CMP Pg 7-57)
246. An approved management plan must be in place prior to the construction and operation within a resource subzone (HAR 13-5-39); a BLNR- approved comprehensive management plan must also be developed prior to construction and operation of such as facility. ExA-003 FEIS Section 3.10 p 3-142

The University's Comprehensive Management Plan (UH CMP)

247. The Applicant relies on the UH CMP and its four subplans and the TMT Management Plan to fulfill the "approved management plan" requirement for its CDUP application (CDUA HA-3568) under HAR §13-5-24. The Applicant claims the proposed use is consistent with the provisions of the CMP and subplans, the approved management documents for the UH Management Areas on Mauna Kea. Ex A-001 CDUA TMT Management Plan p 3-11 Section 3 Management and Controls

248. The CMP is described as “the framework for managing multiple existing and future activities, such as astronomy, recreational and commercial activities, scientific research, and cultural and religious activities.” (Ex A009)
249. The TMT Management Plan is a “project-specific management plan.” Ex A-001 UH/TMT CDUA, p. 2-3.
250. The CMP is described as being in accordance with the Third Circuit Court’s ruling in 2007 regarding the inadequacy of the University’s management plan proposal at the time. (Ex A009)
251. In its 2007 decision and order, the Third Circuit Court found that the definition of management plan in HAR 13-5-2 requires the plan to be HAR 13-5-2 “comprehensive,” that is an “all-covering, all-embracing, all-inclusive” “plan for carrying out multiple land uses” for the conservation of resources on Mauna Kea. *Mauna Kea Anaina Hou v. BLNR*, Civ. No. 4-1-397, 7 (3rd Cir. Haw. Jan. 19, 2007))
252. The Third Circuit Court also found that the “resource that needs to be conserved, protected, and preserved is the summit area of Mauna Kea,” *Mauna Kea Anaina Hou v. BLNR*, Civ. No. 4-1-397, 7 (3rd Cir. Haw. Jan. 19, 2007)
253. As identified in the first management plan for the mountain, the Mauna Kea conservation district the extends from the summit down to the 6,000-foot elevation and includes all lands from the summit to Saddle Road, including the Mauna Kea Forest Reserve and Game Management Area, and Ka’ohe Game Management Area. (Ex. B.17g, page 1)
254. The CMP only applies to the “UH Management Areas” (described as “the Mauna Kea Science Reserve (Science Reserve), the mid-level support facilities at Hale Pohaku, and the Summit Access Road...”). (Ex. A009 page 2-1)
255. The Third Circuit Court also found that where the 1995 management plan “was virtually silent” on the number and size of future telescopes on Mauna Kea, it did not satisfy the requirement for a comprehensive management plan. (*Mauna Kea Anaina Hou v. BLNR*, Civ. No. 4-1-397, 7 (3rd Cir. Haw. Jan. 19, 2007)) page 3-4)
256. “Proposed new development on Mauna Kea, including the Thirty Meter Telescope (TMT)” is outside of the scope of the CMP. Ex A-009 CMP, p. 2-3.
257. The Applicant acknowledges that “this CMP does not address development plan issues related to future observatories, including whether new observatories should be located on Mauna Kea to support the astronomy program or if observatories should have their leases extended or be decommissioned.” (Ex.

A009, page 7-54)

258. The CMP does not provide a limit on the number or size of future telescopes in the Mauna Kea Conservation District. (Ex. A009 page 7-56)
259. The CMP describes the need to complete, among other things:
a burial treatment plan because Mauna Kea is a known burial site (A009, page 7-10)
buffer zones to protect archaeological sites (A009, page 7-10, 7-56)
invasives species control plan (A009, page 7-16 thru 7-18)
emergency hazardous spill protocol (A009, page 7-44)
permitting process for traditional and customary practices deemed appropriate (Ex A009 page 7-8 thru 7-10)
260. The CMP does not provide a timeline for completing these tasks and provides no process for public or agency oversight consistent with Chapter 91, HRS. (Ex. A009)
261. The CMP specifically identifies the following measures as being among those Native Hawaiian rights for which access will be maintained insofar as they are consistent with other management actions: ...gathering of cultural resources..., Access for families to visit iwi kupuna..., Access to scatter ashes..., Access through trails for hunting and gathering..., Access to deposit piko..., Access for traditional...religious and spiritual observances..., Pilgrimage, offerings, and prayers, and Access to Lake Waiau to gather water for religious and spiritual purposes. Exh A-007 Staff Report Feb 25, 2011, p.11
262. Upon approval of the CMP, the BLNR made the UH BOR responsible for implementing the CMP. In accepting that responsibility, the UH BOR delegated implementation of the CMP through normal UH governance channels to UH Hilo, OMKM, and MKMB and also assigned two members of the UH BOR to sit as ex-officio, nonvoting members on the MKMB. Ex A-003 FEIS section 3.10 Land Use Plans, Policies and Controls p 3-148
263. “OMKM’s responsibilities are complicated by the fact that the UH Management areas are governed by two overarching documents—the Master Plan 2000, which was not approved by the Board of Land and Natural Resources, thus requiring UH to continue to comply with the rights and responsibilities outlined in the 1995 Revised Management Plan.” Ex A-011 CRMP 3.2.1 OMKM Mission and Responsibilities 3-3
264. The University of Hawaii is an educational institution, not a land management agency. HRS 304A-102
265. The rangers who work for OMKM, but work closely with Mauna Kea Support Services, do not have the primary enforcement authority. Tr. McLaren

266. At the oral arguments before the Intermediate Court of Appeals on the appeal of the BLNR's decision to deny a contested case hearing on the CMP to some of the Petitioners in the present case, counsel for the University conceded that the CMP "do[es] not take action". (See, http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html, accessed on November 13, 2011 at minute 43:29)
267. University counsel said: the "management plan itself demonstrates these are management measures that the University has been doing for quite some time and can do." (See, http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html, accessed on November 13, 2011, at minute 41:46)
268. Neither the BLNR's April 9, 2009 approval of the CMP or the March 25, 2010 approval of the 4 subplans document any specific findings by the BLNR regarding the 3-part analysis required by the Court's decision in Kapa`akai. (Ex. B-41, B-42)
269. All of the 11,288 acres leased by the University on Mauna Kea are designated as a conservation district. (Ex. A009, page 3-1)
270. "The University's 2000 Master Plan for the UH Management Area designated (approximately) 525 acres (212 ha) of the leased land as an "Astronomy Precinct," where development is to be consolidated to maintain a close grouping of astronomy facilities, roads, and support infrastructure." (Ex. A009, page 3-1 (citations omitted).
271. In addition, the CMP directs decision-makers "to site all new proposed astronomy facilities in the area within the Astronomy Precinct identified as the north plateau." (Ex. A009 page 7-56)

Legislative Auditor's Reports regarding Management

272. The Legislative Auditor conducted two prior audits of the management of Mauna Kea and the Mauna Kea Science Reserve (Report No. 98-6) found that UH's management of the science reserve was inadequate to ensure the protection of Mauna Kea's natural resources. The university had focused primarily on the development of Mauna Kea and the Mauna Kea Science Reserve research program. Policies and action plans to ensure the protection of Mauna Kea outlined in management plans were often late and weakly implemented. New technology also required the university to change its approach to future development within the science reserve. We also found that DLNR needed to improve its protection of Mauna Kea's natural resources, particularly the conservation district permitting process and enforcement. The department's

administrative requirements were frequently overlooked or not completed in a timely manner. B.17k Legislative Audit of Mauna Kea Management 2014

273. In the 2005 Follow-up Audit of the Management of Mauna Kea and the Mauna Kea Science Reserve (Report No. 05-13), we found that while UH and DLNR had made improvements in managing Mauna Kea and the science reserve, more needed to be done. The university still lacked administrative rule-making authority, exercised weak permit monitoring, and management plans for the science reserve needed to be updated to reflect current use and management and to provide increased transparency and accountability of the university. We also found that the leases, subleases, and permits were dated and that DLNR, as landowner, did not provide a mechanism to ensure compliance with lease and permit requirements. The department's divisions did not coordinate their efforts in protecting natural resources, and a management plan for the Mauna Kea Ice Age Natural Area Reserve was needed. B.17k B.17 2014 Legislative Audit of Mauna Kea Management p.15-16

274.

275. The Legislative Auditor found UH issued unauthorized permits to regulate and assess fees for commercial tour activities, putting Mauna Kea's resources and UH's Mauna Kea revenues at risk... In the absence of rules, the office issued unauthorized permits to regulate commercial tour operators and charge commercial tour fees. The office also lacks enforcement authority to protect the mountain's resources from the impacts of public and commercial activities, even though it is responsible for protecting those resources. B.17k 2014 Legislative Audit of Mauna Kea Management p.15-16

276. Commercial tour fees, approximately \$391,000 annually, are an important source of funding for the maintenance of infrastructure on Mauna Kea and the office's ongoing stewardship efforts. (Exhibit 2.3 shows a commercial tour group visiting the Mauna Kea summit.) We found, however, that UH issued temporary commercial tour permits without obtaining final approval from the Board of Regents and relied

on those permits to

FY2009 and FY2013, UH assessed unauthorized tour operator fees totaling nearly

\$2 million, representing

available funds for those years. In addition, UH continues to recognize those unauthorized permits and collect fees via informal agreements with tour operators. Such arrangements put both the mountain's resources and the office's funding at risk. B.17k 2014 Legislative Audit of Mauna Kea Management p.19

The Thirty Meter Telescopes Observatory Proposal

277. The proposed site for the TMT Observatory is a roughly 5-acre area at the end of a four-wheel drive road at an elevation of 13,150 feet on the Northern Plateau of Mauna Kea. Ex A- 003 FEIS, Vol. 1 p. 2-10.

278. Roughly 6.2 acres of previously undisturbed land will be disturbed by the TMT Observatory and Access Way. Ex A- 003 FEIS Section 3.2 Cultural Resources Page 3-26
279. There are no current developments on the Northern Plateau. Ex A-007 Staff Report Feb 25, 2011, p.7
280. TMT is being proposed for an area on the North Plateau of Mauna Kea that has not hosted permanent facilities or developments. It is opening up a new area. Ex A-007 Staff Report Feb 25, 2011, p 59
281. The TMT's footprint will be a minimum of 8.5 acres on a pristine plateau. Ex A-007 DLNR staff report Feb 25, 2011 p.K-1
282. The total dome height will be 184 feet above finished grade, with an exterior radius of 108 feet. Ex A-007 Staff Report Feb 25, 2011, p.15
283. HAR 11-200-12 states: "In Determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short term and long term effects of an action. In most instances, an action shall be determined to have significant impact if it: (13) Requires significant energy consumption." HRS 11-200-12 (Significance Criteria).
284. The TMT will have significant power requirements. Ex A-007 Staff Report Feb 25, 2011, p.45
285. The existing peak demand load documented by HELCO at the substation, including all the observatories and the Hale Pohaku facilities, is 2,230 kW, approximately less than half of the capacity of the substation. Of this current use, the Keck observatory uses approximately 350 kW of power on average. Ex A-003 FEIS Section 3.12 Power and Communications p 3-169
286. Preliminary design electrical load estimates indicate that the TMT Observatory will operate with a "Peak Demand" of 2.4 MW. To adequately support the peak power requirement... two transformers will be upgraded at the existing HELCO substation at Hale Pohaku. Ex A- 308 FEIS Section 3.12 Power and Communications p 3-169
The HELCO transformers at Hale Pohaku need to be upgraded because the anticipated power demand from TMT and the other observatories necessitates upgrading the equipment. Sanders Tr. 8.15.11 P 86 20 -25, p 87 1-2
287. The TMT Project would result in HELCO having to upgrade the two transformers with the Hale Pohaku Substation. (Ex. A-001, CDUA, p. 1-13)

288. The TMT Project would result in HELCO having to also upgrade the existing electrical service by replacing the existing wire conductors with new higher-capacity conductors in the underground conduits that run from the Hale Pohaku Substation to the summit area. (Ex. A-001, CDUA, p. 1-14)
289. DOFAW notes...Not knowing the actual alignment makes it difficult to assess the potential impacts of the project, although, the powerline will pass through the Mauna Kea Ice Age Reserve in some locations. Ex A-007 Staff Report Feb 25, 2011, p.23
290. The Department of Health Clean Water Branch (CWB) notes that the project will need to be compliant with the criteria set out in the Anti-degradation Policy (HAR ss11-54-1.1) and Designated uses (HAR ss11-54-1.1) regarding impacts on state waters. Ex A-007 Staff Report Feb 25, 2011, p.25
291. The building and operation of the TMT Observatory on Maunakea will require a sublease from UH, which lease this ceded land from DLNR. The sublease will be subject to approval first from the TMT board and the UH BOR followed by approval from BLNR. Ex A- 003 FEIS section 3.10 Land Use Plans, Policies and Controls p 3-159
292. The current UH lease expires in 2033 and the TMT Observatory will be required to be decommissioned and restore the site at that time, unless a new lease is obtained from the BLNR. Ex A- 003 FEIS section 3.10 Land Use Plans, Policies and Controls p 3-160
293. The TMT would take approximately five years to decommission. Sanders Tr. August 15, 2011, P 82: 2-5
294. The TMT will require a sublease for use of the land on Mauna Kea leased to the University. (Sanders, Tr. August 15, 2011, 100:11-13,
295. The terms of the sublease to the TMT Observatory Corporation are not known, but are expected to be similar to the terms of current subleases for telescopes on Mauna Kea. (Sanders, Tr. August 15, 2011, 82:12-24, 99:24-101:4, Nagata, Tr. August 16, 2011, 211:21-25)
296. Mr Hayes, project manager for the TMT EIS, stated that Overall the existing level of cumulative visual impacts from the past projects at the summit Is considered to be substantial, significant and adverse. .If the TMT is built, the TMT would add to the cumulative visual Impact that has already been substantial, significant and adverse. The TMT project would represent an additional increment. It would add to the cumulative visual impact of astronomy development? It would be an increment of impact. Tr. 10/25/16, V.3 at 155:10-25

297. Asked what is the difference between increment and cumulative, Mr Hayes responded "cumulative impacts is the sum of increments". When asked if the TMT would add to the cumulative visual impact that you have already stated is substantial, Significant and adverse, he agreed that it is. Tr. 10/25/16, V.3 at 155:10-25, 156:1-6
298. Mr Hayes was asked , as project manager for the EIS and a collaborator on the CDUA, Is It still your position that all of these Impacts do not add to the already significant adverse and substantial cumulative Impact in the Historic District? He answered " As I've said, this project will add an Increment to the cumulative impact, however, it will not tip any of the evaluated Impacts from a significant or from a less than Significant to a significant level. Tr. 10/25/16, V.3 at 181:1-10
299. Asked of Jim Hayes: Is there anything in the proposed project that would reduce those impacts that have been already determined to be substantial to less than substantial? A: No. Tr. 10/25/16, V.3 at 215:11-19

Impacts of the Proposed Project

Threats Posed by the TMT Project to the Natural Environment

Aeolian Ecosystem Impacts

300. It is impossible to accurately predict the exact plant species which will invade the subalpine and alpine zones on Mauna Kea in the future, but managers must be especially aware of plant species that are adapted to dry climates, early successional habitats, high elevation climates, have wind dispersed seeds, and or that originate from the temperate zone. Ex A-010 CMP NRMP 2.2-21
301. There are several invasive plant species that may become established in the subalpine and alpine zone in the future, particularly if anthropogenic climate change affects rainfall regimes in the Hawaiian Islands. Ex A-010 CMP NRMP 2.2-21
302. Habitat alteration threatens native invertebrate communities by directly removing habitat (through development) or changing it to the extent that the invertebrates are no longer able to live there (for example, by changing host-plant abundances). Ex A-010 CMP NRMP, p. 2.2-43.
303. A threat to high elevation environments on Mauna Kea exists in invasion by new plant species that are adapted to subalpine, alpine or arid environments. These can be introduced through ...accidental introduction through human activities (such as seeds stuck to vehicles or visitors' shoes). Ex A-010 CMP

NRMP p. 2.2.20

304. Approximately 9% of non-native species found growing at high elevations in the Hawaiian Islands were first recorded in the past thirty years. Ex A-010 CMP NRMP 2.2.20
305. The CMP requires (Management Action FLU-5) that an airflow analysis be performed on the design of proposed structures to assess potential impacts to aeolian ecosystems. The aeolian ecosystem is related to the wēkiu bug and the fact that its food supply consists of insects blown from lower elevations to the summit, where they come to rest and become wēkiu bug prey. Ex A003 FEIS p 3-70
306. Mr Perry White acknowledged that the dust caused by extraction and movement of thousands of tons rock would have an impact on air quality. Tr. 10/1/16 Vol 1:74:22-25
307. Climate modeling predicts that the intensity of warming is positively related to altitude. (Ex A-010 CMP NRMP 2.2.23)
308. Increase in CO2 concentration may increase the competitive edge by fast growing invasive species. Ex A-010 CMP NRMP 2.2-25
309. The FEIS noted that University has failed to fully determine the significance of cumulative impact to the alpine stone desert ecosystem from activities to date. The project will add an increment to the current level of cumulative impact to all resources that have been substantially, significantly, and adversely impacted by present and future actions. (Exhibit A003 FEIS S-8-9)

Impacts to Geology

310. Telescope activities on Mauna Kea have resulted in substantial, significant and adverse impacts to geologic resources, primarily due to alteration of the cinder cone morphology. Ex A-308 FEIS Section 3.6 Geology, soils, and Slope Stability p 3-111
311. Mr White stated that it was doubtful that, given the terrain, it could be restored to the point that those looking at it from a distance would not recognize a big scar on the land. Tr. 10/1/16 Vol 1:81:3-7

Impact to Floral Community

312. The construction of the observatories has had a permanent impact on the biological resources in the immediate area as well as the batch plant areas, roads,

- and associated areas. No new lichens have become established in the area as a consequence of the construction. Ex. B-64 APP-D8
313. Lichens and moss occur predominantly on rough lava rocks or surfaces or in small cracks and crevices. The cinder cones do not support any lichens, primarily because the substrate is too unstable to allow any colonizing lichen to become established. Ex. B-64 APP D-7
314. Unlike the TMT project area, Cinder cones are not conducive for providing habitat for species of botanical origins. Tr. 01/19/2017, V. 27 at 180: 14-1
315. The road traffic associated with construction of each observatory is a matter of concern. Dust from vehicular traffic was considerable before the upper reaches of the summit road were paved. Ex B. 64 APP D-8 (Note the TMT access road will not be fully paved)
316. The long term stability of the lichen and moss communities is dependent on minimizing disturbance in the area. The colonization rate of species is extremely low. Ex. B-64 APP-D9
317. Habitat Disturbance should be minimized - The rocks and cinder within Area E are home to lichens, mosses, and endemic arthropods, therefore disturbance should be minimized at the construction site and in the surrounding habitats. Ex. A005 (TMT FEIS, Arthropod and Botanical Inventory and Assessment), App. K, p. 31
318. Mr Eric Hansen stated that after substrate disturbance in Area E, recolonization of the highly evolved, unique lichen and moss assemblages in the area would be very slow, if possible at all. Tr. 1/19/12017, Vol 27:159:22-25, 160:1-3
319. Mr. Eric Hansen stated that a lichen community cannot be restored once the substrate in which they grow has been disturbed. Tr. 01/19/2017, V. 27 at 160: 11-13.
320. Hansen stated that there is no mitigation that could take place to mitigate damage to floral communities should the TMT be developed. Tr. 01/19/2017, V 27. at 163: 1-5.
321. The stability of the lichen and moss flora at the summit of Mauna Kea revolves around three different factors; human disturbance, long-term stability and climate change.
322. Dr. Smith disclosed that “a concise determination of some species is not possible under the time constraints of this study even though fruiting bodies may be present. Species growing in such severe habitats, particularly those growing

on rocks, produce spores only during favorable conditions. The only sure way of finding good specimens would be to conduct monthly collections for at least one year.” Witness C. Smith, WDT, p. 9

323. Dust can impact lichens, mosses, and ferns and is believed to degrade Wekiu bug habitat. Ex. A005, (TMT FEIS), App. K, p. 31
324. Wind-blown dust that covers plants, lichens and mosses, deprives them of needed sunlight. The potential impact of excessive dust could have a moderate effect on the flora in habitats adjacent and downwind of the Access Way and TMT Observatory. Ex. A005, (TMT FEIS), p. 3-74
325. Non-native plant species can impact native plant communities by altering the environment, by lowering the groundwater table changing fire regimes, increasing or decreasing shade, smothering plant growth. Ex A010 CMP NRMP 2.2-18
326. Invasive plants currently found in the in the subalpine and alpine plant communities at Hale Pohaku include the non-native grasses and invasive herbs such as common mullein (*Verbascum thapsus*) and fireweed (*Senecio madagascariensis*). Ex A-010 CMP NRMP 2.2-19
327. Although not recorded in plant surveys in 1979, 1985, 1990 or 1999, fireweed (*Senecio madagascariensis*) was found in 2007 at Hale Pohaku, the summit access road, MK Ice Age NAR, and near the summit. Ex A-010 CMP NRMP 2.2.-20
328. Invasive plants are spreading up the mountain. This can be easily observed by the way many invasive plants, such as common mullein, line the roadways up the mountain. Ex A-012 CMP Mauna Kea Public Access Plan (PAP) p 2-24

Impacts to Arthropods

Habitat loss

329. It has been estimated that since 1963, approximately 62 acres (25 hectares) of potential arthropod habitat have been lost to astronomy-related development on the summit. Ex A010 CMP, Natural Resources Management Plan, p. 2.2-43
330. The bulk of human impact has occurred on cinder cones (Types 1,2,3) near the summit of Mauna Kea, and this is where construction of existing observatories and supporting infrastructure and other human modifications have taken place Ward WDT B.17a p 11
331. The TMT Observatory would displace 5.9 acres of Wēkiu bug habitat. Ex A003 FEIS, p. 3-72.

332. The TMT project would impact wekiu bugs in Type 3, 4, and 5 habitats. The wekiu bugs are present on the cinder slopes of Pu'u Hau Oki, and construction of the TMT and Access Way would impact 5.9 acres of wekiu bug habitat, a 10% additional increment of impacted habitat to the cumulative impact on the natural resources. Exhibit A003 FEIS 3.4 p 3-73
333. The potential impacts to the biological resources would include replacement of existing habitat with the TMT observatory and Access Way, dust generated by vehicles travelling along the unpaved Access Way, and paving a portion of the Access Way. (Exhibit R-3 FEIS 3.4 p 3-69)
334. Mr Perry White stated that if the project were implemented, the habitat of endemic and unique insects would be affected. Tr. 10/1/16 Vol 1:74:22-25
335. Dr. Fred Stone conducted an entomology study for the proposed telescope development area, in 1982, that study was incorporated into the FEIS for the MKSRCDP. They made recommendations for biological inventory, habitat mitigation and monitoring which were approved in the Mauna Kea Management Plan by BLNR in 1985. Subsequently Mike Wilson, Chair of DLNR, admitted that the impacts had occurred, and that mitigation measures had not been implemented, but declined to administer penalties because permits had been issued for the construction activities. He also said that the CDUA permit applications by UHIfA did not include possible impact to Wēkiu bug habitat, nor mitigation measures, so there was no way for DLNR and BLNR to know about or evaluate the potential impacts. Exhibits B.17q B.17s B.17r, , B.17p, B.17t
336. DLNR in 1996 determined that the Gemini Northern 8-meter telescope, Japan National Large Telescope (Subaru), and the Smithsonian (SMA) had destroyed habitat beyond that disclosed in the FEIS or allowed in the approved management plan. Wekiu bug habitat on the crater and slope of Pu'u Hau Oki was severely impacted by construction of the Keck I and II telescopes which resulted in removal of approximately 35 feet of the summit ridge of Pu'u Hau Oki and side-casting the material on the crater slopes. Exhibit B.17q, B.17r, B.17s, B.17p, B.17t
337. Wēkiu bug capture rates appear to be heavily influenced by climactic conditions such as presence of snow, which makes it difficult to compare capture rates across studies that were conducted during different conditions or time of year." Ex A009 CMP, p. 5-39 – 5-40.
338. The wekiu bug was listed as a candidate for the endangered species list based on two criteria; its known threats are impacting the population of the organism, and evidence of significant population decline. The Wekiu bug was listed as a candidate for Federal protection on June 13, 2002. Ex A001 CDUA Section 2.3. (Note: The CDUA has not been updated, and does not reflect regulatory changes to the wekiu status since that document was produced.)

339. Until recently the wekiu bug (*Nysius wekiuicola*) was proposed as a Candidate species for Federal listing under the Endangered Species Act. The Wekiu bug (*Nysius wekiuicola*) has garnered significant attention, through inventory, monitoring, autecology study, and public awareness, since its discovery over thirty years ago. Two of the two greatest threats to Wekiu bug identified by the scientists who have contributed to this study effort are habitat loss and predation by alien invasive ant species. Ward WDT B.17 a p 11
340. A prime example of habitat loss through development is the loss of Wekiu bug habitat on the summit through construction of telescope facilities. Wekiu bug habitat is easily altered by vehicular traffic and construction activity, as tephra cinders preferred by the bug are easily crushed into dust-sized particles. Prime habitat can be quickly degraded to compacted silt and mud by use of off-road vehicles. Wekiu bug habitat may also be altered by dust blown up from road grading and other construction activities on the summit. 2.2.2.3 Threats to Invertebrate Communities on Mauna Kea Ex 010 CMP NRMP p 2.2-43
341. Dust blown up from road grading and other construction activities on the summit can reduce surface porosity and fill pockets between cinders. This may degrade wēkiu bug habitat by inhibiting movement and by decreasing the accumulation of bugs blown up for wēkiu bug food consumption. Ex A010 CMP NRMP, p. 2.2-44.
342. Wēkiu bug habitat is easily altered by vehicular traffic and construction activity, as the tephra cinders preferred by the bug are easily crushed into dust-sized particles. Ex A010 CMP NRMP, p. 2.2-44.
343. The southern-most roughly 700 feet of the Access Way would be located on the Pu`u Hau`Oki cinder cone. Ex A001 TMT CDUA, p. 141.
344. It should be noted here that the access way will alter, and destroy, known Type 3 Wēkiu bug habitat. DLNR Division of Forestry and Wildlife Administrator Paul J. Conry, CDUA Comments for the Thirty Meter Telescope wrote, November 29, 2010, Ex A007 Staff Recommendations, p. 2-6.
345. The Arthropod and Botanical Inventory and Assessment recommends minimizing disturbance by limiting construction activities to the footprint pad and road improvements, and not side-casting cinder or other materials into adjacent habitat. Ex A005 FEIS Vol. 3, p. 942/ Appendix K, p. 31.
346. “The cinder [in Access Way Option #3] is considered ideal Wēkiu bug habitat... option [3] would require disturbing the cinder cone and Wēkiu bug habitat, and the road would also bisect and isolate a portion of the habitat. While Wēkiu bugs have been observed crossing existing dirt roads, none have ever been observed on pavement. Because this option disturbs and displaces Wēkiu bug

habitat, mitigation measures similar to those proposed in the Keck Outrigger would likely have to be implemented.” Ex A005 FEIS Vol. 3, Appendix K, p. 24.

347. Option 3 is the proposed plan for the TMT Access Way. Ex A-311 TMT CDUA, p. 4-29.
“Option 3, developing the existing 4-wheel drive road as the Access Way, should be avoided because it disturbs, displaces, and isolates portions of Wēkiu bug habitat. However, as redesigned the impact would be lessened. It would likely require mitigation measures similar to those suggested for the Outrigger Telescopes project, such a habitat restoration.” Ex A-005 FEIS Vol. 3, Appendix K, p. 32.
348. In lieu of a habitat restoration plan, the TMT Project plan is to monitor arthropod activity in the vicinity of the portion of the Access Way that will impact Type 3 Wēkiu bug habitat. Ex A003 FEIS, p. 3-73.
349. Arthropod monitoring will be performed prior to, during and for (only) two years following construction in the area of the access Way on the alpine cinder cone habitat (the flank of TCP Pu’u Hau’oki). Summary of Mitigation Measures Ex. A071 p 5

Alien arthropods

350. Alien arthropods can arrive at Project sites from localities on the Island of Hawai‘i where they are already established, or in crates, boxes, containers, or construction equipment that are shipped from off the Island. Ex A003 FEIS, p. 3-75.
351. Invasive species, including spiders (*Lepthyphantes tenuis* and *Meriola arcifera*), and beetle (*Hippodamia convergens*) that compete with arthropods including the Wēkiu bug for food and may also prey on (other) native species at the summit. Ex A010 CMP NRMP, p. 2.2-36.
352. Non-indigenous arthropods may pose a threat to native species that are residents of the higher elevations of Mauna Kea through predation or as competitors for food resources. Ex A005 FEIS Vol. 3, Appendix K, p. 19.
353. “It is possible that the introduction of an alien invasive species may occur in any area impacted by the construction process, and such invasion would ultimately impact the entire alpine ecosystem.” DLNR Division of Forestry and Wildlife Administrator Paul J. Conry, in his CDUA Comments for the Thirty Meter Telescope wrote, on November 29, 2010, in response to 4.1.2 Natural Resource Management p. 4-13: Ex A004 FEIS Vol II
354. Incremental habitat fragmentation, exacerbated by biotic challenges, puts small isolated species at further risk of extinction. Invasions of non-native weeds

can further degrade an altered habitat and landscape. Predatory insects, and those feeding on the same food sources as the species at risk, can have rapid and devastating consequences. Invasive invertebrates are perhaps the greatest threat to native invertebrates in Hawaii, through competition, predation, habitat alteration, and parasitism. At the summit of Mauna Kea the greatest threat to the arthropod populations is the introduction of invasive arthropods that are adapted to alpine conditions. The potential of introduction of new invasive species to Hale Pohaku and the summit through the importation of goods from similar climates (such as astronomical equipment), construction equipment and fill, road grading equipment and gravel accidental transport on vehicles, clothing and equipment, and biological control agents. Ex A-010 NRMP 2.2, 4.2

355. Several new alien predatory species that could adversely impact the Wekiu bug have been found, and Englund reported that alien ant species are the greatest potential threat in the summit area. ...Because of the predatory and social nature of ants, and because ants have caused the extinction and decline of native arthropods throughout Hawaii, both the endemic wolf spider (*Lycosa* sp.) and the Wekiu bug would be expected to precipitously decline if ants ever become established. (Englund Wekiu-Rep 12-9 p 29) Ex A- 005 FEIS Vol III

356. Since 2005, several new predatory beetle species have been found near Lake Waiau. The lake is in close proximity to the astronomy facilities and frequented by visitors from around the world. This underscores the regular monitoring and a mechanism for rapid response. (Exhibit B.17 I Bishop Museum Englund Wekiu 21-22)

Water Resources

Human Threats to high level aquifers on Mauna Kea.

357. Threats to the hydrology of Mauna Kea include those associated with human presence and activity on the mountain and climate change. Human activities that have the potential to impact water resources quality, and to a lesser degree quantity, include any actions that add to the current wastewater volume or that change in-situ patterns of water movement. Examples are: leaking facility pipes; accidental spills of contaminants; and improperly filtered wastewater. These contributions may affect the quality of water seeped to springs along Mauna Kea's flanks, as well as the fresh water aquifers beneath the mountain. Ex A-010 CMP NRMP, p. 2.1-38.

358. Risk assessment and spill response planning provides a measure of safety for human health and for the protection of the cultural and natural resources of Mauna Kea. Although the observatories have individual spill response plans, such plans are lacking for other transporters or users, such as those that might result from vehicle accidents. Ex A-010 CMP NRMP 4.2-14

History of Hazardous Materials Release (Examples)

359. Observatory facilities and support operations housing any potentially hazardous materials are required by law to have spill response and associated safe handling protocols in place. Situations in which a potential release might occur include discharge of liquid waste from septic tanks and cesspools, malfunction of sewage pipes, transport of sewage and hazardous materials, activities requiring the handling of potential contaminants, and vehicle use. Ex A-010 CMP NRMP 4.2-13
360. Threats to the natural environment due to escape and possible subsequent migration of contaminants vary depending upon the type of contaminant, release volume, and location. The fate and transport of byproducts and potentially hazardous materials used on Mauna Kea have not been determined, and an assessment of the potential risks following a release has not been developed. Ex A-010 CMP NRMP 4.2-13
361. Applicant states that Hydrology information gaps include the fate of leachates or liquid waste containing dissolved or suspended contaminants from septic and cesspool systems. A010 NRMP 2.1-39
362. The two main ground-water-related problems in the State of Hawaii are contamination by organic or inorganic chemicals associated with both agricultural and non- agricultural activities, and the availability of potable fresh ground water. Both problems are ultimately related to ground-water quality. All of the main islands in the State of Hawaii have large amounts of ground water contained in volcanic-rock aquifers. However, the quality of the ground water may not be suitable for all uses. In particular, not all ground water is potable. Some of the ground water is contaminated by chemicals associated with human activities and some contains high concentrations of salts. Ex. B.17z Ground Water Atlas Hawaii HA 730-N p.1
363. Contamination of ground water by human activities can take place in several ways. In some agricultural areas, crops are irrigated with water that might contain large concentrations of dissolved minerals. If such water percolates downward, an underlying aquifer can be contaminated. In addition, fertilizers and pesticides applied to crops can move downward through the unsaturated zone to an aquifer and affect the quality of the water in the aquifer. Wastes from septic-tank systems, sewers, industry, and storm runoff also can introduce undesirable constituents into the aquifers. Ex B.17.z Ground Water Atlas Hawaii HA 730-N p.1
364. Spills of oil, sewage and hazardous chemicals have been repeatedly reported by researchers working at the summit, and they note that oil, in

- particular, will take a long time to biodegrade because of cold and dry conditions (Howarth 2003). Ex A-005 App K Englund
365. About 0.5 gallons of hydraulic fluid spilled in the Canadian France-Hawai'i Telescope (CFHT) facilities in 1979. Ex A-009 CMP, p. 6-9.
366. An unknown amount of diesel fuel leaked from a generator in the construction staging area in 1982. Ex A-0091 CMP, p. 6-9.
367. Mercury spills occurred in the NASA IRTF (1989), CFHT facility (1990), W.M. Keck Observatory (1995), CFHT (1998) and the UH 2.2-m telescope facility (1998). Ex A-009CMP, p. 6-9 and 6-10.
368. Approximately 60 gallons of diesel fuel, engine and hydraulic oil were spilled onto surface cinder near the VLBA, requiring the removal of cinder, in 1995. Ex A-009 CMP, p. 6-9.
369. In 1996, 110 gallons (two 55 gallon containers) ruptured and spilled onto cinder surrounding the Subaru telescope, requiring removal of excavated cinder. Ex A-009 CMP, p. 6-9.
370. Hydraulic fluid leaked from the Caltech Submillimeter Observatory (CSO) from approximately 1990 through 2000. Ex A-009 CMP, p. 6-10.
371. In 2003 at Hale Pōhaku, crankcase oil and hydraulic fluid leaks onto the ground requiring soil excavation and transmission oil leaked onto surface cinder, which likewise had to be excavated. Ex A-009 CMP, p. 6-10.
372. Decaying seals on the Smithsonian Astrophysical Observatory Submillimeter Array allowed hydraulic fluid to leak in 2003. Ex A-009 CMP, p. 6-10.
373. From 1998-2004, sewage overflows of several liters occurred five times at the CSO facilities. Ex A009 CMP, p. 6-10.
374. Decaying seals on the Smithsonian Astrophysical Observatory Submillimeter Array allowed diesel fuel to leak in 2004. Ex A-009 CMP, p. 6-10.
375. Twenty to thirty gallons of propylene glycol spilled at the W.M. Keck Observatory in 2004, with approximately two-thirds of that volume introduced into the outside environment. The contamination required removal of cinder. Ex A-009 CMP, p. 6-10.
376. Telescope mirror washing entails removing mirrors from a protective girdle that contains mercury. Seven documented mercury spills have occurred in association with mirror washing. Ex A-009 CMP p. 6-8.

377. The Applicant for the TMT maintains that mirror washing wastewater is not a hazardous waste. Waste from mirror washing will be collected, removed, and transported off site for treatment and disposal. Ex A-003 FEIS Vol. 1, p. 3-129.

Sewage/ Wastewater Release

378. “A two-gallon sewage spill from an incorrectly installed septic line contaminated cinder and snow in wēkiu bug habitat in the Pu‘u Hauoki crater in 1998.” Ex A-010 CMP NRMP p. 3-34.
379. Approximately 500 – 1,000 gallons of sewage overflowed from the septic tank at Hale Pōhaku and was allowed to percolate into the surrounding environment in 2008. Ex A-009 CMP, p. 6-10.
380. In 1998, a septic tank spilled approximately 2 gallons of sewage onto the ground snow near the Subaru telescope. Ex A-009 CMP, p. 6-9.
381. There are eight septic tanks with leach fields or disposal pits and three cesspools in the UH Managed Areas. Ex A-010 CMP NRMP, p. 3-33.
382. Approximately 53,990 gallons of wastewater are generated each month by existing telescopes on the summit. (Calculations based on Ex A-010 CMP NRMP, p. 3-9).
383. Large sized tank trucks have carrying capacities ranging from 5,500 to 9,000 gallons. Ex A-003 FEIS Vol 1: 3-120

Impacts of proposed TMT to Water Resources

384. The main activities that have potential to result in a release of contaminants include vehicle travel (on and off road) and accidents; release of hazardous material and petroleum product use by observatories and support operations; sewage generation; and transport of hazardous materials and sewage off-site. Ex A-009 CMP, p. 6-14.
385. Transport of contaminants through the substrate has the potential to impact the quality of both surface water and groundwater. Direct toxic impacts on flora or fauna are also possible. Ex A-009 CMP, p. 6-14.
386. The highest probability of impact [on surface water, groundwater, and flora or fauna] is from petroleum products (e.g., fuel for vehicles and backup generators, lubricants, and cleaning fluids) and human waste. Ex A-009 CMP, p.

6-14.

387. The TMT project would require the use, handling and storage of hazardous materials at Mauna Kea including: propylene glycol, acetone, methyl ethyl ketone, at least 2,000 gallons of diesel fuel, ethylene glycol, hydraulic fluid, liquid adhesives, coating metals, acids, paints, solvents, and other cleaning chemicals. Ex A-003 CMP FEIS Vol. 1, p. 3-129.
388. The TMT Observatory and a portion of the access road would create two acres of impervious surfaces that would cause runoff. Runoff would percolate into permeable natural ground. Nance Tr.12.13.16 V16 p.98
389. TMT facilities will be designed to maximize groundwater recharge to the extent possible. Site grading and landscaping will be designed to direct stormwater to pervious areas so that it may percolate into the ground and thus into the aquifer. Ex A001 CDUA 6-1
390. The TMT Project's design features will include the use of stormwater dry wells and grading to maximize groundwater recharge. The release of fuel or chemicals, including mirror washing wastewater, from an accidental spill could degrade surface and groundwater resources. A003 FEIS Vol I 3-121 (pdf p 209)
391. Exhibit A071, page 8 Summary of TMT Mitigation Measures says that the project will use storm-water dry wells and grading to maximize groundwater recharge. Mr Nance stated that the runoff would percolate downward, but he didn't know if it would be confined. Nance Tr.12.13.16 V16 p. 145
392. Runoff would move downward through the unsaturated lava, traversing vertically downward to underlying groundwater. We don't know the distance because we don't know exactly where the groundwater is. Nance Tr.12.13.16 V16 p.99-100
393. The runoff from the TMT site will go downslope to the North, following topography, on the northern flank of Mauna Kea. Nance Tr.12.13.16 V16 p. 110

TMT Resource Use and Waste

394. TMT project managers anticipate the generation of approximately 120 cubic feet of trash per week. Ex A-003 FEIS Vol.1, p. 3-129.
395. UH estimates 2,080 gallons per day will be used by the (480 gpd) TMT Observatory and the Headquarters. (1,600 gpd). Ex A-003 FEIS Vol. 1, p. 3-120.
396. To transport 14,600 gallons of water generated by the TMT Observatory down the mountain each month would require a tanker truck to use the Access

Accidental spills from TMT chemical storage tank

397. Mr. Gary Sanders, TMT project manager, was asked about the protocol for addressing a leak in the underground 5,000 gallon chemical storage tank. He stated, "It depends on where the leak is. We might have to excavate. We might have to go to the location and then we'd have to remove the material. Tr. 01/3/2017, V. 20 at 77, 6-9.
398. Mr Sanders stated, "It depends upon the nature of the leak, butpresumably immediate action to pump out the contents of the tank and then to do whatever had to be done to repair. And if the ground was impacted in any way, to remove the affected material." Depending on the weather and the nature of the leak, such clean-up would require days. Tr. 01/4/2017, V. 21 at 84-85: 25, 1-4, 86: 20-21.
399. When asked about the disposal of hazardous wastes from mirror stripping, Mr. Sanders stated, "And all of the effluent from the stripping and coating process will be collected and stored in a 5,000-gallon double wall with leak detection equipment, underground storage tank and all of that effluent will be treated as if it is hazardous waste, zero discharge and it will be removed periodically. Perhaps once a week or once every two weeks by a trucking company that's licensed and permitted to do hazardous waste removal and properly transport and dispose of the materials." Tr. 01/3/2017, V. 20 at 75-76: 25, 1-9.

Hazardous/Non-Hazardous waste

400. Mr. Sanders explained the process for stripping and recoating the mirrors. When asked what kind of chemicals would be used to strip the mirrors, Mr. Sanders replied, "Common chemicals, they're caustic chemicals, some acid and bases. None of which are hazardous chemicals although they do dissolve the coatings, and this is a well-established process." Tr. 01/3/2017, V. 20 at 75: 21-24.
401. Mr. Sanders states, "It's my understanding that they are not classified as hazardous waste." Tr. 01/3/2017, V. 20 at 97: 11-12.
402. Sanders continues, "But we are not paying attention to that, we are treating all it [sic] as if it were hazardous waste and handling it as if it was hazardous waste and disposing of it as if it was hazardous waste." Tr. 01/3/2017, V. 20 at 97: 14-17.
403. When asked if there is currently a facility on Hawai'i Island that could reprocess that kind of effluent collected from the silver recovering of the plates, Mr. Sanders replied, "I don't know the answer." Tr. 01/3/2017, V. 20 at 231: 4-10.

Impacts to Air Quality

404. Locally generated contributors to air pollution above the inversion level include vehicle exhaust, chemical fumes from construction and maintenance activities, and fugitive dust from various sources, including vehicles traveling on unpaved surfaces and road grading and construction or other activities conducted on unpaved areas. Rapid dispersion of pollutants is aided by strong winds. (Ex A-003 FEIS, p. 3-182)
405. Threats to Mauna Kea's air quality and sonic environment primarily revolve around the presence of humans and their levels of activity. Potential future increases in the number of people visiting, working, and recreating at the UH Management Areas may increase the levels of these impacts. Ex A-010 CMP NRMP p. 2.1-46

Visual Impacts

406. The TMT Observatory will be visible from locations within the summit region, primarily the northern plateau and northern ridge of Kukahau'ula. A001 CDUA 7-9
407. The TMT Observatory will add a new visual element to a relatively undeveloped portion of the summit region. That element will be visible from viewpoints along the northern ridge of Kukahu'ula and from roadways within the northern portion of the summit region. A001 CDUA 7-11 TMT Mgt Plan 2-5
408. The DLNR feels that the visual impacts have been downplayed in the analysis. The analysis does not seem to account for the visual impact of the project on the individuals that move within and between impacted viewplanes, impact on visitors, and more importantly, the impact of viewing a new very large observatory from the perspective within the summit area. Laura Thielen, Chair, DLNR Ex A-004 FEIS Vol II p 21 of 531
409. The TMT would intrude upon the currently unobstructed view of Haleakala Mountain as well as the primary view of the setting sun from the mountain. It will also obstruct viewplanes used for traditional and cultural spiritual and religious Native Hawaiian practice. The Northern Plateau is one of the last un-hindered open space areas with views down to the sea, along the coasts, and across the island chain. The TMT would neither preserve nor improve upon Mauna Kea's natural beauty; the eighteen-story building would be twice the highest allowable structure in Hawaii County, and would forever change the wilderness experience in the summit region. B.17a Ward WDT p 15
410. Development of six acres of industrial infrastructure with twice the County of Hawaii's allowable height limit (FEIS calls it a "new visual element on the northern plateau") on the last remaining unobstructed view plane facing

Haleakala will significantly negatively affect my recreational practices. The view of Mauna Kea's summit, from my vantage point at my residence, from the beach at Hilo bay, from my hiking trails on Mauna Loa, all are fettered by the presence of multiple domes on the skyline; it is almost impossible to find a location on the island of Hawaii where one cannot see a telescope in one's view of Mauna Kea. I believe I am not alone in finding these visual obstructions a significant annoyance and an adverse impact. B.17a Ward WDT p 3

Noise

- 411. Applicant does not define "noise sensitive areas." Ex A-003 FEIS Section 3.13 Noise p 3-179
- 412. Applicant does not conduct an analysis the cultural impacts of noise levels and offers no analysis of noise from culturally significant places like Pu`u Poliahu. FEIS Section 3.13 Noise p 3-179
- 413. The Applicant concedes that significant noise would result from construction activities such as excavation, trenching, grading, pouring of foundations, and erection of structures. FEIS Section 3.15 Construction and Decommissioning p 3-202
- 414. Construction of the proposed project would violate noise regulations, such that a noise variance would be required under HAR 11-46-8 for construction of the TMT Observatory. FEIS Section 3.15 Construction and Decommissioning p 3-202
- 415. The Applicant acknowledges the proposed project would generate construction-related noise in the 80-100 dBA range at 50 feet for front-end loaders, backhoes, tractors, scrapers, graders, pavers, trucks, concrete mixers, concrete pumps, cranes, compressors, pneumatic wrenches, jack hammers, and rock drills. Short periods of blasting may also be necessary to dig foundations for the TMT Observatory. FEIS Section 3.15 Construction and Decommissioning p 3-202
- 416. Noise level in the vicinities of the existing observatories varied from 38 dBA to 77dBA Leq, and 40-78 dBA L10, with noise levels at or below 60 dBA Leq beyond a distance of 50 feet from HVAC exhausts. The loudest noise levels of 68 and 77 dBA Leq and 69 and 78 dBA L10, were measured at locations within 15 feet of HVAC exhaust outputs. Ex A-003 FEIS Section 3.13 Noise p 3-175, 176
- 417. At the public hearing, OCCL Staff acknowledged that telescope activities do interfere with the quiet enjoyment of the mountain and thus added a condition to the TMT CDUA requiring that 4 days be set aside for reduced activities at the TMT. The OCCL staff said: "Shut the lights down a bit; shut the process down so

that on certain days Native Hawaiians can have even more solitude.” (Ex. BLNR Minutes, page 8)

Cultural Impacts of the Proposed TMT Project

This subject will be best addressed by other parties in this hearing.

Mitigation

418. The Applicant contends that because impacts are already substantial, adverse and significant, adding more to that impact is not going to change those impacts, while simultaneously claiming their proposed mitigation measures will offset and reduce the negative impacts to less than significant.

419. One of the most efficient ways of preserving a sensitive ecosystem is to limit future development in the area. (emphasis added) An additional measure of protection for sensitive habitats can be achieved by prohibiting development of any currently undeveloped pu‘u (or portion thereof) at the summit. Ex A-010 CMP NRMP

420. All future developments in the Science Reserve and at Hale Pohaku should include mitigation plans for preventing or repairing damage to sensitive habitats caused by construction and development activities. Any habitat that will be permanently removed should be replaced on at least a one-to-one basis, through either creation of new habitat, restoration of degraded existing habitat, or by permanent protection of similar unique habitats. Mitigation projects on the summit should focus on protection of Wekiu bug habitat from alien species introduction and predation. Ex A-010 CMP NRMP

421. Instead, the Applicant proposes several other mitigation measures, including: paint, reduced size, furniture, and money. A071 p 1-11

422. The CDUA outlines three project-level mitigations for the known visual impacts of the proposed TMT observatory; (1) The location of the TMT project is the primary impact avoidance measure, as it is north of and below the summit.; (2) The design of the observatory also mitigates the visual impact. The dome has been designed to fit very tightly around the telescope, and the telescope has been designed to be much shorter than usual. (3) Also, the coating of the dome will be a reflective aluminum- like coating, which during the day reflects the sky and reduces the visibility of the structure. Ex. A001 (CDUA), p. 2-17, 7-13

423. Figure 1-3: Mauna Kea Summit Region: Existing Facilities, Features, & Future Development Areas in the CDUA shows that the location of TMT north of and below the summit is due to the fact there is no available room on the summit within the designated

- Astronomy Precinct due to the existing observatories. This is not a mitigation measure for eliminating the visual impact of the TMT observatory. Ex. A0011(CDUA), p. 1-4, 7-13
424. Use of ceded lands for \$1 a year or nominal consideration”, “[s]ubleases between the University and the observatories”, “[p]roposed new development on Mauna Kea, including the Thirty Meter Telescope (TMT) and Pan Starrs”, “[c]ommunity benefit package with increased educational benefits”, and “[g]uaranteed employment opportunities for Native Hawaiians and the people on the Island of Hawai‘i” are “Issues and Concerns Beyond the Scope of the CMP” that “policy makers are urged to consider in their broader decision making related to Mauna Kea.” Ex A-009 CMP, p. 2-3.
425. The Mauna Kea Lands Fund special fund is established under section 2170 of Chapter 304A, HRS. (HRS §304A-2170)
426. Per Chapter 304A, the University is authorized to: “give thorough instruction and conduct research in, and disseminate knowledge of, agriculture, mechanic arts, mathematical, physical, natural, economic, political, and social sciences, languages, literature, history, philosophy, and such other branches of advanced learning as the board of regents from time to time may prescribe and to give such military instruction as the board of regents may prescribe and that the federal government requires...” (HRS §304A-102)
427. Section 2170 of Chapter 304A, HRS, states in relevant part:
“(b) The proceeds of the special fund shall be used for:
(1) Managing the Mauna Kea lands, including maintenance, administrative expenses, salaries and benefits of employees, contractor services, supplies, security, equipment, janitorial services, insurance, utilities, and other operational expenses”
428. “Managing the Mauna Kea lands” fails to mention the protection, preservation, or conservation of natural and cultural resources as a purpose of the special fund. (HRS §340A-2170(b)(1))
429. Mauna Kea Lands Fund does not provide for the management of conservation district resources. (HRS §304A-2170(b)(1))
430. The Applicant did not present evidence to show that depositing an unknown quantity of money into the Mauna Kea Land Fund will ensure protection, preservation, and conservation of resources in the Mauna Kea conservation district.
431. The Applicant and DLNR staff discuss both decommissioning of the TMT site, as well as decommissioning of other telescopes as methods for mitigating the significant, substantial, adverse impact of the TMT proposal. Ex. A-311, p. 2-7

432. DLNR staff contends that a lack of staff and funding prevents them from carrying out management actions. This is because DLNR violated its fiduciary duties under Section 5(f) of the Hawaii Admission Act and its statutory duty under HRS § 171-33(5) by disposing of the Section 5(b) lands on Mauna Kea without a proper appraisal and at less than their independently appraised fair-market value. DLNR, by not collecting payment of lease rents at fair-market value, places an unacceptable burden on Hawaii taxpayers, who must subsidize international astronomy. Ward WDT B.17a
433. OCCL Staff Report for the TMT CDDA states that
- a. “Environmental protection costs money. Protecting historic and cultural resources costs money. Education costs money. Maintaining public access and ensuring public safety costs money. Routine infrastructure maintenance costs money. Stopping TMT, and fighting all development will not restore the mountain to a pre-contact condition. The existing roads, electric lines, and facilities will not disappear. Rather, as funds dry up, active and strong management will become difficult, maintenance and renovations will slow, infrastructure will crumble—and the very cultural and environmental resources that Sierra Club et al purport to protect will suffer.” Ex A007 p 62
434. The statement in the CDDA that potential impacts to cultural, archaeological, and historical resources (omitting biological and natural) would cease upon decommissioning (to the extent practicable) is illogical. No decommissioning project will restore the cultural and natural landscape that has been altered. The impact is irrevocable. Ex B.17a Ward WDT
435. It was disclosed by Mr Hansen during cross-examination that it would take 100 years for flora to regenerate after the proposed excavation & disturbance at TMT site. (Hansen, Tr. Tr. 1/19/2017)
436. Mr Eric Hansen stated that after substrate disturbance in Area E, recolonization of the highly evolved, unique lichen and moss assemblages in the area would be very slow, if possible at all. Tr. 1/19/2017, Vol 27:159:22-25, 160:1-3
437. The University claims there will be fewer telescopes when the lease expires, but the CMP decommissioning plan leaves specifics regarding the extent of site restoration undefined. As a result, the costs and risks associated with decommissioning are difficult to gauge. Ex. A013

III. Conclusions of Law

THE TMT PROJECT WOULD HAVE SIGNIFICANT EFFECTS

438. The TMT project satisfies the regulatory definition of “significant effect” because it proposes to construct a new 18-story, 5-acres industrial structure on undeveloped land. The foreseeable significant harm of the proposal include significant viewplanes interrupted, open space lost, the historic district degraded, traditional and customary practices violated, and increased risk to groundwater resources.

A. TMT meets regulatory definition of “significant effect”

439. HRS 343-2 defines "Significant effect" to mean “the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic welfare, social welfare, or cultural practices of the community and State.”
440. The development of observatories within the Astronomy Precinct substantially altered the appearance of the summit, and the presence of these observatories continues to affect the performance of religious and cultural practices. Ex. A-003, (TMT FEIS Section 3.16 Cumulative Impacts), p.3-225
441. From a cumulative perspective, the impact of past and present actions on **cultural, archaeological, and historic resources** is **substantial, significant, and adverse**; the impacts would continue to be substantial, significant and adverse with the consideration of the Project and other reasonably foreseeable future actions. (Emphasis added) Ex. A-003, TMT FEIS, p. S-8
442. From cumulative perspective, the impact of past and present actions on the **traditional and customary practices of Native Hawaiians** has been **substantial, significant and adverse**; the impacts would continue to be substantial, significant, and adverse with the consideration of the Project
443. Project specific impacts would have a significant effect on the natural, cultural, archaeological, and historic resources. FOF # 291-405
444. Project specific impacts would have a significant effect on the continued practice of traditional and customary Native Hawaiian practices.

445. The Applicant concedes that the project would add a new visual element to the summit area of Mauna Kea, where the visual impact of past actions on Mauna Kea, such as the 11 observatories currently located within the Astronomy Precinct, is already considered substantial, significant and adverse. Ex A-003 FEIS Section 3.5 Visual and Aesthetic Resources p 3-101, FOF #201
446. The Applicant concedes that construction of the TMT would destroy natural wildlife habitat that would need 100 years to recover. FOF#303-310
447. Because the proposal includes increased industrial activity over known aquifers, the TMT project would increase the likely damage to water resources on Mauna Kea. (FoF #372-381, 385-387
448. The existing potential risk to water resources on Mauna Kea is significant. FoF #345
449. Given the high permeability of the cinder on Mauna Kea and the existence of five aquifer under the summit area, the project specific and cumulative impact of telescope activity on water resources is significant, substantial, and adverse, and poses a risk to public health FoF 374-378
450. Based on the findings of fact above, the TMT may have a significant effect on water resources, rare, native species, and air quality.

B. B. Applicant Misstates the Standard for Assessing Significant Effect

451. Overall the existing level of cumulative visual impacts from the past projects at the summit Is considered to be substantial, significant and adverse. .If the TMT is built, the TMT would add tthe cumulative visual Impact that has already been substantial, significant and adverse.
452. The TMT project would represent an additional increment. It would add to the cumulative visual impact of astronomy development? It would be an increment of impact. Tr. 10/25/16, V.3 at 155:10-25
453. Asked what is the difference between increment and cumulative, Mr Hayes responded "cumulative impacts is the sum of increments". When asked if the TMT would add to the cumulative visual impact that you have already stated is substantial, Significant and adverse, he agreed that it is. Tr. 10/25/16, V.3 at 155:10-25, 156;1-6

454. Mr Hayes was asked , as project manager for the EIS and a collaborator on the CDUA, Is It still your position that all of these Impacts do not add to the already significant adverse and substantial cumulative Impact in the Historic District? He answered “ As I've said, this project will add an Increment to the cumulative impact, however, it will not tip any of the evaluated Impacts from a significant or from a less than Significant to a significant level. Tr. 10/25/16, V.3 at 181:1-10

455. Hawaii Administrative Rules 11-200-12(b) says “In determining whether an action may have a **significant effect on the environment**, the agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, **an action shall be determined to have a significant effect on the environment if it:**

- C. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;
- D. Curtails the range of beneficial uses of the environment;
- E. Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;
- F. Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;
- G. Substantially affects public health;
- H. Involves substantial secondary impacts, such as population changes or effects on public facilities;
- I. Involves a substantial degradation of environmental quality;
- J. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;
- K. Substantially affects a rare, threatened, or endangered species, or its habitat;
- L. Detrimentally affects air or water quality or ambient noise levels;
- M. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;
- N. Substantially affects scenic vistas and viewplanes identified in county or state plans or studies; or,
- O. Requires substantial energy consumption.”
- P.

456. HAR 11-200-2 defines “Cumulative impact” to mean “the impact on the environment which **results from the incremental impact** of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

457. Based on HAR 11-200, the analysis to determine whether a project would have a significant effect is not based on a threshold, but on the extent accumulated impacts.

458. Based on the findings of fact above, however, the foreseeable impacts of the TMT proposal are both individually and cumulatively significant.

459. The mitigation measures offered do not directly address threats to water resources, cultural practices, obstructed viewplanes, among the many significant impacts identified in these findings of fact.

SIGNIFICANT EFFECTS OF TMT PROJECT NOT MITIGATED

460. The Applicant and Project entity propose a wide range of mitigation measures to reduce the admitted significant effects of the TMT project. These mitigation measures, however, fail to reduce the significant effects of the specific project, as well as the cumulative impact of telescope activity on Mauna Kea, to a level that is less than significant.

461. The Applicant has the burden of proof in demonstrating that the significant effects of the proposed project are mitigated to a level that is less than significant.

Q. Standards for Mitigation Measures Not Met

462. HAR § 11-200-17 (M) provides that:

R.

“The draft EIS shall consider mitigation measures proposed to avoid, minimize, rectify, or reduce impact, including provision for compensation for losses of cultural, community, historical, archaeological, fish and wildlife resources, including the acquisition of land, waters, and interests therein. **Description of any mitigation measures included in the action plan to reduce significant, unavoidable, adverse impacts to insignificant levels, and the basis for considering these levels acceptable shall be included.** Where a particular mitigation measure has been chosen from among several alternatives, the measures shall be discussed and reasons given for the choice made. Included, where possible and appropriate, should be **specific reference to the timing of each step proposed to be taken in the mitigation process, what performance bonds, if any, may be posted, and what other provisions are proposed to assure that the mitigation measures will in fact be taken.**”

463. In federal law, 40 CFR § 1508.20, “mitigation” is defined as

- i. “(a) Avoiding the impact altogether by not taking a certain action or parts of an action.
(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments”

464. To be relevant mitigation must be focused on the restoration of the adverse impact caused by the project. There must be a direct nexus between the harm caused by the proposed project and the mitigation effort promised. See, Morimoto v. Bd. of Land & Natural Res., 107 Haw. 296 (2005)

465. In addition, there must be an assurance that compensation offered will result in minimizing the impacts caused by the project. See, Morimoto v. Bd. of Land & Natural Res., 107 Haw. 296 (2005) (finding U.S. government was capable of creating new, more preferable palila habitat, where the project proposed to destroy less preferable habitat; the requirement was legally enforceable).

466. Applicant UH-Hilo is legally responsible for all obligations and/or liabilities resulting from a finally approved CDUP.

TMT is not a legal party or participant to this CDUA process.

Because the record provides no evidence of an Operational Agreement or any type of legal document between the Applicant and TMT, there is no mechanism for BLNR to require the TMT Corporation comply with permit terms and conditions.

467. "No application for 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. ..." The 1977 Mauna Kea Plan - II (C)

468. The CDUA does not include any indication that "adequate security equal to the amount of the contract to construct the telescope facilities" has been filed.

469. The findings of fact in this case do not demonstrate that the Applicant has satisfy the requirements for mitigation of significant effects.

“Strong Management Framework” Inadequate

470. The Applicant and DLNR staff cite the “Comprehensive Management Plan” as one of the main reasons the significant impacts of the TMT will be mitigated to a level that is less than significant. The conclusion of the Applicant and staff is not supported by the record.
471. Before the Intermediate Court of Appeals, the Applicant described the CMP as a plan that does “not take action” and is no different from the previous activities the University has undertaken on the UH managed lands.
472. As the Findings of Fact above demonstrate, the CMP is incomplete. It identifies hundreds of “needs” without any enforceable timelines or benchmarks to ensure those identified needs are met.
473. The CMP is concerned with only a limited subset of the overall conservation district of Mauna Kea and fails to provide limitations on the number and size of future telescope projects.
474. The CMP does not provide a strong management framework that ensures the significant impacts of the TMT and all existing telescope activity are reduced to a level that is less than significant.

S. Reduced Dome Size

475. The Applicant concedes that the visual and cultural impacts of the TMT are significant, substantial, and adverse.
476. Applicant demonstrated that the proposed TMT could have been larger if the dome-to-aperture ratio of current telescopes was followed. Ex. A-001, p. 1-8)
477. The conclusion that the TMT project could have been bigger does not demonstrate that the admitted significant impacts of the project would be reduced to a level that is less than significant.

Painting TMT silver

478. The Applicant proposes to paint the TMT silver to reduce the visual impact of the project. Ex. A-054, p. 33-40

479. The findings of fact demonstrate that painting the project silver will likely cause a “lighthouse effect” for makai-to-mauka views of the mountain and serious obstacle to open space views from the summit, regardless of its color.
480. The Applicant concedes that the visual and cultural impacts of the TMT are significant, and the finding of facts above demonstrate that significant impact is substantial and adverse.
481. The Applicant offers no evidence that painting the structure silver will reduce those significant, substantial, and adverse impacts to a level that is less than significant.

T. Mauna Kea Lands Fund is Not Mitigation

482. Applicant asserts that sublease rental payments will be deposited in the Mauna Kea Land Funds special fund and used for management of Mauna Kea’s natural and cultural resources.
483. The sublease rent amount has not been negotiated, thus it is unknown how much money would be deposited into the fund.
484. The Mauna Kea Lands Fund special fund is established under section 2170 of Chapter 304A, HRS. (HRS §304A-2170)
485. Per Chapter 304A, the University is authorized to: “give thorough instruction and conduct research in, and disseminate knowledge of, agriculture, mechanic arts, mathematical, physical, natural, economic, political, and social sciences, languages, literature, history, philosophy, and such other branches of advanced learning as the board of regents from time to time may prescribe and to give such military instruction as the board of regents may prescribe and that the federal government requires...” (HRS §304A-102)
486. Section 2170 of Chapter 304A, HRS, states in relevant part:
“(b) The proceeds of the special fund shall be used for:
(1) Managing the Mauna Kea lands, including maintenance, administrative expenses, salaries and benefits of employees, contractor services, supplies, security, equipment, janitorial services, insurance, utilities, and other operational expenses”
487. “Managing the Mauna Kea lands” fails to mention the protection, preservation, or conservation of natural and cultural resources as a purpose of the special fund. (HRS §340A-2170(b)(1))

488. The Applicant did not present evidence to show that depositing an unknown quantity of money into the Mauna Kea Land Fund will ensure protection, preservation, and conservation of resources in the Mauna Kea conservation district.
489. Because the Mauna Kea Lands Fund does not provide for the management of conservation district resources, depositing money into this fund does not satisfy the requirements for direct and enforceable mitigation of the existing and anticipated significant, substantial, and adverse impact of telescope activity on Mauna Kea.
490. Therefore, as the findings of fact demonstrate, the record does not support the Applicant's conclusion that money by itself will reduce the significant impact to a level that is less than significant.

U. Renaturalizing Poliahu Road, Monitoring Wekiu

491. The Applicant offers to renaturalize the dirt road leading up Pu`u Poliahu and monitor the Wekiu population for a set period of years. Ex. A-001
492. Pu`u Poliahu is not within the scope of the CDUA before the BLNR. Thus mitigation actions related to Pu`u Poliahu are "off-site" mitigations and do not directly address the impact caused by the proposed project.
493. Erasing a dirt road is not commensurate with structure of an 18-story, 5-acre industrial building on an undeveloped plateau.
494. Monitoring Wekiu populations is not a mitigation measure because it does nothing to offset or compensate for the Wekiu habitat that would be lost if the TMT were built.
495. "Mitigation plans to monitor conditions and develop data in the future are insufficient. Oregon Natural Desert Assoc. v. Singleton, 47 F. Supp. 2d 1182, 1194 (D. Or. 1998).

V. Community benefits package not relevant to resource protection or restoration

496. The University asserts that the TMT Observatory Corporation will commit a \$1 million annually to various workforce development and public education efforts.

497. The Applicant provides no rule or statute authorizing the BLNR to consider such payments in lieu of strict compliance with the Department's permitting requirements, statutory mandates, and constitutional obligations.

498. Donation of funds for community benefit purposes is outside the scope of the CDUA at issue in this hearing and goes beyond the scope of the BLNR's authority to manage and protect natural and cultural resources. Thus, these donations do not factor into the decision whether this permit application should be granted.

W. Decommissioning

499. Decommissioning of a telescope – either a current telescope or of the TMT should it be built – is not within the scope of the CDUA at issue in this hearing.

500. The possibility that a telescope may be decommissioned in the future – without facts about the extent and method of that decommissioning or the permit vehicle to ensure it happens – is pure speculation that cannot serve as a basis for the BLNR's decision on the contents of CDUA-HA-3568.

501. The University asserts that it “envision[s]” less telescopes on Mauna Kea in the future. Indeed, by the terms of General Lease S-4191, there would be no telescopes on Mauna Kea by 2033.

TMT FAILS TO SATISFY THE EIGHT CRITERIA FOR A CONSERVATION DISTRICT USE PERMIT

502. As outlined below, the TMT project cannot satisfy the eight criteria requirements for issuing a CDUP under HAR 13-5-30. The TMT is not consistent with the purpose of the conservation district, the resource subzone, or requirements of the CZMP. Moreover, it is an acknowledged and unmitigated source of substantial adverse impact that is not compatible with, nor improves upon the wide-open space of the northern plateau. The TMT would further subdivide the conservation district for the purpose of intensifying land use. Lastly, it poses a further risk to the public's health and welfare. For these reasons, the BLNR cannot permission to build the TMT in the conservation district of Mauna Kea.

X. C. TMT fails to satisfy HAR 13-5-24

503. HAR 13-5-24 states “Identified land uses in the resource subzone.

Y. R-3 Astronomy Facilities

Z. (D-1) Astronomy facilities under an approved management plan.”

504. HAR 13-5-2 “Management plan means a comprehensive plan for carrying out multiple land uses.”

505. Mauna Kea Anaina Hou, et al. v. BLNR, et al, Civ. No. 4-1-397, (3rd Cir. Haw. Jan, 19, 2007)) states:

AA. "...the 1995 Plan did not provide for the scope and coverage for development of the astronomy facilities on Mauna Kea, as did the 1985 Plan. It is also apparent by review of its contents that the 1995 management plan would not support the CDUA for the project since the 1995 management plan was virtually silent on the matter of future development of astronomy related facilities on Mauna Kea."

506. The findings of fact above demonstrate that the UH CMP fails to satisfy the requirements for a comprehensive management plan.

Not comprehensive

507. The UH CMP concerns only “UH Managed Areas,” not the entire conservation district of Mauna Kea, which stretches from approximately the 6,000-foot elevation to the summit.

508. The Third Circuit Court held that the resource to be protected by the comprehensive management plan is the summit of Mauna Kea.

509. We now know that the 1977 Management Plan for Mauna Kea (written by DLNR staff) identified the scope of the Mauna Kea conservation district as from the summit down to the 6,000-foot elevation and including all lands from the summit to Saddle Road, including the Mauna Kea Forest Reserve and Game Management Area, and Kaohe Game Management Area. (Ex. B.17g, page 1)

510. Indeed, the admitted confusing and complex management work outlined in the CMP would be better served by bringing all management of Mauna Kea under one comprehensive document developed by DLNR and implemented by DLNR.

No quantitative limit on development

511. The question of future telescope development, and especially the issue of the TMT proposal, were deemed by the authors of the UH CMP as outside the scope of the document. This is to say that the UH CMP is literally silent on the matter of future development of astronomy related facilities on Mauna Kea.

512. While the UH CMP addresses general questions of location for possible future development, it provides no limit on the number or size of future telescopes. As such, it would be

possible under the UH CMP for every inch of the Astronomy Precinct to developed with astronomy related facilities. This is to say, the UH CMP does not protect the resources of the Mauna Kea conservation district from the obvious substantial adverse impact of such an outcome.

Not enforceable

513. The Applicant admitted before the Intermediate Court of Appeals that the UH CMP does “not take action.”

514. The findings of fact above indicate that the UH CMP does not set out any timelines, thresholds, or triggers to ensure that any of the 103 management activities outlined in it will actually happen. This is to say, there is no mechanism for ensuring the UH CMP is ever more than an “unimplemented plan.”

515. Without enforceable requirements that actually ensure the protection of Mauna Kea’s resources, the UH CMP is not the “strong management framework” the Applicant asserts will remedy the longstanding substantial adverse impact of telescope activities on the resources of Mauna Kea.

D. TMT Proposal Not Consistent with CDUA Permit Criteria

516. “HAR 13-5-30 Permits, generally”

- i. (b) generally, “land uses shall not be undertaken in the conservation district.”
- ii. “(c) In evaluating the merits of a proposed land use, the department or board shall apply the following criteria:
- iii. (1) The proposed land use is consistent with the purpose of the conservation district;
 1. (2) The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;
- iv. (3) The proposed land use complies with provisions and guidelines contained in chapter 205A, HRS, entitled Coastal Zone Management,” where applicable;
- v. (4) The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region;

- vi. (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;
- vii. (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;
- viii. (7) Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and
- ix. (8) The proposed land use will not be materially detrimental to the public health, safety, and welfare.

The applicant shall have the burden of demonstrating that a proposed land use is consistent with the above criteria.”

1. Not Consistent with Purpose of Conservation District HAR 13-5-30(c)(1)

517. HAR 13-5-30(c)(1) states: conservation districts are formed “for the purpose of conserving, protecting and preserving the important natural resources of the State through appropriate management to promote their long-term sustainability and the public health, safety, and welfare.” See also, HRS §205-2(e).

518. The Applicant proposes that an 18-story, five-acre industrial structure in a currently undisturbed natural area.

519. The Applicant interprets the purpose of the conservation district as being “appropriate management” and contends that the “strong management framework” of the UH CMP satisfies this permit criteria.

520. The above findings of fact fail to support the conclusion that the UH CMP is a “strong management framework.”

521. In addition, even if the UH CMP did provide strong management, that alone does not satisfy this permit requirement. As written, HAR 13-5-30(c)(1) requires that the proposed land use be consistent with “conserving, protecting, and preserving ... important natural resources.” The TMT project would destroy many of those resources to the point of jeopardizing federal

designations, e.g. National Natural Landmark. Such significant impacts as these would require the Applicant to engage in extensive mitigation measures to correct for the harms caused by the proposed project. Thus, the proposed land use is not consistent with the purpose the of the conservation district.

522. Because the TMT cannot meet this first criterion, this CDUA cannot be approved.

2. Not Consistent with Subzone Designation HAR 13-5-30(c)(2)

523. According to HAR 13-5-13(a), “[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.” Id. (emphasis added).

524. HAR 13-5-2 defines “natural resource” to mean “resources such as plants, aquatic life and wildlife, cultural, historic, and archeological sites, and minerals.”

525. HAR 13-5-2 also defines “Scenic area” to mean “areas possessing natural, scenic, or wildland qualities.”

526. HAR 13-5-24 identifies “astronomy facilities under an approved management plan” as one of the allowable uses in the Resource Subzone.

527. For an identified use to be permitted, it must demonstrate that it is consistent with the sustained use of the natural resources of the area.

528. The Applicant fails to meet this burden. The findings of fact above demonstrate that the proposed project would have a substantial adverse effect on the natural resources of Mauna Kea as a whole and the northern plateau specifically.

529. The mitigation measures offered by the Applicant fail to demonstrate that the direct and undisputed harms of the proposed project will be reduced to a level that is less than significant. The Applicant fails to satisfy criterion two and thus CDUA-HA-3568 cannot be granted.

3. Not Consistent with CZM Provisions in HRS 205A HAR 13-5-30(c)(3)

x. TMT is in the Coastal Management Area

530. The TMT proposal must comply with the provisions of the CZM program as outlined in HRS 205A.

531. HRS 205A-1 Definitions. "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."

532. The TMT is proposed for Mauna Kea on the Island of Hawaii, and thus is within "all lands of the State."

533. The proposed TMT is not consistent with two objectives of the CZM Program.

xi.

b) TMT undermines CZM Objective to protect historic resources

534. HRS 205A-2 Coastal zone management program; objectives and policies.

(b) Objectives.

1. (2) Historic resources;

(A) Protect, preserve, and, where desirable, restore those natural and manmade

2. historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

535. The above findings of fact demonstrate the significant risk telescope activity, including the proposed TMT, poses to the integrity of the historic district of Mauna Kea. The Applicant has offered no evidence that the proposed mitigation measures will reduce the known significant effect of telescope activity on the historic resources of Mauna Kea to a level that is less than significant.

536. Because the proposed TMT would contribute to the existing "significant, substantial, and adverse" impacts of telescopes on Mauna Kea, CDUA-HA-3568 does not comply with HAR 13-5-30(c)(3) and therefore cannot be granted.

xii.

c. TMT undermines CZM Objectives to protect scenic and open spaces

537. HRS 205A-2 Coastal zone management program; objectives and policies. (b) Objectives.
(3) Scenic and open space resources;
(A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
538. The record is replete with evidence of the significant effect the proposed TMT would have on the scenic open spaces and important viewplanes of the northern plateau on Mauna Kea. The Applicant's Visual Impact Analysis Report concedes that the visual impact of the proposed project would be significant, although it is criticized because it "downplays" the visual impacts of the project and misidentifies important viewplanes affected by the proposed project (e.g. Pu`ukohala Heiau).
539. Because the proposed TMT would contribute to the existing "significant, substantial, and adverse" impacts of telescopes on Mauna Kea, CDUA-HA-3568 does not comply with HAR 13-5-30(c)(3) and therefore cannot be granted.

4. Contributes to Existing Substantial Adverse Impacts HAR 13-5-30(c)(4)

540. HAR 13-5-39(c)(4) states:
xiii. "The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region."
541. The Applicant asserts that because the TMT project would have only an incremental impact, it is not substantial and therefore meets criteria four.
542. As outlined, *supra*, this is a misstatement of the standard for assessing significant effect.
543. The findings of fact are replete with evidence – and the Applicant concedes – that the TMT project would contribute to the existing substantial adverse impacts suffered on Mauna Kea.
544. The visual impacts of the proposed TMT will be substantial and adverse.
545. The geological impacts of the proposed TMT will be substantial and adverse, and will jeopardize the listing of Mauna Kea as a National Natural Landmark.

546. The risks of groundwater contamination may be substantial and adverse, but have not been adequately assessed.

547. The Petitioners demonstrated that the Applicant has underestimated the level of significant effect likely to be caused by the construction of the TMT project.

548. The impact to the continuing and constitutionally protected traditional and customary practices of Native Hawaiians would be severe.

549. The record demonstrates that:

BB. the entire conservation district of Mauna Kea is a known sacred landscape with viewplanes associated with navigation and many ancient trails (FOF #103)

CC. the historic properties in the Mauna Kea Science Reserve are “are of importance to Native Hawaiians because they possess traditional cultural significance derived from associated cultural practice and beliefs,” (FOF #103)

DD. the traditional and customary and religious practices include the collection of water, depositing piko, burial ceremonies, and religious observances. (FOF #104)

EE. these ancient practices continue today and have evolved into contemporary practices (FOF #104)

FF. the construction of ahu, releasing of cremated remains, and other contemporary cultural practices evolved from ancient practices and **considered reasonable practices**. (FOF #105, #106)

GG. these practices are of the class of practices protected by Article XII, sec. 7 of the Constitution and the related caselaw. (FOF #107).

550. Further injury to these practices is not allowed under the law.

551. The Applicant has not demonstrated that the mitigation measures proposed for the project would bring the existing wide range of significant effects from telescope activity on Mauna Kea down to a level that is less than significant.

552. The proposed project will have a substantial adverse impact on existing natural resources within the surrounding area, community or region. These impacts will not be mitigated to a level that is less than significant. Thus, the Applicant has failed to meet its burden on the criterion, and the CDUA-HA-3568 cannot be granted.

5. Incompatible with the Surrounding Environment HAR 13-5-30(c)(5)

553. HAR 13-5-30(c)(5) states:

- i. “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 Applicant asserts both that:

- HH. the TMT project would be removed from Pu`u Kukahau`ula and thus not significantly affect traditional and customary practices or the historic significance of that area, and
- II. the TMT project is close to Pu`u Kukauhau`ula, where the majority of telescope construction has occurred and thus is consistent with the surrounding environment.

554. Both cannot be true.

555. The undisputed conclusion that telescope activity on Mauna Kea has a “significant, substantial, and adverse” impact on the resources of the conservation district is an indication that the built structures on Mauna Kea were not consistent with the surrounding environment to begin with.

556. The proposed location for the TMT project is the northern plateau of Mauna Kea and is designated for the purposes of the CDUA process as “Area E.”

557. The above findings of fact demonstrate that Area E and the environment immediately surrounding it is undeveloped land.

558. The findings of fact also demonstrated that viewplanes from the north ridge of the summit and from Pu`u Poliahu that include Area E currently have no built structures or man-made interference.

559. The Applicant has not demonstrated that the TMT is consistent with the surrounding environment of Area E and thus this criterion is not satisfied and the CDUA-HA-3568 cannot be granted.

5. Land Use is Not Compatible with the Locality and Surrounding Area

560. The proposed TMT would not be compatible with the wide open and natural space that is the northern plateau of Mauna Kea. The proposed project is ½ mile from the existing roads and infrastructure, on the alpine desert ecosystem comprised of lichens, mosses and grasses, not on the cinder cones of the summit ridge. FOF #158, 159
561. It is the conservation district (and the historic district) that is the locality to be considered, not the existing telescopes (many of which were retroactively permitted after construction). UH/TMT contends that the TMT project - comprised of more than 12.5 acres (4.9.ac. for the observatory, 3.6 ac. for the access way, 4 ac. for the batch plant staging area, and a utilities corridor (that intrudes into the Natural Area Reserve) - and 400 foot corridor along Mauna Kea access road) must be assessed in the context of existing buildings (i.e. other observatories), otherwise the HAR §13-5-30(c)(5) criterion would be senseless because nothing could ever be built in a Conservation District. (Exhibit R-1 CDUA, p. 18.)
562. UH/TMT's interpretation ignores HAR §13-5-30(b), which establishes **at the outset** that generally, "[l]and uses shall not be undertaken in the conservation district" and further, if they are to occur, **land uses must be evaluated to ensure that no adverse and significant impacts occur**. Id.

6. Undermines Open Space and Natural Beauty of Mauna Kea HAR 13-5-30(c)(6)

563. HAR 13-5-30(c)(6) states:
564. "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"
565. The TMT would intrude upon the currently unobstructed view of Haleakala Mountain as well as the primary view of the setting sun from the mountain. It will also obstruct viewplanes used for traditional and cultural spiritual and religious Native Hawaiian practice. The Northern Plateau is one of the last un-hindered open space areas with views down to the sea, along the coasts, and across the island chain. The TMT would neither preserve nor improve upon Mauna Kea's natural beauty; the eighteen-story building would be twice the highest allowable structure in Hawaii County, and would forever change the wilderness experience in the summit region.
- 566.

567. The above findings of fact demonstrate that the proposed TMT does not improve upon or preserve the open space and natural beauty of Mauna Kea.
568. The staff recommendation rationalizes the approval of the TMT project on the expectation of payment, bemoaning that “management costs money.” (Ex. A007 Staff Report).
569. The Applicant and staff cite no statute or regulation that authorizes the BLNR to circumvent this requirement in exchange for money.
570. The payment of market-based lease rent, as required by HRS 171-17 and -18, is separate and secondary to compliance with the threshold requirements for issuing the CDUP. Indeed, if that were not the case, the Applicant could always offer to pay some amount of money to satisfy any permit requirement that is otherwise violated by the nature of the proposed land use.
571. Moreover, there is no evidence in the record to demonstrate the amount of money the TMT Observatory Corporation will pay.
572. The Applicant also failed to demonstrate that whatever amount the TMT project proponents would pay in rent is sufficient to provide for the management actions needed to mitigate the substantial adverse impact of the TMT project.
573. The Applicant failed to demonstrate that it has the expertise and ability to meet the management needs of the resources on Mauna Kea now, much less after the TMT would be built.

7. TMT Project is Inconsistent Prohibition on Subdivision HAR 13-5-30(c)(7)

574. HAR 13-5-30(c)(7) states that “subdivision of land will not be utilized to increase the intensity of land uses in the conservation district.”
575. HAR 13-5-30(c)(7) states that “subdivision of land will not be utilized to increase the intensity of land uses in the conservation district.”
576. HAR 13-5-2 defines “subdivision” to mean “a division of a parcel of land into more than one parcel.”

577. Webster's Merriam Dictionary defines "division" as something that "divides, separates or marks off," as in a "border." <http://www.merriam-webster.com/thesaurus/division>.
578. Based on the findings of fact outlined above, the University has subdivided its leased parcel in several ways for the purpose of intensifying land uses in the conservation district of Mauna Kea.
579. UH subleases intensified land use by increasing the burden of vehicles, visitors, and long-term personnel that will use access roads, sewage, electricity, utilities, and base-level and mid-level facilities.
580. Land use in the Mauna Kea Science Reserve has the hallmarks of a subdivision: facilities and improvements cost sharing, planned development, and defined, independent property interests.
581. The TMT CDUA erroneously concluded that the "proposed TMT project does not involve the subdivision of land." (Exhibit R-1 CDUA, 2-28). The TMT sublease would further parcel the original (single) lot leased to UH in 1968 (Exhibit B.17 f Lease No. S-4191). The General Lease allows for "an observatory", but DLNR and the University have conveniently ignored that, opting instead to intensify land use in violation of HAR §13-5-30(c)(7) ("subdivision of land will not be utilized to increase the intensity of land uses in the conservation district"). Because the proposed TMT CDUA is premised on a subdivision of land that will intensify land use, the BLNR cannot approve it without abusing its discretion.
- 582.

A.The Astronomy Precinct is a "Subdivision" in violation of HAR 13-5-30(c)(7)

583. The findings of fact above demonstrate that the University divided its 11,088-acre lease into two parts: the Astronomy Precinct and a Natural/Cultural Preservation Area.
584. The findings of fact also demonstrate that the University divided the smaller Astronomy Precinct from the remainder of its leased lands to ensure that future "telescope development was limited to the Astronomy Precinct."
585. This is a division of a parcel into two or more parcels for the purpose of intensifying land uses in the conservation district, which is specifically prohibited by HAR 13-5-30(c)(7).
586. The undisputed fact that currently the cumulative impact of past, present, and reasonably foreseeable telescope activity is considered significant, substantial, and adverse further supports

this conclusion of law.

587. Issuance of CDUA-HA-3568 would further the improper subdivision and intensified land use in the Mauna Kea conservation district, which is not allowed by the administrative rules.

B. TMT Sublease Would be a “Subdivision” of Land in Violation of HAR 13-5-30(c)(7)

588. The above findings of fact demonstrate that while the terms of a sublease to the TMT are not in the record, a sublease would be required by the University and the telescope operator.
589. The above findings of fact demonstrate that a sublease to the TMT would be similar to past subleases issued for telescope facilities on Mauna Kea.
590. Based on the above findings of fact, past subleases for telescope facilities granted telescope operators such exclusive use of land so as to effect a division of the University’s parcel of land into more than one parcel. That the sublease would not be necessary without the construction of a land use in the conservation district, demonstrates that the division of the parcel is for the purpose of intensifying land use in the conservation district.
591. Approving the TMT CDUA would result in a division of land to intensify land uses in the conservation district, which is prohibited by HAR 13-5-30(c)(7).

8. Materially Detrimental to Public Health Safety and Welfare HAR 13-5-30(c)(8)

592. HAR 13-5-30(c)(8) states:
JJ. “The proposed land use will not be materially detrimental to the public health, safety, and welfare.”
593. The findings of fact above – and the record as a whole – is replete with evidence that the desecration of Mauna Kea is a source of immense pain for many people, especially Native Hawaiians.
594. These facts have been known to the University at least since 2005 and the publication of Kepa Maly’s Oral History of Mauna Kea.

595. The Applicant offered no evidence to demonstrate that the pain suffered by some Native Hawaiians from the desecration of Mauna Kea does not undermine the health and well-being of Native Hawaiians.
596. The Petitioners presented evidence, not refuted by the Applicant, that the pain some Native Hawaiians suffer due to the desecration of Mauna Kea could be connected to the poor public health standards of Native Hawaiians.
597. Moreover, the Applicant failed to refute concerns for the contamination of groundwater sources.
598. The findings of fact above demonstrate that Mauna Kea is a place of water. It is undisputed that the summit of Mauna Kea is above 5 aquifers for the Island of Hawaii.
599. It is also undisputed that telescope activity on Mauna Kea has resulted in the release of hazardous chemicals into the environment.
600. The overall cumulative impact of telescope activity on Mauna Kea is acknowledged as being “significant, substantial, and adverse.”
601. The cumulative impacts to the traditional and cultural properties and associated traditional and customary Native Hawaiian practices resulting from the storage, use, and release of the large quantities hazardous materials has not been assessed.
602. Based on the abovementioned facts regarding the traditional and customary practices, the use of the sacred waters, snow and ice from Lake Waiau and summit region, and the University’s failure to assess the significant impacts to those resources and practices from hazardous waste spills, human waste leech fields, and construction related contamination, the Applicant cannot its burden to show that the land use “will not be materially detrimental to public health, safety and welfare.
603. Because the Applicant cannot prove that the proposed TMT project would not be materially detrimental to the public health, safety, and welfare, this criterion is not satisfied and CDUA-HA-3568 cannot be granted.

D. TMT CDUA Inadequate and Incomplete

604. The CDUA was incomplete by failing to assess the TMT Project impacts upon the several

hundred historic properties identified as contributing factors to the Mauna Kea Summit Region Historic District. (Ex. A-001, CDUA)

605.

The CDUA was incomplete by failing to disclose the visual impacts of the TMT Project upon the several hundred historic properties and cultural resources on the northern plateau in the MKSR. (Ex. A-001, CDUA)

606. The CDUA was incomplete by failing to assess the effect of TMT Project as a whole upon the Mauna Kea Summit Region Historic District. (Ex. A-001, CDUA)

607. The CDUA was incomplete by failing to assess how the TMT Project would impact upon the integrity of the Historic District. (Ex. A-001, CDUA)

608. The CDUA was incomplete by failing to assess how the TMT Project would impact upon the integrity of the Mauna Kea Science Reserve as a TCP. (Ex. A-001, CDUA)

The CDUA was incomplete by failing to assess how the TMT Project would impact upon the eligibility of a TCP nomination. (Ex. A-001, CDUA)

609.

In the CDUA, the Applicant downplayed the impact of the TMT Project upon historic properties by omitting all references to SIHP Site Nos. 16169 and 21447 that are shown on Figure 4.1 even though they are identified in Figure 5.1 of the FAIS-AP and in other archaeological reports. (Ex. A-001, CDUA, p. 4-2; Ex. A-055, FAIS-AP, p. 5-5)

The CDUA was incomplete by failing to disclose the impacts upon SIHP Site Nos. 16169 and 21447 that are shown on Figure 4.1 within the Mauna Kea Astronomy Precinct and within the vicinity of the TMT Project area. (Ex. A-001, CDUA, p. 4-2)

In the CDUA, the Applicant downplayed the impact of the TMT Project upon historic properties by intentionally removing the SIHP Site Nos. (16178, 16179, 16181, 16182, 21205) from Figure 4.1 even though they are identified in Figure 5.1 of the FAIS-AP and in other archaeological reports. (Ex. A-001, CDUA, p. 4-2; Ex. A-055, FAIS-AP, p. 5-5)

In the CDUA, the Applicant downplayed the impact of the TMT Project upon cultural resources (“find spots”) in the MKSR by intentionally eliminating all references from the CDUA and removing their site locations from Figure 4.1 even though they are identified in Figure 5.1 of the FAIS-AP and in other archaeological reports. (Ex. A-001, CDUA, p. 4-2; Ex. A-055, FAIS-AP, p. 3-12, 5-5)

The CDUA was incomplete by failing to disclose the impacts upon the several hundred cultural resources (“find spots”) in the MKSR. (Ex. A-001, CDUA; Ex. A-055, FAIS-AP, p. 3-12;)

The CDUA was incomplete by failing to disclose the impacts upon cultural resources (“find

spots”) Nos. 1997.07, 2005.03, 2005.05, 2005.06, 2005.07, 2005.08, & 2005.09 that are within the Mauna Kea Astronomy Precinct and within the vicinity of the TMT Project area. (Ex. A-001, CDUA; Ex. A-28, FAIS-AP, p. 5-5, 5-20)

610. The CDUA was incomplete by failing to assess how the TMT Project would impact upon the eligibility of a National Register of Historic Places nomination. (Ex. A-311, CDUA)
In lieu of a habitat restoration plan, the TMT Project plan is to monitor arthropod activity in the vicinity of the portion of the Access Way that will impact Type 3 Wēkiu bug habitat. Ex A-003 FEIS, p. 3-73.

611. Based on the findings of fact above, the TMT CDUA cannot be issued because it is also inadequate and incomplete.

TMT VIOLATES HISTORIC PRESERVATION REQUIREMENTS

612. Mauna Kea is a known burial ground. State law requires burial treatment plans for proposals occurring in known burial grounds. Yet, there is no burial treatment plan for the summit area of the Mauna Kea conservation district.

613. Mauna Kea is a burial ground of our highest born and most sacred ancestors.

614. Archaeologist [McCoy] noted the ...no shrines have been identified on top of cinder cones in the Mauna Kea Science Reserve...believing that these high and remote places were reserved for the burying of the dead.” (Brackets added) Ex. A048, App. N, p. 23

615. Numerous burials and possible burials have been identified in the Mauna Kea conservation district.

616. Chapter 6E, HRS, states “it shall be the public policy of this State to provide leadership in preserving, restoring, and maintaining historic and cultural property, to ensure the administration of such historic and cultural property in a spirit of stewardship and trusteeship for future generations, and to conduct activities, plans, and programs in a manner consistent with the preservation and enhancement of historic and cultural property.”

617. HRS 6E-2 defines:

"Burial site" means any specific unmarked location where prehistoric or historic human skeletal remains and their associated burial goods are interred, and its immediate surrounding archaeological context, deemed a unique class of historic property and not otherwise included in section 6E-41.

"Historic preservation" means the research, protection, restoration, rehabilitation, and

interpretation of buildings, structures, objects, districts, areas, and sites, including underwater sites and burial sites, significant to the history, architecture, archaeology, or culture of this State, its communities, or the nation.

"Historic property" means any building, structure, object, district, area, or site, including heiau and underwater site, which is over fifty years old.

"Mitigation plan" means a plan, approved by the department, for the care and disposition of historic properties, aviation artifacts, and burial sites or the contents thereof, that includes monitoring, protection, restoration, and interpretation plans.

618. HRS 6E requires where known burials exist a burial treatment plan must be approved by the island burial council.

619. In 1999, the Mauna Kea Summit Region Historic District (MKS RHD), which encompasses the adze quarry and many other significant sites in a vast cultural landscape, was determined eligible for listing on the National Register. (Ex. A055, FAIS-AP, p. 1-1).

620. The Mauna Kea Summit Region Historic District is significant under all four National Register criteria, and criterion "e" of the Hawaii Administrative Rules, Chapter §13-275-6. The district is significant under criterion "a" because of the presence of the Mauna Kea.

621. There are 29 historic properties with a total of 48 features recorded in the MKSR that are interpreted as Burials or Possible Burials.

622. HAR 13-284-2 Definitions.

"Adverse effects" means any alteration to the characteristics of a historic property."

"Detailed mitigation plan" means "the specific plan for mitigation, including but not limited to, a preservation plan, an archaeological data recovery plan, an ethnographic data recovery plan, a historic data recovery plan, a burial treatment plan, and an architectural recordation plan. The detailed mitigation plan serves as a scope of work for mitigation."

"Mitigation" means "the measures taken to minimize impacts to significant historic properties. Mitigation may take different forms, including, but not limited to, preservation, archaeological data recovery, reburial, ethnographic documentation, historic data recovery, and architectural recordation."

"Mitigation commitment" means "the commitment to the form or forms of mitigation to be undertaken for each significant historic property."

623. HAR 13-284-7 Determining effects to significant historic properties.

(b) Effects include, but are not limited to, partial or total destruction or alteration of the historic property, detrimental alteration of the properties' surrounding environment, detrimental visual,

spatial, noise or atmospheric impingement, increasing access with the chances of resulting damage and neglect resulting in deterioration or destruction. These effects are potentially harmful.

624. Based on the above findings of fact regarding the lack of a burial treatment plan for the known burial that is all of Mauna Kea, the University cannot meet their burden under HAR §13-5-30(4) or under HAR 13-5-30(c)(8), or compliance with Chapter 6E of the State Historic Preservation Act.

TMT Violates Constitutional Protections for Traditional and Customary Practices

625. The record is replete with confirmation of the long-standing traditional and customary practices on Mauna Kea. The BLNR has an obligation to protect reasonable traditional and customary practices. The TMT proposal is not consistent with this obligation and thus cannot be granted.

BLNR Illegally Delegated its Authority to the University

626. Article 12, Section 7. “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.”

627. **In Public Access Shoreline Hawai'i v. Hawaii County Planning Commission, 79 Hawai'i 425, 903 P.2d 1246 (1995), (hereafter “PASH”)**, the Hawai'i Supreme Court stated:
- i. 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.

628. **In Ka pa`akai O Ka `Aina v. Land Use Commission (hereafter “Ka Pa`akai v. LUC”), 94 Hawai'i 31, 47, 7 P.3d 1068, 1068 (2000)** the Hawai'i Supreme Courts states:
- ii. To preserve and protect traditional and customary native Hawaiian rights, the Board examines the following factors:

629. The identity and scope of cultural, historical, and natural resources in the application area, including the extent to which traditional and customary native rights are to have been exercised in the application area;

630. The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
631. The feasible action, if any to be taken to reasonably protect native Hawaiian rights if they are found to exist.

Ka Pa`akai v. LUC further states:

- iii. Equally important, the Land Use Commission (“LUC”) made no specific findings or conclusions regarding the effects on or the impairment of any Article XII, section 7 [Hawai`i State Constitution] uses, or the feasibility of the protection for those rules. Instead, as mentioned, the LUC delegated unqualified authority to Ka`upulehu development (“KD”) ...This wholesale delegation of responsibility for the preservation and protection of native Hawaiian rights to KD, a private entity, however, was improper and misses the point...
632. Chapters 205A-2 and 15, and 183C, HRS, obligate the BLNR to “to conserve, protect, and preserve the important natural resources of the State” that are designated as conservation districts. HRS 183C-1.
633. The Applicant the University of Hawai`i at Hilo (UH), is seeking a conservation district use permit (CDUP) relative to CDUA HA-3568, on behalf of TMT Observatory Corporation (“TMT”). Ex. A-001, p.13, K-1 (CDUA)
634. Upon approval of the UH Comprehensive Management Plan (UH CMP) the BLNR made the University Board of Regents (UH BOR) Responsible for implementing the CMP, in accepting that responsibility the UH BOR delegated implementation of the CMP through normal UH governance channels to UHH, OMKM, MKMB, and also assigned two members of the UH BOR to sit as ex-officio, non-voting members on the MKMB. Ex. A-003, p.3-128
635. There is no dispute the University of Hawai`i, is the only Applicant named on the Conservation District Use Application for the proposed TMT Telescopes Project.
636. There is no dispute the TMT Corporation is in fact not named as the “applicant” on the CDUA-HA-3568.
637. The record of the BLNR’s decision to approve the UH CMP and CDUA-HA-3568 did not include specific findings of fact as to three elements of the **Ka Pa`akai** due process analysis. (Ex. B-41, B-42). Indeed, the Applicant’s admitted lack of process for addressing claims of traditional and customary Native Hawaiian practitioners harmed by decisions made ostensibly in compliance with the UH CMP indicates that the appropriate due process analysis required by **Ka Pa`akai** has not been met in this case. Thus, approval of CDUA-HA-3568 would further the

inappropriate “wholesale delegation” BLNR’s legal obligations, in violation of the constitutional due process rights of Native Hawaiian practitioners.

The cultural practitioner petitioners engage in constitutionally protected traditional and customary practices

638. As the findings of fact show, the record is replete with confirmation that the Native Hawaiian petitioners in this case engage in constitutionally protected traditional and customary practices.
639. The findings of fact above demonstrated that:
640. the entire conservation district of Mauna Kea is a known sacred landscape with viewplanes associated with navigation and many ancient trails (FOF #103)
641. the historic properties in the Mauna Kea Science Reserve are “are of importance to Native Hawaiians because they possess traditional cultural significance derived from associated cultural practice and beliefs,” (FOF #103)
642. the traditional and customary and religious practices include the collection of water, depositing piko, burial ceremonies, and religious observances.
643. these ancient practices continue today and have evolved into contemporary practices ; the construction of ahu, releasing of cremated remains, and other contemporary cultural practices evolved from ancient practices and **considered reasonable practices**. (FOF #105, #106)
644. these practices are of the class of practices protected by Article XII, sec. 7 of the Constitution and the related caselaw.
645. These findings of fact demonstrate that the current practices of some of the Petitioners were previously identified as NHTCP (thus meeting both the Constitutional requirements and court requirement (PASH and State v. Hanapi)) and have been known to the University for more than a decade.

BLNR must reasonably protect traditional and customary practices

646. Article 11, Section 1. “For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii'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.
647. Article 12, Section 4. “The lands granted to the State of Hawaii by Section 5(b) of the Admission Act and pursuant to Article XVI, Section 7, of the State Constitution,

excluding therefrom lands defined as "available lands" by Section 203 of the Hawaiian Homes Commission Act, 1920, as amended, shall be held by the State as a public trust for native Hawaiians and the general public."

648. In *In Re Water Use Permit Applications*, 94 Hawai'i 97, 9 P.3d 409 (2000) ("the *Waiahole Ditch Case*"), the Hawai'i Supreme Court recognized that public trust doctrine was "a fundamental principle of constitutional law in Hawai'i." Haw. Const., Art. XI, section 1, P.133, 9 P.3d at 444.

649. The duties imposed by the public trust doctrine in this case are not supplanted or made superfluous by HRS Chapter 183C or the regulations promulgated there under. "Mere compliance by [agencies] with their legislative authority is not sufficient to determine if their actions comport with the requirements of the public trust doctrine. The public trust doctrine at all times forms the outer boundaries of permissible government action with respect to public trust resources." *Id.* at 132, 9 P.3d at 445 (citing to *Kootenai Envtl. Alliance v. Panhandle Yacht Club, Inc.*, 105 Idaho 622, 671 P.2d 1085, 1095 (Idaho 1983)). Thus, BLNR, like the Commission on Water Resource Management in the *Waiahole Ditch Case*, has an "affirmative duty" to take the public trust into account in permitting the use of public lands located in the conservation district and **"to protect the public trust uses whenever feasible."**

650. There is no dispute that Mauna Kea is a "public natural resource" of the class protected under Article XI, section 1 of Hawaii's Constitution. See, *Waiahole Ditch Case* at 133, 9 P.3d at 444. Mauna Kea is part of the "ceded lands trust," lands ceded by the federal government back to the State of Hawai'i by Section 5(b) of the Admission Act and pursuant to Article XVI, Section 7, of the Hawai'i Constitution. These lands are held by the State as "a public trust for native Hawaiians and the general public." Haw. Const., Art. XII, sec. 4. Mauna Kea has also been designated a National Natural Landmark because of its unique geological and biological features. It is eligible for listing in the National Register of Historic Places as a traditional cultural property. There is no doubt that it is a public natural resource of invaluable worth to the public and Native Hawaiians.

651. Therefore, BLNR must independently uphold the Constitutional mandate that it "shall conserve and protect Hawaii's natural beauty and all natural resources...in a manner consistent with their conservation." Haw. Const., Art. XI, sec. 1.

VI. Violations of Surety, Lease, and Obligations to Public and Native Hawaiian Beneficiaries

652. The Native Hawaiians and the general public are the two named beneficiaries of the public trust established in the Hawaii Admissions Act. Section 5(f), of the Act, includes support programs "for the betterment of the conditions of native Hawaiians." As both public and Native Hawaiian beneficiaries of this trust, Petitioners have a right to judicial review of actions of the trustee that result in waste of or deprivation of income from the assets. As beneficiaries of this

trust, they have a right to reasonable revenues from the lease of public lands subject to the provisions of the trust.

653. Section 171-17 and -18, HRS, require the DLNR to assess and collect fair market lease rent, to be deposited in the Public Trust Land Fund.
654. HRS 171-17 (a) The appraisal of public lands for sale or lease at public auction for the determination of the upset price may be performed by an employee of the board of land and natural resources qualified to appraise lands, or by one but not more than three disinterested appraisers whose services shall be contracted for by the board; provided that the upset price or upset rental shall be determined by disinterested appraisal whenever prudent management so dictates. No such lands shall be sold or leased for a sum less than the value fixed by appraisal; provided that for any sale or lease at public auction, the board may establish the upset sale or rental price at less than the appraisal value set by an employee of the board and the land may be sold or leased at that price. The board shall be reimbursed by the purchaser or lessee for the cost of any appraisal required to be made by a disinterested appraiser or appraisers contracted for by the board. (a) Have the appraisal of public lands for sale or lease at public auction for the determination of the upset price may be performed by an employee of the board of land and natural resources qualified to appraise lands, or by one but not more than three disinterested appraisers whose services shall be contracted for by the board.
655. HRS 171-18. All funds derived from the sale or lease or other disposition of public lands shall be appropriated by the laws of the State; provided that all proceeds and income from the sale, lease, or other disposition of lands ceded to the United States by the Republic of Hawaii under the joint resolution of annexation, approved July 7, 1898 (30 Stat. 750), or acquired in exchange for lands so ceded, and returned to the State of Hawaii by virtue of section 5(b) of the Act of March 18, 1959 (73 Stat. 6), and all proceeds and income from the sale, lease or other disposition of lands retained by the United States under sections 5(c) and 5(d) of the Act and later conveyed to the State under section 5(e) shall be held as a public trust for the support of the public schools and other public educational institutions, for the betterment of the conditions of native Hawaiians as defined in the Hawaiian Homes Commission Act, 1920, as amended, for the development of farm and home ownership on as widespread a basis as possible, for the making of public improvements, and for the provision of lands for public use.
656. There are at least 13 leases for telescope structures on the public lands of Mauna Kea. These sub-leases are made between the State, UH and foreign and non-state governments and corporations that have no such protection under the relevant sections of the Admissions Act, including Section 5(f) of the Act.
657. The leases are signed by a representative of DLNR, a representative of the University, and representatives of the telescope owners/operators. Ex. B-7

658. The annual lease rent paid by of the existing telescope owners/operators is either \$1 or less. Exhibit Subleases
659. While the University may benefit from the use of public trust lands for educational purposes under Section 5(f) of the Hawai`i Admissions Act, however, the law does not provide private corporations and foreign countries that same privilege.
660. The University may not extend their public trust lands privilege to non-state and foreign government and or corporations.
661. As is evidenced in the sub-lease agreements the University is not assessing and collecting fair market lease rent and depositing it into the Public Trust Lands Fund for public purposes pursuant to HRS 171.
662. As is evidenced in the sub-lease agreements the DLNR is not assessing and collecting fair market lease rent and depositing it into the Public Trust Lands Fund for public purposes pursuant to HRS 171.
663. It is undisputed that fair market lease rent has not been collected by DLNR for the use of the public lands of Mauna Kea for astronomy related activities, commercial tours, and other revenue generating uses.
664. BLNR is required to assess and collect fair market lease rent to be deposited into the Public Trust Lands Fund to be used for specified public uses, regardless of the fact that the University under HRS 304, may also charge users rent.
665. DLNR's 1977 management plan for the Mauna Kea Conservation District required that no application 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 direct or indirect costs attributed to the project.
666. Although the TMT Observatory Corporation has alluded to pay an un-specified amount of "substantial rent," the University is actually the Applicant on this CDUA, and the UHH has not provided at security deposit.
667. Moreover HRS 171, requires all lease rent for the use of public trust lands to be based on the fair market value. This means rent is not based on what the Applicant or the TMT Corporation is willing to pay.

668. Neither the CMP nor the CDUA ensure that either the general public or Native Hawaiian beneficiaries receives their constitutionally guaranteed portion of all money generated from the use of former crown and government lands of which Mauna Kea is a part as is provide under the law (HRS 171).

669. The BLNR, has a fiduciary duty to protect the interests of its beneficiaries.

DECISION AND ORDER

Based on the above Findings of Fact and Conclusions of Law the University of Hawai`i's Conservation District Use Permit Application (HA-3568) is deficient and hereby DENIED/REVOKED.

BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAII

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

BLNR Contested Case HA-16-02
DEBORAH J WARD'S
Joinder to Temple of Lono Motion to Dismiss

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the above referenced documents were served upon the following parties by the means indicated on the date noted below:

Michael Cain
dlnr.maunakea@hawaii.gov
Custodian of the Records

Carlsmith Ball LLP
isandison@carlsmith.com
jpm@carlsmith.com
lmcaneeley@carlsmith.com
*Counsels for the applicant University
of Hawai'i at Hilo*

Law Offices of Yuklin Aluli
yuklin@kailualaw.com
cdex@hotmail.com
Counsel for Kahea

Kealoha Pisciotto and Mauna Kea
Anaina Hou
keomaivg@gmail.com

Clarence Kukauakahi Ching
kahiwaL@cs.com

E. Kalani Flores
ekflores@hawaiiintel.net

B. Pualani Case
puacase@hawaiiintel.net

Deborah J. Ward
cordylinecolor@gmail.com

Paul K. Neves
kealiikea@yahoo.com

[Deborah Ward](#)
cordylinecolor@gmail.com

Watanabe Ing LLP
rshinyama@wik.com
douging@wik.com
*Counsels for TMT International
Observatory, LLC*

Harry Fergerstrom
P.O. Box 951
Kurtistown, HI 96760

Mehana Kihoi
uhiwai@live.com

C. M. Kaho'okahi Kanuha
kahookahi.kukiaimauna@gmail.com

Joseph Kualii Lindsey Camara
kualiic@hotmail.com

Torkildson, Katz, Moore, Hetherington
& Harris
lsa@torkildson.com
njc@torkildson.com
*Counsels for Perpetuating Unique
Educational Opportunities (PUEO)*

J. Leina'ala Sleightholm
leinaala.mauna@gmail.com

Lanny Alan Sinkin
lanny.sinkin@gmail.com
Representative for The Temple of Lono

Kalikolehua Kanaele
akulele@yahoo.com

Stephanie-Malia:Tabbada
s.tabbada@hawaiiintel.net

Tiffnie Kakalia
tiffniekakalia@gmail.com

Glen Kila
makakila@gmail.com

Dwight J. Vicente
2608 Ainaola Drive
Hilo, Hawaiian Kingdom

Brannon Kamahana Kealoha
brannonk@hawaii.edu

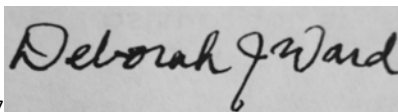
Cindy Freitas
hanahanai@hawaii.rr.com

William Freitas
pohaku7@yahoo.com

Wilma H. Holii
P. O. Box 368
Hanapepe, HI 96716
Witness for the Hearing Officer

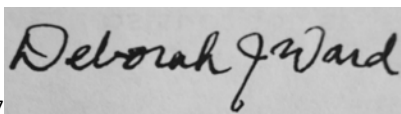
Moses Kealamakia Jr.
mkealama@yahoo.com
Witness for the Hearing Officer

Signed:
Name: DEBORAH WARD



Date: May 28, 2017

Signed:
Name: DEBORAH WARD

A rectangular box containing a handwritten signature in black ink. The signature is written in a cursive style and reads "Deborah J Ward".

Date: May 28, 2017