NOTICE OF BOARD OF REGENTS MEETING

Board business not completed on this day will be taken up on another day and time announced at the conclusion of the meeting.

Date: Thursday, October 17, 2019
Time: 9:30 a.m.
Place: Leeward Community College
        Education Building, Room 201 A/B
        96-045 Ala Ike Street
        Pearl City, Hawai‘i 96782

AGENDA

I. Call Meeting to Order

II. Approval of the Minutes of the August 30, 2019 Meeting

III. Public Comment Period: All written testimony on agenda items received after posting of this agenda and up to 24 hours in advance of the meeting will be distributed to the board. Late testimony on agenda items will be distributed to the board within 24 hours of receipt. Written testimony may be submitted via US mail, email at bor.testimony@hawaii.edu, or facsimile at 956-5156. Individuals submitting written testimony are not automatically signed up for oral testimony. Registration for oral testimony on agenda items will be provided at the meeting location 15 minutes prior to the meeting and closed once the meeting begins. Oral testimony is limited to three (3) minutes. All written testimony submitted are public documents. Therefore, any testimony that is submitted verbally or in writing, electronically or in person, for use in the public meeting process is public information and will be posted on the board’s website.

IV. Report of the President

V. Committee and Affiliate Reports
   A. Report from the Committee on Independent Audit
   B. Report from the Committee on Personnel Affairs and Board Governance
   C. Report from the Committee on Research and Innovation
   D. Affiliate Reports

VI. Agenda Items
   A. Consent Agenda
      1. Recommend Board Approval of Revisions to RP 2.205, Policy on Whistleblowing and Retaliation
      2. Recommend Board Approval of Delegation of Authority to the President to Indemnify, Defend, and Hold Harmless a County Agency, its Officers, Agents, and Employees, Pursuant to Section 46-71.5, Hawai‘i Revised

For disability accommodations, contact the Board Office at 956-8213 or bor@hawaii.edu. Advance notice requested five (5) days in advance of the meeting.
B. Final Report and Dissolution of the Investments Permitted Interaction Group

C. Report of the Maunakea Governance Permitted Interaction Group (For Information Only – No Board deliberation or action will occur at this meeting, pursuant to Section 92-2.5(b), HRS. Deliberation and decisionmaking will occur at the November 6, 2019 Special Board Meeting.)

D. Board of Regents Resolution to Urge De-Escalation of Tension and Non-Violent Solutions on Maunakea

VII. Executive Session (closed to the public):

A. Personnel: (To consider the hire, evaluation, dismissal, or discipline of an officer or employee, where consideration of matters affecting privacy will be involved, pursuant to Section 92-5(a)(2), Hawai‘i Revised Statutes (HRS))
   1. Evaluation of the Internal Auditor

B. Legal Matters: (To consult with the board’s attorneys on questions and issues pertaining to the board’s powers, duties, privileges, immunities, and liabilities, pursuant to Section 92-5(a)(4), HRS)
   1. Quarterly Status Report on Litigation

VIII. Announcements

A. Next Meeting: Special Board Meeting on Wednesday, November 6, 2019, at University of Hawai‘i at Hilo

IX. Adjournment

ATTACHMENTS

Attachment A – Personnel actions posted for information only
Attachment A: Pursuant to §89C-4, Hawaii Revised Statutes, and the reporting requirements of Regents Policy 9.212, the following includes all Executive/Managerial positions as of September 1, 2019, with the approved compensation for the period November 1, 2019 - October 31, 2020.

<table>
<thead>
<tr>
<th>LAST NAME</th>
<th>FIRST NAME</th>
<th>TITLE</th>
<th>CAMPUS</th>
<th>OFFICE</th>
<th>GRADE</th>
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Attachment A: Pursuant to §89C-4, Hawaii Revised Statutes, and the reporting requirements of Regents Policy 9.212, the following includes all Executive/Managerial positions as of September 1, 2019, with the approved compensation for the period November 1, 2019 - October 31, 2020.

<table>
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<th>LAST NAME</th>
<th>FIRST NAME</th>
<th>TITLE</th>
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<th>OFFICE</th>
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Attachment A: Pursuant to §89C-4, Hawaii Revised Statutes, and the reporting requirements of Regents Policy 9.212, the following includes all Executive/Managerial positions as of September 1, 2019, with the approved compensation for the period November 1, 2019 - October 31, 2020.

<table>
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<th>LAST NAME</th>
<th>FIRST NAME</th>
<th>TITLE</th>
<th>CAMPUS</th>
<th>OFFICE</th>
<th>GRADE</th>
<th>FILLED DATE</th>
<th>COMPENSATION</th>
<th>CHANGES FROM PREVIOUS REPORT</th>
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<td>UH AT HILo</td>
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<td>SM1</td>
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</table>
Attachment A: Pursuant to §89C-4, Hawaii Revised Statutes, and the reporting requirements of Regents Policy 9.212, the following includes all Executive/Managerial positions as of September 1, 2019, with the approved compensation for the period November 1, 2019 - October 31, 2020.

<table>
<thead>
<tr>
<th>LAST NAME</th>
<th>FIRST NAME</th>
<th>TITLE</th>
<th>CAMPUS</th>
<th>OFFICE</th>
<th>GRADE</th>
<th>FILLED DATE</th>
<th>COMPENSATION</th>
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</tbody>
</table>
Attachment A: Pursuant to §89C-4, Hawaii Revised Statutes, and the reporting requirements of Regents Policy 9.212, the following includes all Executive/Managerial positions as of September 1, 2019, with the approved compensation for the period November 1, 2019 - October 31, 2020.

<table>
<thead>
<tr>
<th>LAST NAME</th>
<th>FIRST NAME</th>
<th>TITLE</th>
<th>CAMPUS</th>
<th>OFFICE</th>
<th>GRADE</th>
<th>FILLED DATE</th>
<th>COMPENSATION</th>
<th>CHANGES FROM PREVIOUS REPORT</th>
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<tr>
<td>Souki</td>
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</table>
Attachment A: Pursuant to §89C-4, Hawaii Revised Statutes, and the reporting requirements of Regents Policy 9.212, the following includes all Executive/Managerial positions as of September 1, 2019, with the approved compensation for the period November 1, 2019 - October 31, 2020.

<table>
<thead>
<tr>
<th>LAST NAME</th>
<th>FIRST NAME</th>
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</table>
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### VACANT POSITIONS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>CAMPUS</th>
<th>OFFICE</th>
<th>Grade</th>
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</table>
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<table>
<thead>
<tr>
<th>TITLE</th>
<th>CAMPUS</th>
<th>OFFICE</th>
<th>Grade</th>
<th>COMMENT</th>
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MINUTES
BOARD OF REGENTS MEETING
AUGUST 30, 2019

I. CALL TO ORDER

Chair Ben Kudo called the meeting to order at 9:01 a.m. on Friday, August 30, 2019, at the University of Hawai‘i at Mānoa, Orvis Auditorium, 2411 Dole Street, Honolulu, Hawai‘i 96822.

Quorum (12): Chair Ben Kudo; Vice Chair Jan Sullivan; Vice Chair Wayne Higaki; Regent Simeon Acoba; Regent Kelli Acopan; Regent Eugene Bal; Regent Michael McEnerney; Regent Randy Moore; Regent Alapaki Nahale-a; Regent Michelle Tagorda; Regent Robert Westerman; and Regent Ernest Wilson Jr.

Others in attendance: President David Lassner; Vice President for Administration Jan Gouveia; Interim Vice President for Community Colleges Erika Lacro; Vice President for Legal Affairs/University General Counsel Carrie Okinaga; Vice President for Research and Innovation Vassilis Syrmos; Vice President for Information Technology/Chief Information Officer Garret Yoshimi; Vice President for Advancement/UH Foundation Chief Executive Officer Tim Dolan; UH-Mānoa (UHM) Provost Michael Bruno; UH-Hilo (UHH) Chancellor Bonnie Irwin; UH-Maui College Chancellor Lui Hokoana; Leeward Community College Chancellor Carlos Peñaloza; Executive Administrator and Secretary of the Board of Regents (Board Secretary) Kendra Oishi; and others as noted.

II. APPROVAL OF THE MINUTES OF THE JULY 18, 2019 MEETING

Regent Higaki moved to approve the minutes of the July 18, 2019, meeting, seconded by Regent Wilson, and the motion carried unanimously.

IV. APPROVAL OF RESOLUTIONS IN APPRECIATION AND RECOGNITION OF REGENT JEFFREY PORTNOY, REGENT LEE PUTNAM, AND REGENT STANFORD YUEN

Chair Kudo asked to reorder the agenda to take the approval of resolutions for the three emeritus regents first. There were no objections.

Board Secretary Oishi read each of the resolutions.

Regent McEnerney arrived at 9:06 a.m.
Vice Chair Higaki moved to approve the resolutions and Regent Wilson seconded the motion.

Chair Kudo shared his thoughts on the demands of public service and recognized the dedication and commitment of former regents Portnoy, Putnam, and Yuen, and expressed his personal thanks and best wishes.

Regent Acoba expressed his appreciation to: former regent Jeff Portnoy for his devotion to the welfare of the athletic program and singular voice on many key issues which helped to make the board’s decisions better; former regent Lee Putnam, whom he felt was an open and inclusive chair who tried to involve everyone and had an eye for detail on how the board should structure its work; and former regent Stanford Yuen, whom he believed to be the only engineer on the board, and recognized him for his efforts with the university’s capital improvement program.

Vice President Gouveia also expressed her appreciation to the former regents. She expressed her thanks Stanford Yuen who joined the board at the same time that she joined the university. She acknowledged his commitment to the Planning and Facilities Committee, during which he encouraged the furthering of technology; as a result 99 percent of all infrastructure projects are processed electronically and the university is now venturing into asset inventory management. The university has been using the design-build method of delivery amount of time it takes to get to construction has been greatly reduced, which could not have been accomplished without the support of Regent Emeritus Yuen.

Regent Acopan arrived at 9:13 a.m.

Chair Kudo recognized all three former regents for their prominent educational accomplishments, but noted that Regent Emeritus Yuen was a graduate of the University of Hawai‘i and eventually earned two masters degrees and a professional license, and showed exceptional personal drive in accomplishing his goals.

There having been a motion that was made and seconded, the motion carried unanimously, with the exception of Regent Moore who was not present.

Regent Emeritus Yuen provided remarks and shared that his experience as a regent was one of the highlights of his professional career. He thanked the regents for their guidance and leadership. He encouraged the regents to keep up the good work and acknowledged the university leadership for their accomplishments. Regent Emeritus Yuen acknowledged VP Gouveia for making his experience very enjoyable and commended her for the accomplishments achieved under her tenure. Regent Emeritus Yuen shared a reminder of gender equity and prevention of workplace and sexual harassment; he suggested that a major building be named after the author of Title IX legislation, the late Patsy T. Mink. He encouraged the regents to continue their good work and to do what is best for the university for future generations to come.

III. PUBLIC COMMENT PERIOD
Board Secretary Oishi announced that the Board Office received written testimony from the following:

- Kimberly Sales, offering comments regarding Mauna A Wakea.
- Cynthia Franklin, offering comments regarding the Maunakea permitted interaction group.
- Kekailoa Perry, offering comments regarding the President’s report, and accreditation and fiscal concerns related to honorary degrees.

Late written testimony was received from Nanea Lo in opposition of the Maunakea permitted interaction group.

The following individuals provided oral testimony offering comments related to Maunakea: Kalaniakea Wilson, Kaipu Baker, Beau Shishido, Noenoe Silva, Cynthia Franklin, Tiele Dandt, Cristina Bacchilega, Bradford Ikemau Lum, Nanea Lum, Christopher Seals, Kawelau Wright, Ty Kawika Tengan, and an unidentified testifier.

Kekailoa Perry provided oral testimony summarizing his written testimony.

The board went into recess at 10:25 a.m. and reconvened at 10:32 a.m.

V. REPORT OF THE PRESIDENT

President Lassner acknowledged and expressed appreciation to the individuals that testified. He then provided a report highlighting the following:

Hawai‘i Graduation Initiative
- Enrollment headcount has increased at Hawai‘i Community College and Windward Community College. While UHM headcount is down, course credits have increased which indicates that more students are enrolling in more credits.

Hawai‘i Innovation Initiative
- As of today, the university has received just over $100 million in extramural funds, almost 18 percent over the same date last year.

High Performance Mission-Driven System
- The merger of the Travel Industry Management School (TIM) and Shidler College of Business will become effective on September 1, 2019. TIM will operate as a school within a college.
- The merger of the College of Languages, Linguistics, and Literature with the School of Pacific and Asian Studies continues and would create the largest college at UHM.
- Phase I of the UHM reorganization that was approved by the board is underway; there is a new Provost Council and the first meeting of the new Mānoa leadership team will occur next week. Mini-design teams have been meeting over the summer. The goal is to have a proposed framework
available at the end of September for public discussion and have a full formal reorganization proposal for formal consultation next spring.

President Lassner also noted the following accomplishments:

- UHM’s Department of Public Safety was accredited by the Commission on Accreditation for Law Enforcement Agencies, which is the national law enforcement accreditation organization and a gold standard that is something that police departments aspire to. UHM is only the second university in the country to achieve this accreditation. He congratulated Chief Andrew Black for his stellar public safety work on the UHM campus.

- UH received full accreditation for lab animal care services by the Association for Assessment and Accreditation of Laboratory Animal Care. He congratulated Sylvia Kondo and her team for this accomplishment.

- President Lassner congratulated Michael Unebasami, Associate Vice President for Administrative Affairs for Community Colleges, for being honored with the 2019 National Association of College and University Business Officers (NACUBO) Distinguished Business Officer Award. This award is given to the individual who has shown exemplary leadership, outstanding achievement, and extraordinary service over an extended period of time.

- President Lassner approved the charter of a new Staff Senate for UHM to engage support staff with campus governance processes.

VI. COMMITTEE AND AFFILIATE REPORTS

A. Report from the Committee on Personnel Affairs and Board Governance

Committee Chair Bal summarized the committee report.

Regent Acoba commented that he didn’t believe that any decision was made to eliminate committees, but only to evaluate whether committees should be consolidated or eliminated, and also to evaluate the structure of committees.

Chair Kudo announced that he would be assigning members to the seven committees and that regents will be informed on the committee and affiliate group assignments. He noted that he is trying his best to spread the workload evenly.

B. Affiliate Reports

UH Student Caucus: Regent Acopan reported that the UH Student Caucus will be meeting for the first time this year on September 14 and 15 and that regents are invited to attend.

Maunakea Management Board (MKMB): Regent Nahale-a reported that MKMB met and discussed decommissioning and the process that will be used. They also received an update on issues related to invasive species and maintaining access to the road.
All Campus Council of Faculty Senate Chairs (ACCFSC): Regent Wilson reported that the ASSFSC met for the first time on August 19, 2019, and that Tom Conway was elected as one of the co-chairs. They discussed reframing governance relationships and making changes to their bylaws, and welcomed having a liaison to the Board of Regents.

VII. AGENDA ITEMS

A. Approval of the Awarding of the Honorary Doctorate of Humane Letters Degree Upon General Eric Shinseki and President Barack Obama

Provost Bruno summarized the action memo and requested that the board award the Honorary Doctorate of Humane Letters degree to General Eric Shinseki and President Barack Obama in recognition of their outstanding contributions.

Regent Wilson moved to approve awarding the Honorary Doctorate of Humane Letters Degree upon General Eric Shinseki and President Barack Obama, seconded by Regent McEnerney, and the motion carried unanimously.

B. University of Hawai‘i – West Oahu (UHWO) Mauka Lands Photovoltaic Update

VP Gouveia provided an update on the AES option agreement and grant of easement on the UHWO mauka lands for photovoltaic (PV) development. In 2018, HECO issued a request for proposals for developers, and AES was selected in 2019. The Public Utilities Commission approved the project on August 21, 2019. She noted that the provisions under the previous board approval allowed administration to remain nimble through this process.

Regent Wilson asked how the approximate $320,000 per year in anticipated revenue matches up with the cost of electricity per year, and if it will help offset utility costs. VP Gouveia responded that they are still determining the distribution of funds. She believed that UHWO’s electric use is approximately one million megawatt per year and UHM’s electricity bill is approximately $40 million per year.

Regent Bal asked whether there are any projections regarding phase II of the project. VP Gouveia replied that UH has been asked by developers if other lands are available. UH has been working with HECO to overlay the grid on an island map to see if there are feasible lands to tie into the grid. That process has begun for phase II, but a specific site has not been identified.

Regent Acoba asked whether all of the designated land for this type of project was taken up by HECO. VP Gouveia responded that for purposes of mauka lands that need to connect into the HECO grid, the land has been taken up by HECO. She noted that they are evaluating the feasibility of using UHWO makai lands for future projects, including a possible green tariff project. An update will be provided at a future meeting.

Regent Acoba questioned whether HECO set the rent and what the funds are used for. VP Gouveia explained that bids were received from six developers that proposed rental rates following a specified process whereby UH is contractually agreed to rent and developers offer proposals through an open solicitation for proposals. UH signed an agreement to work with the entity selected by HECO. VP Gouveia noted that
administration is still working on determining where the revenue will be allocated; part of it will be returned to UHWO and part will be used to support the sustainability program.

Regent Westerman inquired as to whether AES is obligated to UH regardless of whether they have to renegotiate with HECO, and if there’s a possibility that AES might ask to renegotiate. VP Gouveia noted that the terms are attached to the option agreement and are not negotiable.

Regent Wilson asked if administration is exploring the possibility of using other lands for this purpose. VP Gouveia responded that UH is implementing a balanced approach to maximize the use of lands and works closely with HECO on technical analysis. The university has not engaged in the same level of analysis with utility companies on the neighbor islands.

Chair Kudo commented that this is essentially a land agreement where the university collects lease rent, as opposed to a power-purchase agreement. VP Gouveia confirmed. Chair Kudo asked if there was a possibility that AES could produce more than the agreed upon 18 megawatts that could be used to directly feed to UHWO. VP Gouveia replied that the infrastructure of getting high voltage capacity from mauka to makai of the freeway may not be feasible.

Chair Kudo asked whether there would be sheep or goat on the lands. VP Gouveia did not know, but noted that there have been discussions on how to fulfill the agricultural use component of the land use requirements which may involve animals. The details are still being worked out through the option agreement. UH is a passive landowner, and AES will be responsible for ensuring compliance.

C. Recommendation to Defer Changes to Board of Regents Committee Structure to Allow Each Committee to Examine its Functions and the Implications of Elimination or Consolidation and Report Findings no Later than February 2020

Regent McEnerney made a motion to defer changes to the Board of Regents committee structure to allow each committee to examine its functions and the implications of elimination or consolidation and report findings no later than February 2020. Regent Wilson seconded the motion, and the motion carried unanimously.

VIII. ANNOUNCEMENTS

Chair Kudo acknowledged Melissa Matsuura, Executive Assistant, Office of the Board of Regents, for her six years of dedicated service to the board and wished her well as she moves on to another position within the University System.

Regent Westerman thanked Calvin Shirai for his willingness to serve as Interim Vice Chancellor for Administrative Services for Kaua‘i Community College, as noted on Attachment A to the agenda.

Chair Kudo announced that the next board meeting is scheduled for September 26, 2019, at the University of Hawai‘i Maui College.

IX. ADJOURNMENT
There being no further business, Regent Moore moved to adjourn, and Regent Sullivan seconded, and with unanimous approval, the meeting was adjourned at 11:18 a.m.

Respectfully Submitted,

Kendra Oishi
Executive Administrator and Secretary
of the Board of Regents
Item IV.

Report of the President

NO MATERIALS
ORAL REPORT
Item IV.

Report of the President
LeeCC Chancellor & Faculty
Senate Reports

MATERIALS
Welcome

Carlos Peñaloza, Ph.D. Chancellor

October 17, 2019
Our Students

59% Female
38% Male
3% Non-Binary /Other

Part-time: 62%
Full-time: 38%

| First Time | 17% |
| Returning  | 8%  |
| Continuing | 52% |
| Transfer   | 14% |
| Other      | 10% |
Our Students

ETHNICITY

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Percentage</th>
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<tr>
<td>Hawaiian/Part-Hawaiian</td>
<td>27.2%</td>
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<tr>
<td>Filipino</td>
<td>23.5%</td>
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<tr>
<td>Hispanic</td>
<td>1.9%</td>
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<tr>
<td>Other</td>
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</tr>
</tbody>
</table>

AGE

- 67% under 25
- 19% between 25-34
- 14% 35+

Slide 3
Our Students

By Majors
- Liberal Arts: 46%
- Career & Technical: 23%
- Unclassified: 12%
  (Includes Early College)
- Home-based at another Campus: 19%

Fully Online
- 2015: 1,408
- 2016: 1,411
- 2017: 1,341
- 2018: 1,533
- 2019: 1,781

23% 20%
19% 19% 27%
Fall Enrollment

UHCC System

Leeward

CHALLENGES
Leading the way...

No Cost Textbooks

$3.3 million estimated cost-savings for students since 2015

Fall 2019

35% of all Leeward classes offer NO COST textbooks

No Cost Textbooks, number of courses offered
Results to date:

• The program has produced nearly 900 graduates

• Approximately 80% of the program graduates have been employed as A+ teachers, para-educators, or teachers

• The Alternative Certification in CTE program has generated 60 licensed teachers

• The Advanced Professional Certificate has resulted in 16 licensed teachers
Serving the largest number of Native Hawaiian students in the UHCC System
Title III Grant
2+2 STEM Pathways
Leeward CC and UH West O‘ahu
$2.2 million
To improve Native Hawaiians’ ability to earn AS/ASNS and BS/BAS degrees
Aloha Pathways
UH-Mānoa
College of Social Sciences

Fully online
Integrated pathway to 4-year degrees
Value Added Product Development Center in Wahiawa
Michael Cawdery, Ph.D.
Associate Professor, Teacher Education Program
Chair, Faculty Senate
Taking a Good Look in the Mirror
Prioritizing the Leeward CC Faculty Senate role in Shared Governance

1. Driving, reporting, and evaluating the work of the College
2. Systematically reviewing policy
3. Conducting internal reviews/audits
ACCJC’s (Accrediting Commission) Recommendations to College & System:

• Regularly evaluate and update its policies and practices. (I.B.7)

• Develop a mechanism to inform the College community about the college governance and the college decision-making process. (IV.A.6)

• Develop and implement an assessment process to measure the effectiveness of role delineations, governance and decision-making processes to ensure their integrity. (IV.D.7)
Driving, Reporting, and Evaluating the Work

Autonomy with Accountability
- Master scheduling
- Stakeholder buy-in
- Consistent & concise recording/reporting

Multilateral Communication
- Formalizing how information is shared
- Sharing pertinent information
- Sharing in timely and respectful manner
- Giving sensitive issues time, care, and vetting
- Soliciting requests from authorized campus governance bodies
Policy Review for System Alignment

Campus Policies
- L1.101 Policy on the Policy Development Process
- L1.201 Policy on Shared Governance

UHCC
- Academic Forgiveness
- Course Renewal

UH System
- EP 5. 201 - Approval of New Academic Programs and Review of Provisional Academic Programs
- EP 5.209 - University of Hawaii System Student Transfer and Inter-Campus Articulation
Internal Mechanisms for Review

Defining the Role of Vice-Chair
- Auditing Charter & Bylaws
- Ensuring compliance to policy

Auditing Committees
- Evaluating form and function
- Delineating process and procedures
- Developing continuity in leadership
Mahalo
Election of Committee Chairperson: Regent McEnerney was selected as the committee chair in accordance with Section 304A-321, Hawai‘i Revised Statutes.

Minutes: May 2, 2019, minutes approved.

Testimony: None.

Agenda Items:

A. Committee Goals and Objectives

The committee discussed Section 304A-321, Hawai‘i Revised Statutes, and the Audit Plan For the Fiscal Year Ended June 30, 2020 that was approved by the committee at the May 2, 2019 meeting. These documents guide the committee’s work for the fiscal year.

B. Title III Grants – Senate Resolution 120 (2019)

Internally Auditor Shizumura provided a memo to the committee which noted that Title III grants are subject to the Single Audit requirements and procedures performed annually by Accuity and that an internal audit would be a duplication of efforts. It was further noted that there were no recent instances of non-compliance. The committee chair deferred further discussion on this matter to a future meeting to allow time to determine whether such an audit is necessary and that it would not be duplicative.

C. Review and Acceptance of the Office of Internal Audit Report on the Status of Corrective Action Related to Capital Improvement Projects and Repairs and Maintenance

Internal Auditor Shizumura provided a brief overview of this agenda item and noted that remedies are expected to be fully implemented by the end of the calendar year and that concerns have been mitigated to the satisfaction of the Office of Internal Audit.

Action: The committee unanimously voted to accept the report.

D. Recommend Board Approval of Revisions to Regents Policy (RP) 2.205, Policy on Whistleblowing and Retaliation

The Board Secretary explained that the proposed revisions to RP 2.205 were discussed by the committee in May, and was an initiative of the previous Board Chair. The existing policy relates to whistleblowing and retaliation for university faculty, staff, students, and administrators, but remained silent as to how whistleblower reports against the President should be handled.

Action: The committee voted unanimously to recommend board approval, with a clarifying amendment to add “respective” before “designees,” as appropriate.
Summary of October 3, 2019 Meeting

Minutes of August 22, 2019: Approved.

Testimony: None.

Agenda Items:

A. Committee Goals and Objectives

Committee Chair Tagorda solicited ideas for issues the committee could cover this year. A number of suggestions were offered, including several suggestions relating to the review of board bylaws and policies. The committee chair and vice chair will work on planning committee activities for the year.

B. Recommend Board Approval of Delegation of Authority to the President to Indemnify, Defend, and Hold Harmless a County Agency, its Officers, Agents, and Employees, Pursuant to Section 46-71.5, Hawai‘i Revised Statutes, and Other Revisions to Regents Policy 8.201, Contracts and Official Documents

VP Gouveia explained that UH uses a number of county facilities and that the process for receiving approvals for indemnification are quite onerous in processing the 50-60 transactions that occur per year. She noted that as a result of recent legislation, the Board now has the authority to indemnify county agencies and is authorized to delegate that authority to the president, which is what was being requested.

Action: The committee recommended board approval to delegate such authority to the President.

C. Executive and Managerial (EM) Compensation Update

VP Gouveia provided an update on EM positions and salaries, including a summary of EM personnel, current salary schedules, and the methodology used to evaluate EM personnel and provide salary adjustments. This presentation was provided as information as required by Regents Policy 9.212, and the EM salaries are posted as an attachment to the October 17, 2019, Board of Regents agenda.

D. Board of Regents Committee

The committee held a robust discussion on how the board should evaluate itself and the committee structure, what information is needed to make decisions, and balancing the decrease in the number of regents with maintaining effectiveness. Discussion occurred as to creating an assessment structure, and a suggestion was made that bylaws and policies should be reviewed to determine what the board is required to do and to determine which committee has purview over the issue. The committee chair will work with the Board Office in determining how to undertake this effort.
Minutes of June 6, 2019 Meeting: Approved.

Testimony: None.

Agenda Items:

A. Committee Goals and Objectives

The committee reviewed proposed goals and objectives that were circulated prior to the meeting which focus on the use of Research and Training Revolving Funds and metrics for research and innovation.

Action: The committee adopted the goals and objectives as presented

B. Update on University of Hawai‘i Innovation Spaces

VP Syrmos provided an overview of several current innovation spaces including the UH iLab, Shidler Pacific Asian Center for Entrepreneurship (sPACE), and Mānoa Innovation Center. He also provided an overview of the concept for the Atherton Innovation Center.

C. Update on the UHealthy Hawai‘i Initiative

Dr. Aimee Grace provided an update on UHealthy Hawai‘i, with a focus on the priority area to ensure a robust statewide healthy workforce, which includes addressing healthcare profession shortages. UHealthy Hawai‘i has increased its partner base, including working on putting more programs in high school health academies. Discussion occurred regarding program funding; they were unsuccessful in receiving federal funds and are having discussions with private partners and are considering legislative funding.

D. Research and Innovation Year-in-Review and Fiscal Year (FY) 2019-2020 Outlook

VP Syrmos provided an overview of FY 2019 performance metrics including extramural awards, disclosures, patents, and licenses, and projections for FY 2020. FY 2019 extramural awards totaled $421.8 million, the highest amount since 2015. Extramural awards for FY 2020 are projected to be $401.5 million. VP Syrmos noted that strategic hiring has been a factor that influences extramural awards.

E. Strategic Directions: Update on Metrics

VP Syrmos provided an update on Strategic Directions metrics, including an overview of targets vs. actuals for FY 2014 – FY 2019 for the academic units. He noted that the trend line has stabilized and attributed it to strategic hires. A suggestion was made that adjustments should be made for inflation.
Item V.D.
Affiliate Reports

NO MATERIALS ORAL REPORTS
I. Purpose

To set forth a policy that promotes an atmosphere at the University of Hawai‘i (university) that allows individuals to disclose in good faith violations of law, regulation or policy, and protects individuals from retaliation by adverse academic or employment action taken as a result of a good faith report.

II. Definitions:

“Members of the university” means faculty, staff, students and administrators.

III. Board of Regents Policy:

A. The university is committed to compliance with applicable laws and regulations, and to promulgate policies and procedures to interpret and apply these laws and regulations in the university setting.

B. To achieve compliance, it is the policy of the university to encourage and enable Member of the university or the general public, to make good faith reports of known or suspected violations of law, regulation or policy, including but not limited to fraud.

C. No employee shall take retaliatory academic or employment action against any Member for reporting, or causing to be reported, in good faith suspected violations of law, regulation or policy.

D. The general authority for implementing this policy is vested in the president or designee, with the exception that in connection with the responsibilities of the independent audit committee of the board for reviewing the university’s antifraud programs and controls, and aiding in discovering and remedying incidences of financial fraud regarding the university, it is expected that the independent audit committee through the university’s internal auditor will review and monitor good faith reports of financial fraud.
IV. Delegation of Authority:

The general authority for implementing this policy is vested in the president or designee, with the exception as indicated in Section III.D. above, for which the board retains authority.

V. Contact Information:

Office of the Board of Regents, 956-8213, bor@hawaii.edu.

VI. References:

A. http://www.hawaii.edu/offices/bor/.
B. Hawaii Revised Statutes Section 304A-321, as amended.

Approved as to Form:

Approved as to Form:

______________________________  06/02/2016
/S/                         Date
Cynthia Quinn
Executive Administrator and
Secretary of the Board of Regents
I. Purpose

To set forth a policy that promotes an atmosphere at the University of Hawai‘i (university) that allows individuals to disclose in good faith violations of law, regulation or policy, and protects individuals from retaliation by adverse academic or employment action taken as a result of a good faith report.

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expected that the independent audit committee through the university’s internal auditor will review and monitor good faith reports of financial fraud.

2. All whistleblower hotline reports of violations of law, regulation, or policy made about specific conduct of the president shall be provided to the board executive administrator and secretary and the board chair. The board, through its chair and the appropriate subject matter committee chair, or their designees, shall determine appropriate action including any investigation and appropriate resolution of the matter. An investigation may be conducted by the chair and the appropriate subject matter committee chair, or their designees, the board executive administrator and secretary, and/or an outside investigator retained to pursue the investigation. If an investigation is conducted, the president shall be notified, and every reasonable effort shall be made to conduct the investigation in a confidential manner. Steps may be taken as interim measures, when situations warrant, to protect complainants during any investigation, and retaliation against any complainant for a good faith report of misconduct is strictly prohibited. Any findings of violation of law, regulation, or policy should be presented to the full board in executive session to determine appropriate action, if any.

IV. Delegation of Authority:

The general authority for implementing this policy is vested in the president or designee, with the exception as indicated in Section III.D. above, for which the board retains authority.

V. Contact Information:

Office of the Board of Regents, 956-8213, bor@hawaii.edu.

VI. References:

A. http://www.hawaii.edu/offices/bor/.
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Approved as to Form:

Approved as to Form:

________________________________  __06/02/2016_
Cynthia QuinnKendra Oishi                  Date
Executive Administrator and
Secretary of the Board of Regents
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C. No employee shall take retaliatory academic or employment action against any member for reporting, or causing to be reported, in good faith suspected violations of law, regulation or policy.

D. The general authority for implementing this policy is vested in the president or designee, with the following exceptions:

1. In connection with the responsibilities of the independent audit committee of the board for reviewing the university’s antifraud programs and controls, and aiding in discovering and remedying incidences of financial fraud regarding the university, it is expected that the independent audit committee through the university’s internal auditor will review and monitor good faith reports of financial fraud.
2. All whistleblower hotline reports of violations of law, regulation, or policy made about specific conduct of the president shall be provided to the board executive administrator and secretary and the board chair. The board, through its chair and the appropriate subject matter committee chair, or their designees, shall determine appropriate action including any investigation and appropriate resolution of the matter. An investigation may be conducted by the chair and the appropriate subject matter committee chair, or their designees, the board executive administrator and secretary, and/or an outside investigator retained to pursue the investigation. If an investigation is conducted, the president shall be notified, and every reasonable effort shall be made to conduct the investigation in a confidential manner. Steps may be taken as interim measures, when situations warrant, to protect complainants during any investigation, and retaliation against any complainant for a good faith report of misconduct is strictly prohibited. Any findings of violation of law, regulation, or policy should be presented to the full board in executive session to determine appropriate action, if any.

IV. **Delegation of Authority:**

The general authority for implementing this policy is vested in the president or designee, with the exception as indicated in Section III.D., for which the board retains authority.

V. **Contact Information:**

Office of the Board of Regents, 956-8213, bor@hawaii.edu.

VI. **References:**

B. Hawaii Revised Statutes Section 304A-321, as amended.

**Approved as to Form:**

Approved as to Form:

______________________________  ____________
Kendra Oishi                    Date
Executive Administrator and
Secretary of the Board of Regents
TO: Benjamin Kudo  
Chairperson, Board of Regents  

VIA: David Lassner  
President  

VIA: Kalbert Young  
Vice President for Budget and Finance/Chief Financial Officer  

VIA: Carrie Okinaga  
Vice President for Legal Affairs/University General Counsel  

FROM: Jan Gouveia  
Vice President for Administration  

SUBJECT: Request for Approval of Delegation of Authority to the President to Indemnify, Defend and Hold Harmless a County Agency, its Officers, Agents and Employees Pursuant to Section 46-71.5 of the Hawai‘i Revised Statutes ("HRS") and Other Revisions to Regents Policy 8.201  

SPECIFIC ACTION REQUESTED:  

As authorized by HRS § 46-71.5(c), it is requested that the Board of Regents of the University of Hawai‘i ("Board") delegate to the President the authority to "indemnify, defend and hold harmless a county agency, its officers, agents and employees" in order to receive county aid, assistance, support, benefits, services, and interests in or rights to use county property. This authorization would be effectuated through amendment of Regents Policy ("RP") 8.201, as shown in the attached clean and redlined versions of RP 8.201.  

Additional amendments to RP 8.201 are being proposed to clarify that Regents need to approve transactions, i.e., deal terms and expenditures of monies, as opposed to specific wording of and provisions in contract documents themselves. In practice, this is what Regents have done, and these amendments would conform the policy to practice.
RECOMMENDED EFFECTIVE DATE:

Effective upon approval.

ADDITIONAL COST:

The proposed amendments to RP 8.201 are not anticipated to result in any additional costs to the University.

BACKGROUND:

A. Delegation of Authority to Indemnify Counties

The University regularly and repeatedly uses county parks and other facilities for University purposes and functions. Such repeated uses include class field trips to Hanauma Bay Nature Preserve to conduct SCUBA surveys of coral reef fish, athletic practices and games, and graduations. In addition, the University has for decades worked with Maui County in watershed restoration and invasive species eradication projects requiring helicopter transport across private and public (including county) lands.

As a condition of these uses of county lands, all four counties have required indemnifications. Prior to 2018 amendments, state law provided that only the governor had statutory authority to approve said indemnification of counties. The procedure for the University to obtain approval from the governor to indemnify counties has been burdensome, as the requests often require 7-9 hard copy signatures and can take up to 2 months to process. Currently, the University processes approximately 50 requests to the governor a year: 50% are to use county facilities for 1 day or less; and 96% are for recurring events. A copy of a typical memorandum is attached hereto as Attachment A.

Believing the process to be unduly burdensome given the relatively low risk historically presented by these county indemnifications, in 2018, the University sought a statutory amendment to enable the University itself to so indemnify the counties. The governor signed into law Act 103, Session Laws of Hawai‘i (SLH) 2018, which amended HRS § 46-71.5 to allow the Board, “or its designee,” to agree to “indemnify, defend, and hold harmless a county agency, its officers, agents, and employees” in order to receive county aid, assistance, support, benefits, services, and interests in or rights to use county property. HRS § 46-71.5(c) authorizes said indemnification when:

(1) The use of the county property will be for a university purpose or a university function;
(2) The president of the University of Hawaii, or the president's designee, following a favorable review by the university general counsel or the counsel's designee, approves the indemnity provision in writing; and

(3) The chief financial officer of the University of Hawaii, pursuant to [HRS] section 304A-108, has obtained an insurance policy or policies in an amount sufficient to cover the liability of the university that reasonably may be anticipated to arise under the indemnity provision, or has determined that it is not in the best interest of the university to obtain insurance.

This delegation is consistent with the University's financial responsibility as a semi-autonomous agency with its own risk management program that finances its liabilities through a combination of self-insurance and commercial insurance. Additionally, a similar amendment to HRS § 46-71.5 was signed into law in 2010, which allowed the governor to delegate the authority to indemnify a county agency to the superintendent of education where the use of the county property would be for a public school purpose or function, subject to other conditions (Act 145, SLH 2010, now codified as HRS § 46-71.5(b)).

B. Clarifying Amendments to Conform Policy to Practice

Questions have been raised in the past about whether the Board approves transactions or transactional documents or contracts themselves. The current version of RP 8.201 creates confusion in this regard, as in some instances it references board approval for “agreements” and “contracts”, and in other instances, it references board approval prior to “procurement” or “construction projects”. For example, the current version of RP 8.201 requires Board approval of “consultant contracts” in excess of $1 million; to our knowledge, the Board has never required review and approval of the actual wording of a consultant contract, which largely consists of standardized terms and conditions found in all public entity service contracts.

To our knowledge, the Board’s practice has been to review and approve of transactions or the projects themselves. Administration presents material terms of the transactions for approval and provides the actual final or near-final versions of the transactional agreements for background, as requested by the Board. The Board has thus far not been involved in drafting, revising, negotiating or then approving the actual transactional documents themselves prior to execution.
DISCUSSION:

A. Delegation of Authority to Indemnify Counties

The 50 or so requests made annually to the governor for county indemnifications are often routine and repeat annually, and they generally present low residual risk to the University's finances, given longstanding mitigation measures (which include liability waivers when appropriate) and the university's risk management program as described above. During the five-year tenure of this Vice President for Administration, no county has tendered a claim based on these indemnifications.

It is requested that the authority to indemnify a county agency be delegated to the President to further improve the efficiency of the approval process. Without the delegation of authority to the President, Board approval would be required for all requests to indemnify a county agency and the gains in efficiency from eliminating the governor's approval would be lost. Given that the University processes upwards of 50 requests a year, Board approval would require that significant time and resources be diverted from other matters and devoted to these indemnification requests, which are frequently for low risk and/or recurring events. Furthermore, given the public notice and filing requirements set forth in Chapter 92, HRS, as well as the infrequent Board meeting schedule (monthly at best), the length of time for a request to be approved by the Board would be unchanged from the 1-2 month process requiring the governor's approval.

The delegation of authority to the President would allow the University to accomplish the efficiency improvements and reduction in processing time intended by the legislative amendment to HRS § 46-71.5(c).

B. Clarifying Amendments to Conform Policy to Practice

The proposed amendments to Sections III.C. and III.D. of RP 8.201 would conform board policy to board practice, and clarify that the Board is required to approve of the enunciated transactions, and not the transactional documents themselves. This does not mean the Board will not or cannot review said documents; if the Board wants to review and approve of said documents, it surely can, but will not be required to do so.

It is requested that the Board approve said clarifying amendments.
ACTION REQUESTED:

Based on the information provided in this Action Memo, the University respectfully requests the following amendments to RP 8.201:

(1) Delegation of authority to the President to indemnify the four counties, pursuant to and as authorized by HRS § 46-71.5(c); and

(2) Clarifying amendments to conform board policy to board practice regarding approval of transactions.

Attachment A

c: Kendra Oishi, Executive Administrator and Secretary to the Board of Regents
I. Purpose

To set forth policy regarding contracts and other official documents.

II. Definitions:

No policy specific or unique definitions apply.

III. Policy:

A. General

1. Except as otherwise provided herein, the president is authorized to approve, sign, and execute contracts and settlements of claims in accordance with law and board policy. In addition, the president is authorized to approve or accept all gifts, grants, and contracts involving the university's receipt of extramural funds. Should it be determined, in consultation with the board, that a contract or settlement is anticipated to have a significant impact on policies, programs, or operations; or result in potential institutional liability the prior approval of the board shall be required regardless of amount and source of funding. The president may delegate authority for the approval, acceptance, signing, and execution of contracts and settlements to other university officials.

B. Construction Projects

1. The president is authorized to act as the contracting officer of the university on construction projects, including projects financed in whole or in part from federal and other grants. Construction projects, including repair and maintenance projects, in excess of and/or totaling more than $5,000,000 shall require the board's prior approval. This requirement will not be circumvented through parceling. The president shall provide advanced notice, to the extent
practical, of potentially controversial decisions or actions that are within authority delegated to the president. Should it be determined, in consultation with the board, that a construction project is anticipated to have a significant impact on policies, programs, operations, or generates controversy prior board approval is required regardless of amount or source of funding.

C. Consultant Contracts

1. Contracts to engage consultant services, including but not limited to consultants to study or review university programs and/or operations for the purposes of recommending courses of action, which are anticipated to require changes in board policies and/or have significant impact on policies, programs, or operations, shall require the prior approval of the board regardless of amount or source of funding. Consultant contracts which are estimated to be $1,000,000 or less, consultant expenses included, and are not expected to result in changes in board policies and/or have a significant impact on policies, programs or operations, shall be approved by the president or the president's designee. All consultant contracts in excess of $1,000,000, expenses included, shall require the prior approval of the board. This requirement will not be circumvented by parceling the amount of the contract.

D. Settlement Agreements

1. All settlement agreements recommended by the university's general counsel involving payments of $500,000 or less, or involving workers' compensation claims in any amount and which do not contravene board policy and do not have a significant impact on policies, programs, or operations, shall be approved by the president or the president's designee. Agreements which are anticipated to require changes in board policies and/or have significant impact on policy, programs, or operations and/or where the board is named as a party to a suit, shall require the prior approval of the board regardless of amount. All settlement agreements exceeding $500,000, except for settlement of workers' compensation claims, shall require the approval of the board. This requirement may not be circumvented by subdivision of the total amount of the settlement claim. All settlements requiring board approval shall include a signature line for the board.

E. Procurement Procedures

1. Subject to the provisions set forth herein, the president is authorized to develop internal policies and procedures for the procurement of goods, services and construction in accordance with law and board policy, provided such procedures are approved by the board prior to implementation in
accordance with Chapter 304A-105, HRS. Except as otherwise provided herein, the procurement of goods or services exceeding $5,000,000 shall require the prior approval of the board unless, in consultation with the board, it is anticipated that such procurement will have a significant impact on policies, programs, or operations, in which case prior board approval is required regardless of amount and funding source. The specified threshold will not be circumvented by parceling.

IV. Delegation of Authority:

Except as otherwise provided herein, the president is authorized to approve, sign, and execute contracts and settlements of claims and approve or accept all gifts, grants, and contracts involving the university's receipt of extramural funds, and may delegate certain authority to other university officials. See RP 8.201(A)(1).

The president is authorized to act as the contracting officer of the university on construction projects, including projects financed in whole or in part from federal and other grants. See RP 8.201(B)(1).

The president or the president's designee is authorized to approve certain Consultant contracts. See RP 8.201(C)(1).

The president or the president's designee is authorized to approve certain settlement agreements. See RP 8.201(D)(1).

The president is authorized to develop internal policies and procedures for procurement. See RP 8.201(E)(1).

V. Contact Information:

Office of the Vice President for Administration, 956-8862, jgouveia@hawaii.edu

VI. References:

- http://www.hawaii.edu/offices/bor/

Approved as to Form:
Cynthia Quinn  
Executive Administrator and  
Secretary of the Board of Regents
I. Purpose

To set forth policy on contracts and other official documents.

II. Definitions:

No policy specific or unique definitions apply.

III. Policy:

A. General

Except as otherwise provided herein, the president is authorized to approve, sign, and execute contracts and settlements of claims in accordance with law and board policy. In addition, the president is authorized to approve or accept all gifts, grants, and contracts involving the university's receipt of extramural funds. Should it be determined, in consultation with the board, that a contract or settlement is anticipated to have a significant impact on policies, programs, or operations; or result in potential institutional liability, the prior approval of the board shall be required regardless of amount and source of funding. Except as otherwise provided herein, the president may delegate authority for the approval, acceptance, signing, and execution of contracts and settlements to other university officials.

B. Construction Projects

The president is authorized to act as the contracting officer of the university on construction projects, including projects financed in whole or in part from federal and other grants. Construction projects, including repair and maintenance projects, in excess of and/or totaling more than $5,000,000 shall require the board's prior approval. This requirement will not be circumvented through parceling. The president shall provide advanced notice, to the extent practical, of potentially controversial decisions or actions that are within the authority delegated to the
president. Should it be determined, in consultation with the board, that a
collection project is anticipated to have a significant impact on policies,
programs[,] or operations, or generates controversy, prior board approval is required
regardless of amount or source of funding.

C. Use of Consultant[ - Contracts - ]s

[1.-Contracts to ]Use of [ engage ]consultant services, including but not limited to
consultants to study or review university programs and/or operations for the
purposes of recommending courses of action, which are anticipated to require
changes in board policies and/or have significant impact on policies, programs, or
operations, shall require the prior approval of the board regardless of amount or
source of funding. Consultant [ contracts ]work which [ are ]is estimated to be
$1,000,000 or less, consultant expenses included, and [ are ]is not expected to result
in changes in board policies and/or have a significant impact on policies, programs
or operations, shall be approved by the president or the president’s designee. All
consultant [ contracts ]work estimated to be in excess of $1,000,000, expenses
included, shall require the prior approval of the board. This requirement will not be
circumvented by parceling the amount of the contract.

D. Settlement of Claims[ - Agreements - ]

[1.-] All settlement of claims[ - agreements ]recommended by the university’s general
counsel involving payments of $500,000 or less, or involving workers’ compensation
claims in any amount and which do not contravene board policy and do not have a
significant impact on policies, programs, or operations, shall be approved by the
president or the president’s designee. [ Agreements ]Settlements, which are
anticipated to require changes in board policies and/or have significant impact on
policy, programs, or operations and/or where the board is named as a party to a
suit, shall require the prior approval of the board regardless of amount. All
settlements of claims[ - agreements ]exceeding $500,000, except for settlement of
workers’ compensation claims, shall require the approval of the board. This
requirement may not be circumvented by subdivision of the total amount of the
settlement claim. For all settlements requiring board approval, settlement
documentation shall include a signature execution line for the board.

E. Procurement Procedures

[1.-] Subject to the provisions set forth herein, the president is authorized to develop
internal policies and procedures for the procurement of goods, services and
construction in accordance with law and board policy, provided such procedures are
approved by the board prior to implementation in accordance with Chapter 304A-
105, HRS. Except as otherwise provided herein, the procurement of goods or
services exceeding $5,000,000 shall require the prior approval of the board unless,
in consultation with the board, it is anticipated that such procurement will have a
significant impact on policies, programs, or operations, in which case prior board
approval is required regardless of amount and funding source. The specified
threshold will not be circumvented by parceling.
F. Indemnification by the University

Except for four (4) limited circumstances as set forth below, the University is not legally authorized or permitted to indemnify, defend or hold harmless other parties to a contract (“Other Parties”) against claims by a third party (not a party to the contract) from damages or injuries resulting from the acts or omissions of the University. To agree to such obligations would require the University to: (1) defend the Other Parties against third party claims, which may include paying for defense costs including attorneys’ fees; and (2) pay for any monetary judgment obtained against the Other Parties by third party claimants.

For indemnification of federal agencies pursuant to HRS §29-15.5, approval by the governor is required. For indemnification of county governments in the State of Hawaii pursuant to HRS §46-71.5, the board authorizes the president to approve of said indemnifications, provided statutory requirements are fulfilled and following favorable review by the vice president for administration or designee and the university general counsel or designee; this authorization shall not be delegated further by the president. For indemnification of University research sponsors pursuant to HRS §304A-110, and University research collaborating institutions pursuant to HRS §304A-111 (gross negligence or willful misconduct only), board approval is required.

The president is authorized to establish guidelines regarding the University’s processes to obtain requisite approvals for indemnifications by the University.

IV. Delegation of Authority:

Except as otherwise provided herein, the president is authorized to approve, sign, and execute contracts and settlements of claims, and to approve or accept all gifts, grants, and contracts involving the university’s receipt of extramural funds, to approve and agree to University indemnifications in limited circumstances, and may delegate certain authority to other university officials. See RP 8.201(A) [(1)].

The president is authorized to act as the contracting officer of the university on construction projects, including projects financed in whole or in part from federal and other grants. See RP 8.201(B)(1).

The president or the president’s designee is authorized to approve certain consultant contracts. See RP 8.201(C)(1).

The president or the president’s designee is authorized to approve certain settlement agreements. See RP 8.201(D) [(1)].

The president is authorized to develop internal policies and procedures for
procurement. See RP 8.201(E) [(1)].

The president is authorized to provide indemnifications to the four counties as provided in Section 46-71.5 of the Hawaii Revised Statutes. See RP 8.201(F).

V. Contact Information:

Office of the Vice President for Administration, 956-6405, vpadmin@hawaii.edu

VI. References:

- http://www.hawaii.edu/offices/bor/

Approved as to Form:

06/01/2017

[Cynthia Quinn] Kendra Oishi
Executive Administrator and Secretary of the Board of Regents
I. **Purpose**

To set forth policy on contracts and other official documents.

II. **Definitions:**

No policy specific or unique definitions apply.

III. **Policy:**

A. **General**

Except as otherwise provided herein, the president is authorized to approve, sign, and execute contracts and settlements of claims in accordance with law and board policy. In addition, the president is authorized to approve or accept all gifts, grants, and contracts involving the university's receipt of extramural funds. Should it be determined, in consultation with the board, that a contract or settlement is anticipated to have a significant impact on policies, programs, or operations; or result in potential institutional liability, the prior approval of the board shall be required regardless of amount and source of funding. Except as otherwise provided herein, the president may delegate authority for the approval, acceptance, signing, and execution of contracts and settlements to other university officials.

B. **Construction Projects**

The president is authorized to act as the contracting officer of the university on construction projects, including projects financed in whole or in part from federal and other grants. Construction projects, including repair and maintenance projects, in excess of and/or totaling more than $5,000,000 shall require the board's prior approval. This requirement will not be circumvented through parceling. The president shall provide advanced notice, to the extent practical, of potentially controversial decisions or actions that are within the authority delegated to the president. Should it be determined, in consultation with the board, that a
construction project is anticipated to have a significant impact on policies, programs or operations, or generates controversy, prior board approval is required regardless of amount or source of funding.

C. Use of Consultants

Use of consultant services, including but not limited to consultants to study or review university programs and/or operations for the purposes of recommending courses of action, which are anticipated to require changes in board policies and/or have significant impact on policies, programs, or operations, shall require the prior approval of the board regardless of amount or source of funding. Consultant work which is estimated to be $1,000,000 or less, consultant expenses included, and is not expected to result in changes in board policies and/or have a significant impact on policies, programs or operations, shall be approved by the president or the president's designee. All consultant work estimated to be in excess of $1,000,000, expenses included, shall require the prior approval of the board. This requirement will not be circumvented by parceling the amount of the contract.

D. Settlement of Claims

All settlement of claims recommended by the university's general counsel involving payments of $500,000 or less, or involving workers' compensation claims in any amount and which do not contravene board policy and do not have a significant impact on policies, programs, or operations, shall be approved by the president or the president's designee. Settlements which are anticipated to require changes in board policies and/or have significant impact on policy, programs, or operations and/or where the board is named as a party to a suit, shall require the prior approval of the board regardless of amount. All settlements of claims exceeding $500,000, except for settlement of workers' compensation claims, shall require the approval of the board. This requirement may not be circumvented by subdivision of the total amount of the settlement claim. For all settlements requiring board approval, settlement documentation shall include a signature execution line for the board.

E. Procurement Procedures

Subject to the provisions set forth herein, the president is authorized to develop internal policies and procedures for the procurement of goods, services and construction in accordance with law and board policy. Provided such procedures are approved by the board prior to implementation in accordance with Chapter 304A-105, HRS. Except as otherwise provided herein, the procurement of goods or services exceeding $5,000,000 shall require the prior approval of the board unless, in consultation with the board, it is anticipated that such procurement will have a significant impact on policies, programs, or operations, in which case prior board approval is required regardless of amount and funding source. The specified threshold will not be circumvented by parceling.
F. Indemnification by the University

Except for four (4) limited circumstances as set forth below, the University is not legally authorized or permitted to indemnify, defend or hold harmless other parties to a contract ("Other Parties") against claims by a third party (not a party to the contract) from damages or injuries resulting from the acts or omissions of the University. To agree to such obligations would require the University to: (1) defend the Other Parties against third party claims, which may include paying for defense costs including attorneys' fees; and (2) pay for any monetary judgment obtained against the Other Parties by third party claimants.

For indemnification of federal agencies pursuant to HRS §29-15.5, approval by the governor is required. For indemnification of county governments in the State of Hawai'i pursuant to HRS §46-71.5, the board authorizes the president to approve of said indemnifications, provided statutory requirements are fulfilled and following favorable review by the vice president for administration or designee and the university general counsel or designee; this authorization shall not be delegated further by the president. For indemnification of University research sponsors pursuant to HRS §304A-110, and University research collaborating institutions pursuant to HRS §304A-111 (gross negligence or willful misconduct only), board approval is required.

The president is authorized to establish guidelines regarding the University's processes to obtain requisite approvals for indemnifications by the University.

IV. Delegation of Authority:

Except as otherwise provided herein, the president is authorized to approve, sign, and execute contracts and settlements of claims, to approve or accept all gifts, grants, and contracts involving the university's receipt of extramural funds, to approve and agree to University indemnifications in limited circumstances, and may delegate certain authority to other university officials. See RP 8.201(A).

The president is authorized to act as the contracting officer of the university on construction projects, including projects financed in whole or in part from federal and other grants. See RP 8.201(B)(1).

The president or the president's designee is authorized to approve certain consultant contracts. See RP 8.201(C)(1).

The president or the president's designee is authorized to approve certain settlement agreements. See RP 8.201(D).

The president is authorized to develop internal policies and procedures for procurement. See RP 8.201(E).
The president is authorized to provide indemnifications to the four counties as provided in Section 46-71.5 of the Hawai‘i Revised Statutes. See RP 8.201(F).

V. Contact Information:

Office of the Vice President for Administration, 956-6405, vpadmin@hawaii.edu

VI. References:

- http://www.hawaii.edu/offices/bor/

Approved as to Form:

__________________________  __________________________
Kendra Oishi                      Date
Executive Administrator and Secretary of the Board of Regents
March 8, 2019

MEMORANDUM

TO: The Honorable David Y. Ige
    Governor of the State of Hawaii

    The Honorable Curt T. Otaguro, Comptroller
    Department of Accounting and General Services

    The Honorable Clare E. Connors
    Attorney General

VIA: Carrie K. S. Okinaga
    Vice President for Legal Affairs and University General Counsel

FROM: Darren Suzuki
      Interim Director, Risk Management

SUBJECT: INDEMNIFICATION APPROVAL FOR USE OF COUNTY OF HAWAI'I FACILITIES UNDER HAWAI'I REVISED STATUTES §46-71.5

Transmitted herewith for your review and approval is an indemnification request for the use of the County of Hawai'i Department of Parks and Recreation Edith Kanakaole Multi-Purpose Stadium on May 9-11, 2019 from 8:00 a.m. to 11:00 p.m. for University of Hawai'i at Hilo's commencement ceremony and rehearsals.

Upon your approval, please forward to:

University of Hawai'i
Office of Risk Management
2444 Dole Street, Bachman 112
Honolulu, HI 96822

If you have any questions, please feel free to call this office at 956-7243.

Attachment
February 21, 2019

TO: The Honorable David Y. Ige
    Governor of the State of Hawai‘i

    The Honorable Curt T. Otaguro
    Comptroller
    State of Hawai‘i

    The Honorable Clare E. Connors
    Attorney General
    State of Hawai‘i

VIA: Carrie K.S. Okinaga
     Vice President for Legal Affairs and University General Counsel
     University of Hawai‘i

VIA: Darren Suzuki
     Interim Director, University of Hawai‘i Risk Management Office

VIA: Marcia Sakai
     Interim Chancellor
     University of Hawai‘i at Hilo

FROM: Ken Hon
      Interim Vice Chancellor for Academic Affairs
      University of Hawai‘i at Hilo

SUBJECT: REQUEST TO APPROVE INDEMNIFICATION OF THE COUNTY OF HAWAI‘I UNDER HRS §46-71.5 FOR THE USE OF THE EDITH KANAKAOLE MULTI-PURPOSE STADIUM

Pursuant to Hawai‘i Revised Statutes §46-71.5, we respectfully request your approval of an indemnification to allow the University of Hawai‘i, for the benefit of the University of Hawai‘i at Hilo to utilize the Edith Kanakaole Multi-Purpose Stadium to conduct its commencement ceremony and rehearsals on May 9-11, 2019 from 8:00 a.m. to 11:00 p.m.
The Honorable David Y. Ige  
February 21, 2019  
Page 2

Under Hawai‘i Revised Statutes §46-71.5, the State may agree to indemnify, defend, and hold harmless a county agency if certain preconditions are satisfied: 1) the Governor approves the State’s proposed indemnification; and 2) the Comptroller, pursuant to Section 41D-8.5, HRS, has (a) obtained an insurance policy in an amount sufficient to cover reasonably anticipated liability of the State that may arise or (b) determined that obtaining such a policy is not in the best interest of the State.

A. Indemnity Protection to be Provided

The State shall indemnify, defend, and hold harmless the County of Hawai‘i, its officers, employees, and agents, from any and all claims of liability for any damage to real or personal property or injury to or death of any persons when such damage, injury or death arises out of the action or omission of the University of Hawai‘i, its officers, employees, agents, consultants, contractors, or invitees in conjunction with the use of the Edith Kanakaole Multi-Purpose Stadium for its commencement ceremony and rehearsals on May 9-11, 2019 from 8:00 a.m. to 11:00 p.m.; provided that the State shall not be required to indemnify, defend, or hold harmless, the County of Hawai‘i, its officers, employees, and agents, from any claims of liability for any damages to real or personal property or injury to or death of any persons, when such damage, injury or death arises out of the action or omission of the County of Hawai‘i, and/or its officers, employees, agents, consultants, contractors or invitees, regarding the maintenance and repair of the above mentioned facility/property. This provision shall not be read or interpreted to create any liability of the State or any person or entity to any person or entity, except for the duties to indemnify, defend, and hold harmless set forth herein. This provision is not intended to and shall not be interpreted to benefit any third person, or to benefit or create any third-party beneficiary.

B. Inspection

For the purposes of this request, the University of Hawai‘i at Hilo has inspected the requested venue and noted the facility is in safe condition for its intended use. Further, the University of Hawai‘i at Hilo believes there is no significant risk or liability to the University to use the facility as indicated in our request.

C. Conclusion

Because of the benefits to the University, its students, and to the community, we respectfully request your approval of the foregoing indemnity protection for the County of Hawai‘i so we may proceed with use of the facility as stated above.
Should you have any questions, please contact the University of Hawai‘i Risk Management Office at (808) 956-7243.

D. Attorney General Review

The Attorney General has reviewed and approved the proposed request for the above mentioned dates.

Attorney General’s Recommendation for Approval:

\[\text{Clare E. Connors} \quad \text{Date} \quad \text{MAR 1} \ 1 \ 2019\]
\[\text{Attorney General, State of Hawai‘i}\]

Comptroller Review and Approval:

\[\text{Pursuant to HRS §41D-8.5, the Comptroller has obtained an insurance policy or policies in an amount sufficient to cover the liability of the State that reasonably may be anticipated to arise under the indemnity provision set forth in this memorandum.}\]
\[\text{The Comptroller has determined that it is not in the best interest of the State to obtain insurance for the indemnity set forth herein and approves the indemnity without further need of insurance.}\]

\[\text{Curt T. Otaguro} \quad \text{Date} \quad 3/19/19\]
\[\text{Comptroller, State of Hawai‘i}\]

Governor’s Approval:

\[\text{David Y. Ige} \quad \text{Date} \quad \text{MAR 19} \ 2019\]
\[\text{Governor of the State of Hawai‘i}\]
Date: September 18, 2019

To: University of Hawaii Board of Regents

From: Randolph G. Moore, chair, task group on Board of Regents investment policies

The task group (a “permitted interaction group” under the state’s sunshine law) was appointed by then-BOR chair Lee Putnam pursuant to the authorization by the Board of Regents approved at its April 18, 2019 meeting. The task group met four times: on July 25, August 15, August 29 and September 12, 2019.

The members of the task group were:
- Simeon Acoba, BOR
- Jannah Lyn Dela Cruz, ASUH
- Sean Mitsui, ASUH
- Randy Moore, BOR, chair of the task group
- Clinton Ng, ASUH
- Michelle Tagorda, BOR

In addition, the task group was supported by:
- Peter Backus, Graystone Consulting (investment advisor to ASUH)
- Lori Hamano, UBS (investment advisor to UH)
- Amy Kunz, UH Associate VP for budget & finance and controller
- Kyle Yoneshige, UBS
- Kalbert Young, UH VP for budget & finance and chief financial officer

The assignment of the task group was to review and recommend changes, if any, to the Board of Regents policies related to investments:

- R.P. 8.207 (Investments)
- R.P. 8.211 (Resolution on Use of New Income, Principal, and Investment of ASUH-Manoa Stadium Stock Fund Dated January 18, 1979)
- R.P. 8.212 (Guidelines on Use of Income from the University of Hawai‘i Mānoa Stadium Stock Fund, Proceeds from the Sale of the Kaimuki Observatory Lot and from the Rental of University Property).

The task group proceeded by posing the following questions, and answered them as indicated:

1. Is R.P. 8.207 limited to the investment portfolios or should it include, for example, proceeds from future real estate sales or leases?
   - **Answer:** R.P. 8.207 should apply to any proceeds from future real estate sales or future real estate lease income that, by BOR resolution, is added to the endowment.

2. Should the legacy endowment be open to future inputs?
   - **Answer:** yes, if the inputs are from future real estate sales or leases, but not if they are from donors because accepting donations for the legacy endowment would undermine the UHF’s fund-raising efforts. The UH administration may recommend deposits to the legacy endowment, for approval or disapproval by the BOR.

3. What are the respective roles of the BOR, the UH administration, and investment managers/monitors in the governance and management of the legacy endowment?
   - **Answer:**
     - **BOR:**
       - Establishes and periodically reviews the policy on investments.
       - Approves the hiring of an investment advisor.
       - Through its budget & finance committee, quarterly monitors the investment results and confirms the investment advisor’s decisions and outcomes are in accordance with policy and expectations.
     - **UH administration**
       - Recommends to the BOR the selection of an investment advisor.
       - Contracts with the investment advisor and manages the contract.
Reviews investment results monthly and conformance of investments with the investment policy quarterly or immediately upon notification by the investment advisor of any non-conformance with the investment policy.

- **Investment advisor**
  - Determines asset allocation within the parameters of the investment policy.
  - Selects individual portfolio managers/mutual funds/exchange-traded funds.
  - Reports investment results monthly to the UH administration.
  - Reports conformance of investments with the investment policy quarterly to the UH administration or sooner upon discovery of any non-conformance with the investment policy.
  - Reports investment results and conformance of investments with the investment policy quarterly to the BOR budget & finance committee.

4. How are these responsibilities discharged?
   - **Answer:** see #3.

5. What is the objective of the legacy endowment’s investments?
   - **Answer:**
     - Provide the highest risk-adjusted total return net of fees, measured over five and ten years, within the risk profile set forth in the asset allocation model below:

<table>
<thead>
<tr>
<th>Asset class</th>
<th>Max.</th>
<th>Min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed stocks</td>
<td>80%</td>
<td>40%</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>60%</td>
<td>15%</td>
</tr>
<tr>
<td>Russell midcap (bottom 800 of the largest 1000)</td>
<td>15%</td>
<td>*</td>
</tr>
<tr>
<td>Russell 2000 (smallest 2000 in the Russell 3000)</td>
<td>15%</td>
<td>*</td>
</tr>
<tr>
<td>MSCI EAFE</td>
<td>40%</td>
<td>*</td>
</tr>
<tr>
<td>MSCI emerging markets</td>
<td>15%</td>
<td>*</td>
</tr>
<tr>
<td>Fixed income</td>
<td>60%</td>
<td>20%</td>
</tr>
<tr>
<td>U.S. treasuries, agencies, and U.S. corporate bonds rated Baa or better</td>
<td>60%</td>
<td>20%</td>
</tr>
<tr>
<td>High-yield U.S. corporate bonds</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>Municipal bonds rated Baa or better</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>Alternative investments (only if the specific non-marketable investments are authorized in advance by the BOR)</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>Cash and equivalents</td>
<td>10%</td>
<td>0%</td>
</tr>
</tbody>
</table>

* In the aggregate, the minimum for these four asset classes is 15%.

   - Maintain the purchasing power of the corpus over five and ten year periods.
   - Provide annual distribution from the endowment for current expenditure up to 4.25% of a rolling 20-quarter average of the corpus, measured at the end of each fiscal quarter, with the actual distribution amount to be determined by the UH administration.

6. Should the policy include a goal of growing the corpus to, say, $100 million by a certain future year?
   - **Answer:** no. The objective in #5 above will result in the value of the corpus increasing over time by the rate of inflation. For example, if inflation is 2% per year, the corpus will grow from $70 million to $100 million in 18 years. Forcing the corpus to reach $100 million earlier than 18 years (in this example) would require that distributions be restricted to build up the corpus faster than it would grow by inflation, so current beneficiaries would receive less and future beneficiaries would receive more in inflation-adjusted benefits. This is intergenerational inequity.

7. Should the policy include language addressing a significant downturn in the value of the corpus?
   - **Answer:** yes. “In the event that the amount available for distribution in any year decreases by more than 5% from the previous year, due to a diminution in the value of the corpus, the BOR may authorize a distribution greater than the amount set forth in this policy, up to 95% of the distribution authorized in the immediately preceding year.”

8. What kind of investments are appropriate for the endowment?
   - **Answer:**

   - **Permitted investments:**
a) Savings accounts  
b) Commercial paper with A-1 or P-1 rating  
c) Certificate of deposit  
d) Floating rate securities  
e) High yield bonds  
f) Municipal bonds  
g) Money market funds/common trust cash equivalent funds  
h) U.S. government, its agencies, or its instrumentalities  
i) Securities guaranteed by or collateralized by securities guaranteed by the U.S. government, its agencies, or its instrumentalities  
j) Debt securities and convertible securities of U.S. corporations and supranational organizations  
k) Preferred stocks  
l) Common stocks  
m) Publicly-traded foreign securities  
n) Mutual funds, exchange traded funds and common trust or commingled funds, including such funds that use leverage  
o) American depository receipts/shares  
p) Global depository receipts/shares  
q) The selling of covered call options (giving someone else the right but not the obligation to buy a stock you already own at a predetermined price on or before a predetermined date).  
r) The buying of protected puts (the right but not the obligation to sell a stock you already own at a predetermined price on or before a predetermined date).  
s) Real estate investment trusts, and real estate mortgages  
t) Forward foreign exchange contracts, and bond/currency options and futures used for the defensive hedging of foreign currency exposure  
u) Publicly-traded limited partnerships  
v) Hedge funds  
w) Private equity  

**Prohibited investments:**  

aa) Direct investments in entities which, including predecessors, have a record of less than three years of continuous operation  
bb) Commodities  
cc) Lettered stock and private placements  
dd) Selling “naked” puts and/or calls  
ee) Derivative securities not covered under permitted investments  
ff) Adjustable rate issues with coupons which move inversely to an index  

9. Should the policy include the directive to not invest in fossil fuel producers? Does “fossil fuel producer” need a clear definition?  
  
- **Answer:** Yes, the policy should include the directive not to invest in fossil fuel producers. And yes, the term needs a definition: it is the list referenced in #8(kk).  

10. Our current policy provides for an investment monitor, separate from the investment manager. What is a monitor’s role? Should we have one? Does the policy need to define “investment monitor,” “investment manager,” and “investment advisor?”
• Answer: see #3 for a discussion of the role of the investment advisor. The investment advisor also serves as the investment monitor, reporting on the legacy fund’s performance as well as the conformance of the fund’s investments with the investment policy.

11. Should the policy address fees of the investment manager(s) and investment monitor?
• Answer: yes, by requiring the investment advisor to disclose total expenses annually.

12. What should the investment manager and investment monitor (if any) report to us? How frequently?
   Possible matters to report: (i) current asset allocation with rationale, (ii) current level of risk, with rationale, and explanation of how it is measured, (iii) explanation of deviation of performance from benchmarks, (iv) investment outlook for the near-, intermediate-, and long-term future, and how that outlook affects the manager’s actions.
• Answer: see above regarding the content of the investment advisor’s report. The report should be made quarterly to the UH administration and to the BOR’s budget & finance committee.

13. What is the purpose of a benchmark? Is it a floor for returns?
• Answer: a benchmark is a tool to assess the performance of the investment advisor. It is not a floor for expected returns.

14. What benchmark(s) should be used to evaluate the performance of (i) the endowment as a whole (ii) specific asset classes. How often should the performance be reviewed?
• Answer: use the following three benchmarks:
  o A benchmark constructed from this asset allocation model, reviewed quarterly and annually, over five years:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 stock index</td>
<td>40%</td>
</tr>
<tr>
<td>Russell midcap index (bottom 800 of the largest 1000)</td>
<td>5%</td>
</tr>
<tr>
<td>Russell 2000 index (smallest 2000 in the Russell 3000)</td>
<td>5%</td>
</tr>
<tr>
<td>MSCI EAFE-NR index (net of foreign withholding taxes)</td>
<td>15%</td>
</tr>
<tr>
<td>MSCI emerging markets index</td>
<td>5%</td>
</tr>
<tr>
<td>Bloomberg Barclay’s US aggregate bond index</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

  o 4.5% plus the rate of inflation, reviewed annually and measured over ten and twenty years.
  o Performance of college endowments of a similar size, reviewed annually and measured over five and ten years.

15. What restrictions on the use of the legacy endowment were imposed by donors? By the BOR?
• Answer: donor restrictions, primarily for scholarships, apply to about 48% of the endowment corpus; restrictions on the approximately 52% balance are established by the BOR.

16. What restrictions, if any, should be established by the BOR on the expenditure of income from or the corpus of unrestricted legacy endowment funds?
• Answer: the restrictions are set forth in #5 and #7 above – the spending policy of 4.25% of a 20-quarter rolling average of the value of the corpus, with an exception if this formula would result in a reduction in any year’s distribution of more than 5% from the previous year.

17. What reports, if any, and with what frequency, should the BOR require on the expenditure of legacy endowment funds? Should the BOR be required to approve specific distributions from the endowment?
• Answer: the BOR should require a broad category annual report on the expenditure of the annual distribution from the fund for the most recent five years.

18. How does the ASUH stadium fund differ from the UH legacy endowment, and in what way(s) should it be managed or evaluated differently? Should the ASUH stadium stock fund have different investment parameters (e.g., fossil fuel producers) and/or a different distribution policy from the UH legacy endowment?
• Answer:
  o The BOR should continue to approve the engagement of the investment advisor for the ASUH stadium stock fund, upon recommendation from ASUH.
  o The ASUH stadium stock fund investment advisor should have the same latitude to select individual asset managers and to determine the asset allocation as the UH legacy fund investment advisor.
19. What are the respective roles of the BOR, the ASUH, the UH administration, and investment managers/monitors in the governance and management of the ASUH stadium stock fund?
   
   - Answer: the investment advisor for the ASUH stadium stock fund should report results quarterly to the UH administration and to ASUH and semi-annually to the BOR, and ASUH annually should report to the BOR the amounts distributed to ASUH organizations.

20. What are the funds from the Kaimuki Observatory sale and from the rental of properties that are referred to in R.P. 8.212? Why are these matters in a regents policy?

   - Answer: the combined current value of the funds from the stadium stock sale, the Kaimuki Observatory lot sale, and rentals is about $21 million. A more detailed breakdown may not be determinable. This R.P. should be repealed and any surviving directives in this R.P. regarding the payout of funds from the Manoa stadium stock fund or the fund established by the proceeds from the sale of the Kaimuki Observatory lot should be incorporated into R.P. 8.207.

After discussion and concurrence (with amendments, if any, to the foregoing) by the BOR, the UH administration should prepare revised R.P.s 8.207, 8.211 and 8.212 for review and approval by the BOR.
The purpose of this final report is to share the resulting findings and recommendations of the Maunakea Governance Permitted Interaction Group (MIG) with the full board. Deliberation and decision making regarding the final report and dissolution of the MIG will take place during a subsequent meeting, pursuant to the statute on permitted interactions under the Sunshine Law, Section 92-2.5(b), Hawai‘i Revised Statutes (HRS).

I. Background

A. On August 2, 2019, the Board of Regents (Board) met to consider creating a permitted interaction group to investigate issues and make recommendations related to Maunakea governance. This action was borne from a feeling amongst some Regents that the Board needed to do more to evaluate on the University of Hawai‘i’s (University) governance and stewardship of Maunakea, especially in light of the criticisms being levied against the University in relation to the Thirty Meter Telescope project (TMT). The need for Board engagement was amplified by the blocking of the access road to Maunakea that began on July 13, 2019, as well as the occupation of Bachman Hall on the University of Hawai‘i at Mānoa campus.

B. The scope and responsibility of the Board was unclear and exacerbated by the fact that most of the Regents had not been members of the Board when the vote on the TMT sublease was taken in 2010. Also, some Regents expressed the difficulty for the Board to remain nimble during a time where circumstances can change daily, given the constraints of the Sunshine Law where no more than two Regents can have discussions on board-related business unless a public notice is issued at least six days in advance of a meeting.

Section 92-2.5(b), HRS, allows for more than two members, but less than a quorum, of the Board to “[i]nvestigate a matter relating to the official business of their board” under certain conditions, including that findings and recommendations be provided to the Board and that deliberation and decision making can only occur at a public meeting “held subsequent [emphasis added] to the meeting at which the findings and recommendations of the investigation were presented to the board…” In this instance, the findings and recommendations will be presented to the Board on October 17, 2019, but no deliberation or action by the Board will occur at that meeting. The intent is for deliberation and discussion, and possible decision making, to occur at a special meeting of the Board on November 6, 2019.

C. The MIG was formed by the Board on August 2, 2019; link to minutes here: https://www.hawaii.edu/offices/bor/regular/minute/201908020900.special.pdf
1. The MIG included the following Regents:
   a) Ben Kudo, Board Chair
   b) Jan Sullivan, Board Vice Chair
   c) Wayne Higaki, Board Vice Chair, Hawai‘i Island Regent, and Regent-member of the Mauna Kea Management Board (MKMB)
   d) Kelli Acopan, Student Regent
   e) Alapaki Nahale-a, Hawai‘i Island Regent and Regent-member of MKMB
   f) Ernest Wilson Jr., Maui Island Regent

2. President David Lassner, Vice President for Legal Affairs and University General Counsel Carrie Okinaga, Executive Director of Maunakea Stewardship Greg Chun, and Associate General Counsel Jesse Souki participated in several of the MIG meetings. Kendra Oishi, Executive Administrator and Secretary of the Board of Regents, provided administrative assistance to the MIG.

3. A MIG briefing was held on August 27, 2019, that included the individuals noted above and the following: UH Hilo Chancellor Bonnie Irwin, Director of the Office of Maunakea Management (OMKM) Stephanie Nagata, Interim Director of the Institute for Astronomy Bob McLaren, and UH Communications Director Dan Meisenzahl.

D. The purpose of the MIG was to investigate issues related to the University's stewardship and governance activities on Maunakea, and to make findings and recommendations to the Board regarding the development of a statement expressing principles supported by the Board as it pertains to Maunakea, in addition to those articulated in the Resolution Affirming Commitment to the Collaborative Stewardship of Maunakea’s Cultural, Natural, Educational and Scientific Resources, adopted by the Board on August 24, 2017.

E. The MIG met on the following dates:
   • August 2, 2019
   • August 27, 2019
   • August 30, 2019
   • September 5, 2019
   • September 19, 2019
   • September 26, 2019
October 10, 2019

The MIG met to discuss various issues, including the following:

- Identifying the issues that the MIG should explore and be educated on for the members to have a foundational background of Maunakea-related issues and in order to exercise sound judgment in making its findings and recommendations.
- Historical, operational, financial, and legal issues, including:
  - The history of astronomy on Maunakea and TMT;
  - The impetus for astronomy on Maunakea;
  - Governance documents;
  - State audit reports;
  - Establishment of and stewardship by OMKM, MKMB, Maunakea Support Services (MKSS), and Kahu Ku Mauna;
  - Funding of operations;
  - “Home rule” issues;
  - Obligations of UH and TMT under the TMT Conservation District Use Permit; and
  - The role of the Board and past voting history.
- Public outreach and communications.
- Decommissioning of observatories.
- Administrative rules: content, purpose, and impact.
- TMT sublease provisions and legal obligations.
- Resolution of TMT conflict options.
- Tour operators on Maunakea.
- Faculty views on TMT.
- The possible issuance of a statement or adoption of a resolution expressing Regent views.
- Developing the language for a Board resolution on action items.

II. Findings and Recommendations

A. The MIG recognizes the complexity of the issues related to Maunakea and that Maunakea has become a symbol of Native Hawaiian self-determination. It also recognizes that the University has been criticized for past and present mismanagement of Maunakea.

B. The MIG recognizes that the Board has the ultimate responsibility to fulfill and carry out all of the recommendations, obligations, and duties identified in the Mauna Kea Science Reserve Master Plan (2000), Mauna Kea Comprehensive Management Plan UH Management Areas (2009), A Cultural Resources Management Plan for the University of Hawai‘i Management Areas on Mauna Kea (2009), Natural Resources
Management Plan for the UH Management Areas on Mauna Kea (2009),
Public Access Plan for the UH Management Areas on Mauna Kea (2010),
and Decommissioning Plan for the Mauna Kea Observatories (2010).

C. The MIG recognizes the need to collectively do better with regard to
efficiency, effectiveness, and transparency in the functional structure of
Maunakea management, and that this should be undertaken with urgency
while considering the perspectives of multiple stakeholders.

D. While some progress has been made with regard to fulfilling audit findings
and other deficiencies, progress has been slow in other areas, particularly
in the decommissioning of observatory sites that were previously identified.

E. Maunakea is a special place to all of Hawai‘i, and Native Hawaiian cultural
practices need to be acknowledged in planning for the use of Maunakea.

F. The MIG recommends:

- Adoption of the attached University of Hawai‘i Board of Regents
  Resolution to Act on Items Relating to Maunakea Management
  (Resolution). The Resolution includes twelve specific action items:

  1. Two (2) observatory sites known as the Caltech Submillimeter
     Observatory and Hokulea site shall be decommissioned no later
     than April 30, 2021. For purposes of this resolution, the term
     “decommissioning” shall mean the complete removal of all man-
     made structures at each respective site bringing each site to as
     close as feasible to its natural state prior to construction. These
     will be the first two of five observatories to be decommissioned.

  2. A schedule of decommissioning of these two sites will be laid out
     on a Gantt chart or other similar visual schedule for each of the
     above sites indicating function and timeframe for each major step
     in the decommissioning process to achieve completion on or by
     April 30, 2021. The schedule for decommissioning shall be
     presented to the Board of Regents on or before its February
     meeting 2020.

  3. A new educational telescope facility for the University of Hawai‘i at
     Hilo shall be established on already developed land at Hale
     Pohaku or elsewhere, as soon as can be permitted, with a target
     date no later than April 30, 2021 to ensure the prompt availability of
     a teaching telescope. The Regents shall support the funding of the
     planning, design and construction of the new educational facility.

  4. A third (3rd) observatory site known as the United Kingdom
     InfraRed Telescope (UKIRT) shall be decommissioned no later
     than December 2024. A Gantt chart or other similar visual
schedule shall be provided to the Board of Regents by December 31, 2022. This will be the third of five observatories to be decommissioned.

5. Since the fourth (4th) observatory site known as the Very Long Baseline Array (VLBA) observatory is already scheduled to be decommissioned by December 31, 2033, the last of the five sites to be decommissioned will be identified and designated to the Board of Regents on or by December 31, 2022.

6. In collaboration with OMKM and MKSS, the ʻImiloa Astronomy Center shall develop a suite of educational programs regarding Maunakea including but not limited to Native Hawaiian culture, history, environmental and biological considerations designed for tour guides and drivers, employees, contractors, recreational users, scientists and observatory workers and visitors, as required by the Management Plans, by August 31, 2020. OMKM shall report to the Board of Regents on its plans and progress to implement said educational programs at its February meeting 2020. Administration shall make a budget request during the 2020 legislative session to fund this action item.

7. Administration shall make a CIP request during the 2020 legislative session for monies to plan, design and construct an educational center at Hale Pohaku and/or another appropriate site on Maunakea that will educate visitors on cultural, environmental and astronomy related topics relating to Maunakea.

8. The Mauna Kea Science Reserve Master Plan update will accommodate uses by Native Hawaiian cultural practitioners.

9. A reorganization and restructuring plan shall be presented to the Board of Regents as to all advisory, operating and funding bodies involved in the management of Maunakea by April 2020. The purpose of the plan is to improve the operations and management and make it more efficient, effective and transparent. The reorganization and restructuring plan shall be embodied into a governance document that is approved by the Board of Regents.
10. As part of the reorganization and restructuring plan, an in-depth analysis will be done to determine whether the management of the Maunakea Science Reserve would be better served if transferred to a governmental authority, or other third party entity or through alternate management mechanisms, e.g., conservation easement agreement. The results of this analysis will be presented to the Board of Regents by April 2020.

11. The University will cooperate with the Department of Hawaiian Home Lands (DHHL) to resolve any outstanding issues relating to the roadway infrastructure on Maunakea and will seek opportunities to assist DHHL in its efforts to fulfill its trust duties and responsibilities on the use of its Maunakea lands; and

12. As permitted by law, the University should pursue a partnership with an appropriate agency or organization whose primary beneficiary is the native Hawaiian community, to operate commercial shuttles and tours on Maunakea.

- The dissolution of the MIG.

III. Conclusion

The MIG has concluded its task as identified when the Board approved creation of the MIG during its August 2, 2019 meeting. Its specific recommendations and call to action are included in the attached Resolution. As such, the MIG recommends dissolution at this time.

While the MIG recommends dissolution, it recognizes that the issues related to Maunakea are extremely complex and will continue to impact the University and the entire State, and go far beyond the issue of Maunakea. The MIG recognizes faculty, students, and others who have stood up for their beliefs. The MIG also recognizes astronomers who have brought great distinction to the University, the State, and to the field of astronomy. The MIG believes these gaps can be bridged over time in a peaceful manner.

Attachments

(A) Draft Board Resolution to Act on Items Relating to Maunakea Management

(B) Materials from August 27, 2019, MIG Briefing:
   a. Powerpoint Presentation for MIG
   b. Maunakea
      i. Mauna Kea BOR Key Decisions
      ii. Mauna Kea Advisory Committee Roster 2000
iii. MK Long-Term Report – HCR314

c. TMT
   i. Consent to Sublease and Non-Exclusive Easement Agreement UH TIO
   ii. GL S-4191 Reserve Lease
   iii. TMT SCA
   iv. TMT Sublease

d. Decommissioning
   i. Decommissioning Plan for the Mauna Kea Observatories
   ii. Caltech Submillimeter Observatory (CSO) Letter
   iii. Written Direct Testimony of Robert McLaren
   iv. CDUP Special Conditions 10 and 11
   v. Matrix of Observatory Data

e. Administrative Rules
   i. Hearing Officers’ Consolidated Report

To Act on Items Relating to Maunakea Management

WHEREAS, the Board of Regents believes and acknowledges that Maunakea holds a special and important place in the history, culture, and hearts of the peoples of Native Hawaiian ancestry and all of Hawaii; and

WHEREAS, Maunakea has become a symbol of Native Hawaiian self-determination; and

WHEREAS, the Board of Regents recognizes that the University of Hawai‘i (“University”) has been criticized for past and present management of Maunakea; and

WHEREAS, the Board of Regents realizes that any mismanagement of Maunakea is hurtful and disrespectful to the sanctity and inviolability of this place to Native Hawaiians and others; and

WHEREAS, the Board of Regents in response to past criticisms, has clarified its roles, duties, and responsibilities beginning with the adoption of the Mauna Kea Science Reserve Master Plan (2000), Mauna Kea Comprehensive Management Plan UH Management Areas (2009), A Cultural Resources Management Plan for the University of Hawai‘i Management Areas on Mauna Kea (2009), Natural Resources Management Plan for the UH Management Areas on Mauna Kea (2009), Public Access Plan for the UH Management areas on Mauna Kea (2010), and Decommissioning Plan for the Mauna Kea Observatories (2010) (collectively hereinafter referred to as “Management Plans”); and

WHEREAS, under said Management Plans, the Board of Regents was principally responsible to fulfill and to carry out all of the recommendations, obligations, and duties promulgated under said Management Plans; and

WHEREAS, the Board of Regents takes its responsibility seriously and hereby affirms its commitment to follow through with the recommendations made in the Management Plans to better manage the impacts of the astronomy facilities and operations upon the natural environment, cultural resources, recreational resources, educational resources, and upon the broader community; and

WHEREAS, the Board of Regents has determined that there remain unmet responsibilities and ongoing compliance issues that have delayed completion of certain recommendations and requirements under the Management Plans; and

WHEREAS, THE Board of Regents therefore desires to remove any delays in compliance and to complete ongoing responsibilities in an accelerated and expeditious manner.

NOW, THEREFORE, BE IT RESOLVED that University of Hawai‘i President David Lassner, University of Hawai‘i at Hilo Chancellor Bonnie Irwin, University of Hawai‘i Vice President Vassilis Syrmos, Maunakea Support Services (MKSS), Institute for Astronomy (IfA), Office of Maunakea Management (OMKM), and any other necessary, related management or operation entity be directed to cause the following action items to be accomplished in the timeframes as
1. Two (2) observatory sites known as the Caltech Submillimeter Observatory and Hokukea site shall be decommissioned no later than April 30, 2021. For purposes of this resolution, the term “decommissioning” shall mean the complete removal of all man-made structures at each respective site bringing each site to as close as feasible to its natural state prior to construction. These will be the first two of five observatories to be decommissioned.

2. A schedule of decommissioning of these two sites will be laid out on a Gantt chart or other similar visual schedule for each of the above sites indicating function and timeframe for each major step in the decommissioning process to achieve completion on or by April 30, 2021. The schedule for decommissioning shall be presented to the Board of Regents on or before its February 2020 meeting.

3. A new educational telescope facility for the University of Hawai‘i at Hilo shall be established on already developed land at Hale Pohaku or elsewhere, as soon as can be permitted, with a target date no later than April 30, 2021, to ensure the prompt availability of a teaching telescope. The Board of Regents shall support the funding of the planning, design, and construction of the new educational facility.

4. A third (3rd) observatory site known as the United Kingdom Infrafred Telescope (UKIRT) shall be decommissioned no later than December 2024. A Gantt chart or other similar visual schedule shall be provided to the Board of Regents by December 31, 2022. This will be the third of five observatories to be decommissioned.

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6. In collaboration with OMKM and MKSS, the ‘Imiloa Astronomy Center shall develop a suite of educational programs regarding Maunakea including but not limited to Native Hawaiian culture, history, environmental, and biological considerations designed for tour guides and drivers, employees, contractors, recreational users, scientists and observatory workers, and visitors, as required by the Management Plans, by August 31, 2020. OMKM shall report to the Board of Regents on its plans and progress to implement said educational programs at its February 2020 meeting. Administration shall make a budget request during the 2020 legislative session to fund this action item.

7. Administration shall make a CIP request during the 2020 legislative session for monies to plan, design, and construct an educational center at Hale Pohaku and/or another appropriate site on Maunakea that will educate visitors on cultural, environmental, and astronomy related topics relating to Maunakea.

8. The Maunakea Master Plan update will accommodate uses by Native Hawaiian cultural practitioners.
9. A reorganization and restructuring plan shall be presented to the Board of Regents as to all advisory, operating, and funding bodies involved in the management of Maunakea by April 2020. The purpose of the plan is to improve operations and management and make it more efficient, effective and transparent. The reorganization and restructuring plan shall be embodied into a governance document that is approved by the Board of Regents.

10. As part of the reorganization and restructuring plan, an in-depth analysis will be done to determine whether the management of the Maunakea Science Reserve would be better served if transferred to a governmental authority or other third party entity, or through alternate management mechanisms (e.g., conservation easement agreement, etc.). The results of this analysis will be presented to the Board of Regents by April 2020.

11. The University will cooperate with the Department of Hawaiian Home Lands (DHHL) to resolve any outstanding issues relating to the roadway infrastructure on Maunakea and will seek opportunities to assist DHHL in its efforts to fulfill its trust duties and responsibilities on the use of its Maunakea lands.

12. As permitted by law, the University should pursue a partnership with an appropriate agency or organization whose primary beneficiary is the Native Hawaiian community, to operate commercial shuttles and tours on Maunakea.

Adopted by the Board of Regents
University of Hawai‘i
_______________, 2019
RESERVED FOR VIDEO ON START OF ASTONOMY ON MAUNAKEA
1964

Board of Supervisors County of Hawaii - Resolution No. 361

Urged elected officials
- Facilitate road construction
- Maunakea area as an observatory site

Helene Hale, Chair

State Legislature - SCR 16

Urged Governor:
- Set aside area on the summit
- Telescope and operation of astronomical activities
GOVERNOR JOHN BURN’S VISION

- Future labor force – skilled technicians and scientists
- Recognized the advantages in scientific research
- Called upon University and all available resources in the public and private sectors
- Oceanography and space science
1968

- Maunakea Science Reserve
  - 65 year lease
John Jefferies
Founding Director of IfA
Smooth air flow across the summit minimizes turbulence, helping keep images steady and increasing resolution compared to most other high altitude sites.

Predominant East-West air flow, unobstructed by land for thousands of miles before it reaches Hawaii.
- Summit station from top of
-13-North station from top of microthermal tower
Mauna Kea  1970

UH  2.2-meter telescope
The Canada-France-Hawaii Telescope CFHT (3.6m)
United Kingdom Infrared Telescope UKIRT (3.8 m)
The NASA Infrared Telescope Facility IRTF (3.0 m)
1983 Complex Development Plan

- Predicted 13 Telescopes (11 major + 2 minor) by year 2000
- 1983 existing (6): 2x24” UH 2.2m CFHT UKIRT IRTF
- Foreseen (3): CSO JCMT Keck 1
- Predicted (4): 3 OIR (Keck 2, Subaru, Gemini) + 1 Radio (SMA)
- 1989: VLBA Antenna added (not at summit)
- 1994: One 24” removed for Gemini
Caltech Submillimeter Observatory CSO (10.4 m) 1987
The Very Long Baseline Array Antenna VLBA (25 m) 1992
The two Keck Telescopes (10 m)
The Gemini North Telescope (8.1 m)
The Submillimeter Array (8 x 6m)
UKIRT now UH Telescope
1998 Audit – Main Findings

- UH management is inadequate to ensure protection of natural resources
- UH Control over public access is weak
- Cultural value of Maunakea was largely unrecognized
1998 Audit – Main Recommendations

• Begin master planning process for next iteration
  – solicit public input early in the process
  – identify telescope siting areas and no-build areas
  – identify critical habitats for plants and invertebrates
  – develop administrative rules
  – hire rangers
  – documented periodic inspections to control trash
  – develop a forum for continuous community input

• Develop a new method for measuring development impact;
  stop using telescope count for this purpose
2000 Mauna Kea Science Reserve Master Plan

- 24 person Advisory Committee (June 1998 – August 1999)
  - Co-chairs, Larry Kimura and Pila Wilson
- Adopted by BOR, June 2000
- Created Office of Maunakea Management (OMKM)
- Defined Astronomy Precinct (525 acres)
- Keck Outriggers & Pan-STARRS4 (did not happen)
- TMT at its proposed location
- Other future development to be at existing site.
  (e.g. CFHT> Maunakea Spectroscopic Explorer – MSE)
<table>
<thead>
<tr>
<th>Type</th>
<th>Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical/ Infrared (7)</td>
<td>Gemini Observatory</td>
</tr>
<tr>
<td></td>
<td>UH</td>
</tr>
<tr>
<td></td>
<td>NASA Infrared Telescope Facility</td>
</tr>
<tr>
<td></td>
<td>Canada-France-Hawaii Telescope</td>
</tr>
<tr>
<td></td>
<td>UKIRT (UH)</td>
</tr>
<tr>
<td></td>
<td>W. M. Keck Observatory</td>
</tr>
<tr>
<td></td>
<td>Subaru Telescope</td>
</tr>
<tr>
<td>Submillimeter (2)</td>
<td>JCMT (East Asian Observatory)</td>
</tr>
<tr>
<td></td>
<td>Submillimeter Array</td>
</tr>
<tr>
<td>Radio (1)</td>
<td>Very Long Baseline Array</td>
</tr>
</tbody>
</table>

Richard Matsuda, W. M. Keck Observatory

- **Minimal cost to State**
  - Observatories built and operate own cost
  - $1/year sublease rent in exchange for viewing time
  - Share in cost to manage the mountain
- **Non-profit entities; not revenue generated**
- **Nation’s & World’s center for astronomy**
### Table 2. Economic Impacts of Astronomy-Related Local Expenditures by County

<table>
<thead>
<tr>
<th>County</th>
<th>Local expenditures (millions of 2012 $)</th>
<th>Impacts (millions of 2012 $)</th>
<th>Jobs (#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii County</td>
<td>58.53</td>
<td>91.48</td>
<td>27.98</td>
</tr>
<tr>
<td>Honolulu County</td>
<td>25.80</td>
<td>68.43</td>
<td>21.50</td>
</tr>
<tr>
<td>Kauai County</td>
<td>1.28</td>
<td>2.61</td>
<td>1.06</td>
</tr>
<tr>
<td>Maui County</td>
<td>2.58</td>
<td>5.34</td>
<td>1.72</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>88.09</strong></td>
<td><strong>167.86</strong></td>
<td><strong>52.26</strong></td>
</tr>
</tbody>
</table>
STEM Workforce for Observatories
(STEM = Science, technology, engineering and math)

• Nationwide, STEM job growth is expected to be 1.7x non-STEM jobs.

• Hawaii ranks 95/100 in major metro areas

• Typically ~80% of observatory jobs are in STEM

Richard Matsuda, W. M. Keck Observatory
Maunakea Observatories Outreach Programs
MAUNAKEA OBSERVATORIES

Education, Outreach, Workforce Development

The Maunakea Scholars program was launched in 2015 and opens the doors of the Maunakea Observatories to high school students to perform mentored research of their own design on the most powerful telescopes in the world...
Welcoming Students Across Our Archipelago

Maunakea Scholar Host Schools 2018/19

- Kapa‘a High
- Waipahu High
- Nanakuli
- Kapolei
- Molokai High
- King Kekaulike High
- Lanai High
- Kohala High
- Honoka‘a
- Kealakehe High
- Waiakea
Akamai Internships Summary

- Akamai internship program, administered by the Institute for Scientist & Engineer Educators (ISEE), has been collaborating with Hawaii astronomy since 2003
- Program originator recently received Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM)
- Akamai program pairs college students that are Hawaii residents with observatories on Hawaii Island, Maui, Pasadena (TMT)
  - Some other high-tech opportunities too (NELHA)
- Intensive ~8 week summer program in which students are paired with mentors, given engineering projects to work on, and present results at the end of the program period...
- TMT is a major funder of this program
## Akamai Student Success Rates

<table>
<thead>
<tr>
<th>Akamai 2003-2012 alumni 3+ years after internship (222 participants)</th>
<th>Persistence rate (82% of interns tracked)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Now in STEM workforce</td>
<td>70%</td>
</tr>
<tr>
<td>Enrolled in undergrad or grad STEM program</td>
<td>17%</td>
</tr>
<tr>
<td>Total on STEM pathway</td>
<td>87%</td>
</tr>
<tr>
<td>Women</td>
<td>82%</td>
</tr>
<tr>
<td>Native Hawaiians, Pacific Islanders</td>
<td>84%</td>
</tr>
<tr>
<td>Underrepresented minorities</td>
<td>86%</td>
</tr>
</tbody>
</table>
Akamai By the Numbers...

- 356 college students from Hawai‘i have completed internships at observatories and tech companies since 2003
- 87% of alumni are still in science and engineering
- Over 100 alumni have already obtained science and engineering jobs in Hawai‘i
TMT Relative to Subaru

TMT 56m

すばる望遠鏡 43m

TMTはすばる望遠鏡に比べて口径が4倍近く大きいが、ドームはひと回り大きいサイズにとどまっている。
TMT Permitting

- Site Testing at 13N (June 2005 – July 2008)
- MK Selected as Site (July 2009)
- Environmental Impact Statement (EIS) Published (May 2010)
- BOR approves TMT, June 2010
- CDUP Approved subject to Contested Case (February 2011)
- CDUP Approved (April 2013); Opponents Appeal
- Groundbreaking disrupted by protestors (October 2014)
- Protester roadblocks prevent site work (March, April, June 2015)
- Hawaii Supreme Court (HSC) voids permit (December 2015)
- Court orders new contested case on permit
- Land Board grants new permit (September 27, 2017)
- HSC denies appeal – upholds permit (October 30 2018)
To MKMB Regarding SUPPORT/NONSUPPORT OF TMT

Kahu Kū Mauna stands against any construction project that brings substantive impact to the summit of Maunakea. As such, we have strong reservations about the TMT project being planned for the North Plateau. After considerable deliberations, we find that our reservations are not sufficient to stand against the project, and we are in agreement that the leaders of the TMT project have demonstrated intentions of responsible tenancy that strives to meet the standards established by OMKM, therefore making their proposal less objectionable to the council.

As the Hawaiian advisory council to OMKM, we support the responsible stewardship of Maunakea and the policies that lead to a system of best management practice. We encourage collaboration and the sharing of resources among the tenants, the eventual decommissioning and removal of all observatories, and the complete restoration of the summit of Maunakea.
TMT Benefits

• Annual operating budget - $26 million
• 8 to 10 years of construction
  – 300 local and specialized construction jobs
• 140 employees when operational
  – Committed to fill positions with local hires
Governor Ige’s 10-Point Plan

• May 2015 response to TMT protests
• TMT to be last new site (already in 2000 Master Plan)
• Decommission 3 telescopes & their sites by time of TMT operations
• UH names 3 for decommissioning: CSO, Hokulea, UKIRT
• Return 10,000 acres of Science Reserve to State
• Restart Environmental Impact Statement (EIS) for new lease
• Reduce term of new lease request (<65 years)
Maunakea Science Reserve Lease

• Currently 11,288 acres and runs through 2033
• New lease would replace existing lease
• Current subleases would be valid through 2033
• First step is Environmental Impact Statement (EIS)
• Started EIS in Jan. 2014 (EISPN)
• Restarted Feb. 2018 (EISPN)
• Alternatives are current area and reduced area
UH Managed Lands

- 11,288 acres composed of two areas:
  - 525 – acre Astronomy Precinct
  - Cultural and Natural Preserve
Mauna Kea Science Reserve Master Plan

• Adopted by UH Board of Regents in 2000 to address community concerns

• Internal UH policy guide for Maunakea
  • New Policy
    – Hawaii Island community-based management
  • Management Structure
    – Dedicated management division
    – Volunteer community advisory boards
      – Maunakea Management Board
      – Kahu Kū Mauna
MANAGEMENT ROLES AND RESPONSIBILITIES

- **OMKM**
  - Oversight of day-to-day activities on the mountain

- **MKMB and Kahu Kū Mauna**
  - Develop & implement management policies
  - Review project proposals and recommend approval and/or disapproval
  - Cultural matters
DEVELOPMENT GUIDELINES & RESTRICTIONS

- Restricted to Astronomy Precinct
- No development on undisturbed puʻu
- Avoid archaeological sites
- Minimal impact on natural resources
- Recycle existing sites
PROJECT REVIEW & APPROVAL

• Project review process - generally
  – Proposal reviewed by OMKM
  – Kahu Kū Mauna reviews
  – MKMB reviews and recommends approval/disapproval

• Major Project Review Process
  – Design review committee
    ▪ Volunteer Community experts
  – Community review
  – Final review and approval

• TMT first to undergo project review process
• TMT first to pay substantial rent
  – Ramp up $1.08 million; 11 years
  – To date $1.229 million
COMPREHENSIVE MANAGEMENT PLAN (CMP)

- 2009 – Approved Board of Land and Natural Resources
- State’s overarching management document
- Protect resources; controls construction and mountain activities; and educate the public through community outreach
CMP ANNUAL REPORT

2015 Annual Report

Table 1. CMP Management Actions

<table>
<thead>
<tr>
<th>CMP</th>
<th>Component Plan</th>
<th>Component</th>
<th>Management Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMP</td>
<td>Understanding and Protecting Mauna Kea’s Resources</td>
<td>7.1</td>
<td>- Native Hawaiian Cultural Resources</td>
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<tr>
<td>CMP</td>
<td>Education and Outreach</td>
<td>7.1.5</td>
<td>- Education and Outreach</td>
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<tr>
<td>CMP</td>
<td>Enhancing Resources</td>
<td>7.1.6</td>
<td>- Enhancing Resources</td>
</tr>
<tr>
<td>CMP</td>
<td>Managing Access and Use</td>
<td>7.2</td>
<td>- Activities and Uses</td>
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<tr>
<td>CMP</td>
<td>Infrastructure and Maintenance</td>
<td>7.3.2</td>
<td>- Permitting and Enforcement</td>
</tr>
<tr>
<td>CMP</td>
<td>Managing the Ball Environment</td>
<td>7.3.4</td>
<td>- Managing the Ball Environment</td>
</tr>
<tr>
<td>CMP</td>
<td>Construction Guidelines</td>
<td>7.3.5</td>
<td>- Construction Guidelines</td>
</tr>
<tr>
<td>CMP</td>
<td>Ryokan Recycling, Demolition, Donation and Restoration</td>
<td>7.3.6</td>
<td>- Ryokan Recycling, Demolition, Donation and Restoration</td>
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<tr>
<td>CMP</td>
<td>Conserving Past Land Use</td>
<td>7.4.1</td>
<td>- Conserving Past Land Use</td>
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<tr>
<td>CMP</td>
<td>Managing Origin</td>
<td>7.4.2</td>
<td>- Managing Origin</td>
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<tr>
<td>CMP</td>
<td>Operations and Implementation</td>
<td>7.4.3</td>
<td>- Operations and Implementation</td>
</tr>
<tr>
<td>CMP</td>
<td>Monitoring, Evaluation, and Update</td>
<td>7.4.4</td>
<td>- Monitoring, Evaluation, and Update</td>
</tr>
</tbody>
</table>

Assigning Categories and Priorities

Immediate: 1 - 3 years
Short-term: 4 - 6 years
Mid-term: 7 - 9 years
Long-term: 10+ years

Table 1. Research Activities

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>Hawaiian ecological studies of the Hawaiian Islands</td>
</tr>
<tr>
<td>2002</td>
<td>Hawaiian ecological studies of the Hawaiian Islands</td>
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<td>2003</td>
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<td>2012</td>
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<td>2013</td>
<td>Hawaiian ecological studies of the Hawaiian Islands</td>
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<td>2014</td>
<td>Hawaiian ecological studies of the Hawaiian Islands</td>
</tr>
<tr>
<td>2015</td>
<td>Hawaiian ecological studies of the Hawaiian Islands</td>
</tr>
</tbody>
</table>

CMP ANNUAL REPORT

Purpose

As defined in the 2010 Mauna Kea Comprehensive Management Plan, management actions are evaluated and implemented. Management actions are identified and selected based on a comprehensive review of the Mauna Kea Comprehensive Management Plan. The Plan includes a comprehensive review of the management actions, and a prioritization of the actions for implementation. The Plan is intended to help ensure that the Mauna Kea Comprehensive Management Plan is implemented effectively.

Overview of CMP Management Actions

The CMP includes 100 management actions categorized into four components. These components are further subdivided into sub-components (Table 1).

Table 2. CMP Implementation

<table>
<thead>
<tr>
<th>Year</th>
<th>CMP Implementation Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>CMP Implementation Notes</td>
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<tr>
<td>2011</td>
<td>CMP Implementation Notes</td>
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<td>2016</td>
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<td>2017</td>
<td>CMP Implementation Notes</td>
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<td>2018</td>
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<td>2019</td>
<td>CMP Implementation Notes</td>
</tr>
<tr>
<td>2020</td>
<td>CMP Implementation Notes</td>
</tr>
</tbody>
</table>

CMP ANNUAL REPORT
CMP PLANS

- Cultural Resources Management Plan
- Natural Resources Management Plan
- Public Access Plan
- Decommissioning Plan
- Historic Property Monitoring Plan
- Burial Treatment Plan
- Maunakea Invasive Special Management Plan
- Invasive Species, Sign Plan, Operations Monitoring & Maintenance Plan ...
RESOURCE IDENTIFICATION
Cultural Related Studies & Programs

- Archival and oral history study (2004)
- Archaeological inventory survey (2009)
- Annual monitoring (2012)
- Reports to DLNR
- Do not manage culture
Natural Resources

- Biological
  - Arthropods - Wēkiu bug (2002)
  - Biodiversity (2012)
  - Botanical (2013)
  - Birds and bats (2017)

- Physical
  - Climate (2017)
  - Permafrost (2012)
  - Spatial mapping – geology (2014)
Resources Management Programs

- Wēkiu bug
  - Life history and genetics
  - Habitat characterization
  - Food/diet studies
  - Habitat restoration

- Arthropods and Invasive Species
  - Invasive species plan
  - Large vehicle inspections
  - Removal of invasive plants

- Erosion
WEKIU BUG

US Fish & Wildlife Service

- 1999 – 2005
  Magnitude of threat: high
  Federal candidate species

- 2006
  Lowered priority
  Magnitude of threat:
  moderate to low

- 2011
  Removed as a candidate species for federal protection
Summit Private Vehicles

Average Daily Counts, by Time of Day and Year

Vehicle counts at given times of day

Average Daily Counts, by Time of Day and Combined Months, 2015-2018

Vehicle counts by month
Summit vs. Halepōhaku

Average Daily Private Vehicles by Location and Time, April thru October 2018

<table>
<thead>
<tr>
<th>Number of Vehicles</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
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<tbody>
<tr>
<td>8A-11A</td>
<td>51</td>
<td>46</td>
<td>44</td>
<td>49</td>
<td>45</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>8A-11A</td>
<td>19</td>
<td>18</td>
<td>16</td>
<td>15</td>
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<tr>
<td>12P-3P</td>
<td>77</td>
<td>78</td>
<td>70</td>
<td>78</td>
<td>64</td>
<td>62</td>
<td>62</td>
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<tr>
<td>12P-3P</td>
<td>19</td>
<td>27</td>
<td>24</td>
<td>27</td>
<td>24</td>
<td>25</td>
<td>25</td>
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<tr>
<td>4P-7P</td>
<td>145</td>
<td>194</td>
<td>207</td>
<td>229</td>
<td>145</td>
<td>177</td>
<td>177</td>
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<tr>
<td>4P-7P</td>
<td>24</td>
<td>51</td>
<td>44</td>
<td>66</td>
<td>49</td>
<td>44</td>
<td>44</td>
</tr>
</tbody>
</table>
OMKM Awards

Kona-Kohala Chamber of Commerce 2016 Pūalu Environmental Award

Kona-Kohala Chamber of Commerce 2017 Pūalu Award for Culture and Heritage

Historic Hawaii Foundation – 2017 Long Term Historic Property Monitoring Program
OMKM RANGER PROGRAM (2001)

- Daily reports – data base
- Interface with visitors
- Significance of Maunakea
  - Health and safety information
  - How to visit safely
- First responder first aid
- Pick up trash
- Remove invasive plants
- Twice annual inspections compliance with BLNR permits
STAFFING

• OMKM Staffing
  – 7 FTE administrative
  – 1 PTE

• Rangers
  – 8 FTE
  – 1 PTE
FOLLOW-UP AUDITS
2005 FOLLOW-UP AUDIT

Follow-Up Audit of the Management of Mauna Kea and Mauna Kea Science Reserve

- Master Plan addressed most of 1998 findings, controls on impacts of future development
- The master plan created new management structure – OMKM, MKMB and Kahu Kū Mauna.
- New management structure instrumental in establishing controls for the science reserve
- Challenges
  - Lack of rules
  - Monitoring of observatories compliance with CDUP
2005 FOLLOW-UP AUDIT

Recommendations

• Obtain authority to promulgate administrative rules
• Develop and implement comprehensive management plan
• Implement and enforce permit and sublease monitoring system
• Revise and update planning documents – Master Lease, and subleases
2014 Follow-Up Audit:
- “We found that UH has developed several management plans that provide a comprehensive framework for managing and protecting Mauna Kea while balancing the competing interests of culture, conservation, scientific research and recreation.”
- 6 recommendations for UH, including rules

2017 and 2018 Follow-Up Audits:
- 3 Implemented, 3 Not or Partially Implemented (incl. rules)

2019 Follow-Up Audit (only asked about 3):
- Draft response: rules in process, everything else done
Obligations of UH and TMT under the TMT Conservation District Use Permit
DECOMMISSIONING PLAN FOR THE MAUNA KEA OBSERVATORIES

A Sub-Plan of the Mauna Kea Comprehensive Management Plan

January 2010

Prepared for:

Office of Mauna Kea Management
University of Hawai‘i

Prepared by:

Sustainable Resources Group Int'l, Inc.
DECOMMISSIONING

• BOR - approved plan 2010
• BLNR – approved 2010
• Process resulting in *partial or total* removal of all structures associated with an observatory facility and restoring the site to greatest extent possible to pre-construction condition

• Deconstruction and Site Restoration
  – Deconstruction and removal plan
    • Full or partial
  – Site restoration
    • Three tiered – CMP
    • Minimal, Moderate Full
Starting point for discussion is Full Removal and Full restoration

- Compliance documents, contractual agreements
  - Conservation District Use Application
  - Conservation District Use Permit
  - Master Lease
  - Sublease Lease
  - Operating Agreement

- Environmental due diligence
  - Environmental Site Assessment
  - Environmental Assessment (EA)
COMMUNITY PARTICIPATION AND REVIEW

2000 Mauna Kea Science Reserve Master Plan
- Community participation and input
- Decommissioning Review Committee
- Outreach and public venues
## CSO Decommissioning Process Status

<table>
<thead>
<tr>
<th>Document</th>
<th>CSO Decommissioning Process</th>
<th>Review by</th>
<th>KSB Resource</th>
<th>Public Comment on</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final EA</td>
<td>Notice of Intent (NOI)*</td>
<td>May 15 &amp; Mar 16</td>
<td>May 2015</td>
<td>Outstanding</td>
<td>Completed</td>
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<tr>
<td>Environmental Site Due Diligence Phase 1 ESA*</td>
<td></td>
<td>Jan 18</td>
<td>Aug 2012</td>
<td>Outstanding</td>
<td>Approved by KSB, pending Phase 2 ESA (below)</td>
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<tr>
<td>Cost Benefit Analysis*</td>
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<td>Aug 18 &amp; Oct 18</td>
<td>Outstanding</td>
<td>溶解在EA程序中</td>
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<tr>
<td>Site Restoration &amp; Reclamation Plan (SRAPP)*</td>
<td></td>
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<td>溶解在EA程序中</td>
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<tr>
<td>Project Scope</td>
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<td>溶解在EA程序中</td>
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<tr>
<td>Technical Reports</td>
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<td>溶解在EA程序中</td>
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<td>Environmental Assessment</td>
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<td>溶解在EA程序中</td>
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<tr>
<td>Pre-Final DRAFT EA</td>
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<td>Final EA*</td>
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<td>Application (FCA)*</td>
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<td>Permit (CDUP) Issued by SARB</td>
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<td>Demolition &amp; Restoration</td>
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<td>Site Phase 1 ESA</td>
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<td>Site Restoration Plan</td>
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<td>溶解在EA程序中</td>
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* For 2018 decommissioning steps approvals include OMEM, KSB, and UH President. The first “Site Decommissioning Plan” may require approval by the UH Board of Regents.

MAMM - CSO Decommissioning Update August 6, 2016
UH Hilo Hoku Ke‘a Telescope

- Response to Governor’s 10 point plan
- Notice of Intent – May 2016
  - Community group opposes decommissioning
  - MKMB defers approval; additional consultation
- UHH reviews other sites for relocation
  - Hualalai
  - NOAA’s Maunaloa site
  - Halepōhaku
- Community group gives blessing of Halepōhaku
- DLNR
  - Testing program during EA/permitting process – NO
  - New site new telescope – EA, CDUA, Board Permit
<table>
<thead>
<tr>
<th>Date</th>
<th>Source</th>
<th>Acting Authority</th>
<th>Topic</th>
<th>Description</th>
<th>Source</th>
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<tr>
<td>12/19/18</td>
<td>BOR Independent Audit Committee Minutes</td>
<td>BOR</td>
<td>Management</td>
<td>Committee on Independent Audit unanimously &quot;accept[ed] the Report in Response to the Board of Regents Resolution Requesting a Financial Management Audit of Relevant University-related Entities Engaged in the Stewardship and Management of Maunakea[.]&quot;</td>
<td><a href="http://www.hawaii.edu/offices/bor/audit/minute/201812191030.committee.pdf">http://www.hawaii.edu/offices/bor/audit/minute/201812191030.committee.pdf</a></td>
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<tr>
<td>10/18/18</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>Rules</td>
<td>BOR unanimously approved, &quot;administration’s recommendation, based on testimony received during the public hearings process, to draft revisions to specific provisions in the proposed Chapter 20-26, Hawai‘i Administrative Rules, entitled 'Public and Commercial Activities on Mauna Kea Lands', and to return to the Board of Regents for approval of the new draft prior to a second round of public hearings[.]&quot;</td>
<td><a href="https://www.hawaii.edu/offices/bor/regular/minute/201810180930.regular.pdf">https://www.hawaii.edu/offices/bor/regular/minute/201810180930.regular.pdf</a></td>
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<tr>
<td>6/7/18</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>Rules</td>
<td>BOR unanimously approved, &quot;Authorization to Request Governor’s Approval to Allow the University to Hold Public Hearings regarding Proposed Chapter 20-26, Hawai‘i Administrative Rules, entitled 'Public and Commercial Activities on Mauna Kea Lands'[.]&quot;</td>
<td><a href="https://www.hawaii.edu/offices/bor/regular/minute/201806070930.regular.pdf">https://www.hawaii.edu/offices/bor/regular/minute/201806070930.regular.pdf</a></td>
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<tr>
<td>2/22/18</td>
<td>BOR Special Meeting Minutes</td>
<td>BOR</td>
<td>Management</td>
<td>BOR voted (Acoba and Portnoy abstaining) &quot;to approve the resolution requesting financial management audit of Maunakea activities[,]&quot;</td>
<td><a href="http://www.hawaii.edu/offices/bor/regular/minute/201802221045.special.pdf">http://www.hawaii.edu/offices/bor/regular/minute/201802221045.special.pdf</a></td>
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<tr>
<td>8/24/17</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>Management</td>
<td>BOR voted (Portnoy and McEnerney voting No) to adopt, &quot;Resolution Affirming Commitment to the Collaborative Stewardship of Maunakea’s Cultural, Natural, Educational, and Scientific Resources[,]&quot;</td>
<td><a href="https://www.hawaii.edu/offices/bor/regular/minute/201708240900.regular.pdf">https://www.hawaii.edu/offices/bor/regular/minute/201708240900.regular.pdf</a></td>
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<tr>
<td>2/20/14</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>TMT</td>
<td>BOR approved (Acido voting No) &quot;motion to approve the Mauna Kea Sublease and Non-Exclusive Easement Agreement with TMT International Observatory, LLC.&quot;</td>
<td><a href="http://www.hawaii.edu/offices/bor/regular/minute/201402200000.regular.pdf">http://www.hawaii.edu/offices/bor/regular/minute/201402200000.regular.pdf</a></td>
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<tr>
<td>4/16/09</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>Plan</td>
<td>BOR voted unanimously to adopt resolution entitled, &quot;Affirmation of University of Hawai‘i Commitment to the Financing and</td>
<td><a href="http://www.hawaii.edu/offices/bor/regular/minute/201402200000.regular.pdf">http://www.hawaii.edu/offices/bor/regular/minute/201402200000.regular.pdf</a></td>
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<td>Acting Authority</td>
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<tr>
<td>9/22/00</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>Management</td>
<td>BOR voted unanimously &quot;to approve in concept the establishment of an Office of the Chancellor, University of Hawai‘i at Manoa, separate from the position of President, University of Hawai‘i, provided the separation incurs no additional costs and with the further understanding that reorganization and implementation plans along with appropriate organizational charts and budgets be submitted to the Board for its consideration by its meeting in January 2001 and that no reorganization nor assignments shall take place until such plans are approved by the Board.[.]&quot;</td>
<td><a href="http://www.hawaii.edu/offices/bor/regular/minute/20000922.regular.html">http://www.hawaii.edu/offices/bor/regular/minute/20000922.regular.html</a></td>
</tr>
<tr>
<td>6/16/00</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>Plan</td>
<td>BOR voted (Thompson abstaining) to &quot;adopt in principle the Mauna Kea Science Reserve Master Plan dated March 2000, as amended, with implementation details subject to University policies, procedures and applicable statutes and with the further stipulation that there be no new construction at the Reserve until the Office of Mauna Kea Management, the Mauna Kea Management Board and the Kahu Kūpuna Council are established[.]&quot;</td>
<td><a href="http://www.hawaii.edu/offices/bor/regular/minute/20000616.regular.html">http://www.hawaii.edu/offices/bor/regular/minute/20000616.regular.html</a></td>
</tr>
<tr>
<td>6/16/00</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>Management</td>
<td>BOR voted unanimously &quot;to establish the Office of Mauna Kea Management as part of the organizational structure of UH-Hilo[.]&quot;</td>
<td><a href="http://www.hawaii.edu/offices/bor/regular/minute/20000616.regular.html">http://www.hawaii.edu/offices/bor/regular/minute/20000616.regular.html</a></td>
</tr>
<tr>
<td>6/16/00</td>
<td>BOR Minutes</td>
<td>BOR</td>
<td>Management</td>
<td>BOR voted unanimously to adopt &quot;Resolution on the Management of the Mauna Kea Science Reserve.&quot;</td>
<td><a href="http://www.hawaii.edu/offices/bor/regular/minute/20000616.regular.html">http://www.hawaii.edu/offices/bor/regular/minute/20000616.regular.html</a></td>
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APPENDIX D

Mauna Kea Advisory Committee Roster
## APPENDIX D. MAUNA KEA ADVISORY COMMITTEE

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Larry Kimura</td>
<td>University of Hawai‘i at Hilo</td>
</tr>
<tr>
<td>Co-Chair</td>
<td>Assistant Professor of Hawaiian Studies</td>
</tr>
<tr>
<td>Dr. William Wilson</td>
<td>University of Hawai‘i at Hilo</td>
</tr>
<tr>
<td>Co-Chair</td>
<td>Professor of Hawaiian Studies</td>
</tr>
<tr>
<td>Mr. James Arakaki</td>
<td>County of Hawai‘i</td>
</tr>
<tr>
<td></td>
<td>County Council Chairman</td>
</tr>
<tr>
<td>Mr. Gerald DeMello</td>
<td>University of Hawai‘i at Hilo</td>
</tr>
<tr>
<td></td>
<td>Director, University Relations</td>
</tr>
<tr>
<td>Ms. Virginia Goldstein</td>
<td>County of Hawai‘i</td>
</tr>
<tr>
<td></td>
<td>Planning Director</td>
</tr>
<tr>
<td>Dr. William Heacox</td>
<td>University of Hawai‘i at Hilo</td>
</tr>
<tr>
<td></td>
<td>Professor of Astronomy</td>
</tr>
<tr>
<td>Mr. Richard Henderson</td>
<td>Retired State Senator</td>
</tr>
<tr>
<td>Mr. Rex Johnson</td>
<td>The Nature Conservancy</td>
</tr>
<tr>
<td>Dr. Jerry Johnson</td>
<td>University of Hawai‘i at Hilo</td>
</tr>
<tr>
<td></td>
<td>Professor</td>
</tr>
<tr>
<td>Dr. James Juvik</td>
<td>University of Hawai‘i at Hilo</td>
</tr>
<tr>
<td></td>
<td>Professor of Geography</td>
</tr>
<tr>
<td>Mr. Bill Kikuchi</td>
<td>Office of Senator Daniel K. Inouye</td>
</tr>
<tr>
<td>Mr. Herring Kalua</td>
<td>Hawaiian Homes Commission</td>
</tr>
<tr>
<td></td>
<td>Department of Hawaiian Home Lands</td>
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<tr>
<td>Dr. Robert McLaren</td>
<td>University of Hawai‘i</td>
</tr>
<tr>
<td></td>
<td>Interim Director, Institute for Astronomy</td>
</tr>
<tr>
<td>Dr. Pat McCoy</td>
<td>State Historic Preservation Division</td>
</tr>
<tr>
<td></td>
<td>Hawai‘i Island Archaeologist</td>
</tr>
<tr>
<td>Mr. Aika Maikui</td>
<td>Hunter, former sugar worker</td>
</tr>
<tr>
<td>Name</td>
<td>Organization/Role</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Mr. Nelson Ho</td>
<td>Sierra Club, Hawai‘i Chapter Hawai‘i Chapter Conservation Chair</td>
</tr>
<tr>
<td>Mr. Imaikalani Namahoe</td>
<td>UH APT</td>
</tr>
<tr>
<td>Mr. Monty Richards</td>
<td>Kahua Ranch, Ltd. Former Regent</td>
</tr>
<tr>
<td>Ms. Betty Snowden</td>
<td>Retired Alu Like Director</td>
</tr>
<tr>
<td>Ms. Hannah Kihalani Springer</td>
<td>Office of Hawaiian Affairs Trustee</td>
</tr>
<tr>
<td>Ms. Leinaala Teves</td>
<td>Native Hawaiian Speaker</td>
</tr>
<tr>
<td>Ms. Mililani Trask</td>
<td>Office of Hawaiian Affairs Trustee</td>
</tr>
<tr>
<td>Ms. Charlene Unoki</td>
<td>Department of Land and Natural Resources</td>
</tr>
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</table>
Response to

HCR 314, Regular Session of 2006

Report on long-term development of observatory sites on the summit of Mauna Kea

by

Rolf-Peter Kudritzki
Director, Institute for Astronomy
University of Hawaii

December 1, 2006

Summary. A report on the long-term future development of observatory sites on the Summit of Mauna Kea is given. A conceptual plan is presented that proposes a much smaller number of future projects than foreseen in the University of Hawaii Master Plan of 2000. The long-range goal is to have eventually fewer observatories than now, but still the very best in the world in this way securing continued world leadership in astronomical research and education in Hawaii for the next decades.

1. Introduction.

This report is submitted in response to the request by the House of Representatives of the Twenty-third Legislature of the State of Hawaii, Regular Session of 2006, the Senate concurring, "that the University of Hawaii Institute for Astronomy prepares a report on the long-term development of observatory sites on the summit of Mauna Kea, including a conceptual plan that consolidates the number of observatory sites, to enhance the quality of astronomy research and limit the size of the geographical area on which to situate new observatories."

The report is structured as follows. We first describe the present situation of astronomical research and education in Hawaii and its important role for the State and the University. Then, we discuss the concept for long-term astronomical development, as it is described in the comprehensive and detailed "Mauna Kea Science Reserve Master Plan", which was approved by the Board of Regents in June 2000. Since the development of the Master Plan, the scientific priorities of astronomy for the new century have become much clearer, and a new more concise concept for future astronomical development has emerged that will guarantee Hawaii's continued world leadership in astronomical research and education, while at the same time being well balanced with the needs for cultural and environmental protection of Mauna Kea. This concept will be introduced in section three of this report.
1. The role of astronomy in Hawaii.

To appreciate the role of astronomy in our state, one first needs to understand the history of astronomy development in Hawaii; the basic philosophy behind that development; the essential role played by the Institute for Astronomy; and the educational, scientific and economic benefits that accrue from astronomy.

The Institute for Astronomy (IfA) is 38 years old and is by far the youngest among top-ranked astronomy programs in the U.S. In this short time, the Institute has grown to become one of the most visible of UH's scientific research programs and one of the most respected astronomy institutes in the world. The IfA plays in the same league as Caltech, Harvard, Princeton, Berkeley, and Cambridge. It attracts the best faculty and the best students from around the world. It has become a pillar of academic excellence and certainly an engine of economic growth in the State. Where once school kids in the world learned that the center of astronomy was Mount Palomar in California, now they learn it is in Hawaii. How has this story of scientific success been possible in such a short time?

The answer to this question is the superior quality of Mauna Kea and Haleakala as the world's best observatory sites and the concept developed by the IfA, the University and the State to build up the most capable observatory in the world. The astronomers of the IfA were the first in the world to dare to build a technologically very challenging and complex observatory with small, but very efficient, telescopes at the extreme elevation and thin air of 13,796 ft. With their exciting astronomical detections they were able to demonstrate to the world that Mauna Kea is unique as an astronomical site.

Scientifically, the logical consequence for UH would have been to use this enormous advantage to build the next generation of most powerful telescopes on its own, as the universities in California, Texas, Arizona and on the East Coast did before. However, UH was (and is) a medium size State University with a very limited budget, and Hawaii is a small state with limited resources. Thus, a different concept was developed—the concept of scientific partnerships.

Within this concept the national and international partners contribute the capital funding for the facility, carry most or all of the operational costs, and contribute to the infrastructure development. The University, through the IfA, provides the leadership and know-how to operate an observatory at extreme altitude, the management of the physical and operational infrastructure (roads, power, fiber-optics communications, food, lodging) and ongoing protection from adverse intrusions such as light pollution and radio frequency interference. The University also provides the land for the observatory site from its lease from the State, along with assistance in planning and permitting. The University and its partners collaborate in the scientific use of the telescopes including development of technologically advanced instrumentation. Most importantly, they share the scientific observing time on the facilities with no cost to the University.
In this way, the University and the State did not have to contribute the enormous capital costs to design and build the extremely powerful new telescopes, but were still able to provide researchers with access to these unique facilities and give them the opportunity to build up one of the best research and education programs in the world. The benefits, both economic and otherwise, are substantial as indicated below.

1. Astronomy facilities on Mauna Kea and Haleakala represent a capital investment of close to $1 billion. The economic impact of astronomy to the State amounts to $150 million per year. New projects for Haleakala and Mauna Kea have the potential to double these numbers.

2. The observatories and other astronomy-related activities on Mauna Kea and Haleakala provide 600 quality jobs in a clean high-tech industry on the neighbor islands. It is important to note that only a small fraction of these jobs are for astronomers. Most of them are for technical, administrative and logistic services. This number will increase if we continue to follow the sound policies that have been in place for nearly 30 years. Beyond the simple numbers, there is the fact that astronomy as a high-tech science diversifies the Hawaii economy and gives local young people with scientific and technical talents a wealth of opportunities to realize their potential without having to leave their family and friends in Hawaii to pursue employment elsewhere. Unlike some high-tech industries, astronomy is fundamentally rooted in Hawaii. Once established, an astronomy facility cannot be easily relocated to the mainland or overseas.

3. The IfA has developed into one of the world's preeminent centers for astronomical research. The Institute receives extramural awards totaling between $20 to $25 million annually for astronomical research, for development of new astronomical instrumentation, for improving its own old telescopes and for operating telescopes, such as the NASA Infrared Telescope Facility on Mauna Kea and the Mees Solar Observatory on Haleakala. Its graduate program belongs to the best in the world and about 1,000 undergraduate students per year participate in astronomy courses in Manoa. In addition, UH Hilo has recently developed a very successful astronomy undergraduate program. Astronomy is one of UH's most successful programs.

4. The Mauna Kea Observatories are the world's largest observatory complex, and will remain so for the foreseeable future. Hawaii and its State University are recognized around the world for this outstanding achievement—a source of tremendous prestige for the State. Approximately 1,500 scientists come to work at the Observatories each year; most add some vacation time to their trip. Hundreds of others come to Hawaii each year to participate in astronomy-related conferences. Several small companies make a business of providing quality tours to Mauna Kea. The observatories' base facilities in Hilo, Waimea and on Maui are a major addition to those communities and contribute in many ways.
5. Over the years, the observatories have made significant monetary contributions to the infrastructure, much of which is of benefit to the general community. This includes $2 million for road improvements on Mauna Kea and another $2 million to assist GTE Hawaiian Tel to install a fiber optics cable across the Saddle from Waimea to Hilo. This cable provides state-of-the-art service for both the Big Island telephone system and the observatories.

6. The observatories operate the Visitor Information Station at Hale Pohaku, which provides free public star gazing seven nights a week and welcomes about 100,000 visitors each year.

7. The observatories pay the entire cost of maintenance and snow removal for the road and they pay for emergency services. The public can use the road all the time. The costs for this service and the Visitor Station amount to $700,000 a year.

Although the economic benefits are substantial, it is important to keep in mind that the primary mission of astronomy is not to generate revenue. Astronomy is basic science and concentrates on the scientific exploration of the universe. Astronomy is the mother of all sciences and has changed our understanding of the world and our thinking as humans like no other science. The telescopes on Mauna Kea and Haleakala have contributed fundamentally to the advancement of modern astronomy. They are world-class research facilities, and the best window our planet provides on the strange and wonderful universe we live in.


The 2000 Master Plan is a comprehensive document, which was approved by the Board of Regents in June 2000 after an arduous, two-year process with input from all sectors of the community, and supervised by a community-based advisory committee chaired by two faculty members at UH Hilo's College of Hawaiian Language, Dr. Pila Wilson and Mr. Larry Kimura. It was accompanied by a State Environmental Impact Statement signed by the Governor of the State. The Master Plan has been submitted to the Legislature on many occasions and is available on the Institute for Astronomy's website. The scope of the Master Plan is much broader than future development of astronomy. It addresses the cultural and environmental aspects of the University's use and responsibility for the Mauna Kea Science Reserve and proposes a new organizational structure, which has been implemented by establishing the Office of Mauna Kea Management, based at the University of Hawaii at Hilo, and two important community-based advisory bodies, the Mauna Kea Management Board, and Kahu Ku Mauna, the Office's and Board's cultural advisory council. Within the new organizational structure the Institute for Astronomy’s responsibility on Mauna Kea is limited to astronomical operation, research and education, whereas the Office has the responsibility for the cultural and environmental protection and all other aspects of land management. In this report we will not discuss these latter aspects. It is our understanding from the 2006 hearings that the objective of HCR 314 is to obtain information on the prospects and
plans for future astronomical development on Mauna Kea, and we have restricted the report accordingly.

The scientific progress in modern astronomy is intimately related to the development of new technologies, new instrumentation, and new and more powerful telescopes. Without such development it is impossible to stay at the forefront of astronomical research. It is therefore natural that the Master Plan also contains a section about very ambitious future astronomical development. However, this development together with all but one of the existing facilities is confined to the "Astronomy Precinct", a very small fraction of less than five percent (4.65% or 525 acres) of the existing Mauna Kea Science Reserve of 11,288 acres in order to maintain a close grouping of astronomy facilities, roads and support infrastructure. This approach minimizes the potential impact to the natural and cultural resources of the summit region. The criteria to be followed for new facilities proposed in the Astronomy Precinct include:

- Emphasize recycling of existing sites when possible so as not to disturb existing habitat areas, archeology and landforms;
- Limit visual impact and scattering of facilities by clustering within the existing development areas;
- Utilize the natural forms in the summit area to shield views of built facilities;
- Implement design measures to allow facilities to blend better with the existing landscape;
- Minimize infrastructure development by locating near the existing roadway and utility network;
- Minimal impact on existing facilities;
- Minimum impact of Wekiu bug habitat;
- Avoidance of archeological sites;
- Suitability for observations.

A vigorous UH approval process for new project has been introduced, which includes reviews by the Office of Mauna Kea Management, the Kahu Ku Mauna Council, the Mauna Kea Management Board, the Chancellor of UH Hilo, the UH President and finally the Board of Regents. In addition, new projects have to carry out an environmental analysis in the form of either an Environmental Assessment or an Environmental Impact Statement and they have to go through the State process with the Department of Land and Natural Resources to obtain a Conservation District Use Permit. In the whole process each new facility will be required to present a detailed justification addressing the following questions

1. Why is the facility needed?
2. Why is Mauna Kea the best site for the facility?
3. What other location options are available?
4. What are the expected benefits with regard to research and education, employment and economy
5. What is the expected facility lifetime and term of sublease agreement?
There are currently 12 observatories on Mauna Kea. The Master Plan identifies five of those (the UH 0.6m, the UH 2.2m, the Canada-France-Hawaii Telescope, the United Kingdom Infrared Telescope, and the NASA Infrared Telescope Facility) as older facilities, several of which could be upgraded or replaced within the next 20 years. The expectation is that the new or upgraded telescopes would come in a range of sizes from 2 to 15 meter mirror sizes (note that the 10m-class mirrors of the existing Keck, Gemini and Subaru Telescopes represent the current state-of-the-art observatory facilities), however there are clear restrictions in terms of the height and volume for these facility redevelopments. The Master Plan also assumes that the other seven existing facilities would remain as is over the next 20 years.

In addition, the Master Plan envisages the expansion of two existing facilities. For the Keck Observatory it proposes the addition of four to six 1.8m outrigger telescopes to create a very powerful infrared interferometer, which would study cosmic objects for spatially resolved fine details, for instance the motion of stars caused by the presence of Jupiter-like planets orbiting around them. For the existing Harvard-Smithsonian Submillimeter Array (SMA) – an array of 12 movable radio telescope antennas distributed over 24 fixed concrete pads – the plan foresees an extension by 12 more antennas and 24 additional pads to increase the sensitivity and efficiency.

Three new projects at three new sites are proposed in the Master Plan. The first is the UH Hilo instructional telescope, a relatively small (1m mirror) telescope planned for a site adjacent to the existing UH 0.6m telescope. This facility is planned to be used for the education and training of undergraduate students in UH Hilo’s Department of Physics and Astronomy program. The second is a new optical/infrared telescope comparable in size and capability to the existing Keck or Gemini telescopes. For environmental and cultural reasons a site below the summit ridge on the north shield is proposed.

The third new facility proposed is a revolutionary new telescope with a very large mirror of 25m to 50m diameter. This would be the largest telescope in the world. The site foreseen for this telescope is on the north-west lava plateau below the summit. This location minimizes visibility of the new facility from Hilo and Honokaa and would not affect Wai’iu bug habitat.

The future astronomical development on Mauna Kea as foreseen in the University's Master Plan gives very high priority to the protection of natural and cultural resources, but at the same it also proposes a considerable expansion of future astronomical activity on Mauna Kea. If all facilities discussed in the Master Plan were built, the number of observatories would increase from 12 to 15 and two of the existing ones would be expanded.

In the next section we will introduce a modified plan, which proposes significantly less future development.
3. A modified plan for long-term astronomical development on Mauna Kea.

When future development for the next 20 years was discussed in the Master Plan of the year 2000, the goal was to be as comprehensive as possible in order not to exclude potentially important scientific options for the future. However, now six years later and after detailed scientific discussion within the Institute for Astronomy it has become clear that the number of future projects envisaged for the next 20 years is much smaller than anticipated in the Master Plan. The long-range goal is to have eventually fewer observatories than now, but certainly still the very best in the world.

After six years of successful operation under the Master Plan in coordination and collaboration with the Office of Mauna Kea Management and its community-based advisory boards it is well recognized that future plans for Mauna Kea require balanced management to preserve, protect and enhance the cultural and natural resources as well as providing a world-class center for education and research in astronomy. As laid out in the Master Plan and also described in the previous section, all major future development will be subject to stringent review by the Office of Mauna Kea Management, Mauna Kea Management Board, and Kahu Ku Mauna Council, as well as the community-based Hawaiian Culture and Environment committees, which report to the Board. In addition, as also already described in the section before, all major developments require a Conservation District Use Permit from the State Board of Land and Natural Resources. As the leaseholder for the Science Reserve, UH is responsible for submitting the use application. In conjunction with this process, UH must satisfy State and Federal environmental impact requirements (Chapter 343 and NEPA). The Institute for Astronomy is committed to sponsor only projects that are considered the best in the world, and not simply to add projects for the sake of adding another telescope to the mountain.

The goal of our new plan is to keep Hawaii's world leadership in ground-based astronomy. This achievement and recognition as a world leader will benefit not only UH as an educational and research institution but the entire state. The advancing and leading edge technologies associated with astronomy research and development will aid Hawaii’s efforts to boost its technology industry, including software and instrument development.

In the following, we will discuss the new modified plan in detail. We will also compare it with the development as proposed in the Master Plan. We will start with the two observatories, for which significant expansion was proposed, the Keck Observatory and the Submillimeter Array (SMA). For the Keck Observatory the addition of six Outrigger telescopes was planned. In our new plan we do not foresee adding any more telescopes to the Keck Observatory.

For the SMA, the Master Plan proposed 12 more antennas and 24 new concrete pads for the array; however in our new plan, we consider only the very moderate expansion of two
more antennas and two pads. UH is also working on the relocation of two existing antenna pads located at the base of Pu'u Poliahu, a culturally significant site.

In the Master Plan a new observatory site on the summit ridge was proposed for the UH Hilo instructional telescope. In order not to increase the number of observatory sites on the summit ridge, the Institute for Astronomy has agreed to give its UH 0.6m telescope and the site to UH Hilo so that the instructional telescope can be built there with only little if any modification of the existing site. This minimizes cultural and environmental impact for this important educational project, which was described in the previous section. An Environmental Assessment of the project by UH Hilo has been completed.

Another redevelopment of an existing site in our new plan is the use of the UH 2.2m site for the Institute for Astronomy's new Pan-STARRS observatory. Pan-STARRS uses completely new technology being developed by the Institute to detect killer asteroids which threaten to impact the Earth. It will detect the majority of the most dangerous objects about 30 years before their potential impact giving some time to develop protection for mankind in case of a serious threat. This project is federally funded. The Institute for Astronomy is preparing a federal EIS in collaboration with the federal funding agency. In addition, UH will submit a comprehensive Mauna Kea management plan to the State Board of Land and Natural Resources for review and approval, before applying for a Conservation District Use Permit for this project.

In addition to the UH Hilo instructional telescope the Master Plan proposes two new telescopes at two new sites, as described in the previous section. One of them, the optical/infrared telescope of Keck or Gemini size, is not pursued any further in our new plan. With the enormously increased efficiencies of Keck, Gemini, and Subaru we do not believe that there is a scientific need anymore for another telescope of this size. It is worth mentioning at this point that the observatories on Mauna Kea are experimenting with the use of new fiber optics technology to combine the light from the already existing telescopes, the so-called Ohana Project. This is a challenging project, which will probably take decades to be successful, but it will greatly expand the capability and utility of the existing observatories.

The only project at a new site proposed in our new plan is the Thirty Meter Telescope (TMT). With its mirror of 30m diameter it will be the largest telescope in the world, and will be ten times more powerful than the Keck telescopes. It will be able to image planets orbiting around other stars and to analyze the light coming from these planets and, thus, to ascertain whether the conditions exist for the formation of life in planetary systems around other stars. It will also be able to detect the most distant galaxies in the universe and will see them in stage when the universe was still very young after its birth in the Big Bang.

As described in the previous section a site is foreseen for this observatory on the northern plateau below the summit ridge. This new site is preferable to a replacement of one of the existing telescopes, because the facility would be less visible and the environmental
and cultural impact would be smaller. The Institute for Astronomy is currently carrying out site testing and atmospheric characterization measurements at this site.

The TMT is a $1 billion project and the most ambitious project of modern astronomy. It is the dedicated goal of the Institute for Astronomy and UH to attract this unique project to Hawaii. It will have an enormous scientific, educational and economic impact and it will secure leadership of Hawaii in astronomical science for the next decades. This is the key project for the future of astronomy in Hawaii.

In summary, our new plan does not propose any further extension of the Keck Observatory with Outrigger telescopes and only a very small expansion of the SMA. It proposes two new projects, the UH Hilo instructional telescope and Pan-STARRS, which will use existing sites and will stay within the footprints of the existing facilities. As the most important project it proposes the TMT on a new site on the northern plateau below the summit ridge.

While the Master Plan of the year 2000 assumed that all existing facilities, which would not be replaced by new ones would continue to exist for the next 20 years, we do not make this assumption for the new plan. It is clear that newer facilities such as Keck, Gemini, Subaru, Pan-STARRS, the UH Hilo telescope and the SMA will certainly continue to operate over the next 20 years. However, some of the others will not continue with their operation, because other aspects of astronomical observations will become more important. In such cases our plan is not to refurbish all of them but only a few and only in cases where an extremely important scientific case can be made. Otherwise, our new plan is to demolish the old facility, to clean the site and to recreate the site in a stage as it was, before the facility had been built. (It is important to note that Operating and Site Development Agreements – the contracts between UH and the telescope partners on Mauna Kea – require that the costs for such reestablishment of the site in its original status have to be paid by the telescope partners.) We are confident that in this way the number of observatories on Mauna Kea in 20 years from now will be smaller than now. But with all the new facilities, in particular the TMT, Hawaii will still have the very best in the world.
CONSENT TO SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT
BETWEEN TMT INTERNATIONAL OBSERVATORY LLC AND
THE UNIVERSITY OF HAWAII
UNDER GENERAL LEASE NO. S-4191

CONSENT is hereby given by the STATE OF HAWAII, by its Board of Land and Natural Resources, Lessor under unrecorded General Lease No. S-4191 dated June 21, 1968, issued to the University of Hawaii, a body corporate, as “Lessee,” to the Sublease and Non-Exclusive Easement Agreement (the “Sublease”) dated July 28, 2014, between TMT INTERNATIONAL OBSERVATORY LLC, a Delaware limited liability company, whose address is 1111 South Arroyo Parkway, Suite 200, Pasadena, California 91105, as “Sublessee,” and the UNIVERSITY OF HAWAII, a public body corporate and the public university of the State of Hawaii, whose address is 2444 Dole Street, Honolulu, Hawaii 96822, as “Sublessor”; SUBJECT, HOWEVER, to the provisions of Section 171-21, Hawaii Revised Statutes, as amended, relating to the rights of holder of security interests; PROVIDED, FURTHER, that nothing contained herein shall change, modify, waive or amend the provisions, terms, conditions and covenants or the duties and obligations of the Lessee or Sublessee under General Lease No. S-4191.
SUBJECT FURTHER, that:

1. The Lessee shall submit construction plans of the Sublessee's improvements to the Land Division, Department of Land and Natural Resources, State of Hawaii, for the Chairperson of the Board of Land and Natural Resources' approval prior to constructing any improvements on the premises.

2. The Sublessee shall comply with all the conditions of Conservation District Use Permit No. HA-3568, as approved by the Board of Land and Natural Resources' Findings of Fact, Conclusions of Law, and Decision and Order issued on April 12, 2013.

IT IS UNDERSTOOD that except as provided herein, should there be any conflict between the terms of General Lease No. S-4191 and the terms of the Sublease, the former shall control; and that no further sublease or assignment of any interest of the premises or any portion thereof shall be made without the prior written consent of the Board of Land and Natural Resources.
IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board of Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be duly executed this ___ day of April, 2015.

Approved by the Board of Land and Natural Resources at its meeting held on June 27, 2014.

STATE OF HAWAII

By ________________________
Interim Chairperson
Board of Land and Natural Resources

LESSOR

UNIVERSITY OF HAWAII, a public body corporate and the public university of the State of Hawaii

By ________________________
Its President

By ________________________
Its VP for Administration

LESSEE/SUBLESSOR

TMT INTERNATIONAL OBSERVATORY LLC, a Delaware limited liability company

By ________________________
Its EXECUTIVE DIRECTOR

SUBLESSEE
STATE OF HAWAI'I

CITY AND COUNTY OF HONOLULU

On this 6th day of February, 2015, before me appeared David Lassner and Jan Gouveia, to me personally known, who, being by me duly sworn, did say that they are the President and VP for Administration, respectively, of the UNIVERSITY OF HAWAII, a body corporate, and that the seal affixed to the foregoing instrument is the corporate seal of said University and that the foregoing instrument was signed and sealed in behalf of said University by authority of its Board of Regents, and the said Jan Gouveia and David Lassner acknowledged said instrument to be the free act and deed of said University.

Notary Public, State of Hawaii

My commission expires: 7-06-15
STATE OF HAWAII  
COUNTY OF  

On this 9th day of February, 2015, before me appeared Donald Straney, to me personally known, who, being by me duly sworn, did say that he/she is the Chancellor, of the UNIVERSITY OF HAWAIJI, a body corporate, and that the seal affixed to the foregoing instrument is the corporate seal of said University and that the foregoing instrument was signed and sealed in behalf of said University by authority of its Board of Regents, and the said Donald Straney acknowledged said instrument to be the free act and deed of said University.

Brenda H. Shin
Notary Public, State of Hawaii

My commission expires: 07/08/15

559369_2.DOC
STATE OF California
COUNTY OF Los Angeles

On this 25 day of February, 2015, before me personally appeared Edward C. Stone, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

GWENDA POLLARD
Notary Public, State of California

My commission expires: Jan. 25, 2017
GENERAL LEASE NO. S-4191

THIS INDENTURE OF LEASE, made this 21st day of June, 1968, by and between the STATE OF HAWAII, by its Board of Land and Natural Resources, pursuant to the provisions of Section 103A-90(b), Revised Laws of Hawaii 1955, as amended, hereinafter referred to as the "LESSOR", and the UNIVERSITY OF HAWAII, a body corporate, whose post office address is 2444 Dole Street, Honolulu, City and County of Honolulu, State of Hawaii, hereinafter referred to as the "LESSEE",

WITNESSETH THAT:

FOR and in consideration of the mutual promises and agreements contained herein, the Lessor does hereby demise and lease unto the said Lessee and the said Lessee does hereby rent and lease from the Lessor, all of that certain parcel of land situate at Kaoha, Hamakua, County and Island of Hawaii, State of Hawaii, and more particularly described in Exhibit "A", hereto attached and made a part hereof.

TO HAVE AND TO HOLD, all and singular the said premises, herein mentioned and described, unto the said Lessee, for and during the term of sixty-five (65) years, to commence from the 1st day of January, 1968, and to terminate on the 31st day of December, 2033.
RESERVING UNTO THE LESSOR THE FOLLOWING:

1. Water Rights. All surface and ground waters appurtenant to the demised premises, together with the right to enter and to capture, divert or impound water; provided, that the Lessee shall exercise such rights in such manner as not to interfere unreasonably with the Lessee's use of the demised premises; provided, further, that the Lessee shall have the right to use the waters of Lake Waiau for any purpose necessary or incidental to the use permitted by this lease on the following conditions:

   a. No drilling or disturbance of Lake Waiau's bottom, banks or areas adjacent thereto shall be permitted;
   b. No activity shall be permitted which will result in the pollution of the waters of Lake Waiau;
   c. Lessee shall not take or divert any of the waters arising from springs which furnish the water supply for Pohakulua, and no alterations to said springs shall be made by Lessee.

2. Access. All rights to cross the demised premises for inspection or for any government purposes.

3. Hunting and Recreation Rights. All hunting and recreation rights on the demised lands, to be implemented pursuant to rules and regulations issued by said Board in discharging its fish and game or state parks responsibilities; provided, however, that such hunting and recreation activities shall be coordinated with the activities of the Lessee on the demised lands; and provided, further, that such hunting and recreation activities shall be limited to day-light hours only.
4. Right to use Demised Lands. The right for itself, and its successors, lessees, grantees and permittees, to use any portion of the lands demised and the right to grant to others rights and privileges affecting said land; provided, however, that, except as otherwise provided herein, no such use shall be permitted or rights and privileges granted affecting said lands, except upon mutual determination by the parties hereto that such use or grant will not unreasonably interfere with the Lessee's use of the demised premises; provided, further, that such agreement shall not be arbitrarily or capriciously withheld.

THE LESSEE, IN CONSIDERATION OF THE PREMISES, COVENANTS WITH THE LESSOR AS FOLLOWS:

1. Surrender. The Lessee shall, at the expiration or sooner termination of this lease, peaceably and quietly surrender and deliver possession of the demised premises to the Lessor in good order and condition, reasonable wear and tear excepted.

2. Maintenance of the Premises. The Lessee shall keep the demised premises and improvements in a clean, sanitary and orderly condition.

3. Waste. The Lessee shall not make, permit or suffer, any waste, strip, spoil, nuisance or unlawful, improper or offensive use of the demised premises.

4. Specified Use. The land hereby leased shall be used by the Lessee as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex.

Activities inimical to said scientific complex shall include light and dust interference to observatory operation.
during hours of darkness and certain types of electric or electronic installation on the demised lands, but shall not necessarily be limited to the foregoing.

5. Assignments. The Lessee shall not sublease, subrent, assign or transfer this lease or any rights thereunder without the prior written approval of the Board of Land and Natural Resources.

6. Improvements. The Lessee shall have the right during the existence of this lease to construct and erect buildings, structures and other improvements upon the demised premises; provided, that plans for construction and plot plans of improvements shall be submitted to the Chairman of the Board of Land and Natural Resources for review and approval prior to commencement of construction. The improvements shall be and remain the property of the Lessee, and shall be removed or disposed of by the Lessee at the expiration or sooner termination of this lease; provided, that with the approval of the Chairman such improvements may be abandoned in place. The Lessee shall, during the term of this lease, properly maintain, repair and keep all improvements in good condition.

7. Termination by the Lessee. The Lessee may terminate this lease at any time by giving thirty (30) days' notice in writing to the Lessor.

8. Termination by the Lessor. In the event that (1) the Lessee fails to comply with any of the terms and conditions of this lease, or (2) the Lessee abandons or fails to use the demised lands for the use specified under paragraph 4 of these covenants for a period of two years, the Lessor may terminate this lease by giving six months' notice in writing to the Lessee.

9. Non-Discrimination. The Lessee covenants that the use and enjoyment of the premises shall not be in support of any
policy which discriminates against anyone based upon race, 
creed, color or national origin.

10. **General Liability.** The Lessee shall at all times, 
with respect to the demised premises, use due care for safety, 
and the Lessee shall be liable for any loss, liability, claim 
or demand for property damage, personal injury or death arising 
out of any injury, death or damage on the demised premises 
caused by or resulting from any negligent activities, operations 
or emissions of the Lessee on or in connection with the demised 
premises, subject to the laws of the State of Hawaii governing 
such liability.

11. **Laws, Rules and Regulations, etc.** The Lessee 
shall observe and comply with Regulation 4 of the Department 
of Land and Natural Resources and with all other laws, ordi- 
nances, rules and regulations of the federal, state, municipal 
or county governments affecting the demised lands or improve- 
ments.

12. **Objects of Antiquity.** The Lessee shall not ap- 
propriate, damage, remove, excavate, disfigure, deface or 
destroy any object of antiquity, prehistoric ruin or monument 
of historical value.

13. **Undesirable Plants.** In order to prevent the 
introduction of undesirable plant species in the area, the 
Lessee shall not plant any trees, shrubs, flowers or other 
plants in the leased area except those approved for such 
planting by the Chairman.

In Witness Whereof, the STATE OF HAWAII, by its 
Board of Land and Natural Resources, has caused the seal of 
the Department of Land and Natural Resources to be hereunto 
affixed and these presents to be duly executed this __/____.

-5-
day of June, 1968, and the UNIVERSITY OF HAWAII, by its Acting President and Vice-President of Affairs, has caused these presents to be duly executed this day of June 1968, effective as of the day and year first above written.

STATE OF HAWAII

By: [Signature]

Chairman and Member
Board of Land and Natural Resources

And By: [Signature]

Member
Board of Land and Natural Resources

UNIVERSITY OF HAWAII

By: [Signature]

Its Acting President

And By: [Signature]

Its Vice-President for Business Affairs

APPROVED AS TO FORM

[Signature]
Deputy Attorney General
Dated: 5-8-68

PROOFED BY:
EXHIBIT "A"

MAUNA KEA SCIENCE RESERVE
Ko'ola, Hamakua, Island of Hawaii, Hawaii

Being a portion of the Government Land of Ko'ola

Beginning at a point on the south boundary of this
parcel of land, the coordinates of said point of beginning
referred to Government Survey Triangulation Station "SUMMIT
1955" being 12,325.95 feet South and 471.84 feet West, as
shown on Government Survey Registered Map 2789, thence running
by azimuths measured clockwise from True South:

1. Along Mauna Kea Forest Reserve, Governor's Proclamation
dated June 5, 1909, on a
curve to the right with a
radius of 13,200.00 feet, the
chord azimuth and distance
being: 133° 00' 18,667.62
feet;

2. Thence along Mauna Kea Forest Reserve, Governor's Proclamation
dated June 5, 1909, still on
a curve to the right with a
radius of 13,200.00 feet, the
chord azimuth and distance
being: 225° 00' 18,667.62
feet;

3. Thence along Mauna Kea Forest Reserve, Governor's Proclamation
dated June 5, 1909, still on
a curve to the right with a
radius of 13,200.00 feet, the
chord azimuth and distance
being: 281° 18' 04.6"
5173.56 feet;

4. 207° 49' 06.5" 841.83 feet along Mauna Kea Forest Reserve,
Governor's Proclamation dated
June 5, 1909;

5. Thence along Mauna Kea Forest Reserve, Governor's Proclamation
dated June 5, 1909, on a curve
to the right with a radius of
1200.00 feet, the chord azimuth
and distance being: 297° 49'
06.5" 2400.00 feet;
6. 27° 49' 06.5" 841.83 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

7. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 306° 59' 47.4" 1624.16 feet;

8. 227° 29' 00.9" 2805.06 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

9. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1500.00 feet, the chord azimuth and distance being: 317° 29' 00.9" 3000.00 feet;

10. 47° 29' 00.9" 2805.06 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

11. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13200.00 feet, the chord azimuth and distance being: 325° 31' 55.2" 701.87 feet;

12. 245° 46' 12.7" 2760.45 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

13. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 2000.00 feet, the chord azimuth and distance being: 335° 46' 12.7" 4000.00 feet;

14. 65° 46' 12.7" 2760.45 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

15. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 352° 14' 32.9" 3563.50 feet;
16. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being 45° 00' 18,667.62 feet to the point of beginning and containing an AREA OF 13,321.054 ACRES.

EXCEPTING and RESERVING to the State of Hawaii and to all others entitled thereto, the Mauna Kea-Imnula and Mauna Kea-Umikoa Trails, and all other existing trails within the above-described parcel of land, together with rights of access over and across said trails.

ALSO, EXCEPTING and RESERVING to the State of Hawaii, its successors and assigns, the waters and all riparian and other rights in and to all the streams within the above-described parcel of land.
MAUNA KEA SCIENCE RESERVE
Kaohe, Hamakua, Island of Hawaii, Hawaii
Scale: 1 inch = 4000 feet
SCIENTIFIC COOPERATION AGREEMENT

BETWEEN

TMT INTERNATIONAL OBSERVATORY LLC

AND

THE UNIVERSITY OF HAWAII

CONCERNING THE DESIGN, CONSTRUCTION AND OPERATION
OF THE THIRTY METER TELESCOPE
ON
MAUNA KEA, HAWAII
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SCA ATTACHMENT A: SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT BETWEEN TMT INTERNATIONAL OBSERVATORY LLC AND THE UNIVERSITY OF HAWAII
   Exhibit A to Attachment A – Master Lease (General Lease S-4191)
   Exhibit B to Attachment A – Consent to Sublease under General Lease S-4191
   Exhibit C-1 to Attachment A – Subleased Premises and Easement Area
   Exhibit C-2 to Attachment A – Legal Description of Subleased Premises
   Exhibit C-3 to Attachment A – Legal Description of Easement Area

SCA ATTACHMENT B: ACCESS ROADS
THIS AGREEMENT is made this 28th day of July, 2014, by and between TMT INTERNATIONAL OBSERVATORY LLC, a Delaware limited liability company ("TIO"), and the UNIVERSITY OF HAWAI'I, a public body corporate and the public university of the State of the Hawai'i ("UH"), and shall be effective as provided in Section XV below.

RECATALS

WHEREAS, the optical and infrared regions of the electromagnetic spectrum have shown great scientific potential for contributing to our understanding of the astronomical universe;

WHEREAS, the summit area of Mauna Kea is exceptionally well-endowed as a site for observations in these wavelengths;

WHEREAS, TIO and UH believe that the best interests of both parties are to be served through a program of close scientific cooperation centered around the TMT Telescope (as defined below) and related facilities;

WHEREAS, the operation of the TMT Telescope on Mauna Kea will greatly benefit the educational and research programs at UH;

WHEREAS, TIO and UH have a common interest in ensuring that the development of the Mauna Kea site will enhance the effective operation of the TMT Telescope; and

WHEREAS, the presence of the TMT Telescope on Mauna Kea will bring substantial community benefits, in addition to educational and research benefits;

NOW, THEREFORE, in consideration of the mutual agreements herein contained, TIO and UH agree as follows:

I. DEFINITIONS

For purposes of construing the provisions of this Scientific Cooperation Agreement, the following definitions apply:

"Base Support Facilities" refers to any possible headquarters in Hawaii for the operations of TIO on Mauna Kea.

"BLNR" stands for the Board of Land and Natural Resources of the State of Hawaii.
"HELCO" stands for the Hawaii Electric Light Company, Inc., the public utility which provides electricity to the Mauna Kea Observatories (as defined below).

"IfA" stands for the Institute for Astronomy, an organized research unit of the University of Hawaii at Manoa.

"Information Station" is the building and associated infrastructure (access, parking, utilities) near the Mid-Level Facilities which is used as a public information building.

"Infrastructure Improvements" are any capital improvements made for the common good of the Mauna Kea Observatories including, but not limited to, roads, power, telephone and communications installations, and the Mid-Level Facilities.

"Instruments" include cameras, spectrometers, and other special-purpose equipment used to detect and analyze light, together with computers, test equipment, and tools required to equip the Facilities.

"Major Astronomical Facilities" are: UH 88-inch Telescope, Canada-France-Hawaii Telescope (CFHT), NASA Infrared Telescope Facility (IRTF), United Kingdom Infrared Telescope (UKIRT), James Clerk Maxwell Telescope (JCMT), Caltech Submillimeter Observatory (CSO), Keck I, Keck II, VLBA Antenna, Subaru, Gemini North, and the Submillimeter Array. Future telescope facilities forming a part of the Mauna Kea Observatories shall be considered "Major Astronomical Facilities" unless otherwise agreed in writing by UH.

"Mauna Kea Observatories" includes, but is not limited to, the Mauna Kea Science Reserve, the astronomical facilities and infrastructure improvements on Mauna Kea, and UH operations which support the astronomical facilities on Mauna Kea.

"Mauna Kea Observatory Access Road" is the roadway between the Mid-Level Facilities and the Mauna Kea summit including roadways currently in use through the Mauna Kea Science Reserve.

"Mauna Kea Science Reserve" is the land in the summit area of Mauna Kea consisting specifically of land which is leased by UH from the BLNR under General Lease S-4191.

"Mauna Kea Users’ Committee" is the committee established by UH to serve as the official forum in which the Major Astronomical Facilities may discuss aspects of the management of the Mauna Kea Observatories. The committee is chaired by the Director of the IfA. Currently, each Major Astronomical Facility is entitled to two representatives on the Mauna Kea Users’ Committee.

"Mid-Level Facilities" include, but are not limited to, the Information Station, bedrooms, laboratories, common areas, and offices at Hale Pohaku on Mauna Kea.
"MKSS" stands for Mauna Kea Observatories Support Services, which is operated by UH through the IfA, and is responsible for providing services to support the Mauna Kea Observatories.

"MKSS Oversight Committee" is the committee established by UH to oversee the activities and management of MKSS and to recommend changes to the Director of the IfA. Currently each Major Astronomical Facility is entitled to one representative on the MKSS Oversight Committee.

"Principal Parties" are TIO and UH, and refer to the Principal Parties to this SCA.

"SCA" stands for this “Scientific Cooperation Agreement Between TMT International Observatory LLC and the University of Hawaii Concerning the Design, Construction, and Operation of the Thirty Meter Telescope on Mauna Kea, Hawaii,” and to which is attached the Sublease.

"Sublease" is the Sublease and Non-Exclusive Easement Agreement between TIO and UH, and approved by BLNR, attached hereto as Attachment A, including the exhibits thereto.

"Subleased Premises" refers to the land subleased to TIO by UH with the approval of the BLNR. The Subleased Premises are a portion of that certain land area leased to UH by BLNR and described in General Lease S-4191, which is included as Exhibit A of Attachment A hereto, and which Subleased Premises are shown and described in Exhibits C-1 and C-2 of Attachment A hereto; Exhibits A, C-1, and C-2 of Attachment A hereto are incorporated herein by reference.

"TIO Board" refers to the governing and policy setting body for TIO.

"TMT Director" means the Observatory Director for the TMT Telescope.

"TMT Facilities" include, but are not limited to, the TMT Telescope and enclosure; the support building (the space necessary to support scientific observers and technical personnel while at the summit); together with Instruments, electrical conductors, cableways and tunnels; driveways and parking lots; power, telephone and communications conduits and lines; and access roads within the border of the Subleased Premises. "TMT Facilities" does not include the Mid-Level Facilities, the Base Support Facilities, or any other facilities outside the Subleased Premises.

"TMT Infrastructure Contribution" has the meaning set forth in Section VI.D.1.c below.

"TMT Parties" refers to the members of TIO.

"TMT Telescope" means the Thirty Meter Telescope on Mauna Kea, to be located on the Subleased Premises and used for astronomical observations.
II. LOCATION OF THE TMT FACILITIES

The Sublease (Attachment A) specifies the location on Mauna Kea where the TMT Facilities will be situated.

III. INTERACTION BETWEEN TIO AND UH

Day-to-day interaction between the Principal Parties regarding design, construction and operation of the TMT Facilities shall usually be carried out by specified representatives of TIO and UH or their designees. In the case of UH, the specified representative will normally be the IfA Director (or the designee of the IfA Director) and, in the case of TIO, this will normally be the Project Manager for the TMT Facilities (during construction) and the TMT Director (during operations, commencing at first light).

IV. SOLE RESPONSIBILITIES OF UH

A. Management of the Mauna Kea Observatories

UH shall provide a forum to allow the Major Astronomical Facilities which form a part of the Mauna Kea Observatories to discuss, on an equal footing, aspects of the management of the Mauna Kea Observatories. Such a forum currently exists and is referred to as the Mauna Kea Users' Committee. TIO shall be entitled to appoint two representatives to the Mauna Kea Users' Committee. Should this committee be replaced with another forum at some time in the future, TIO shall be entitled to participate on the same basis as the other agencies, entities, or persons operating Major Astronomical Facilities. Since UH, the Sublessor under the Sublease, is the Lessee with the State of Hawaii, it is recognized that final responsibility for management of the Mauna Kea Science Reserve resides with UH.

V. SOLE RESPONSIBILITIES OF TIO

A. Design, Fabrication, Construction, Installation, and Operation of the TMT Facilities

TIO shall be solely responsible for securing the funding for the design, fabrication, construction, installation, and operation of the TMT Facilities. TIO commits to taking reasonable measures consistent with Conservation District Use Permit HA-3568 and the TMT Access Way Agreement dated September 13, 2012 by and among UH, the Smithsonian Institution Astrophysical Observatory, and the TMT Observatory Corporation to minimize inconvenience which TMT construction activities may create for other telescope facilities.

B. Power and Communications Conduits and Lines

TIO shall fund and arrange for the installation of electric power and communications conduits from handholes near the TMT Telescope site to the TMT Facilities. These handholes
will be at the new terminus of the summit electric power and communications distribution system as indicated in Section VI.D.1.c.(ii) below. The conduits shall conform to the standards set for the summit power and communications distribution system. TIO shall also fund and arrange for connection of commercial power and communications service via these conduits to the TMT Facilities.

VI. RESPONSIBILITIES SHARED JOINTLY BY TIO AND UH

A. Research Environment

Under General Lease S-4191 between UH and BLNR (Exhibit A of Attachment A), UH is to use the Mauna Kea Science Reserve as a scientific complex. UH carries the responsibility also to protect the site from interference that may emanate from within or from outside the Mauna Kea Science Reserve.

1. UH:

   a. UH shall continue to protect the interests of the astronomical facilities in the Mauna Kea Science Reserve from interference emanating from within the Mauna Kea Science Reserve which would affect the scientific integrity of the sites on which the astronomical facilities are located.

   b. UH shall continue to pursue actively the initiation and/or improvement of such State and County laws and ordinances as are necessary to assure that man-made light emanating from outside the Mauna Kea Science Reserve during nighttime does not over time increase significantly or change in character, so as to interfere with the effectiveness of optical or infrared observations.

   c. UH shall ensure that no other astronomical facilities will be constructed or operated within an 800-foot radius surrounding the TMT Telescope during the term of the Sublease, as it may be extended pursuant to Sections 9.a., 9.b., or 9.c. thereto.

2. TIO:

   TIO shall conduct its activities in the Mauna Kea Science Reserve in a manner compatible with the activities of other astronomical facilities located there, and shall conform to applicable regulations established by UH and by federal, state, and county authorities for the preservation of the environmental quality and the scientific integrity of the Mauna Kea Science Reserve.
B. Rights of Access

1. **UH:**

   UH shall ensure TIO's right of access to the Subleased Premises, to the Mauna Kea Observatory Access Road, and to the Mid-Level Facilities (to be documented separately) and shall ensure its right to have access to a handhole or handholes for the electric power, and communications described in Section V.B. above. UH shall grant to or use its best efforts to obtain for TIO such other rights of access as may be needed for utilities and cableways.

2. **TIO:**

   TIO shall pay any additional costs, fees and other charges assessed by third parties (such as HELCO) associated with the rights of access described in Section VI.B.1. above.

C. Access Roads to the TMT Facilities

1. **UH:**

   UH shall provide to TIO the use of existing roads for access to the TMT Facilities, subject to any limitation in the TMT Access Way Agreement dated September 13, 2012 by and among UH, the Smithsonian Institution Astrophysical Observatory, and the TMT Observatory Corporation. The existing roads in the vicinity of the Mauna Kea summit are shown in Attachment B hereto. Improvements to the access road to the TMT Telescope site are discussed in Section VI.D.1.c.(i) below.

D. Infrastructure Improvements Shared in Common with Other Astronomical Facilities at the Mauna Kea Observatories

   UH has taken responsibility to fully or partially fund and arrange for Infrastructure Improvements to the Mauna Kea Observatories which are and will be of common benefit to all the astronomical facilities which operate there. All such Infrastructure Improvements are subject to State and County permits, approvals, and funding.

1. **Commercial Power, Data Communications Conduits and Lines, and Road Improvements**

   a. **Description of Improvements:**

      UH has installed commercial electric power infrastructure at Hale Pohaku and at the Mauna Kea summit. At the summit, the power is distributed by means of a distribution loop, comprising two conduits containing the electrical cables, and conforming to HELCO standards, which passes near each of the Major Astronomical Facilities. Each facility accesses the commercial power by connecting to the distribution loop at a suitable handhole near its location. UH has also provided two communications conduits from Hale Pohaku to a central point at the summit, and from there to a distribution system comprising two or more conduits.
which generally follows the same path as that used for the power. UH has installed fiber-optic cable in one of these conduits. This cable is part of the Mauna Kea Observatories Communications Network, a high-bandwidth communications system which is intended to link the facilities of the Mauna Kea Observatories with each other, with base facilities, and with commercial carriers which can provide links to home institutions and other institutions around the world. UH has completed improvement and paving of the upper section of the Mauna Kea Observatory Access Road (above elevation 11,800 feet) and of the connecting roads to the existing facilities at the summit.

b. **Access to Existing Improvements by TIO:**

For purposes of TMT, TIO shall have access to the Infrastructure Improvements described in Section VI.D.1.a. above as follows:

(i) The TMT Facilities shall connect to the electric power and communications lines as described in Section V.B. above.

(ii) Use of the access roads within the Mauna Kea Science Reserve in accordance with Section VI.C. above.

(iii) The right to join the Mauna Kea Observatories Communications Network and to participate in the network on the same terms as other network members. The costs associated with connecting the TMT Facilities to the network shall be borne by TIO.

c. **Contribution by TIO to Future Improvements:**

Subject to the provisions below in this Section VI.D.1.c., TIO shall contribute a total of SIX MILLION SIX HUNDRED THOUSAND Dollars ($6,600,000) (in first-half 2013 dollars, with escalation following the most recently published State of Hawaii All Urban Consumer Price Index) (not seasonally adjusted) ("TMT Infrastructure Contribution") toward the cost of continued development of the Mauna Kea infrastructure.

This TMT Infrastructure Contribution shall first be used to fund three specific improvements, to the extent these funds allow:

(i) Extension of the summit spur road system to the TMT Telescope site.

(ii) Extension of the summit electric power and communications distribution system from its current terminus near the Submillimeter Array to a new terminus near the TMT Telescope site.

(iii) Upgrade of the electrical power infrastructure to accommodate the eventual requirements of the TMT Facilities. This includes an upgrade to the substation at Hale Pohaku and new cable from there to the summit.
TIO shall be responsible for the design and construction of items (i) and (ii) above and for the implementation of item (iii) above, in collaboration with HELCO. The design and implementation of these improvements shall be subject to approval by UH, by HELCO, and by the Department of Land and Natural Resources of the State of Hawaii, and subject to the funds allowing for the improvements.

TIO shall make this TMT Infrastructure Contribution on or before the date that is SIXTY (60) days after the effective date of this SCA pursuant to Section XV below. UH agrees that TIO may withhold from the payment an amount equal to TIO's initial cost estimate provided to UH for any infrastructure improvements described in (i) through (iii) above. Should the sum of the approved cost estimates equal or exceed the TMT Infrastructure Contribution, then TIO may withhold the entire contribution.

Before any contracts for these improvements are let, TIO shall provide UH with a cost estimate for the improvements, which figure may include a contingency factor up to 10% and be subject to revision following the receipt of actual bids for the improvements. If UH approves this cost estimate, as revised, then UH shall authorize TIO to use all or part of its infrastructure contribution to pay for the actual cost of these improvements, as verifiable by contractors' invoices, up to a maximum amount equal to the above-mentioned cost estimate, as revised, or the entire contribution, whichever is less. Should the contractor(s) default or otherwise fail to complete these improvements necessitating additional contracts and/or expense, or should major change orders be required, then TIO shall provide UH with a new cost estimate. If UH approves this new cost estimate, TIO may continue to use all or part of its infrastructure contribution to pay for the actual cost of these improvements, as verifiable by contractors' invoices, up to a maximum amount equal to the new cost estimate or the entire contribution, whichever is less.

Should the TMT Infrastructure Contribution be insufficient to complete items (i) through (iii) above, TIO shall be responsible for providing the required additional funding.

Should the TMT Infrastructure Contribution exceed the amount needed to fund items (i) through (iii) above, then UH shall be free to use such excess funds for other Infrastructure Improvements which UH considers desirable.

Following acceptance of the work and within NINETY (90) days of the receipt of final invoices, TIO shall provide UH with a final accounting of the cost of these infrastructure improvements, and shall remit to UH the amount, if any, by which the sum withheld exceeds the actual cost.

Notwithstanding anything to the contrary in this SCA, should this SCA be terminated in accordance with Section XVII below on or prior to the fourth anniversary of the effective date of this SCA, then the TMT Infrastructure Contribution shall not be payable by TIO to UH (or shall be refunded by UH to TIO, if applicable) to the extent of any amounts not theretofore expended in accordance with this Section VI.D.1.c.
2. **Other Infrastructure Improvements to the Mauna Kea Observatories**

It may become necessary or desirable for the greater benefit of the Mauna Kea Observatories to construct Infrastructure Improvements beyond those described in Section VI.D.1. above. If such Infrastructure Improvements are funded entirely by contributions from new funding sources (e.g., new astronomical facilities which join the Mauna Kea Observatories) and/or UH, then TMT shall enjoy access to such improvements on an equal footing with the other astronomical facilities. If such Infrastructure Improvements require contributions from some or all of the astronomical facilities for which there are signed agreements with UH, then TIO shall have access to such improvements, and TIO shall be liable to contribute to the cost of such improvements, only if and to the extent that TIO and UH have agreed in writing to such access and contributions. If TIO elects to participate in any such improvements, TIO and UH shall negotiate in good faith to determine the fair share of the cost of such improvements which TIO shall contribute. The amount of this fair share shall be set forth in separate written agreements and normally shall be based on the fractional utilization by TIO of any such improvements. In cases where utilization is not readily quantifiable, the share paid by TIO shall not exceed a fraction, the numerator of which is ONE (1), and the denominator of which is the number of Major Astronomical Facilities, including the TMT Telescope.

E. **Operations and Maintenance**

1. **UH:**

   a. UH shall provide services on a basis of no profit, no loss to TIO through MKSS. Such services may include, but shall not be limited to: food and lodging; fuel, water and utilities; data communications; road maintenance; snow removal; weather forecasting; emergency services; public information, outreach and educational services including access control and facilities; and general administration.

   b. The cost of MKSS services shall be shared among the astronomical facilities operating or under construction at the time the costs are incurred. For some services the costs may be allocated to each facility as shares. For others a rate will be set and the charge to the facility will be based on actual utilization of that service. Each year, in its budget, MKSS will establish the shares and rates so that projected costs equal projected revenue for each service. MKSS will adjust said shares and rates if actual expenditures or revenues differ significantly from the projections.

   c. TIO, or its designee, shall be represented on the MKSS Oversight Committee, which reviews MKSS activities, recommends changes to the activities, and reviews and makes recommendations on the MKSS budget.

2. **TIO:**

   a. TIO shall provide the funds necessary to operate and maintain the TMT Facilities.
b. TIO shall pay its share of the cost of MKSS services as described in Section VI.E.1. above. Said share shall include all MKSS services except that data communications is not included until TIO becomes a participant in the Mauna Kea Observatories Communications Network.

c. TIO shall fund the cost of operating and maintaining the power and communications lines from the handhole described in Section V.B. above to the TMT Facilities.

F. Sublease: Order of Precedence

   a. Immediately upon execution of this SCA, and for so long as this SCA shall remain in force, UH and TIO shall each fulfill all of their respective obligations, as Sublessor and Sublessee, respectively, as specified in Attachment A hereto.

   b. In the event of any conflict between the terms of this SCA and the Sublease, the Sublease shall be controlling.

VII. DELEGATION OF RESPONSIBILITIES BY TIO

TIO may delegate certain of its obligations and responsibilities hereunder to other agents for the purpose of constructing or operating the TMT Facilities. However, it is understood and agreed that TIO shall remain ultimately responsible for the obligations and responsibilities undertaken by it in this SCA.

VIII. ASSIGNMENT OF RIGHTS BY TIO

Any proposed assignment of ownership rights to the TMT Facilities shall require the consent of UH and shall be to the same person or entity to which the Sublease (or any rights therein) is to be assigned in accordance with Section 23 of the Sublease. In the event that TIO decides that it would be beneficial to involve yet further parties in the construction and/or operation of the TMT Facilities, TIO shall so notify UH so as to provide adequate time for UH to review the proposed terms and conditions of such partnership and to obtain the necessary prior consent of the UH Board of Regents, the State of Hawaii Board of Land and Natural Resources, and any other bodies whose consent is required under the terms of the Lease, the Sublease, or other agreements and documents; provided, however, that nothing in this SCA shall be interpreted or construed to require that TIO obtain any consent or approval of UH, the UH Board of Regents, the State of Hawaii Board of Land and Natural Resources, or any other entities or bodies regarding any parties to be admitted as liability limited company members of TIO or regarding any use of Federal grant funds for construction and/or operation of the TMT Facilities. TIO shall further provide UH with written assurance that such new party or parties concur with this SCA and that they are legally bound to abide by it. In any case, TIO shall not assign or transfer any of its rights under this SCA without the prior written consent of UH.
IX. SCIENTIFIC COOPERATION

In recognition of the potential for scientific interaction between TIO and UH which the TMT Facilities offer, and of the contribution of UH in making the site available for TIO, TIO and UH agree on the following matters with regard to the operational phase of the TMT Facilities.

A. UH Use of the TMT Facilities

1. Recognizing UH's considerable investment in the development of Mauna Kea as an astronomical site, UH shall be entitled to a guaranteed fraction of the observing time on the TMT Telescope. The UH observing time shall be allocated to proposals sponsored by UH as follows:

a. During each calendar year, UH shall be entitled to seven and one-half percent (7.5%) of the observing time after engineering time has been subtracted from the total time. Engineering time is telescope time whose purpose is not astronomical research (astronomical research includes demonstration science), but is rather the development, modification, or maintenance of the TMT Telescope, including commissioning of Instruments. During the third and subsequent years after first light, and for the purpose of determining the UH entitlement to observing time, engineering time may include time allocated to an extended shutdown of the TMT Telescope for the purpose of major repair or improvements, provided the shutdown has been approved by the TIO Board.

b. The UH observing time shall be equally distributed over the seasons of the year and the phases of the Moon.

c. In the event of a major failure of the TMT Facilities, the resulting lost observing time shall be accommodated by reducing the UH entitlement and the entitlement of the TMT Parties in the same proportion.

d. Only proposals having a UH-affiliated Principal Investigator, and forwarded by the IfA Director, shall be considered in scheduling the UH allocation of observing time. UH shall be solely responsible for evaluation and selection of proposals to be included in the UH allocation of time. The selection shall be made on the basis of scientific merit. There shall be no restrictions on the eligibility of co-investigators to collaborate on observing programs utilizing the UH observing time.

e. Detailed scheduling of observing time is the responsibility of the TMT Director.

f. In the event that UH and one or more of the TMT Parties each forward proposals for the same time-critical observation, the TMT Director shall attempt to achieve a resolution satisfactory to TIO and UH. If this cannot be achieved, selection between the proposals shall be done by the TMT Director on the basis of scientific merit.
g. TIO and UH recognize that, in order to achieve the full scientific potential of the TMT Telescope, it may be necessary to adopt innovative and flexible approaches to the scheduling of the TMT Facilities. Policies for scheduling of observations shall be approved by the TIO Board and shall in general apply to UH in the same manner as they apply to the TMT Parties.

2. UH-sponsored observers shall receive technical and logistic support while at the TMT Facilities and shall have access to the TMT Facilities, all on the same basis as TIO-sponsored observers.

3. UH-sponsored personnel shall be subject to the authority of the TMT Director when using the TMT Facilities and shall follow all rules, policies and procedures of TIO.

4. Data obtained by UH observers during UH time on TMT shall be subject to TIO's data rights policy which will include a period of time during which the data will be proprietary to UH, consistent with the proprietary period applicable to the TMT Parties, and after which such data will be released to all of the TMT Parties.

B. UH Participation in TMT Facilities Instrument Development

TIO shall provide UH with opportunities to participate in the development of Instruments for the TMT Facilities. Any decision concerning awarding Instrument proposals to UH shall be in TIO's sole discretion.

C. UH Participation in the TIO Board

UH shall be entitled to appoint one member to the TIO Board, which member shall have non-voting observer status.

D. UH Participation in TIO Science Advisory Committee

UH shall be entitled to have either one representative or representation in proportion to its share of observing time, whichever is greater on the TIO Science Advisory Committee.

E. TMT Facilities Attribution

In all publications and news releases regarding results obtained from work performed at the TMT Facilities, the TMT Telescope shall be given appropriate credit in a form approved by TIO. Results obtained at the TMT Facilities by IfA faculty shall have credit for these results also given to “the University of Hawaii, Institute for Astronomy” in any publications or news releases.

F. Interaction with News Media

Except for the publication of scientific results, external communications regarding the TMT Telescope or the TMT Facilities shall be reasonably coordinated between TIO and UH.
and/or TIO may request one another to coordinate specific media events. Each party shall keep the other informed of press releases, filming and live television transmissions.

X. INSURANCE

   TIO shall, at all times, maintain insurance as required under the Sublease.

XI. ATTORNEY'S FEES

   Except as otherwise provided in Attachment A hereto, TIO and UH shall each pay their own attorney's fees and any other legal expenses.

XII. DISPUTE RESOLUTION

   Any dispute relating to or arising as a result of or in connection with this SCA, if not resolved by negotiation, shall be submitted first to non-binding mediation with Dispute Prevention & Resolution, Inc. and if such mediation is not concluded within six (6) months after submission, then shall be decided in legal or equitable proceedings in accordance with Hawaii law in any court having jurisdiction in the State of Hawaii. Such mediation shall take place in the County of Honolulu, State of Hawaii. Each party shall bear its own costs and fees for such mediation and the fees and expenses of the mediator shall be borne by the parties equally.

XIII. GOVERNING LAW: SEVERABILITY

   The validity, construction and performance of this SCA and the legal relations between the Principal Parties shall be governed by and construed in accordance with the laws of the State of Hawaii. In the event any provision of this SCA shall be held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions of this SCA shall remain in full force and effect.

XIV. AMENDMENTS TO THIS SCA

   This SCA may be amended in writing at any time by mutual agreement of the Principal Parties.

XV. TERM OF THIS SCA

   This SCA shall become effective on the effective date of the Sublease and shall terminate as provided in Section XVII below.
XVI. RENEGOTIATION OF THIS SCA

If the Master Lease (as defined in the Sublease) is replaced with a New Master Lease (as defined in the Sublease) as contemplated by Section 9.a. of the Sublease or other master lease between UH and the BLNR pursuant to Section 9.b. of the Sublease and the Sublease is not thereafter terminated or if the term of the Sublease is extended pursuant to Section 9.c. of the Sublease, the Principal Parties agree to negotiate in good faith any revisions to this SCA proposed at the time by either TIO or UH, provided that the material terms of this SCA shall be substantially the same and not changed.

XVII. TERMINATION

This SCA shall be terminated upon the first of any of the following events to occur:

1. Mutual written agreement of the Principal Parties.

2. Termination of the Sublease (Attachment A), including as it may be extended pursuant to Sections 9.a., 9.b., or 9.c. thereto.

3. Termination of management or operation of the TMT Facilities by TIO or its assignee, if any, as approved under Section VIII above.

XVIII. DISPOSITION OF TMT FACILITIES ON TERMINATION

Disposition of the TMT Facilities on termination of this SCA shall be conducted pursuant to the provisions of the Sublease.

XIX. COUNTERPARTS

This SCA may be executed in counterparts, each of which so executed shall, irrespective of the date of its execution and delivery, be deemed an original (including counterparts delivered by facsimile or email), and said counterparts together shall constitute one and the same agreement binding all of the parties hereto.

[Remainder of page intentionally left blank; signature page follows.]
IN WITNESS WHEREOF, the parties hereto have executed this Scientific Cooperation Agreement as of the day and year first above written.

FOR THE UNIVERSITY OF HAWAI'I:

By ____________________________
Name: David Lassner
Title: President
Date: 7/28/14

By ____________________________
Name: Howard Todo
Title: Vice-President for Budget and Finance
Date: 7/29/14

By ____________________________
Name: Donald A. Straney
Title: Chancellor, University of Hawai'i at Hilo
Date: 7/31/14

Approved as to form:

By ____________________________
Name: Lawrence S. Okinaga, Carlsam Ball LLP
Title: Special General Counsel
Date: 6/28/2014

TMT INTERNATIONAL OBSERVATORY LLC:

By ____________________________
Name: Edward C. Stone
Title: Executive Director
Date: 7/23/14
Attachment A to Scientific Cooperation Agreement Between TIO and UH

Sublease

(attached)
Attachment B to Scientific Cooperation Agreement Between TIO and UH

Access Roads

Mauna Kea Science Reserve
TMK (3) 4-4-15:08

Astronomy Precinct

Mauna Kea Access Roads

Mauna Kea Summit

Naturiti Area Reserve (NAR)

400-Yard Management Corridor

Hale Pōhaku
TMK (3) 4-4-15:12

Scientific Cooperation Agreement Attachment B

- 1 -
SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT
BETWEEN
TMT INTERNATIONAL OBSERVATORY LLC
AND
THE UNIVERSITY OF HAWAII

THIS SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT (this "Sublease") is made and entered into on this ______ day of July, 2014, effective as of July 28, 2014 (the "Effective Date"), by and between TMT International Observatory LLC, a Delaware limited liability company ("Sublessee"), and the University of Hawaii, a public body corporate and the public university of the State of Hawaii ("Sublessor").

RECITALS

This Sublease is entered into with reference to the following:

A. Sublessor leases certain lands located on and around the summit of Mauna Kea, Island of Hawaii from the State of Hawaii, Board of Land and Natural Resources ("Lessor") pursuant to General Lease No. S-4191, dated June 21, 1968 (the "Master Lease"), a copy of which is attached hereto as Exhibit A and incorporated herein by reference.

B. Sublessee desires to sublease a portion of said lands, as more fully described below, for the purpose of constructing and operating an optical/infrared telescope facility known as the Thirty Meter Telescope ("TMT") in the manner described in, and accordance with, this Sublease and that certain Scientific Cooperation Agreement Between Sublessee and Sublessor Concerning the Design, Construction and Operation of the Thirty Meter Telescope on Mauna Kea, Hawaii (the "Scientific Cooperation Agreement") executed simultaneously herewith and to be effective on the same Effective Date indicated above. The TMT facilities will include, but are not limited to, the TMT telescope and enclosure; the support building (the space necessary to support scientific observers and technical personnel while at the summit); together with instruments, electrical conductors, cableways and tunnels; driveways and parking lots; power, telephone and communications conduits and lines; and access roads within the border of the Subleased Premises (as defined in Section 1 below) ("TMT Facilities"). "TMT Facilities" does not include any facilities outside the Subleased Premises.

C. The Master Lease provides that Sublessor may not enter into a sublease without the prior written consent of the Lessor. Prior written consent to this Sublease has been obtained pursuant to that certain Consent to Sublease Under General Lease No. S-4191 dated _________________, 2014, a copy of which is attached hereto as Exhibit B and incorporated herein by reference.

D. In 2000, Sublessor adopted the Mauna Kea Science Reserve Master Plan, which establishes the management structures for Sublessor's stewardship of the areas it
manages on Mauna Kea. In 2009 and 2010, Sublessor adopted, and Lessor approved, the Mauna Kea Comprehensive Management Plan ("CMP") and its subplans: the Cultural Resources Plan, Natural Resources Management Plan, Public Access Plan, and Decommissioning Plan. These plans commit Sublessor to exercise responsible stewardship of Mauna Kea and to ensure that astronomical activities are conducted in a manner that respects the cultural significance of Mauna Kea, protects the environment, and is responsive to the needs and concerns of Native Hawaiians and the public.

E. In May 2010, Sublessor completed an Environmental Impact Statement for the TMT. In September 2010, Sublessor filed an Application for a Conservation District Use Permit to construct the TMT. The permit was approved in April 2013. Sublessee is now seeking a long term sublease to build and operate the TMT.

F. Sublessor has submitted a request to the Lessor for the mutual cancellation of the current Master Lease and issuance of a new master lease for a term of sixty-five (65) years from issuance. Sublessee desires to continue operation of the TMT Facilities beyond 2033. It is desirable for management and planning purposes, including appropriate stewardship of Mauna Kea, to address the potential continued operation of the TMT Facilities beyond 2033 in this Sublease.

AGREEMENT

Now, therefore, in consideration of the foregoing and of the mutual promises and agreements set forth herein, Sublessor and Sublessee agree as follows:

1. Subleased Premises. Sublessor does hereby sublease to Sublessee, and Sublessee does hereby sublease from Sublessor, the parcel of land shown and described in Exhibits C-1 and C-2 attached hereto and incorporated herein by reference (the "Subleased Premises"), constituting a portion of the land leased by Sublessor under the Master Lease.

2. Non-Exclusive Easements. Sublessee shall have the right of access to and egress from the Subleased Premises over and across the Mauna Kea Science Reserve, utilizing the common entrances and rights of way, together with others entitled thereto, under such rules and regulations as may be established by and amended from time to time by Sublessor. Sublessee shall also have the rights to (i) utilize and construct in, grade, fill, and perform work approved by Lessor and Sublessor in the easement area shown and described in Exhibits C-1 and C-3 attached hereto and incorporated herein by reference (the "Easement Area"), (ii) utilize and construct in and perform work approved by Lessor and Sublessor and consistent with the TMT Access Way Agreement dated September 13, 2012, by and among Sublessor, the Smithsonian Institution Astrophysical Observatory, and the TMT Observatory Corporation, in the spur road from the Mauna Kea Observatory Access Road to the Subleased Premises, (iii) install and utilize power and communications conduits and lines from a central handhole or handholes in the Mauna Kea summit area to the Subleased Premises, and (iv) utilize and access the Batch Plant staging area as authorized by the TMT CDUP (as defined in Section 4 below).
3. **Survey/Site Specific Description.** The site shown in Exhibit C-1 hereto has been surveyed. The area covered by the Subleased Premises is specifically described in the metes and bounds description in Exhibit C-2 hereto. The area covered by the Easement Area is specifically described in the metes and bounds description in Exhibit C-3 hereto.

4. **Use of Subleased Premises.** Sublessee shall use the Subleased Premises solely to construct and operate the TMT Facilities in accordance with this Sublease and the Scientific Cooperation Agreement. The construction and operation of the Subleased Premises shall be conducted in strict compliance with the terms and conditions of Conservation District Use Permit HA-3568 approved by the Lessor on April 12, 2013 (the "TMT CDUP"), including performance of all mitigation conditions set forth therein, and any amended or subsequent Conservation District Use Permit. Sublessee shall not at any time during the term of this Sublease construct, place, maintain, or install on the Subleased Premises any other building, structure, or improvement without the prior written approval of Sublessor and Lessor and upon such conditions as Sublessor or Lessor may impose. For purposes of the foregoing sentence, any other "improvement" means improvements that are not specified in or contemplated by the TMT CDUP and not contained within the building envelop of TMT observatory plans approved in accordance with Section 37 below. For the avoidance of doubt, the addition of any instruments, equipment or any other additions that are fully contained within the observatory structure or buildings shall not require the prior written approval of Sublessor or Lessor, provided that such additions are otherwise in compliance with the terms of this Sublease and the Master Lease.

5. **Management and Stewardship Obligations.** This Sublease shall be subject to the following:

   a. The Subleased Premises are within the State Land Use Conservation District and all uses shall comply with the applicable rules and regulations of the State Conservation District, including but not limited to Hawaii Revised Statutes ("HRS") Chapter 183C and Hawaii Administrative Rules ("HAR") Chapter 13-5.

   b. Sublessee shall comply with applicable State rules and regulations related to historic preservation including but not limited to HRS Chapter 6E, and HAR Chapters 13-197, 13-198, 13-275 through 13-284 and 13-300, and any applicable amendments of or supplements to such historic preservation regulations.

   c. Sublessor shall exercise management jurisdiction over the Subleased Premises pursuant to management plans approved by the Lessor, including the CMP and its subplans, the Natural Resources Management Plan, Cultural Resources Management Plan, Decommissioning Plan, and Public Access Plan, the TMT Management Plan, and any amendments of or supplements to management plans approved by the Lessor for lands that include the Subleased Premises. Sublessee acknowledges that it has reviewed and is familiar with the CMP and subplans. Sublessor shall keep Sublessee informed regarding any future amendments or supplements thereto, and shall promptly provide copies of such documents to Sublessee.
d. All public and commercial activities in the areas of Mauna Kea managed by Sublessor, including recreational activities, shall be governed by administrative rules promulgated pursuant to the authority granted Sublessor by Act 132 (SLH 2009), following consultation with DLNR, the Office of Hawaiian Affairs, and the public in accordance therewith.

e. The Constitution of the State of Hawaii mandates the protection of recognized customary and traditional native Hawaiian rights subject to State regulation. This Sublease shall be subject to the right of Native Hawaiians to exercise protected traditional and customary practices as provided in the CMP and consistent with the laws of the State of Hawaii.

f. Sublessor has established a management structure to manage the lands of which the Subleased Premises are a part, which structure includes the Office of Mauna Kea Management at the University of Hawaii at Hilo, the volunteer community-based Mauna Kea Management Board and the Kahu Kū Mauna advisory council on Hawaiian cultural matters.

6. Operation of the TMT Facilities. Neither Sublessee nor any successor or assign shall operate the TMT Facilities for purposes of research without a valid and effective Scientific Cooperation Agreement with Sublessor. The TMT Facilities may be operated in the absence of a valid and effective Scientific Cooperation Agreement only when necessary to ensure the safety of personnel or of the TMT Facilities.

7. Rent. In consideration for the use of the Subleased Premises, Sublessee shall pay to Sublessor annual rents based on calendar years during the term of this Sublease as set forth below. The annual rent during the construction period is based on the incremental value of the major milestones achieved during the construction of the TMT Facilities. The milestones are set forth below and generally span approximately two (2) year periods. The annual rents shall be paid based upon the specified calendar years below regardless of whether the respective milestone is achieved.

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Rent</th>
<th>Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>$300,000</td>
<td>Civil construction</td>
</tr>
<tr>
<td>4-5</td>
<td>$400,000</td>
<td>Enclosure</td>
</tr>
<tr>
<td>6-7</td>
<td>$600,000</td>
<td>Telescope Structure</td>
</tr>
<tr>
<td>8-9</td>
<td>$700,000</td>
<td>Instruments and Mirrors</td>
</tr>
<tr>
<td>10</td>
<td>$900,000</td>
<td>Commissioning</td>
</tr>
<tr>
<td>11 and later</td>
<td>$1,080,000</td>
<td>Operations</td>
</tr>
</tbody>
</table>

Rent shall be paid in advance, in equal semi-annual installments, on or before January 31 and July 31, of each calendar year during the term of this Sublease. The first installment of rent for the initial, partial year (which will be prorated) shall be due within 30 days of the date of execution of this Sublease. Beginning in January of 2015, and in January of each year thereafter, the annual rental amount for the year shall be based on the initial annual rental amount adjusted for the annual rate of inflation recorded for subsequent years in
accordance with the Consumer Price Index for all Urban Consumers, U.S. City Average (not seasonally adjusted) (base year 1982-1984 - 100) ("CPI"), published by the United States Department of Labor, Bureau of Labor Statistics. The calculation shall be made by comparing the CPI last published for the date nearest to the Effective Date (the "Base Index") with the CPI last published for the date nearest to the current anniversary date (the "Current Index"). If the Current Index has increased or decreased over the Base Index, then the amount subject to adjustment shall be set for the ensuing year by multiplying the initial annual rental amount by a fraction, the numerator of which is the Current Index and the denominator of which is the Base Index. If the base of the CPI changes from the 1982-84 base (100), the CPI shall, thereafter, be adjusted to the 1982-84 base (100) before the computation indicated above is made. If the CPI Index is at any time no longer published, a comparable index generally accepted and employed by the real estate profession shall be used.

Sublessor shall receive, deposit, and apply the rents received hereunder in accordance with the laws of the State of Hawaii, including, without limitation, Section 304A-2170 of the Hawaii Revised Statutes, as amended from time to time. Such deposit shall be net of the funds required by law to be transferred or paid to the Office of Hawaiian Affairs. Sublessor shall be responsible for paying over to the Office of Hawaiian Affairs its ratable share of the rents received in accordance with the laws of the State of Hawaii.

8. **Master Lease: Order of Precedence.** The rights granted to Sublessee pursuant to this Sublease are subject to the terms and conditions of the Master Lease, as the same may be amended. In the event of any conflict between the terms of this Sublease and the Master Lease, the Master Lease shall be controlling. In the event of any conflict between the terms of this Sublease and the Scientific Cooperation Agreement, this Sublease shall be controlling. Sublessee shall comply with the terms and conditions of the Master Lease at all times. If Sublessee causes a breach or default of any term, covenant, restriction, or condition of the Master Lease, and this breach or default shall continue for a period of more than forty-five (45) days after delivery by the Sublessor of a written notice of breach or default and demand for cure (plus any additional period as the Lessor may allow for good cause), then Sublessor may, subject to the provisions of Section 171-21 of the Hawaii Revised Statutes, at once re-enter the Subleased Premises, or any part, and upon or without the entry, at its option, terminate this Sublease without prejudice to any other remedy or right of action for arrears of rent or for any preceding or other breach of contract; and in the event of termination, at the option of the Sublessor, all buildings and improvements shall remain and become the property of the Sublessor or shall be removed by Sublessee in accordance with the Site Decommissioning Plan at Sublessee's sole cost and expense; furthermore, Sublessor shall retain all rent paid in advance to be applied to any damages.

9. **Term and Termination.** The term of this Sublease shall begin on the Effective Date and shall expire on December 31, 2033, unless extended or sooner terminated as provided herein.

   a. **Mutual Cancellation of Master Lease and Concurrent Issuance of New Master Lease.**
(1) Sublessor shall use its best efforts to continue to and shall diligently pursue and take all actions necessary or advisable to complete the process currently underway with Lessor to obtain mutual cancellation of the current Master Lease subject to and concurrent with issuance of a new master lease (the "**New Master Lease**"), for a term of sixty-five (65) years and on terms and conditions materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013. In the foregoing sentence, such "actions" shall include, without limitation, continuing to prepare and process an Environmental Impact Statement for the New Master Lease and such "terms and conditions" shall include, without limitation, that the New Master Lease shall include the provisions stating that "The lease shall be subject to all existing subleases entered into by the Lessee and approved by the Lessor pursuant to General Lease No. S-4191 dated June 21, 1968", and "Should this lease be rendered or declared invalid, illegal, or unenforceable by a court of competent jurisdiction, such invalidation shall cause, without further action, General Lease No. S-4191 dated June 21, 1968 to be revived in its entirety for the duration of the term therein, unless and until the parties subsequently agree otherwise".

(2) If the New Master Lease is approved and duly executed by Lessor and Sublessor, Sublessor shall promptly provide a copy of the New Master Lease to Sublessee. Effective as of the effective date of the New Master Lease, the following shall apply:

i) The provisions of this Sublease shall continue, whether by extension, issuance of a new sublease, or otherwise, provided that any continuance shall be in accordance with the terms herein as a sublease under the New Master Lease (including, without limitation, the rents set forth herein);

ii) The New Master Lease shall become the Master Lease for all purposes of this Sublease or any new sublease, and all references to the Master Lease in this Sublease or any new sublease shall thereafter refer to the New Master Lease; and

iii) The term of this Sublease shall automatically be extended, and shall thereafter expire sixty-five (65) years after the Effective Date, or upon expiration or termination of the New Master Lease, whichever shall first occur.

(3) If the New Master Lease is approved, but the term is not for sixty-five (65) years or the terms and conditions thereof are not materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013, Sections 9.a.(2)i), ii), and iii) above shall apply unless Sublessee, at its sole option, provides a notice of termination to Sublessor in accordance with Section 9.d. below within one hundred twenty (120) days after Sublessee's receipt of the New Master Lease from Sublessor. Sublessor further agrees to diligently negotiate in good faith with Sublessee regarding mutually acceptable amendments to this Sublease during such one hundred twenty (120) day period and to promptly and diligently pursue approval by the Lessor of such amendments.
(4) If the New Master Lease is approved on terms and conditions materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013 or is otherwise acceptable to Sublessee in Sublessee’s sole judgment, Sublessor agrees to execute an amendment to this Sublease to reflect compliance with Sections 9.a.(2)i), ii), and iii) above or a new sublease on the same material terms and conditions as set forth in this Sublease (including, without limitation, the rents set forth herein) and reflecting compliance with Sections 9.a.(2)i), ii), and iii) above.

(5) Sublessee acknowledges that the Lessor has sole authority to determine whether to approve and enter into the New Master Lease, pursuant to and in accordance with Hawaii law, that no such approval has been granted as of the date of this Sublease, and that no prior commitment to issue such approval has been or can be made.

b. Failure to Obtain New Master Lease. If the New Master Lease is not approved by Lessor or if Sublessor otherwise fails to obtain a New Master Lease that automatically extends the term of this Sublease in accordance with Sections 9.a.(3) or 9.a.(4) above, Sublessor agrees to use its best efforts to and will immediately and diligently pursue another means of acquiring sufficient rights to continue to lease the Subleased Premises to Sublessee on substantially the same terms and conditions herein, but for an additional term extending to, on or about March 31, 2079. If a subsequent master lease is approved and duly executed by Lessor and Sublessor, Sublessor shall promptly provide a copy of such subsequent master lease to Sublessee and, at Sublessee’s sole option: (I) the provisions of Sections 9.a.(2)i), ii), and iii) above shall apply as if the subsequent master lease is the "New Master Lease" referred to in Section 9.a. above and Sublessor shall execute an amendment to this Sublease to reflect compliance with Sections 9.a.(2)i), ii), and iii) above or a new sublease on the same material terms and conditions as set forth in this Sublease (including, without limitation, the rents set forth herein) and reflecting compliance with Sections 9.a.(2)i), ii), and iii) above, or (II) Sublessor shall diligently negotiate in good faith a new sublease with Sublessee, if so desired by Sublessee, on the same material terms and conditions as set forth in this Sublease (including, without limitation, the rents set forth herein and compliance with the Master Lease then in effect) or on such other terms and conditions as may be mutually agreeable to Sublessor and Sublessee, with a term ending on or after March 31, 2079.

c. Option to Extend Term. Notwithstanding the foregoing in Sections 9.a. and 9.b. above, Sublessee shall have an option to extend the term of this Sublease beyond December 31, 2033 if Sublessor acquires rights to sublease the Subleased Premises to Sublessee, whether under the New Master Lease or other master lease, and such extension shall be coterminous with such New Master Lease or other master lease, but in no event shall the term of this Sublease extend beyond March 31, 2079. Such option shall expire on December 31, 2033 and Sublessee shall have sole discretion regarding whether or not to exercise such option.

d. Termination Without Cause. Sublessee shall have the right to terminate this Sublease at any time upon six (6) months prior written notice to Sublessor.
e. **Termination for Breach.** This Sublease may be terminated for breach as provided in, and in accordance with, Sections 8 above or 25 below.

f. **Non-use and Abandonment.** If the Sublessee shall, at any time for a continuous period of eleven (11) months, fail or cease to use, or abandon the Subleased Premises, this Sublease shall cease and terminate. Sublessor shall provide written notice to Sublessee within thirty (30) days after the sixth (6th) month of such eleven (11) month period and shall allow Sublessee three (3) months to cure any such purported abandonment.

10. **Effect of Termination or Expiration: Decommissioning.** Upon termination or expiration of this Sublease, Sublessee shall, at Sublessor's sole option and at Sublessee's sole cost and expense either (a) surrender the Subleased Premises with all improvements existing or constructed thereon, or (b) decommission and remove the TMT Facilities and restore the land in accordance with the CMP and the Decommissioning Plan for Mauna Kea Observatories, A Sub-Plan of the Mauna Kea Comprehensive Management Plan (dated January, 2010 and approved by Lessor in March, 2010) ("Decommissioning Plan"), and any amended, supplemental, or successor plans adopted by Sublessor with the approval of the Lessor.

a. **Decommissioning Funding Plan.** Sublessee shall develop and periodically update a Decommissioning Funding Plan as described in, and in accordance with, the Decommissioning Plan, to provide assurance to Sublessor that sufficient funds will be available to carry out deconstruction and site restoration activities upon termination or expiration of this Sublease. The Decommissioning Funding Plan shall include one or more financial assurance mechanisms as described in the Decommissioning Plan. Sublessee shall provide the initial Decommissioning Funding Plan on or before the execution date of this Sublease as set forth above. Sublessee shall submit an updated Decommissioning Funding Plan to Sublessor for Sublessor's review and approval as provided in the CMP, and shall provide such information and documents as Sublessor may reasonably request from time to time to verify the availability and adequacy of funding to meet Sublessee's decommissioning and restoration obligations. If, at any time during the term of this Sublease, Sublessor reasonably determines that the Decommissioning Funding Plan is insufficient, Sublessee shall consult with Sublessor and shall negotiate in good faith to determine the amount of such additional funding and provide such additional funding assurance mechanisms.

b. **Site Decommissioning Plan.** Upon expiration or termination of this Sublease or any extended sublease, decommissioning, including site restoration, shall be carried out in strict compliance with a Site Decommissioning Plan developed and approved in accordance with the Decommissioning Plan ("Decommissioning Obligations").

c. **Delivery of Possession.** Except as otherwise provided herein, upon expiration or termination of this Sublease or any extended sublease and completion of Sublessee's Decommissioning Obligations, Sublessee shall peaceably deliver to Sublessor possession of the Subleased Premises in a clean and orderly condition.
d. **Payment of Decommissioning Costs of Sublessor or Lessor.** Sublessee shall promptly pay on demand any reasonable and necessary costs incurred by Sublessor or Lessor to remedy any failure on the part of Sublessee to fully and timely perform its Decommissioning Obligations.

e. **Survival.** The obligations of Sublessee under this Section 10, the rights and obligations of Sublessor and Sublessee under Sections 9.a., 9.b., and 9.c. above, and the obligations of Sublessee under Section 11 below shall survive expiration or termination of this Sublease.

f. **Termination Without Decommissioning: Assumption of Decommissioning Obligations by Sublessor.** If this Sublease expires or is terminated prior to the expiration of the Master Lease and at a time when the TMT Facilities have remaining useful life, at Sublessor's sole option Sublessee shall be relieved of its Decommissioning Obligations and permitted to surrender its subleasehold interest in the Subleased Premises without removal of the TMT Facilities on such terms as may be mutually agreed in writing by Sublessor and Sublessee, which may include payment to Sublessor of an amount to be held in reserve for future decommissioning in exchange for Sublessor's assumption of the Decommissioning Obligations.

11. **Indemnity.** Sublessee shall indemnify, defend, and hold harmless Lessor, Sublessor, and their officers, agents, employees, and other persons acting on their behalf, from and against any claim or demand for loss, liability, or damages (including, but not limited to, reasonable attorneys' fees and claims for property damage, personal injury, or death, based upon any accident, fire, or other incident on or about the Subleased Premises) to the extent arising or resulting from: (1) any act or omission on the part of Sublessee relating to Sublessee's use, occupancy, maintenance, or enjoyment of the Subleased Premises; (2) any failure on the part of Sublessee to properly maintain the Subleased Premises and areas adjacent thereto in Sublessee's use and control, including any accident, fire, or nuisance, arising from or caused by any failure on the part of Sublessee to maintain the Subleased Premises in a safe condition; or (3) Sublessee's non-observance or non-performance of any of the terms, covenants, and conditions of this Sublease or the Master Lease or the rules, regulations, ordinances and laws of the Federal, State, or County governments. Sublessee further agrees to indemnify, defend, and hold harmless Lessor and Sublessor from any damages or claims arising from the release of "hazardous material" (as defined in Section 31 below) on the Subleased Premises occurring while Sublessee is in possession, or elsewhere if caused by Sublessee or any person acting under Sublessee.

12. **Insurance.** Sublessee shall, at its own cost and expense, maintain the following insurance. Such insurance shall be subject to the reasonable approval of Sublessor and Lessor and, except as to any property insurance, shall name Sublessor and Lessor as additional insureds. Sublessee shall deliver executed certificates thereof to Sublessor on or before the Effective Date of this Sublease and thereafter within a reasonable time prior to the expiration of the term of each such policy. As often as any such policy shall expire or terminate, renewal or additional policies shall be procured and maintained by Sublessee in like manner to like extent. If Sublessee has only provided
Sublessor with certificates evidencing the policies required to be carried by Sublessee under this Sublease, Sublessee agrees to deliver executed copies of all such required policies to Sublessor within ten (10) days of Sublessor's written request for the same.

   a. **Property Insurance.** Sublessee shall at its own expense and at all times during the term of this Sublease keep Sublessee's property, including but not limited to the TMT Facilities, insured against (i) all of the risks covered by a standard ISO Commercial Property Special Causes of Loss Form (or equivalent) which shall be in an amount equal to the full replacement cost of such property and shall not have a deductible in excess of Two Hundred and Fifty Thousand Dollars ($250,000), and (ii) such other hazards or risks which a reasonably prudent telescope operator on Mauna Kea would insure against. Sublessee hereby waives any and all rights of subrogation which it may have against Lessor and/or Sublessor, except to the extent of available insurance. In case the property required to be insured above or any part thereof shall be destroyed or damaged by fire or such other casualty required to be insured against, then and as often as the same shall happen, the proceeds of such insurance shall be paid to Sublessee to be used by Sublessee to promptly repair and restore any damage to such property.

   b. **Liability Insurance.** Sublessee shall procure at Sublessee's expense and keep in force during the term of this Sublease and any extension thereof, the following insurance:

   i) **General Liability Insurance.** Commercial general liability insurance (including coverage for liability caused by the fault of Sublessee, products-completed operations liability, personal and advertising injuries and coverage for contractual liability to the extent provided by ISO Form CGL #00-01-04-13 (or equivalent) covering Sublessee and naming as additional insureds: (i) Sublessor, (ii) Lessor, (iii) Sublessor's and Lessor's managers, officers, agents and employees, and (iv) such other parties as Sublessor may specify, insuring against liability arising out of the use, occupancy or maintenance of the Subleased Premises and areas appurtenant thereto by Sublessee with limits of not be less than One Million Dollars ($1,000,000) for property damage, and Five Million Dollars ($5,000,000) for injuries and deaths in any one occurrence or a combined single limit of Five Million Dollars ($5,000,000) per occurrence and deductibles of no more than Two Hundred and Fifty Thousand Dollars ($250,000). Such insurance shall be primary and shall not limit the liability of the Sublessee under Section 11 above.

   ii) **Auto Liability Insurance.** Auto liability insurance covering all automobiles used by Sublessee in connection with its operations in the Subleased Premises with limits of not less than Five Hundred Thousand Dollars ($500,000) for property damage, and Five Million Dollars ($5,000,000) for injuries or deaths in any one occurrence or a combined single limit of Five Million Dollars ($5,000,000) per occurrence, with deductibles of no more than Five Thousand Dollars ($5,000) per occurrence and naming Sublessor and Lessor as additional insureds.

   iii) **Pollution Liability Insurance.** Pollution liability insurance in the amount of not less than Five Million Dollars ($5,000,000) and with deductibles of no
more than Two Hundred and Fifty Thousand Dollars ($250,000) per occurrence and naming Sublessor and Lessor as additional insureds. Such insurance shall cover bodily injury, property damage, and environmental damage, including clean up and defense and remediation costs, for occurrences that arise from the occupancy or use of the Subleased Premises during the term of this Sublease by Sublessee.

c. General Insurance Requirements.

i) Sublessee shall use its best efforts to obtain the following terms in each policy of commercial property insurance and general liability insurance required in Sections 12.a. and 12.b. above to the extent that such terms are reasonably available in the commercial marketplace:

a) a provision that the liability of the insurer thereunder shall not be affected by, and that the insurer shall not claim, any right of set-off, counterclaim, apportionment, proration, or contribution by reason of, any other insurance obtained by or for Sublessor, Lessor, Sublessee, or any person claiming by, through, or under any of them; and

b) no provision relieving the insurer from liability for loss occurring while the hazard to buildings and personal property is increased, whether or not within the knowledge or control of, or because of any breach of warranty or condition or any other act or neglect by Sublessor, Lessor, Sublessee, or any person claiming by, through, or under any of them.

ii) Each policy of commercial property insurance and general liability insurance required in Sections 12.a. and 12.b. above shall:

a) be written by an insurance company rated A- or better, Class size VIII or better, by the Best's Key Rating Guide, based upon the rating system in effect on the date this Sublease is signed. In the event that Best's changes its rating system or ceases to provide ratings at some later date, then such insurance company shall have a rating from Best (or some other comparable rating service if Best's ceases to provide ratings) comparable to the "A- or better, Class VIII or better" requirement of the immediately preceding sentence; and

b) be specifically endorsed to provide that they are primary policies, not contributing with and not in excess of any coverage that Sublessor and/or Lessor may carry, notwithstanding anything to the contrary contained in any policies obtained by Sublessor and/or Lessor.

In addition, Sublessor shall request that each such policy be specifically endorsed to provide that such policy may not be cancelled except upon the insurer giving at least thirty (30) days' prior written notice thereof (ten (10) days in the case of nonpayment of premium) to Sublessor, Lessor, Sublessee, and other person having an interest in the property who has requested such notice of the insurer.
13. **Taxes, Assessments, etc.** Sublessee shall pay or cause to be paid, when due, the amount of all taxes, rates, and assessments of every description as to which the Subleased Premises or any part, or any improvements, or the Lessor, Sublessor, or Sublessee, are now or may be assessed or become liable by authority of law during the term of this Sublease; provided, however, that with respect to any assessment made under any betterment or improvement law which may be payable in installments, Sublessee shall be required to pay only those installments, together with interest, which becomes due and payable during the term of this Sublease.

14. **Utility Services.** Sublessee shall be responsible for obtaining any utility services and shall pay when due all charges, duties and rates of every description, including water, sewer, gas, refuse collection or any other charges, as to which the Subleased Premises or any part, or any improvements, or the Lessor, Sublessor, or Sublessee may become liable for during the term, whether assessed to or payable by the Lessor, Sublessor, or Sublessee.

15. **Covenant against discrimination.** The use and enjoyment of the Subleased Premises shall not be in support of any policy which discriminates against anyone based upon race, creed, sex, color, national origin, religion, marital status, familial status, ancestry, physical handicap, disability, age or HIV (human immunodeficiency virus) infection.

16. **Sanitation.** Sublessee shall keep the Subleased Premises and improvements in a strictly clean, sanitary and orderly condition.

17. **Waste and Unlawful, Improper or Offensive Use of Subleased Premises.** Sublessee shall not commit, suffer or permit to be committed any waste, nuisance, strip or unlawful, improper or offensive use of the Subleased Premises or any part, nor, without the prior written consent of the Lessor and Sublessor, cut down, remove or destroy, or suffer to be cut down, removed or destroyed, any trees now growing on the premises.

18. **Compliance with Laws.** Sublessee shall comply with all applicable requirements of all municipal, state, and federal authorities and observe all municipal, state and federal laws applicable to the Subleased Premises, now in force or which may be in force.

19. **Inspection of Subleased Premises.** Upon reasonable notice by Sublessor to Sublessee, Sublessee shall permit the Lessor, Sublessor, and their respective agents, at all reasonable times during the Sublease term, to enter the Subleased Premises and examine the state of its repair and condition.

20. **Improvements.** Sublessee shall not at any time during the term of this Sublease construct, place, maintain and install on the premises any building, structure or improvement of any kind and description except with the prior written approval of the Lessor and the Sublessor and upon those conditions as the Lessor or Sublessor may impose, unless otherwise provided in this Sublease. Construction of the TMT Facilities in accordance with Section 4 above is authorized. Except as otherwise provided in this
21. **Repairs to Improvements.** Sublessee shall, at its own expense, keep, repair, and maintain all buildings and improvements now existing or hereafter constructed or installed on the Subleased Premises in good order, condition and repair, reasonable wear and tear excepted.

22. **Liens.** Sublessee shall not commit or suffer any act or neglect which results in the Subleased Premises, any improvement, the leasehold estate of the Sublessor, or the subleasehold estate of the Sublessee becoming subject to any attachment, lien, charge, or encumbrance, except as provided in this Sublease, and shall indemnify, defend, and hold the Lessor and Sublessor harmless from and against all attachments, liens, charges, and encumbrances and all resulting expenses.

23. **Assignments, etc.** Sublessee shall not sublease, subrent, transfer, assign, or permit any other person to exclusively occupy the Subleased Premises or any portion or transfer or assign this Sublease or any interest therein, either voluntarily or by operation of law, without the prior written approval of the Lessor and the Sublessor.

24. **Costs of Litigation.** Sublessee shall pay all costs, including reasonable attorney's fees, and expenses incurred by or paid by the Lessor or Sublessor (i) in enforcing the covenants and agreements of the Master Lease or this Sublease with respect to Sublessee, (ii) in recovering possession of the Subleased Premises, or (iii) in the collection of delinquent rental, taxes, and any and all other charges.

25. **Breach.** Time is of the essence in this Sublease and if the Sublessee shall become bankrupt, or if this Sublease and Subleased Premises shall be attached or taken by operation of law, or if Sublessee shall fail to observe and perform any of the material covenants, terms, and conditions contained in this Sublease and on its part to be observed and performed (other than a failure that causes a breach of the Master Lease, in which case Sublessor and Sublessee hereby agree that Section 8 above applies), and this failure shall continue for a period of more than sixty (60) days after delivery by the Sublessor of a written notice of breach or default and demand for cure, by personal service, registered mail or certified mail to the Sublessee at its last known address and to each holder of record having a security interest in the premises, then Sublessor may, subject to the provisions of Section 171-21 of the Hawaii Revised Statutes, at once re-enter the premises, or any part, and upon or without the entry, at its option, terminate this Sublease without prejudice to any other remedy or right of action for arrears of rent or for any preceding or other breach of contract; and in the event of termination, at the option of Sublessor, all buildings and improvements shall remain and become the property of the Sublessor or shall be removed by Sublessee in accordance with Section 10 above; furthermore, Sublessor shall retain all rent paid in advance to be applied to any damages.

26. **Condemnation.** If at any time, during the term of this Sublease, any portion of the Subleased Premises should be condemned, or required for public purposes by any...
government authority, the rental shall be reduced in proportion to the value of the portion of the Subleased Premises condemned. Sublessee shall be entitled to receive from the condemning authority the proportionate value of the Sublessee's permanent improvements so taken in the proportion that it bears to the unexpired term of the Sublease; provided, that the Sublessee may, in the alternative, remove and relocate its improvements to the remainder of the lands occupied by Sublessee. Sublessee shall not by reason of the condemnation be entitled to any claim against the Lessor or Sublessor for condemnation or indemnity for leasehold interest and all compensation payable or to be paid for or on account of the leasehold interest by reason of the condemnation shall be payable to and be the sole property of the Lessor or Sublessor. The foregoing rights of the Sublessee shall not be exclusive of any other to which Sublessee may be entitled by law. Where the portion taken renders the remainder unsuitable for the use or uses for which the Subleased Premises were leased, Sublessee shall have the option to surrender this lease and be discharged and relieved from any further liability; provided, that Sublessee shall remove the permanent improvements constructed, erected and placed by it within any reasonable period allowed by the Lessor and Sublessor, in accordance with Section 10 above.

27. **Right to Enter.** The Lessor, Sublessor, or the County of Hawaii and their agents or representatives shall have the right to enter and cross any portion of the Subleased Premises for the purpose of performing any public or official duties; provided, however, in the exercise of these rights, the Lessor, Sublessor, or the County of Hawaii shall not interfere unreasonably with the Sublessee or Sublessee's use and enjoyment of the Subleased Premises.

28. **Extension of Time.** Notwithstanding any provision contained in this Sublease, when applicable, Sublessor may for good cause shown, allow additional time beyond the time or times specified in this Sublease for the Sublessee to comply, observe, and perform any of the Sublease terms, conditions, and covenants.

29. **Quiet Enjoyment.** Sublessor covenants and agrees with Sublessee that upon payment of the rent at the times and in the manner provided and the observance and performance of these covenants, terms, and conditions on the part of the Sublessee to be observed and performed, the Sublessee shall and may have, hold, possess, and enjoy the premises for the term of this Sublease, without hindrance or interruption by the Lessor, Sublessor or any other person or persons lawfully claiming by, through, or under the Lessor or Sublessor.

30. **Non-warranty.** Neither the Lessor nor Sublessor warrants the conditions of the Subleased Premises, as the same are being subleased as is.

31. **Hazardous Materials.** Sublessee shall not cause or permit the escape, disposal or release of any hazardous materials except as permitted by law. Sublessee shall not allow the storage or use of such materials in any manner not sanctioned by law or by the highest standards prevailing in the industry for the storage and use of such materials, nor allow to be brought onto the premises any such materials except to use in the ordinary
course of Sublessee's business where the Sublessee has provided Sublessor with a list that contains the identity of such materials used or stored by Sublessee in the ordinary course of its business and in compliance with all applicable federal and state regulations; provided, that if Sublessor disapproves in writing any such materials, the disapproved materials shall not be brought onto the Subleased Premises. If any lender or governmental agency shall ever require testing to ascertain whether or not there has been any release of hazardous materials by Sublessee, then the Sublessee shall be responsible for the reasonable costs thereof. In addition, Sublessee shall execute affidavits, representations and the like from time to time at Lessor's or Sublessor's request concerning Sublessee's best knowledge and belief regarding the presence of hazardous materials on the Subleased Premises placed or released by Sublessee.

For the purpose of this Sublease, "hazardous material" shall mean any pollutant, toxic substance, hazardous waste, hazardous material, hazardous substance, or oil as defined in or pursuant to the Resource Conservation and Recovery Act, as amended, the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, the Federal Clean Water Act, or any other federal, state, or local environmental law, regulation, ordinance, rule, or by-law, whether existing as of the date hereof, previously enforced, or subsequently enacted.

32. Hawaii Law. This Sublease shall be construed, interpreted, and governed by the laws of the State of Hawaii.

33. Exhibits - Incorporation in Sublease. All exhibits referred to herein are attached to this Sublease and hereby are deemed incorporated by reference.

34. Headings. The section headings herein are inserted only for convenience and reference and shall in no way define, describe or limit the scope or intent of any provision of this Sublease.

35. Partial Invalidity. If any term, provision, covenant or condition of this Sublease should be held to be invalid, void or unenforceable, the remainder of this Sublease shall continue in full force and effect and shall in no way be affected, impaired or invalidated thereby.

36. Withdrawal. If and to the extent that Lessor exercises its power of withdrawal under the Master Lease to withdraw any portion of the Subleased Premises for public uses or purposes upon giving reasonable notice and without compensation except as otherwise provided in the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease between Sublessor and Lessor that includes the Subleased Premises, then Sublessor shall have the right to withdraw these same portions of the Subleased Premises during the term of this Sublease upon giving reasonable notice to Sublessee and subject to the Sublessee's claim for any compensation provided under the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease between Sublessor and Lessor that includes the Subleased Premises for any permanent improvement constructed upon the Subleased Premises that is destroyed or made unusable in the process of the withdrawal or
taking. Upon such withdrawal, or upon the taking which causes any portion of the Subleased Premises to become unusable for the specific use or uses for which it was subleased, the rent shall be reduced in proportion to the value of the land withdrawn or made unusable, and to the extent permitted in the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease between Sublessor and Lessor that includes the Subleased Premises, if any permanent improvement constructed upon the land by Sublessee is destroyed or made unusable in the process of the withdrawal or taking, the proportionate value shall be paid based upon the unexpired term of the lease (which value shall also include the cost of decommissioning such improvements including site restoration as required in the Decommissioning Plan).

37. Building Construction. All building construction shall be in full compliance with all applicable laws, rules and regulations of the federal, state, and county governments and in accordance with plans and specifications submitted to and approved by the Sublessor and the Chairman of the Board of Land and Natural Resources prior to commencement of construction.

38. Clearances. Sublessee shall be responsible for obtaining all necessary federal, state or county clearances.

39. Time of Essence. Time is of the essence in all provisions of this Sublease.

40. Written Notice. All notices shall be in writing and shall be deemed to have been delivered on the date sent if sent by certified mail (return receipt requested) or recognized courier (with delivery confirmation) or transmitted by facsimile (with written confirmation of transmission) and in each case with a copy sent by email on the same date as follows:

Sublessor:

Chancellor
University of Hawaii at Hilo
200 West Kawili Street
Hilo, Hawaii 96720-4091
Telephone: (808) 932-7348
Facsimile: (808) 932-7338
Email: dstraney@hawaii.edu

Sublessee:

Project Manager (during construction) or Observatory Director (after first light; contact information for Observatory Director to be delivered to Sublessor by written notice following construction)
TMT International Observatory LLC
1111 South Arroyo Parkway, Suite 200
Pasadena, CA 91105
41. Dispute Resolution. Any dispute relating to or arising as a result of or in connection with this Sublease, if not resolved by negotiation, shall be submitted first to non-binding mediation with Dispute Prevention & Resolution, Inc. and if such mediation is not concluded within six (6) months after submission, then shall be decided in legal or equitable proceedings in accordance with Hawaii law in any court having jurisdiction in the State of Hawaii. Such mediation shall take place in the County of Honolulu, State of Hawaii. Each party shall bear its own costs and fees for such mediation and the fees and expenses of the mediator shall be borne by the parties equally.

42. Historic preservation. In the event any historic properties or burial sites, as defined in Section 6E-2 of the Hawaii Revised Statutes, are found on the Subleased Premises, Sublessee and Sublessee’s agents, employees and representatives shall immediately stop all land utilization and/or work and contact the Historic Preservation Office in compliance with Hawaii Revised Statutes Chapter 6E.

43. Removal of Trash. Sublessee shall be responsible for the removal of all illegally dumped trash upon the premises within ninety (90) days from the date of execution of this Sublease and shall so notify the Sublessor in writing at the end of ninety (90) days.

44. Phase I Environmental Site Assessment. Prior to termination or revocation of this Sublease, Sublessee shall conduct a Phase I environmental site assessment of the Subleased Premises and conduct a complete abatement and disposal of any such sites, if necessary, satisfactory to the standards required by the Federal Environmental Protection Agency, the Department of Health, and the Department of Land and Natural Resources. Failure to comply with the provisions of this Section 44 shall not extend the term of this Sublease or automatically prevent termination or revocation of the lease. Sublessor, at its sole option, may refuse to approve termination, unless this evaluation and abatement provision has been performed. In addition or in the alternative, Sublessor may, at its sole option if Sublessee does not so, arrange for performance of the provisions of this Section 44, all costs and expenses of such performance to be charged to and paid by Sublessee.
45. **Counterparts.** This Sublease may be executed in counterparts, each of which so executed shall, irrespective of the date of its execution and delivery, be deemed an original (including counterparts delivered by facsimile or email), and said counterparts together shall constitute one and the same agreement binding all of the parties hereto.

*Remainder of page intentionally left blank; signature page follows.*
IN WITNESS WHEREOF, Sublessor and Sublessee have executed this Sublease as of the date first written above.

SUBLESSOR:

FOR THE UNIVERSITY OF HAWAI'I:

By

Name: David Lassner
Title: President
Date: July 21, 2014

By

Name: Howard Todo
Title: Vice-President for Budget and Finance
Date: July 28, 2014

SUBLESSEE:

FOR TMT INTERNATIONAL OBSERVATORY LLC:

By

Name: Edward C. Stone
Title: Executive Director
Date: July 23, 2014

By

Name: Donald Straney
Title: Chancellor, University of Hawaii at Hilo
Date: July 28, 2014

Approved as to form:

By

Name: Lawrence S. Okinaga, Carlsmitth Ball LLP
Title: Special General Counsel
Date: July 28, 2014
The attached document: SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT BETWEEN TMT INTERNATIONAL OBSERVATORY LLC AND THE UNIVERSITY OF HAWAI'I, dated July 28, 2014 which consists of 48 pages (including this page), was executed by DAVID LASSNER and HOWARD TODO and on this 28 day of July, 2014 in the First Judicial Circuit of the State of Hawaii, personally known/proved to me on the basis of satisfactory evidence to be the persons, who personally appeared before me and being by me duly sworn or affirmed, did say that they are the PRESIDENT and VICE-PRESIDENT FOR BUDGET AND FINANCE, respectively, of the UNIVERSITY OF HAWAI'I, and that such persons executed the foregoing instrument as the free act and deed of such persons, and if applicable in the capacities shown, having been duly authorized to execute such instrument in such capacities.

[Notary Signature]

Printed Name: Notary Name

My commission expires: July 18, 2016
The attached document: **SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT BETWEEN TMT INTERNATIONAL OBSERVATORY LLC AND THE UNIVERSITY OF HAWAII, dated July 28, 2014 which consists of 48 pages (including this page), was executed by DONALD STRANEY on this 28th day of July, 2014 in the Third Judicial Circuit of the State of Hawaii, personally known/proved to me on the basis of satisfactory evidence to be the person, who personally appeared before me and being by me duly sworn or affirmed, did say that he is the CHANCELLOR of UNIVERSITY OF HAWAI’I AT HILO, and that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

[Notary Signature]

Printed Name: Notary Name

My commission expires: ________

[notary stamp or seal]
The attached document: SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT BETWEEN TMT INTERNATIONAL OBSERVATORY LLC AND THE UNIVERSITY OF HAWAII, dated July 23, 2014 which consists of 22 pages (including this page), was executed by EDWARD C. STONE on this 23rd day of July, 2014, personally known/proved to me on the basis of satisfactory evidence to be the person, who personally appeared before me and being by me duly sworn or affirmed, did say that he is the EXECUTIVE DIRECTOR of TMT INTERNATIONAL OBSERVATORY LLC and that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

[notary stamp or seal]

Printed Name: Notary Name C.M. Aguilar

My commission expires: Jan. 16, 2017
Exhibit A to Sublease

Master Lease (General Lease No. S-4191)

GENERAL LEASE NO. S-4191

THIS INDENTURE OF LEASE, made this 1st day of January, 1968, by and between the STATE OF HAWAII, by its Board of Land and Natural Resources, pursuant to the provisions of Section 103A-90(b), Revised Laws of Hawaii 1955, as amended, hereinafter referred to as the "LESSEOR", and the UNIVERSITY OF HAWAII, a body corporate, whose post office address is 2444 Dole Street, Honolulu, City and County of Honolulu, State of Hawaii, hereinafter referred to as the "LESSEE",

WITNESSETH THAT:

FOR and in consideration of the mutual promises and agreements contained herein, the Lessor does hereby demise and lease unto the said Lessee and the said Lessee does hereby rent and lease from the Lessor, all of that certain parcel of land situate at Kaohe, Hamakua, County and Island of Hawaii, State of Hawaii, and more particularly described in Exhibit "A", hereto attached and made a part hereof.

TO HAVE AND TO HOLD, all and singular the said premises, herein mentioned and described, unto the said Lessee, for and during the term of sixty-five (65) years, to commence from the 1st day of January, 1968, and to terminate on the 31st day of December, 2033.
RESERVING UNTIL THE LESSOR THE FOLLOWING:

1. Water Rights. All surface and ground waters appurtenant to the demised premises, together with the right to enter and to capture, divert or impound water; provided, that the Lessor shall exercise such rights in such manner as not to interfere unreasonably with the Lessee's use of the demised premises; provided, further, that the Lessee shall have the right to use the waters of Lake Waiau for any purpose necessary or incidental to the use permitted by this lease on the following conditions:
   a. No drilling or disturbance of Lake Waiau's bottom, banks or areas adjacent thereto shall be permitted;
   b. No activity shall be permitted which will result in the pollution of the waters of Lake Waiau;
   c. Lessee shall not take or divert any of the waters arising from springs which furnish the water supply for Pohakuloa, and no alterations to said springs shall be made by Lessee.

2. Access. All rights to cross the demised premises for inspection or for any government purposes.

3. Hunting and Recreation Rights. All hunting and recreation rights on the demised lands, to be implemented pursuant to rules and regulations issued by said Board in discharging its fish and game or state parks responsibilities; provided, however, that such hunting and recreation activities shall be coordinated with the activities of the Lessee on the demised lands; and provided, further, that such hunting and recreation activities shall be limited to day-light hours only.
4. **Right to use Demised Lands.** The right for itself, and its successors, lessees, grantees and permittees, to use any portion of the lands demised and the right to grant to others rights and privileges affecting said land, provided, however, that, except as otherwise provided herein, no such use shall be permitted or rights and privileges granted affecting said lands, except upon mutual determination by the parties hereto that such use or grant will not unreasonably interfere with the Lessee's use of the demised premises; provided, further, that such agreement shall not be arbitrarily or capriciously withheld.

THE LESSEE, IN CONSIDERATION OF THE PREMISES, COVENANTS WITH THE LESSOR AS FOLLOWS:

1. **Surrender.** The Lessee shall, at the expiration or sooner termination of this lease, peaceably and quietly surrender and deliver possession of the demised premises to the Lessor in good order and condition, reasonable wear and tear excepted.

2. **Maintenance of the Premises.** The Lessee shall keep the demised premises and improvements in a clean, sanitary and orderly condition.

3. **Waste.** The Lessee shall not make, permit or suffer, any waste, strip, spoil, nuisance or unlawful, improper or offensive use of the demised premises.

4. **Specified Use.** The land hereby leased shall be used by the Lessee as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve, being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex.

Activities inimical to said scientific complex shall include light and dust interference to observatory operation.
5. **Assignments.** The Lessee shall not sublease, subrent, assign or transfer this lease or any rights thereunder without the prior written approval of the Board of Land and Natural Resources.

6. **Improvements.** The Lessee shall have the right during the existence of this lease to construct and erect buildings, structures and other improvements upon the demised premises; provided, that plans for construction and plot plans of improvements shall be submitted to the Chairman of the Board of Land and Natural Resources for review and approval prior to commencement of construction. The improvements shall be and remain the property of the Lessee, and shall be removed or disposed of by the Lessee at the expiration or sooner termination of this lease; provided, that with the approval of the Chairman such improvements may be abandoned in place. The Lessee shall, during the term of this lease, properly maintain, repair and keep all improvements in good condition.

7. **Termination by the Lessee.** The Lessee may terminate this lease at any time by giving thirty (30) days' notice in writing to the Lessor.

8. **Termination by the Lessor.** In the event that (1) the Lessee fails to comply with any of the terms and conditions of this lease, or (2) the lessee abandons or fails to use the demised lands for the use specified under paragraph 4 of these covenants for a period of two years, the Lessor may terminate this lease by giving six months' notice in writing to the Lessee.

9. **Non-Discrimination.** The Lessee covenants that the use and enjoyment of the premises shall not be in support of any
policy which discriminates against anyone based upon race, creed, color or national origin.

10. General Liability. The Lessee shall at all times, with respect to the demised premises, use due care for safety, and the Lessee shall be liable for any loss, liability, claim or demand for property damage, personal injury or death arising out of any injury, death or damage on the demised premises caused by or resulting from any negligent activities, operations or omissions of the Lessee on or in connection with the demised premises, subject to the laws of the State of Hawaii governing such liability.

11. Laws, Rules and Regulations, etc. The Lessee shall observe and comply with Regulation 4 of the Department of Land and Natural Resources and with all other laws, ordinances, rules and regulations of the federal, state, municipal or county governments affecting the demised lands or improvements.

12. Objects of Antiquity. The Lessee shall not appropriate, damage, remove, excavate, disfigure, deface or destroy any object of antiquity, prehistoric ruin or monument of historical value.

13. Undesirable Plants. In order to prevent the introduction of undesirable plant species in the area, the Lessee shall not plant any trees, shrubs, flowers or other plants in the leased area except those approved for such planting by the Chairman.

IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board of Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be duly executed this __/__/.
day of ______________, 1968, and the UNIVERSITY OF HAWAII, by its ______________ and ______________ has caused these presents to be duly executed this ______________ day of ______________, 1968, effective as of the day and year first above written.

STATE OF HAWAII

By: __________________________
   Chairman and Member
   Board of Land and Natural Resources

And By: __________________________
   Member
   Board of Land and Natural Resources

UNIVERSITY OF HAWAII

By: __________________________
   Its Agent President

And By: __________________________
   Its

APPROVED AS TO FORM:

Deputy Attorney General
Dated: ______________

Proofed by: ______________
EXHIBIT "A"

MAUNA KEA SCIENCE RESERVE
Kohe, Hamakua, Island of Hawaii, Hawaii

Being a portion of the Government Land of Kohe

Beginning at a point on the south boundary of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "SUMMIT 1955" being 12,325.95 feet South and 471.84 feet West, as shown on Government Survey Registered Map 2789, thence running by azimuths measured clockwise from True South:

1. Along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 135° 00' 18,667.62 feet;

2. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 225° 00' 18,667.62 feet;

3. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 281° 18' 04.6" 5173.56 feet;

4. 207° 49' 06.5" 841.83 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

5. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1200.00 feet, the chord azimuth and distance being: 297° 49' 06.5" 2400.00 feet;
6. 27° 49' 06.5" 841.83 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

7. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 306° 59' 47.4" 1824.16 feet;

8. 227° 29' 00.9" 2805.06 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

9. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1500.00 feet, the chord azimuth and distance being: 317° 29' 00.9" 3000.00 feet;

10. 47° 29' 00.9" 2805.06 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

11. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13200.00 feet, the chord azimuth and distance being: 325° 31' 55.2" 701.87 feet;

12. 245° 46' 12.7" 2760.45 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

13. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 2000.00 feet, the chord azimuth and distance being: 335° 46' 12.7" 4000.00 feet;

14. 65° 46' 12.7" 2760.45 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

15. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 352° 14' 32.9" 3563.50 feet;
16. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 45° 00' 18,667.62 feet to the point of beginning and containing an area of 11,321.054 ACRES.

EXCEPTING and RESERVING to the State of Hawaii and to all others entitled thereto, the Mauna Kea-Humula and Mauna Kea-Baikoa Trails, and all other existing trails within the above-described parcel of land, together with rights of access over and across said trails.

ALSO, EXCEPTING and RESERVING to the State of Hawaii, its successors and assigns, the waters and all riparian and other rights in and to all the streams within the above-described parcel of land.
Exhibit B to Sublease

Consent to Sublease Under General Lease No. S-4191

(attached)
CONSENT TO SUBLEASE OF GENERAL LEASE NO. S-4191

CONSENT is hereby given by the STATE OF HAWAII, by its Board of Land and Natural Resources, Lessor under unrecorded General Lease No. S-4191 dated June 21, 1968, leased to the University of Hawaii, a public body corporate, as Lessee, to the attached Sublease and Non-Exclusive Easement Agreement ("Sublease") dated _________, 2014, from the UNIVERSITY OF HAWAII, a public body corporate, as "Sublessor," to TMT INTERNATIONAL OBSERVATORY LLC, a Delaware limited liability company, as "Sublessee"; SUBJECT, HOWEVER, to the provisions of Section 171-21, Hawaii Revised Statutes, as amended, relating to the rights of holder of security interests, PROVIDED, FURTHER, that noting contained herein shall change, modify, waive or amend the provisions, terms, conditions and covenants or the duties and obligations of the Lessee or Sublessee under General Lease S-4191.

IT IS UNDERSTOOD that except as provided herein, should there be any conflict between the terms of General Lease No. S-4191 and the terms of the Sublease, the former shall control; and that no further sublease or assignment of any interest of the premises or any portion thereof shall be made without the prior written consent of the Board of Land and Natural Resources.

IT IS FURTHER UNDERSTOOD AND AGREED by the STATE OF HAWAII, by its Board of Land and National Resources, that in the event said General Lease No. S-4191 is surrendered or defaulted upon by Lessee, UNIVERSITY OF HAWAII, prior to the expiration of the term thereof, the Sublease shall remain in full force and effect for the remainder of the term thereof, and Sublessee, TMT INTERNATIONAL OBSERVATORY LLC, shall be allowed its continued right to quiet enjoyment of the demised premises, upon and subject to the terms, conditions and covenants of General Lease No. S-4191. For the avoidance of doubt, for purposes of the immediately preceding sentence, a "surrender" by Lessee, UNIVERSITY OF HAWAII, does not include a mutual cancellation of said General Lease No. S-4191 and concurrent issuance of a New Master Lease (as defined in Section 9.a. of the Sublease) on terms that are acceptable to Sublessee or other master lease on terms that are acceptable to Sublessee, TMT INTERNATIONAL OBSERVATORY LLC, as contemplated by Section 9 of the Sublease.

FURTHERMORE, Lessee hereby acknowledges that the Lessor’s consent to sublease under General Lease No. S-4191 does not release the Lessee of any and all responsibilities, obligations, liabilities, and claims respecting or arising under or out of said General Lease prior to the effective date of this consent.
IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board and Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be fully executed on this ____ day of __________, 2014.

STATE OF HAWAII

By________________________
Chairperson and Member
Board of Land and
Natural Resources

LESSOR

UNIVERSITY OF HAWAII, a public body corporate

By________________________
DAVID LASSNER
Its President

By________________________
HOWARD TODO
Its Vice-President for Budget and Finance

By________________________
DONALD STRANEY
Chancellor, University of Hawai‘i at Hilo

LESSEE

APPROVED AS TO FORM:

________________________
Deputy Attorney General
Dated: __________

DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P. O. Box 621
Honolulu, Hawaii 96809
STATE OF HAWAII )
) ss.
CITY AND COUNTY OF HONOLULU )

On this __ day of ___________, 2014, before me personally appeared DAVID LASSNER, HOWARD TODO and DONALD STRANEY personally known, who, being by me duly sworn or affirmed, did say that they are the President of the University of Hawai‘i, the Vice-President for Budget and Finance of the University of Hawai‘i, and the Chancellor of the University of Hawai‘i at Hilo, respectively, and that the foregoing instrument was signed in the capacity shown, having been duly authorized to execute such instrument on behalf of the University of Hawai‘i, a public body corporate, by authority of its Board of Regents, and that said DAVID LASSNER, HOWARD TODO and DONALD STRANEY acknowledged the foregoing instrument as the free act and deed of said University.

Name: ________________________________________
Notary Public, State of Hawaii
My commission expires: ________________________

(Notary Stamp or Seal)

NOTARY CERTIFICATION STATEMENT

<table>
<thead>
<tr>
<th>Document Identification or Description:</th>
<th>CONSENT TO SUBLEASE OF GENERAL LEASE NO. S-4191</th>
</tr>
</thead>
</table>

Document Date: ____________________________
No. of Pages: ______________________________
Jurisdiction (in which notarial act is performed): Third Judicial Circuit of the State of Hawaii

Signature of Notary  
Date of Notarization and Certification Statement  
(Notary Stamp or Seal)

Printed Name of Notary
Exhibit C-1 to Sublease

Subleased Premises and Easement Area

(attached)
Exhibit C-2 to Sublease

Legal Description of Subleased Premises

(attached)
DESCRIPTION

TMT SITE PREMISES

All of that certain parcel of land being a portion of the Government Land of Kaohe, being also a portion of Mauna Kea Science Reserve covered by General Lease S-4191 to the University of Hawaii Situated at Kaohe, Hamakua, Island of Hawaii, Hawaii

Beginning at the southwest corner of this parcel of land referred to the Hawaii State Plane Coordinate System, Zone 1 (NAD83) 362,519.00 feet North and 1,646,660.00 feet East and the direct azimuth and distance from the Government Survey Triangulation Station “SUMMIT 1955” being 129° 52' 08'"; 6,166.86 feet and running by azimuths measured clockwise from True South:

1. 152° 35’ 33’’ 304.14 feet along the remainder of the Government Land of Kaohe and the remainder of Mauna Kea Science Reserved covered by General Lease S-4191 to the University of Hawaii;

2. 180° 00’ 00’’ 190.00 feet same;

3. 270° 00’ 00’’ 630.00 feet along same;

4. 0° 00’ 00’’ 430.00 feet along same;

5. 90° 00’ 00’’ 320.00 feet along same;

6. 0° 00’ 00’’ 30.00 feet along same;

7. 90° 00’ 00’’ 170.00 feet along the same to the point of beginning and containing an area of 5.9986 acres, more or less.

Description Prepared By:
Engineering Partners Inc.

Hilo, Hawaii, March 10, 2014
Exhibit C-3 to Sublease

Legal Description of Easement Area

(attached)
DESCRIPTION

NON-EXCLUSIVE ACCESS AND UTILITY EASEMENT

All of that certain parcel of land being a portion of the Government land of Kaohe, being also a portion of Mauna Kea Science Reserve covered by General Lease S-4191 to the University of Hawaii Situate at Kaohe, Hamakua, Island of Hawaii, Hawaii

Beginning at the southwest corner of this parcel of land referred to the Hawaii State Plane Coordinate System, Zone 1 (NAD83) 361,104.89 feet North and 1,647,460.58 feet East and the direct azimuth and distance from the Government Survey Triangulation Station “SUMMIT 1955” being 122° 50’ 16”; 4,680.47 feet and running by azimuths measured clockwise from True South:

1. 147° 03’ 17” 30.07 feet along the remainder of the Government Land of Kaohe and the remainder of Mauna Kea Science Reserved covered by General Lease S-4191 to the University of Hawaii;

   Thence along the same on a curve to the left with a radius of 15.00 feet, the chord azimuth and distance being;

2. 144° 25’ 01” 1.38 feet;

3. 141° 46’ 45” 73.94 feet along same;

   Thence along the same on a curve to the right with a radius of 135.00 feet, the chord azimuth and distance being;

4. 149° 50’ 37” 37.88 feet;

5. 157° 54’ 28” 14.29 feet along same;

6. 67° 54’ 28” 15.00 feet along same;

7. 157° 54’ 28” 32.04 feet along same;

8. 148° 47’ 42” 37.18 feet along same;

9. 238° 47’ 42” 15.00 feet along same;

1
Thence along the same on a curve to the right with a radius of 435.00 feet, the chord azimuth and distance being:

10. 152° 25' 35"  55.11 feet;
11. 156° 03' 28"  17.62 feet along same;

Thence along the same on a curve to the left with a radius of 365.00 feet, the chord azimuth and distance being;

12. 149° 09' 32"  87.69 feet;
13. 142° 15' 36"  89.55 feet along same;

Thence along the same on a curve to the right with a radius of 435.00 feet, the chord azimuth and distance being;

14. 145° 06' 28"  43.22 feet;
15. 147° 57' 20"  86.90 feet along same;

Thence along the same on a curve to the right with a radius of 435.00 feet, the chord azimuth and distance being;

16. 158° 27' 14"  158.52 feet;
17. 168° 57' 08"  156.20 feet along same;

Thence along the same on a curve to the right with a radius of 155.00 feet, the chord azimuth and distance being;

18. 179° 43' 11"  57.92 feet;
19. 190° 29' 14"  45.76 feet along same;

Thence along the same on a curve to the left with a radius of 85.00 feet, the chord azimuth and distance being:

20. 181° 19' 15"  22.08 feet;
21. 172° 09’ 16” 43.65 feet along same;

    Thence along the same on a curve to the left with a radius of 365.00 feet, the chord azimuth and distance being;

22. 163° 49’ 06” 105.84 feet;

23. 155° 28’ 55” 25.44 feet along same;

    Thence along the same on a curve to the left with a radius of 185.00 feet, the chord azimuth and distance being;

24. 138° 43’ 43” 106.65 feet;

25. 121° 58’ 31” 82.07 feet along same;

26. 31° 58’ 31” 10.00 feet along same;

27. 121° 58’ 31” 15.18 feet along same;

    Thence along the same on a curve to the right with a radius of 275.00 feet, the chord azimuth and distance being;

28. 127° 44’ 21” 55.24 feet;

29. 223° 30’ 11” 10.00 feet along same;

    Thence along the same on a curve to the right with a radius of 265.00 feet, the chord azimuth and distance being;

30. 138° 12’ 29” 43.47 feet;

31. 142° 54’ 46” 47.07 feet along same;

    Thence along the same on a curve to the right with a radius of 105.00 feet, the chord azimuth and distance being;

32. 162° 13’ 04” 69.43 feet;

33. 181° 31’ 22” 1.83 feet along same;

34. 270° 00’ 00” 70.02 feet along the TMT Building Site Easement;
35. 1° 31’ 22” 3.69 feet along the remainder of the Government Land of Kaho‘o and the remainder of Mauna Kea Science Reserved covered by General Lease S-4191 to the University of Hawaii;

Thence along the same on a curve to the left with a radius of 35.00 feet, the chord azimuth and distance being;

36. 342° 13’ 04” 23.14 feet;

37. 322° 54’ 46” 47.07 feet along same;

Thence along the same on a curve to the left with a radius of 195.00 feet, the chord azimuth and distance being;

38. 312° 26’ 39” 70.86 feet;

39. 301° 58’ 31” 97.25 feet along same;

Thence along the same on a curve to the right with a radius of 255.00 feet, the chord azimuth and distance being;

40. 318° 43’ 43” 147.01 feet;

41. 335° 28’ 55” 25.44 feet along same;

Thence along the same on a curve to the right with a radius of 435.00 feet, the chord azimuth and distance being;

42. 343° 49’ 06” 123.13 feet;

43. 352° 09’ 16” 43.65 feet along same;

Thence along the same on a curve to the right with a radius of 155.00 feet, the chord azimuth and distance being;

44. 1° 19’ 15” 49.38 feet;

45. 10° 29’ 14” 45.76 feet along same;
Thence along the same on a curve to the left with a
radius of 85.00 feet, the chord azimuth and
distance being;

46. 359° 43' 11" 31.76 feet;
47. 348° 57' 08" 156.20 feet along same;

Thence along the same on a curve to the left with a
radius of 365.00 feet, the chord azimuth and
distance being;

48. 338° 27' 14" 133.01 feet;
49. 327° 57' 20" 86.90 feet along same;

Thence along the same on a curve to the left with a
radius of 365.00 feet, the chord azimuth and
distance being;

50. 325° 06' 28" 36.27 feet;
51. 322° 15' 36" 89.55 feet along same;

Thence along the same on a curve to the right with a
radius of 435.00 feet, the chord azimuth and
distance being;

52. 329° 09' 32" 104.50 feet;
53. 336° 03' 28" 17.62 feet along same;

Thence along the same on a curve to the left with a
radius of 365.00 feet, the chord azimuth and
distance being;

54. 332° 25' 35" 46.24 feet;
55. 328° 47' 42" 43.96 feet along same;
56. 337° 54' 28" 53.11 feet along same;

Thence along the same on a curve to the left with a
radius of 65.00 feet, the chord azimuth and
distance being;

57. 329° 50' 37" 18.24 feet;
58. 321° 46' 45" 73.94 feet along same;

Thence along the same on a curve to the right with a radius of 85.00 feet, the chord azimuth and distance being:

59. 324° 25' 01" 7.82 feet;
60. 327° 03' 17" 30.07 feet along same;
61. 57° 03' 17" 70.00 feet along same to the point of beginning and containing an area of 2.6653 acres, more or less.

Description Prepared By:
Engineering Partners Inc.

RONALDO B. AURELIO
Licensed Professional Land Surveyor
Certificate Number 7564
Expires April 30, 2014

Hilo, Hawaii, March 10, 2014
DECOMMISSIONING PLAN FOR THE MAUNA KEA OBSERVATORIES

A Sub-Plan of the Mauna Kea Comprehensive Management Plan

January 2010

Prepared for:
Office of Mauna Kea Management
University of Hawai‘i-Hilo

Prepared by:
Sustainable Resources Group Intn’l, Inc.
DECOMMISSIONING PLAN
FOR THE
MAUNA KEA OBSERVATORIES
A Sub-Plan of the Mauna Kea Comprehensive Management Plan

January 2010

Prepared for:
Office of Mauna Kea Management
University of Hawai‘i - Hilo
200 W. Kawili Street
Hilo, Hawaii 96720
www.malamamaunakea.org

Prepared by:
Sustainable Resources Group Intn’l, Inc.
111 Hekili Street, Suite A373
Kailua, HI 96734
www.srgii.com
Executive Summary

The Decommissioning Plan for Mauna Kea Observatories (Decommissioning Plan) is a sub-plan of the Mauna Kea Comprehensive Management Plan (CMP). It was required as a condition of approval of the CMP by the Board of Land and Natural Resources (BLNR) in April 2009. The purpose of this Decommissioning Plan is to describe a process for decommissioning observatories on Mauna Kea, including financial planning. Although some observatories have made preliminary inquiries regarding what might be expected of them if they were to cease operations, neither the State, nor the University, have guidelines for the decommissioning of facilities. This Decommissioning Plan provides the guidelines recommended by the University.

The Decommissioning Plan provides a framework that can be used by both existing and future observatories on Mauna Kea to ensure that the Department of Land and Natural Resources (DLNR) as the land owner and lessor, UH as the lessee, and the observatories as sublessees have clear expectations of the observatory decommissioning process. In presenting the decommissioning process, the plan acknowledges the distinction between the requirements for existing and new and/or renegotiated subleases. The information in this plan is also expected to assist in future planning for new facilities with respect to decommissioning.

Section 1 defines what is meant by decommissioning, including the desired future condition and necessary steps to achieve it, and the responsible entities and their roles. Section 2 outlines the decommissioning terms currently contained in the master lease and subleases and addresses potential terms for new and/or renegotiated subleases. Section 3 provides information on financial planning for decommissioning. This will help to ensure that adequate funds are available to pay for the costs of deconstruction and site restoration at the end of the life of the observatory.

Section 4 provides guidance for practical implementation of the decommissioning process including site restoration. It presents specific details on the course of action to be implemented by sublessees to comply with terms of subleases related to decommissioning. Section 5 addresses UH’s goal of maintaining a world-class observatory complex and the role of telescope decommissioning in achieving limited growth. By the end of the current lease (2033) UH foresees there may be ten observatories in the Astronomy Precinct, based on UH’s current understanding. Section 6 describes the need for regular review and updating of the Decommissioning Plan based on adaptive management strategies as described in the Mauna Kea CMP.

A list cross-referencing Mauna Kea CMP management actions to related sections in the Decommissioning Plan is provided in Table 1 to aid in implementing both plans. This list focuses on those actions directly related to the decision-making process of decommissioning, including options for facility removal and site restoration. Other related management information pertains to the specific activities that will occur during implementation of the decommissioning process (i.e., deconstruction, habitat restoration). These actions are detailed in Appendix A.
### Table 1. Mauna Kea CMP Management Actions Cross-Referenced to the Decommissioning Plan

<table>
<thead>
<tr>
<th>MKCMP Management Action</th>
<th>DP Section</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CMP Section 7.1.1: Native Hawaiian Cultural Resources</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td></td>
</tr>
<tr>
<td>CR-1 Kahu Kū Mauna shall work with families with lineal and historical connections to Mauna Kea, kūpuna, cultural practitioners, the Office of Hawaiian Affairs and other Native Hawaiian groups, including the Mauna Kea Management Board’s Hawaiian Culture Committee, toward the development of appropriate procedures and protocols regarding cultural issues.</td>
<td>4.1, 4.2.3, 4.2.4</td>
</tr>
<tr>
<td><strong>Historic Properties</strong></td>
<td></td>
</tr>
<tr>
<td>CR-12 Consult with Kahu Kū Mauna about establishing buffers (preservation zones) around known historic sites in the Astronomy Precinct, to protect them from potential future development.</td>
<td>App D</td>
</tr>
<tr>
<td><strong>CMP Section 7.1.2: Natural Resources</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ecosystem Protection, Enhancement, and Restoration</strong></td>
<td></td>
</tr>
<tr>
<td>NR-7 Delineate areas of high native diversity, unique communities, or unique geological features within the Astronomy Precinct and at Hale Pōhaku and consider protection from development.</td>
<td>App D</td>
</tr>
<tr>
<td>NR-10 Incorporate mitigation plans into project planning and conduct mitigation following new development.</td>
<td>App D</td>
</tr>
<tr>
<td>NR-12 Create restoration plans and conduct habitat restoration activities, as needed.</td>
<td>4.2.4</td>
</tr>
<tr>
<td><strong>CMP Section 7.2.2: Permitting and Enforcement</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Laws and Regulations</strong></td>
<td></td>
</tr>
<tr>
<td>P-1 Comply with all applicable federal, state, and local laws, regulations, and permit conditions related to activities in the UH Management Areas.</td>
<td>1, 2, 4, 6</td>
</tr>
<tr>
<td>P-2 Strengthen CMP implementation by recommending to the BLNR that the CMP conditions be included in any Conservation District Use Permit or other permit.</td>
<td>1.3, 4</td>
</tr>
<tr>
<td><strong>CMP Section 7.3.3: Site Recycling, Decommissioning, Demolition and Restoration</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Site Recycling, Decommissioning, Demolition, and Restoration</strong></td>
<td></td>
</tr>
<tr>
<td>SR-1 Require observatories to develop plans to recycle or demolish facilities once their useful life has ended, in accordance with their sublease requirements, identifying all proposed actions.</td>
<td>This plan</td>
</tr>
<tr>
<td>SR-2 Require observatories to develop a restoration plan in association with decommissioning, to include an environmental cost-benefit analysis and a cultural assessment.</td>
<td>4.2.4</td>
</tr>
<tr>
<td>SR-3 Require any future observatories to consider site restoration during project planning and include provisions in subleases for funding of full restoration.</td>
<td>3.1.2, 4.2.4</td>
</tr>
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### Acronyms

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<th>Description</th>
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<tr>
<td>ALMA</td>
<td>Atacama Large Millimeter/Submillimeter Array</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
</tr>
<tr>
<td>AUI</td>
<td>Associated Universities, Inc.</td>
</tr>
<tr>
<td>BLNR</td>
<td>Board of Land and Natural Resources</td>
</tr>
<tr>
<td>BOR</td>
<td>Board of Regents</td>
</tr>
<tr>
<td>CDP</td>
<td>Complex Development Plan</td>
</tr>
<tr>
<td>CDUA</td>
<td>Conservation District Use Application</td>
</tr>
<tr>
<td>CDUP</td>
<td>Conservation District Use Permit</td>
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<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation and Liability Act</td>
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<tr>
<td>CFHT</td>
<td>Canada-France-Hawai‘i Telescope</td>
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<tr>
<td>CMP</td>
<td>Comprehensive Management Plan</td>
</tr>
<tr>
<td>CRMP</td>
<td>Cultural Resource Management Plan</td>
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<tr>
<td>CSO</td>
<td>Caltech Submillimeter Observatory</td>
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<tr>
<td>DFP</td>
<td>Decommissioning Funding Plan</td>
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<td>DLNR</td>
<td>Department of Land and Natural Resources</td>
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<tr>
<td>DOH</td>
<td>Department of Health</td>
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<tr>
<td>EA</td>
<td>Environmental Assessment</td>
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<td>EPA</td>
<td>Environmental Protection Agency</td>
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<td>Infrared Telescope Facility</td>
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<td>James Clerk Maxwell Telescope</td>
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<td>Mauna Kea Management Board</td>
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<td>NAOJ</td>
<td>National Astronomical Observatory of Japan</td>
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<td>NAR</td>
<td>Natural Area Reserve</td>
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<td>National Aeronautics and Space Association</td>
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<td>NEPA</td>
<td>National Environmental Policy Act</td>
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<td>NGLT</td>
<td>Next Generation Large Telescope</td>
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<td>NHPA</td>
<td>National Historic Preservation Act</td>
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<td>NOI</td>
<td>Notice of Intent</td>
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<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
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<td>NRAO</td>
<td>National Radio Astronomy Observatory</td>
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<td>NRMP</td>
<td>Natural Resources Management Plan</td>
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<td>NSF</td>
<td>National Science Foundation</td>
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<tr>
<td>OCCL</td>
<td>Office of Conservation and Coastal Lands</td>
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<td>O/IR</td>
<td>Optical/Infrared</td>
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<td>OMKM</td>
<td>Office of Mauna Kea Management</td>
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<td>OSDA</td>
<td>Operating and Site Development Agreement</td>
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<td>Remedial Action Plan</td>
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<td>Research Development Plan</td>
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<td>Sampling and Analysis Plan</td>
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<td>Site Decommissioning Plan</td>
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<td>SDRP</td>
<td>Site Deconstruction and Removal Plan</td>
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<td>SHPD</td>
<td>State Historic Preservation Division</td>
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<td>SMA</td>
<td>Submillimeter Array</td>
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<td>STFC</td>
<td>Science and Technology Facilities Council</td>
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<td>TMT</td>
<td>Thirty-Meter Telescope</td>
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<tr>
<td>UH</td>
<td>University of Hawai‘i</td>
</tr>
<tr>
<td>UHH</td>
<td>University of Hawai‘i, Hilo</td>
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<tr>
<td>UKIRT</td>
<td>United Kingdom Infrared Telescope</td>
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<tr>
<td>VLBA</td>
<td>Very Long Baseline Array</td>
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</table>
Definitions

*Deconstruction* pertains to the actions that result when a structure is no longer needed and equipment and infrastructure must be dismantled and removed from the site. Depending on the specific project, deconstruction may be partial or total.

*Demolition* includes the destructive removal of buildings and/or infrastructure that are not salvageable.

*Existing observatories* are those that are presently located on Mauna Kea and have an existing sublease agreement with UH.

*Facility* refers to the physical structures existing on site at each observatory.

*Infrastructure* refers to non-facility structures, including all supporting structures beyond a facility footprint (i.e., utility lines, roads), if common or shared.

*Land use* is defined in HAR §13-5 as “The construction, reconstruction, demolition, or alteration of any structure, building, or facility on land.”

*Observatory* is used in reference to either existing or proposed observatories.

*Obsolescence* refers to a technology that is no longer scientifically competitive.

*Recycling* is used to describe any action involving use of an existing structure that houses equipment or is used in support of research that is reused, retrofitted, rebuilt, or expanded.

*Removal* is defined as the total or partial removal of all structures and infrastructure to the extent achievable under normal engineering deconstruction planning protocols.

*Restoration* is defined as the total return, or return to the greatest extent possible, of the impacted areas to their pre-construction condition.
1 Observatory Decommissioning on Mauna Kea

1.1 Background and Purpose

The Decommissioning Plan for Mauna Kea Observatories (Decommissioning Plan) was initiated in response to a conditional requirement made pursuant to approval of the Mauna Kea Comprehensive Management Plan (CMP) by the Board of Land and Natural Resources (BLNR) in April 2009 (Ho’akea LLC dba Ku’iwalu 2009). BLNR required completion and approval of the Decommissioning Plan, including a financial plan, within one year or prior to the submittal of a Conservation District Use Application (CDUA), whichever occurs first.

There are currently 13 observatories on University of Hawai’i (UH) leased land on Mauna Kea. Sublease terms specify that unless the facilities are sold or otherwise transferred, they must be removed and the site restored. The current master lease ends December 31, 2033, and would require removal of facilities at all sites to be completed by this date unless the Chairman of BLNR approves abandonment in place. Neither the master lease nor the subleases provide any guidelines for the observatory decommissioning process.

The purpose of this Decommissioning Plan is to describe a decommissioning process for observatories to follow that is acceptable to UH and the Department of Land and Natural Resources (DLNR). The Decommissioning Plan provides a framework for eventual removal of observatories and site restoration that can be used by both existing and potential future observatories on Mauna Kea to ensure that BLNR as the lessor, UH as the lessee, and the observatories as sublessees have clear expectations of the observatory decommissioning process. This plan identifies the trigger for initiating the decommissioning process, financial planning needs (Section 3) and detailed guidance on the decommissioning process for sublessees (Section 4). It also contains information that may be required under new and/or renegotiated lease agreements between the UH and sublessees, which is expected to assist them in the planning process for their facilities. The plan presents a revised statement from UH on objectives and future plans for astronomy development on Mauna Kea (Section 5). Finally, it recognizes that adaptive management strategies are to be utilized by the University (Section 6). This adaptive strategy suggests that as more information becomes available and as circumstances change, the Decommissioning Plan will be amended to adapt to new information and changed circumstances.

This Decommissioning Plan does not address specific timelines or dates for decommissioning observatories, except that all decommissioning activities shall be completed by the end of the master lease (see Section 2.2.5), nor does it address the process of renegotiation of a new master lease or sublease agreements.

1.2 Observatory Decommissioning Process

Decommissioning refers to a process that results in the partial or total removal of all structures associated with an observatory facility and the restoration of the site, to the greatest extent possible, to its pre-construction condition. An observatory shall enter into consultation with DLNR and UH regarding the

---

1 This expands on the definition contained in the 2009 Mauna Kea CMP, which stated “Decommissioning relates to the process when a facility is deemed obsolete and a determination has been made by the facility lessee to remove the telescope and restore the site.”
decommissioning process when a decision is made by the sublessee to cease operations, and deconstruct and remove their facilities on Mauna Kea. The sublessee that negotiates the decommissioning process shall be the legally recognized entity identified in the sublease agreement with UH and shall have full legal power to represent the operator, or consortium of operators, of the observatory. If and when astronomy use on Mauna Kea ends, all observatories will be decommissioned.

Decommissioning is initiated when a sublessee decides to cease operation due to changing priorities, lack of funding, or obsolescence; when the sublease expires; or if UH revokes a sublease (see Section 5.1). The decommissioning process guides the deconstruction of the observatory facility and its supporting infrastructure and restoration of the site (see Section 4). In addition to a funding plan (see Section 3.1), the four components of the process include (1) a Notice of Intent, (2) an environmental due diligence review, (3) a Site Deconstruction and Removal Plan and, (4) a Site Restoration Plan.

1.3 Entities with a Role in the Observatory Decommissioning Process

The decommissioning process involves several different entities with responsibilities related to decommissioning (see Table 2). Since UH leased lands are within the State Conservation District, land use is subject to the requirements of Hawai‘i Administrative Rules (HAR) §13-5. Additional information about these entities can be found in Section 3.3 of the Mauna Kea CMP.

**Table 2. Mauna Kea Observatory Decommissioning Roles and Responsibilities**

<table>
<thead>
<tr>
<th>Entity</th>
<th>Roles and Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Department of Land and Natural Resources</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Board of Land and Natural Resources (BLNR) | - Land owner and issuer of master lease  
- Final approval over all land uses on Conservation District lands pursuant to the Conservation District Use Permit (CDUP) process |
| Department of Land and Natural Resources, Office of Conservation and Coastal Lands (DLNR-OCCL) | - Regulates and enforces land use for lands that lie within the State’s Conservation District  
- Processes Conservation District land use requests  
- Discussion and approval of decommissioning options per lease terms  
- Any decommissioning plan in which a facility would be deconstructed and a site restored is subject to review and consideration by DLNR through the CDUP process² |
| Department of Land and Natural Resources, Land Division | - Manages State-owned lands  
- Responsible for master lease negotiations between DLNR and UH |
| State Historic Preservation Division (DLNR-SHPD) | - Reviews proposed construction and deconstruction projects to ensure minimal effects on historic and cultural properties |
| **Department of Health** | |
| Clean Water Branch | - Reviews National Pollutant Discharge Elimination System (NPDES) permit |
| Safe Drinking Water Branch | - Reviews cesspool and septic tank abandonment/removal plans |
| Waste Water Branch | - Reviews cesspool and septic tank abandonment/removal plans |

² DLNR will review all Notices of Intent and then decide if a CDUP is necessary (see Section 4.2.1). If yes, the Site Decommissioning Plan (SDP) may be included in the CDUA and made a condition of the CDUP.
<table>
<thead>
<tr>
<th>Entity</th>
<th>Roles and Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>County of Hawai‘i</strong></td>
<td></td>
</tr>
<tr>
<td>Building Division</td>
<td>- Issues building, plumbing and electrical permits&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Engineering Division</td>
<td>- Reviews grubbing, grading, and stockpile permits</td>
</tr>
<tr>
<td>Planning Department</td>
<td>- Reviews grubbing, grading, and stockpile permits</td>
</tr>
<tr>
<td><strong>University of Hawai‘i</strong></td>
<td></td>
</tr>
<tr>
<td>Office of Mauna Kea Management (OMKM)</td>
<td>- Oversees day-to-day management of the UH Management Areas&lt;sup&gt;4&lt;/sup&gt; - Has advisory committees (Environment Committee, Wēkiu Bug Scientific Committee, Hawaiian Culture Committee, and Public Safety Committee) - Responsible for overall coordination of the decommissioning process - Responsible for reviewing project designs and ensuring that any proposed project is consistent with the 2000 Master Plan and the Mauna Kea CMP - Responsible for coordination of the ‘Major Project Review Process’, which addresses new construction and site recycling&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mauna Kea Management Board (MKMB)</td>
<td>- Volunteer board representing the community and advising on activities, operations, proposed land uses, and decommissioning planned for UH Management Areas - In consultation with Kahu Kū Mauna, is responsible for reviewing and recommending proposed facility’s Site Decommissioning Plan (SDP)</td>
</tr>
<tr>
<td>Kahu Kū Mauna</td>
<td>- Volunteer council appointed by MKMB - Advises MKMB, OMKM, and the UH Hilo Chancellor on Hawaiian cultural matters affecting the UH Management Areas - Responsible for reviewing proposed facility’s SDP from a cultural perspective</td>
</tr>
<tr>
<td>Mauna Kea Observatories Support Services (MKSS)</td>
<td>- Oversees the general maintenance and logistical services to all Mauna Kea observatories and the facilities at Hale Pōhaku</td>
</tr>
<tr>
<td>Institute for Astronomy (IfA)</td>
<td>- Promotes and provides guidance regarding astronomical research, including long-term planning and visioning.</td>
</tr>
<tr>
<td><strong>Observatories</strong></td>
<td></td>
</tr>
<tr>
<td>Sublessees&lt;sup&gt;6&lt;/sup&gt;</td>
<td>- Responsible for working with UH and DLNR during the decommissioning process and for submitting and implementing a decommissioning plan that both complies with the terms of their sublease and is consistent with the Mauna Kea CMP and its sub-plans.</td>
</tr>
</tbody>
</table>

---

<sup>3</sup> Plumbing and electric permits not required for total demolition.

<sup>4</sup> The UH Management Areas on Mauna Kea extend from approximately 9,200 ft to the summit at 13,796 ft, encompassing three distinct areas: the Mauna Kea Science Reserve, the mid-level facilities at Hale Pōhaku, and the Summit Access Road.

<sup>5</sup> The Major Project Review Process, as approved by the BOR, includes the Master Plan Design Review Process, an environmental review process, the Master Plan Project Approval Process, and the DLNR CDUA Process.

<sup>6</sup> Two of the observatories (the UH 2.2-m and the UHH 0.9-m) are wholly owned and operated by the University of Hawai‘i. UH has an equity interest in the Canada-France-Hawaii Telescope, as a member of the CFHT Corporation. The NASA IRTF is owned by NASA and operated by UH under a Cooperative Agreement with NASA. All the others are owned and operated by a single entity or by a consortium that does not include UH (see Table 3).
1.4 BLNR Approvals and Potential Conditions

When BLNR approved the Mauna Kea CMP in April 2009, it imposed a condition that UH develop a Decommissioning Plan, including a financial plan. The Decommissioning Plan, if approved by BLNR, shall become part of the Mauna Kea CMP, which is the approved management plan for the UH Management Areas on Mauna Kea.

Subleases from UH are conditional on receipt of a CDUP from BLNR for the proposed land use within the Conservation District. Land use is defined in HAR §13-5, Conservation District as:

"the construction, reconstruction, demolition, or alteration of any structure, building, or facility on land."

Issuance of a CDUP by BLNR indicates that the proposed land use (i.e. construction of an observatory) has been reviewed pursuant to Hawai‘i Revised Statutes (HRS) Chapter 183 and HAR §13-5. The CDUP process is used to evaluate the compatibility of use and the potential impacts to valued cultural, historical and natural resources. As the lease holder for the Science Reserve, UH is responsible for obtaining the CDUP for all sublessees. CDUPs may also be required as part of the decommissioning process when the observatory is demolished (see Section 4.2).

Observatories that follow the decommissioning process outlined in this plan will ensure that all elements of the process adhere to all applicable statues and local ordinances and are coordinated with and approved by UH and DLNR. Although this process cannot be required of existing sublessees (see Section 2.2.1), it is recommended that existing sublessees utilize this process in the eventual removal of their observatories. In addition, the process and proposed requirements may also be included in any new or renegotiated leases or subleases in the Mauna Kea Science Reserve.

1.5 Guidance from the Mauna Kea CMP

The Mauna Kea CMP provides a guide for managing existing and future activities and uses to ensure ongoing protection of Mauna Kea’s cultural and natural resources, many of which are unique. The role of the Mauna Kea CMP in considering future land use is to guide the evaluation of proposed projects from the standpoint of potential impacts to cultural and natural resources, and to provide management actions that can be adopted by BLNR as special conditions in any CDUPs that it may issue. As a sub-plan, the Decommissioning Plan is consistent with the information and management actions set forth in the Mauna Kea CMP.

Site recycling, decommissioning, demolition, and restoration were specifically developed as a component plan as part of the guidelines for managing the built environment (see Section 7.3.3 of the Mauna Kea CMP). The desired outcome of this component plan as stated in the CMP is:

“To the extent possible, reduce the area disturbed by physical structures within the UH Management Areas by upgrading and reusing buildings and equipment at existing locations, removing obsolete facilities, and restoring impacted sites to pre-disturbed condition.”

Similarly, the Decommissioning Plan presents a process that can be incorporated in part or in full into CDUPs for decommissioning activities (see Section 4).

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Many of the activities related to decommissioning that will occur during its implementation (i.e., deconstruction, habitat restoration, archaeological monitoring) are addressed in the CMP and related sub-plans. Additional details and considerations are found in the Mauna Kea CMP, the *Cultural Resources Management Plan for the UH Management Areas on Mauna Kea* (CRMP) and the *Natural Resources Management Plan for the UH Management Areas on Mauna Kea* (NRMP) (McCoy et al. 2009; SRGII 2009) (see Appendix A).

## 2 Decommissioning Terms in Lease Agreements

### 2.1 Mauna Kea Science Reserve Master Lease

The Mauna Kea Science Reserve (Science Reserve) was established in 1968 through a 65-year lease (General Lease No. S-4191) between BLNR (Lessor) and UH (Lessee). It encompasses 11,288 acres (ac) above approximately 11,500 ft elevation, except for the area within the Mauna Kea Ice Age Natural Area Reserve (NAR). According to the lease the Science Reserve is to be used ‘as a scientific complex’.

The University’s Master Plan for the Mauna Kea Science Reserve (2000 Master Plan) designated 525 ac of the leased land as an “Astronomy Precinct,” where development is to be consolidated to maintain a close grouping of astronomy facilities and support infrastructure. The remaining 10,763 ac are designated a Natural/Cultural Preservation Area in order to protect natural and cultural resources (Group 70 International 2000).

The master lease expires on December 31, 2033. It may be terminated at any time by the Lessee or for cause by the Lessor. Under the master lease, DLNRs reserved rights include hunting and recreation, water, and trails and access. The lease allows for the construction of improvements (buildings, infrastructure and other improvements), with BLNR’s approval. Without a new lease, or approval from the Chairman of BLNR to abandon them in place, permitted improvements within the Science Reserve must be removed prior to December 31, 2033. There is no specific provision in the master lease related to decommissioning or site restoration.

Relevant sections of the master lease relating to Lessee responsibilities, returning the land back to the State of Hawai‘i, and the fate of improvements include:

*The Lessee, in consideration of the premises, covenants with the Lessor as follows:*

1. **Surrender.** The Lessee shall, at the expiration or sooner termination of this lease, peaceably and quietly surrender and deliver possession of the demised premises to the Lessor in good order and condition, reasonable wear and tear excepted.

2. **Maintenance of the Premises.** The Lessee shall keep the demised premises and improvements in a clean, sanitary and orderly condition.

---

8 The Science Reserve originally encompassed approximately 13,321 acres, but in 1998 2,033 acres were withdrawn as part of the Mauna Kea Ice Age Natural Area Reserve (NAR).

9 In order to operate observatories past the current lease end date, the University will need to negotiate a new lease with DLNR. If a new master lease is negotiated, new subleases will likely be negotiated with the observatories.
4. **Specified Use.** The land hereby leased shall be used by the Lessee as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex.

5. **Assignments.** The Lessee shall not sublease, sub-rent, assign or transfer this lease or any rights thereunder without the prior written approval of the Board of Land and Natural Resources.

6. **Improvements.** The Lessee shall have the right during the existence of this lease to construct and erect buildings, structures and other improvements upon the demised premises; provided, that plans for construction and plot plans of improvements shall be submitted to the Chairman of the Board of Land and Natural Resources for review and approval prior to commencement of construction. The improvements shall be and remain the property of the Lessee, and shall be removed or disposed of by the Lessee at the expiration or sooner termination of this lease; provided that with the approval of the Chairman such improvements may be abandoned in place. The Lessee shall, during the term of this lease, properly maintain, repair and keep all improvements in good condition.

13. **Objects of Antiquity.** The Lessee shall not appropriate, damage, remove, excavate, disfigure, deface or destroy any object of antiquity, prehistoric ruin or monument of historical value.

### 2.2 Sublease Terms

With the exception of the two UH telescopes, the entities that own or operate the existing observatories each have a sublease with UH outlining the terms of their occupancy. Terms of current subleases are tied to the terms of the master lease and expire on December 31, 2033. Current sublessees shall abide by the terms of their subleases (see Section 2.2.1) until they are renegotiated (see Section 2.2.2) or terminated (see Section 2.2.3). New observatories will require a new sublease (see Section 2.2.2).

#### 2.2.1 Terms of Existing Subleases

Existing subleases specify terms for the disposition of observatory facilities in the event of termination or expiration of tenancy (see Table 3). Unless and until existing observatories revise their subleases, they need only comply with the existing terms. In general, the terms require sublessees to 1) remove the facilities and restore the property at the expense of the sublessee; 2) sell the facilities to UH or a third party; or 3) surrender the facilities to UH upon approval of UH and the Chairman of BLNR. This decommissioning plan addresses the first option, which is to remove the facilities and restore the site.

Decommissioning provisions in existing subleases require the removal of the facility, at the sublessees’ sole expense, and restoration of the observatory site to either “even grade” or “original condition”. Subleases do not state whether removal means complete removal of all facilities and infrastructure. The following is from the sublease to the Science and Engineering Research Council dated February 10, 1984, and is indicative of terms of other subleases:

\[
\text{In the event that part of the property is removed, Sublessee shall restore the demised premises, or any portion affected thereby, to even grade to the extent that improvements are removed, and shall repair any damage done to the improvements in the event that equipment is removed. . . . [A]ll property shall be razed and removed at the sole expense of Sublessee. Such action shall be completed within ONE (1) year after termination or expiration of this Sublease, unless otherwise}
\]

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6
agreed in writing by Sublessor. In the event of such removal, Sublessee shall restore the demised premises, or any portion affected thereby, to even grade. In the event Sublessee shall fail to remove such property or debris and restore the demised premises within the time specified above, such property may be removed, the land restored to even grade by Sublessor at the expense of Sublessee.

The existing subleases do not provide details about the decommissioning process. A process is outlined as part of this Decommissioning Plan in the form of a Site Decommissioning Plan (SDP) (see Section 4). In accordance with the Mauna Kea CMP and this Decommissioning Plan, it is recommended that existing sublessees develop SDPs. If sublessees develop the SDP as described, they will ensure that all elements of the deconstruction and site restoration process adhere to all applicable statues and local ordinances and are coordinated with and approved by UH and DLNR.

2.2.2 Proposed Terms for New and/or Renegotiated Subleases

Potential future observatories will be required to obtain CDUPs from BLNR in coordination with UH, and sign sublease agreements with UH, subject to approval by BLNR. New subleases will likely be more specific regarding the actual terms of the requirements for decommissioning, including compliance with the policies, objectives and recommendations of the Mauna Kea CMP and this Decommissioning Plan, as well as other applicable plans, policies and/or permits.

If UH negotiates a new master lease for the Science Reserve with DLNR, there will be an opportunity to renegotiate existing subleases. Similar to the requirements for potential new observatories, any renegotiated sublease will likely be more specific in terms of requirements for decommissioning, including compliance with the policies, objectives and recommendations of the Mauna Kea CMP and this Decommissioning Plan, as well as other applicable plans, policies and/or permits.

2.2.3 Terminating Subleases

Subleases are terminated upon conclusion of operation of a particular telescope by a sublessee, expiration of tenancy at the end of a lease, or revocation of a sublease by UH. Unless the facility is recycled, it must be deconstructed and the site restored per the terms of the sublease.

2.2.4 Site Abandonment

Although unlikely, it is possible that a sublessee could abandon an observatory in place, without deconstructing and site restoration. If this happens, UH, as the lessee to DLNR, will ultimately be responsible for the site through the terms of their master lease. If the facility cannot be recycled, site decommissioning could include having to remove facilities and restore the site. Funding mechanisms to limit the possibility of the financial burden from falling on UH in this situation should be included in any new or renegotiated sublease (see Section 3.1).

2.2.5 Existing Decommissioning Information

During preparation of the Mauna Kea CMP, UH IfA asked observatories to clarify their understanding of and commitment to compliance with their sublease terms regarding removal of their facilities. Appendix B includes copies of the written confirmation provided to IfA from each observatory. Table 3 summarizes the latest available information related to decommissioning by observatories including sublessee, sublease
start date, operational start date, lease/sublease end date; planned operational period; lease/sublease terms; decommissioning date; funding source for decommissioning; and other related information.

Due to contractual and legal agreements between sublessees and UH, a timeline for decommissioning of individual facilities is not possible except to note that unless otherwise stated by the sublessee, observatories are assumed to be operational through the end of their sublease term (see Section 5.3).

Table 3. Mauna Kea Observatories: Summary of Information Related to Decommissioning

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical/Infrared</td>
<td>UH 0.9-m Telescope</td>
</tr>
<tr>
<td>Sublessee</td>
<td>University of Hawai‘i at Hilo</td>
</tr>
<tr>
<td>Sublease Start Date</td>
<td>N/A</td>
</tr>
<tr>
<td>Operational Start Date</td>
<td>2008</td>
</tr>
<tr>
<td>Lease / Sublease End Date</td>
<td>2033</td>
</tr>
<tr>
<td>Operations</td>
<td>Operational for minimum of 20 yr (new facility)</td>
</tr>
<tr>
<td>Lease / Sublease Terms</td>
<td>Remove or dispose of by UH at the expiration or sooner termination of the</td>
</tr>
<tr>
<td></td>
<td>lease, unless BLNR Chair approves that facilities may remain in place</td>
</tr>
<tr>
<td>Decommissioning Date</td>
<td>Not planned at this time</td>
</tr>
<tr>
<td>Other</td>
<td>UH received funding from the National Science Foundation (NSF) for an</td>
</tr>
<tr>
<td></td>
<td>educational and research telescope on Mauna Kea, for the use of its faculty</td>
</tr>
<tr>
<td></td>
<td>and students. The building is a reuse of the UH 0.6m observatory that</td>
</tr>
<tr>
<td></td>
<td>operated from 1968-2008. The 0.9-m telescope is currently being built, with</td>
</tr>
<tr>
<td></td>
<td>planned operation by 2010.</td>
</tr>
<tr>
<td>UH 2.2-m Telescope</td>
<td>Sublessee University of Hawai‘i</td>
</tr>
<tr>
<td>Sublease Start Date</td>
<td>N/A</td>
</tr>
<tr>
<td>Operational Start Date</td>
<td>1970</td>
</tr>
<tr>
<td>Lease / Sublease End Date</td>
<td>2033</td>
</tr>
<tr>
<td>Operations</td>
<td>Expected to continue until replacement by Pan-STARRS (estimated 2012)</td>
</tr>
<tr>
<td>Lease / Sublease Terms</td>
<td>Same as UHH 0.9m</td>
</tr>
<tr>
<td>Decommissioning Date</td>
<td>Planned for replacement by Pan-STARRS. Timing will be determined by</td>
</tr>
<tr>
<td></td>
<td>permitting process and availability of funding.</td>
</tr>
<tr>
<td>Funding Source for</td>
<td></td>
</tr>
<tr>
<td>Decommissioning</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Pan-STARRS would reuse the site and operate for a minimum of 10 years.</td>
</tr>
<tr>
<td>NASA Infrared Telescope Facility (IRTF)</td>
<td>NASA</td>
</tr>
<tr>
<td>Sublessee</td>
<td>NASA</td>
</tr>
<tr>
<td>Sublease Start Date</td>
<td>November 29, 1974</td>
</tr>
<tr>
<td>Operational Start Date</td>
<td>1979</td>
</tr>
<tr>
<td>Lease / Sublease End Date</td>
<td>2033</td>
</tr>
<tr>
<td>Operations</td>
<td></td>
</tr>
</tbody>
</table>

10 The two UH observatories are covered by the terms of the 65-year General Lease No. S-4191 between BLNR and UH established in 1968. All other entities have sublease agreements with UH.
11 Per R.P. Kudritzki, MKCMP Appendix A9: Reflects planned operations.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Lease/Sublease Terms**                  | 1. Surrender to UH subject to approval of UH and BLNR Chair  
2. Removal of facilities and restoration of property at expense of NASA  
Minimum period of advance notice for terminating sublease in writing by sublessee is not specified. |
| Decommissioning Date                      | Not planned at this time                                                                                                                   |
| Funding Source for Decommissioning       | Subject to the availability of appropriated funding i.e. congressional approval for the expenditure of taxpayer dollars.                      |
| Other                                     | Has not quantified any termination costs.                                                                                                   |

### Canada-France-Hawaii Telescope (CFHT)

<table>
<thead>
<tr>
<th>Sublessee</th>
<th>Canada-France-Hawaii Telescope Corporation. Telescope is shared by Canada, France and UH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sublease Start Date</td>
<td>December 18, 1975</td>
</tr>
<tr>
<td>Operational Start Date</td>
<td>1979</td>
</tr>
<tr>
<td>Lease/Sublease End Date</td>
<td>2033</td>
</tr>
</tbody>
</table>
| Operations                                | 1. Surrender to UH subject to approval of UH and BLNR Chairman  
2. Removal of facilities and restoration of property at expense of CFHT  
Sublease has provision that allows termination by sublessee with six (6) months notice. |
| Decommissioning Date                      | Not planned at this time                                                                                                                   |
| Funding Source for Decommissioning       | CFHT Corporation                                                                                                                           |
| Other                                     | $6 million quote for decommissioning was given in 2004. This did not include any clean-up of contaminated soil. Planning for one year of operational costs for ‘cleaning cost’. Potentially sell Waimea headquarters to fund decommissioning. |

### United Kingdom Infrared Telescope (UKIRT)

<table>
<thead>
<tr>
<th>Sublessee</th>
<th>Science and Technology Facilities Council (STFC) of the United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sublease Start Date</td>
<td>September 21, 1978</td>
</tr>
<tr>
<td>Operational Start Date</td>
<td>1979</td>
</tr>
<tr>
<td>Lease/Sublease End Date</td>
<td>2033</td>
</tr>
</tbody>
</table>
| Operations                                | 1. Sale to UH  
2. Sale to a 3rd party acceptable to UH  
3. Surrender with the approval of BLNR Chair  
4. Removal of facilities and restoration of property at expense of STFC  
Sublease has provision that allows termination by either party with five (5) years notice. |
| Decommissioning Date                      | Not planned at this time                                                                                                                   |
| Funding Source for Decommissioning       | STFC                                                                                                                                 |
| Other                                     | Received confidential quote for decommissioning in 2006. This information is not available for public record.  
Facility to be removed and site restored to original condition at end of operation. The financial provision for this is maintained within the STFC (not Joint Astronomy Centre) budget and is informed by an exercise conducted every 3-5 years to secure up-to-date estimates for decommissioning. |

13 http://www.jach.hawaii.edu/admin/Finance/JAC%20ASSET%20MANAGEMENT%20STRATEGY.htm
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>W. M. Keck Observatory (Keck I)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sublessee</strong></td>
<td>Caltech and the University of California</td>
</tr>
<tr>
<td><strong>Sublease Start Date</strong></td>
<td>June 29, 1992</td>
</tr>
<tr>
<td><strong>Operational Start Date</strong></td>
<td>1992</td>
</tr>
<tr>
<td><strong>Lease / Sublease End Date</strong></td>
<td>2033</td>
</tr>
<tr>
<td><strong>Operations</strong></td>
<td>Operational for minimum of 20 yr</td>
</tr>
</tbody>
</table>
| **Lease /Sublease Terms** | 1. Removal of facilities and restoration of property at expense of Caltech  
2. Sale to UH  
3. Sale to a 3rd party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the 3rd party and UH  
4. Surrender in place  
Options 2, 3, and 4 require approval of UH and DLNR. If none of these options are available, option 1 must be completed within 1 year. Sublease has provision that allows termination by sublessee with two (2) years notice. |
| **Decommissioning Date** | Not planned at this time |
| **Funding Source for Decommissioning** | Caltech and University of California |
| **Decommissioning Plan for Mauna Kea Observatories January 2010** | |
| **Subaru Telescope** | |
| **Sublessee** | National Astronomical Observatory of Japan (NAOJ). |
| **Sublease Start Date** | June 5, 1992 |
| **Operational Start Date** | 1999 |
| **Lease / Sublease End Date** | 2033 |
| **Operations** | Operational for minimum of 20 yr |
| **Lease /Sublease Terms** | 1. Removal of facilities and restoration of property at expense of NAOJ  
2. Sale to UH  
3. Sale to a 3rd party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the 3rd party and UH  
4. Surrender in place  
Options 2, 3, and 4 require approval of UH and DLNR. If none of these options are available, option 1 must be completed within 1 year. Sublease has provision that allows termination by sublessee with two (2) years notice. |
<p>| <strong>Decommissioning Date</strong> | Not planned at this time |
| <strong>Funding Source for Decommissioning</strong> | NAOJ |
| <strong>Other</strong> | 2008 estimate: Removal of the Subaru telescope would cost more than $10 million. |</p>
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gemini North Telescope</strong></td>
<td></td>
</tr>
<tr>
<td>Sublessee</td>
<td>US National Science Foundation (NSF)(^{14})</td>
</tr>
<tr>
<td>Sublease Start Date</td>
<td>August 9, 1994</td>
</tr>
<tr>
<td>Operational Start Date</td>
<td>1999</td>
</tr>
<tr>
<td>Lease / Sublease End Date</td>
<td>2033</td>
</tr>
<tr>
<td>Operations</td>
<td>Operational for minimum of 20 yr</td>
</tr>
</tbody>
</table>
| Lease / Sublease Terms    | 1. Removal of facilities and restoration of property at expense of NSF  
                           | 2. Sale to UH  
                           | 3. Sale to a 3\(^{rd}\) party, contingent upon the execution of a new Sublease and  
                           | Operating and Site Development Agreement between the 3\(^{rd}\) party and UH  
                           | 4. Surrender in place  
                           | Options 2, 3, and 4 require approval of UH and DLNR. If none of these options  
                           | are available, option 1 must be completed within 1 year  
                           | Sublease has provision that allows termination by sublessee with two (2) years  
                           | notice. |
| Decommissioning Date      | Not planned at this time |
| Funding Source for        | NSF to pursue funding |
| Decommissioning           |             |
| Other                     | 2008 estimate: Removal of the Gemini North telescope would cost  
                           | approximately $9 million. |
| **Radio**                 |             |
| **Caltech Submillimeter Observatory (CSO)** |             |
| Sublessee                 | Caltech and the US National Science Foundation |
| Sublease Start Date       | December 20, 1983 |
| Operational Start Date    | 1987        |
| Lease / Sublease End Date | 2033        |
| Operations                |             |
| Lease / Sublease Terms    | 1. Sale to UH  
                           | 2. Sale to a 3\(^{rd}\) party acceptable to UH  
                           | 3. Surrender with the approval of BLNR Chair  
                           | 4. Removal of facilities and restoration of property at expense of Caltech  
                           | If none of options 1-3 is completed within 12 months after termination or  
                           | expiration of the sublease, option 4 must be exercised.  
                           | Sublease has provision that allows termination by sublessee with two (2) years  
                           | notice. |
| Decommissioning Date      | Plans call for the dismantling of the observatory to begin in 2016, with the return  
                           | of the site to its natural state by 2018.\(^{15}\) |
| Funding Source for        | Caltech     |
| Decommissioning           |             |
| Other                     |             |
| **James Clerk Maxwell Telescope (JCMT)** |             |
| Sublessee                 | STFC. Telescope is shared by the UK, Canada and the Netherlands |
| Sublease Start Date       | February 10, 1984 |
| Operational Start Date    | 1987        |
| Lease / Sublease End Date | 2033        |
| Operations                |             |

\(^{14}\) The Gemini Observatory, comprising the Gemini North Telescope on Mauna Kea and the Gemini South Telescope in Chile, is a scientific collaboration among the US, UK, Canada, Australia, Argentina, Brazil and Chile. The Gemini Observatory is operated by the Association of Universities for Research in Astronomy Inc. under an agreement with the NSF.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
</table>
| Lease /Sublease Terms         | 1. Sale to UH  
2. Surrender with the approval of UH  
3. Sale to a 3rd party acceptable to UH  
4. Removal of facilities and restoration of property at expense of STFC  
If none of options 1-3 is agreed upon within six months, then option 4 must be exercised.  
Minimum period of advanced notice for terminating sublease in writing by sublessee is not specified. |
| Decommissioning Date          | Not planned at this time                                                                                                                                                                                                                                                                                                                                                                                     |
| Funding Source for Decommissioning | STFC                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Other                         | See details for UKIRT                                                                                                                                                                                                                                                                                                                                                                                        |
| Sub毫米imeter Array (SMA)     |                                                                                                                                                                                                                                                                                                                                                                                                                |
| Sublessee                     | Smithsonian Astrophysical Observatory/Taiwan                                                                                                                                                                                                                                                                                                        |
| Sublease Start Date           | May 15, 1995                                                                                                                                                                                                                                                                                                                                       |
| Operational Start Date        | 2002                                                                                                                                                                                                                                                                                                                                               |
| Lease / Sublease End Date     | 2033                                                                                                                                                                                                                                                                                                                                               |
| Operations                    | Operational for minimum of 20 yr                                                                                                                                                                                                                                                                                                                     |
| Lease /Sublease Terms         | 1. Removal of facilities and restoration of property at expense of Smithsonian  
2. Sale to UH  
3. Sale to a 3rd party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the 3rd party and UH  
4. Surrender in place  
Options 2, 3, and 4 require approval of UH and DLNR. If none of these options are available, option 1 must be completed within 1 year  
Sublease has provision that allows termination by sublessee with two (2) years notice. |
| Decommissioning Date          | Not planned at this time                                                                                                                                                                                                                                                                                                                                                                                     |
| Funding Source for Decommissioning | Smithsonian Institution                                                                                                                                                                                                                                                                                                                              |
| Other                         | Smithsonian Institution has put forth a variety of technical options for decommissioning, but did not have any cost estimates at this time.                                                                                                                                                                          |
| Very Long Baseline Array (VLBA) |                                                                                                                                                                                                                                                                                                                                                   |
| Sublessee                     | US National Radio Astronomy Observatory (NRAO), Associated Universities Inc., and the US NSF                                                                                                                                                                                                                                                         |
| Sublease Start Date           | September 28, 1990                                                                                                                                                                                                                                                                                                                                  |
| Operational Start Date        | 1992                                                                                                                                                                                                                                                                                                                                               |
| Lease / Sublease End Date     | 2033                                                                                                                                                                                                                                                                                                                                               |
| Operations                    |                                                                                                                                                                                                                                                                                                                                                     |
| Lease /Sublease Terms         | 1. Removal of facilities and restoration of property at expense of NRAO  
2. Sale to UH  
3. Sale to a 3rd party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the 3rd party and UH  
4. Surrender in place  
Options 2, 3, and 4 require approval of UH and DLNR. If none of these options are available, option 1 must be completed within 1 year  
Sublease has provision that allows termination by sublessee with one (1) year notice. |
| Decommissioning Date          | Not planned at this time                                                                                                                                                                                                                                                                                                                                                                                     |
| Funding Source for Decommissioning | NSF to pursue funding                                                                                                                                                                                                                                                                                                                               |
| Other                         | Site will not be reused in the future.                                                                                                                                                                                                                                                                                                                     |
3 Financial Planning for Decommissioning

Inclusion of a financing plan as part of the Decommissioning Plan was a specific condition of BLNR’s conditional approval of the Mauna Kea CMP. Costs for decommissioning observatories have the potential to be substantial and, therefore a financial planning is critical to ensure sufficient funds are available for decommissioning activities. A financial assurance or other financial arrangement provided by a sublessee is a guarantee that funds for decommissioning will be available when needed. Financial assurance helps ensure that a suitable mechanism is in place for financing the deconstruction of facilities and site restoration. This is necessary to both fund the decommissioning activities and to ensure funding in the event that a sublessee is unable or unwilling to complete decommissioning in a timely manner. Obtaining and maintaining current updated estimates of these costs are essential over the long-term planning horizon. The amount of financial assurance obtained should be based on a conceptual cost estimate and must be adjusted over time. Financial assurance is achieved through the use of financial instruments (see Section 3.2).

The need for financial assurance arises from concern that although current subleases contain provisions requiring “removal of facility and restoration of site” if no other option is selected or agreed upon, there are no financial assurances that funding is available for facility removal or site restoration. Although existing subleases have affirmed their commitment to funding decommissioning activities, and some have obtained preliminary cost estimates, there are no known funds specifically set aside for this purpose (see Table 3 and Appendix B). Ideally, financial assurance for decommissioning should be obtained prior to the commencement of permitted activities, incorporated into sublease terms, and maintained until termination of the sublease. Such assurance may be included in all new or renegotiated subleases. This section outlines recommended financial planning requirements for decommissioning applicable to sublessees on Mauna Kea.

3.1 Decommissioning Funding Plan

Funding details will be included in a Decommissioning Funding Plan (DFP) for each new or renegotiated sublease. A DFP is a document that contains a cost estimate for decommissioning, describes the method for assuring funds for decommissioning through one or more financial instruments, describes the means for adjusting both the cost estimate and funding level over the life of the sublease, and contains a certification of financial assurance that may include but not be limited to signed originals of the financial instruments provided as financial assurance. A certification of financial assurance documents the sublessee’s assurance that a prescribed amount of funding has been secured for decommissioning and site restoration. The amount secured should be based on the conceptual cost-estimate and be sufficient to adequately perform the decommissioning proposed in the SDP and comply with all local, state and federal environmental regulations.

3.1.1 Developing a Decommissioning Funding Plan

Existing Subleases

It is recommended that existing sublessees develop a DFP or similar document as soon as a decision is made regarding the extent of facility removal and level of site restoration and, if feasible, at least two

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16 Conceptual cost is a best estimate derived prior to development of detailed engineering plans. The value estimated should be considered provisional and it is derived using common engineering cost estimate methods.
years prior to the actual decommissioning of their facility (see Table 4). A DFP or similar document provides assurances to UH and DLNR that the sublessee has sufficiently planned for meeting the terms of their sublease agreement.

**New and Renegotiated Subleases**

For new and renegotiated subleases, DFPs should be developed when negotiating the sublease or upon an agreement between an observatory and its funding entity, and should become part of the subleases. This will allow the costs for deconstruction and site restoration to be recognized over the estimated life of the facilities. The DFP and associated cost estimates will be reviewed and updated periodically on an agreed upon term (at a minimum every 15 years) by the sublessee to current costs and submitted to UH in the form of an update to the DFP.

### Table 4. Timeline for Developing a Decommissioning Funding Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Existing Sublease</th>
<th>New or Renegotiated Sublease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission of initial DFP, or similar document to UH</td>
<td>Requested as soon as a decision is made regarding the extent of facility removal and level of site restoration and, if feasible at least two (2) years prior to the actual decommissioning of the facility.</td>
<td>With sublease or upon acceptance of an agreement with observatory funding entity.</td>
</tr>
<tr>
<td>Submission of conceptual cost estimate</td>
<td>Component of initial DFP or similar document (recommended)</td>
<td>Component of initial DFP</td>
</tr>
<tr>
<td>Submission of detailed cost estimate</td>
<td>One to two (1-2) years prior to start of deconstruction, or as soon as feasible (recommended)</td>
<td>One to two (1-2) years prior to start of deconstruction</td>
</tr>
<tr>
<td>UH review; MKMB approval</td>
<td>Within six (6) months of receipt</td>
<td>With sublease</td>
</tr>
<tr>
<td>Updates</td>
<td>Requested every fifteen (15) years</td>
<td>Required every fifteen (15) years</td>
</tr>
<tr>
<td>Integrate into SDP</td>
<td>If a DFP or similar document is prepared, submit with NOI to include information on how funding for decommissioning is being assured</td>
<td>Submit with NOI</td>
</tr>
</tbody>
</table>

#### 3.1.2 Estimating Costs for Decommissioning

Conceptual cost estimates are used as a basis for determining the initial amount of financial assurance to be obtained. Conceptual cost is a best estimate derived prior to development of detailed engineering plans. The value estimated should be considered provisional and it is derived using common engineering cost estimate methods. Costs must be adjusted over time. The preparation of a conceptual cost estimate is part of the financial assurance and confirms that the sublessee has a plan, albeit preliminary, for removing their facilities and restoring the site, per their respective sublease terms. A conceptual cost estimate is subject to review by UH and/or DLNR.
When an SDP is initiated, the conceptual cost estimate should be replaced by a detailed cost estimate (see Table 4). The detailed cost estimate should be submitted together with other required SDP documents describing site deconstruction and restoration (see Section 4.2).

The detailed cost estimate should provide for removal of the facility and restoring the site to the ‘full’ level (see Section 4.2.4). The detailed cost estimate shall be prepared, preferably by a Licensed Engineer, and is subject to review at the request of UH and/or DLNR. The estimate shall be used as the basis for decision-making in terms of determining the extent of funding deconstruction and site restoration activities or, if allowed, allocating funds to a different purpose (see Section 4.3). Funding for site restoration is the responsibility of the sublessee. The detailed cost estimate shall include funding of an effectiveness monitoring program to evaluate the restoration for an agreed upon time. In the event that the monitoring schedule extends past the termination date of the sublease, the monitoring funds will be housed at OMKM, or at a mutually agreed upon agency or organization, and used to complete the monitoring.

3.1.3 Finalizing Decommissioning Costs
DFPs are eventually incorporated into SDPs. When the information is included in the SDP at the end of operations, it will need to include: (a) an updated, detailed cost estimate for deconstruction and restoration; (b) one or more financial assurance mechanisms (including supporting documentation); (c) a comparison of the cost estimate with the financial assurance secured for decommissioning; and (d) a plan for assuring the availability of adequate funds for completion of decommissioning. A situation may arise in which a sublessee has set aside funding, but it does not engage in decommissioning. This would be the case if the site was sold to UH or another entity or surrendered to UH (see Section 2.2). The sublessee would be required to conduct any tasks outlined in contractual agreements related to decommissioning with these funds (e.g. environmental due diligence prior to land transfer). Any surplus funds are owned by the sublessee. A new owner would be responsible for complying with the sublease terms, including decommissioning and restoration of the site.

3.2 Financial Assurance Mechanisms
A number of different types of financial instruments may be used to demonstrate financial assurance, for example, trusts, letters of credit, surety bonds, and guarantees. Some financial instruments provide a special account into which the sublessee may prepay the applicable costs. Other financial instruments guarantee funding by a suitably qualified third party, thereby providing contingency in the event the sublessee is unable or unwilling to pay these costs when they arise. There are a number of different mechanisms to choose from to comply with the financial assurance requirements for decommissioning, which can be used on their own or in combination. The following are examples of financial assurance “methods”:

Prepayment. Under this method, the sublessee provides advance decommissioning funding in full using an account segregated from the sublessee’s assets and outside the sublessee’s administrative control. Acceptable prepayment mechanisms include trust funds, escrow accounts, government funds, certificates of deposit, and deposits of government securities.

Surety, insurance, or guarantee. Under this method, an entity with adequate financial strength (e.g., bank, insurer, or other financial institution) guarantees that the required amount of funds will be available when
needed by the sublessee. Acceptable surety, insurance, or guarantee mechanisms include surety bonds, performance bonds, letters of credit, lines of credit, insurance policies, parent company guarantees, and self-guarantees. The amount should cover the estimated costs of deconstruction and site restoration.

DLNR uses performance bonds in their subleases. A performance bond is a surety bond issued by an insurance company or a bank to guarantee satisfactory completion of a project by a sublessee. In the case of observatory decommissioning on Mauna Kea, a performance bond would be required to be issued in favor of UH for whom the sublessee is constructing an observatory. If the sublessee fails to demolish the structure and restore the site according to the specifications laid out by the contract (most often due to the bankruptcy of the sublessee), UH is guaranteed compensation for any monetary loss up to the amount of the performance bond.

*External sinking fund/Reserve account.* This method allows a sublessee to gradually prepay for decommissioning by combining the use of a partially funded prepayment instrument (e.g., a trust or escrow) with a surety bond, a letter of credit, or insurance covering the unfunded balance. This mechanism may be implemented over the term of the sublease and funds adjusted based on updated cost estimates.

*Asset collateral.* This method allows a sublessee to pledge the market value of an existing asset, such as land or buildings, as funding for decommissioning activities. Market value of pledged assets should be updated regularly through a standard appraisal process.

*Statement of intent.* This method is a commitment that a government funded or operated sublessee shall request and obtain decommissioning funds from its funding body, when necessary. A Statement of Intent needs to state the estimated cost of decommissioning, as well as demonstrate that the party signing the statement has the authority to make such a statement on behalf of the government. The signatory should be the head of the agency or the designee. This instrument may be used by observatories that are funded or operated by a consortium of international, national, or State governments.

### 3.3 Documenting Financial Assurance

The financial assurance shall be evaluated by UH to ensure that sufficient funds will be available to carry out deconstruction and site restoration activities in a safe and timely manner. The financial assurance submission shall include: a conceptual cost estimate for decommissioning; a description of the means for adjusting the cost estimate and associated funding level periodically over the life of the facility; a certification of financial assurance by the sublessee that financial assurance has been provided in the amount of the cost estimate; and one or more financial assurance mechanisms (including supporting documentation). UH shall review the financial assurance submission to ensure that it includes the information summarized above and demonstrates the following:

- the accuracy and appropriateness of the methods used by the sublessee to estimate the costs of decommissioning;
- the acceptability of the sublessee’s submitted financial assurance mechanism(s) for decommissioning; and
- the means identified in the DFP or SDP for adjusting the cost estimate and associated funding level over the life of the facility.
The material to be reviewed by UH is technical in nature. UH will make a quantitative evaluation of the sublessee’s cost estimate or prescribed amount, and financial assurance mechanism(s). The purpose of the review of the cost estimate is to ensure that the sublessee has developed a cost estimate for decommissioning based on documented and reasonable assumptions and that the estimated cost is sufficient to allow an independent third party to assume responsibility if the sublessee is unable to complete the decommissioning. Demonstration and acknowledgement of adequate financial assurance for decommissioning may be required as part of new and/or renegotiated subleases.

4 Decommissioning Process Requirements

The decommissioning process is initiated when either UH revokes a sublease, the sublessee decides to cease operations, or when it is decided observatory operations will end when the sublease expires (see Section 5.1). The decommissioning process is also initiated if the general lease between UH and DLNR expires and no new lease is negotiated. The decommissioning process includes a series of necessary steps to remove the observatory and its supporting infrastructure by deconstruction, demolition, and restoring the site to at or near its pre-construction condition.\(^\text{17}\)

The decommissioning process is successful when all regulatory compliance requirements are met and the site is deemed returnable to the State. A Site Decommissioning Plan (SDP) documents the condition of the site, outlines the approach to decommissioning, and proposes a plan for site restoration. The phases and specific details of the SDP are presented in Section 4.2. An SDP should be submitted at least five years prior to either the termination date of a sublease, or a sublessee’s decision to cease operations, or as soon as is feasible if decommissioning is to take place less than five years after a decision is made to cease operations, whichever occurs first.

Removal of facilities and restoration of property is a requirement in the existing subleases if ownership of the facility is not sold or otherwise transferred. These sublease documents do not specifically define the term “removal” or what this entails. This plan defines “removal” as the total or partial removal of all structures and infrastructure to the extent achievable under normal engineering deconstruction planning protocols. For decision making purposes, the starting point for determining the scope and extent of removal shall be total removal. With respect to “restoration,” most of the existing subleases state that restoration shall be to “even grade,” while two subleases require restoration to “original condition, reasonable wear and tear excepted.” For purposes of this Decommissioning Plan, “restoration” is defined as the total return, or return to the greatest extent possible, of the impacted areas to their pre-construction condition. The starting point for determining the level to which a site is to be restored shall be total restoration to the pre-construction condition. The extent of removal and level of site restoration must be acceptable to both UH and DLNR.

Although the requirements to develop a SDP and a DFP are not contained in the existing sublease agreements between UH and the various sublessees, it is a BLNR condition that UH develop a Decommissioning Plan that describes a decommissioning process that includes a financial plan. BLNR is the final authority regarding approval of the Decommissioning Plan, CDUPs for construction of new

\(^{17}\) Any future project within the UH Management Areas that has the potential to have an adverse impact will require the preparation of an EA or EIS under the National Environmental Policy Act (NEPA) and/or HRS Chapter 343, Environmental Impact Statements and HAR Section 11-200, Environmental Impact Statement Rules.
observatory facilities, and CDUPs for removal of existing facilities (see Section 1.4). The requirements to develop a SDP and a DFP may be contained in new or renegotiated subleases.

4.1 Coordinating the Decommissioning Process

OMKM is responsible for overall coordination of the decommissioning process. OMKM will liaison with DLNR-OCCL as needed, will maintain all required reporting and documentation, and will provide DLNR-OCCL with all relevant documentation.

Deconstruction and site restoration efforts will be managed by the sublessees with oversight by OMKM. Sublessees will be responsible for securing all permits necessary to demolish, recycle, transport and dispose of all materials removed from the site, as well as for adherence to applicable State of Hawai‘i statutes pertaining to natural and cultural resource protection. All communications between sublessees to permitting agencies or other government entities during preparation and execution of the decommissioning process shall include OMKM on the correspondence list. It is important for OMKM to be apprised of all activities under the decommissioning process.

There are several elements of the decommissioning process that will incorporate community input. A process similar to the BOR-approved Major Project Review Process will be established to review, guide and recommend the disposition of a site, including site restoration and planning (see Figure 1). Reviewers will include OMKM, the Mauna Kea Management Board, Kahu Kū Mauna, and the Environment Committee. OMKM is considering forming a Decommissioning Working Group comprised of members of the observatories. The working group would provide guidance and a forum for ensuring consistency in the execution of the decommissioning process.

4.2 Site Decommissioning Plan

A Site Decommissioning Plan (SDP) documents the condition of the site, outlines an approach to decommissioning, and proposes a plan for site restoration, if applicable. Each SDP shall be developed in stages consisting of the following four components: (1) a Notice of Intent, (2) an environmental due diligence review, (3) a Site Deconstruction and Removal Plan and, (4) a Site Restoration Plan. Each of the four components of a SDP shall be submitted to UH\textsuperscript{18} and DLNR-OCCL, except where noted below. Development of all components of a SDP shall be completed in coordination with OMKM. OMKM will coordinate reviews with Kahu Kū Mauna and the Environment Committee and provide written comments to MKMB. All components of each SDP shall be approved by MKMB followed by approval by the UH President. The final SDP may also require approval by the UH Board of Regents (BOR). DLNR-OCCL, reserves the right to request modification of the plan and/or require a BLNR-approved CDUP. Permitting and notification requirements for decommissioning are described in Section 4.2.3. The components of an SDP are presented as a flow chart in Figure 1. A timeline for submitting and implementing these different components is presented in Table 5.

\textsuperscript{18} In the context of review and approval, “UH” refers to all entities that fall under the University of Hawai‘i that will be reviewing the plans, including OMKM, MKMB, Kahu Kū Mauna, and Environment Committee.
Figure 1. Components of a Site Decommissioning Plan

*Preparation, review, and approval of RAP, SDRP and SRF may occur concurrently.*
4.2.1 Notice of Intent

The first component of the decommissioning process is the preparation of a *Notice of Intent* (NOI) (see Figure 1). The purpose of the NOI is to propose whether a site will be removed, continued for use as an observatory by a third party, or retrofitted for a different use. Intentions for site restoration should also be described in the NOI. The NOI should be submitted to UH and DLNR-OCCL at least five years prior to either the termination date of a sublease, or a sublessee’s decision to cease operations, or as soon as is feasible if decommissioning is to take place less than five years after a decision is made to cease operations, whichever occurs first. DLNR-OCCL reserves the right to require a CDUP pending a review of the proposed decommissioning activities described in the NOI (see Section 1.4 and Figure 1).

The NOI shall contain a site description that summarizes the overall condition and land use, including a description of all structures, equipment and other appurtenances. A site plan(s) drawn to scale showing all existing structures, above and below grade, should be included. Available historical information on the development, operation, and use of the site shall be presented. A description of the pre-construction condition of the site should be provided based on available information. For site restoration purposes, the pre-construction condition will be based on the site’s topographic condition prior to the construction of the observatory. Acceptable information for establishing pre-construction conditions includes: topographic maps prepared at the time of the observatory’s construction; oblique, aspect, and elevation photographs; engineering plans and drawings; site descriptions contained in narrative format; and other sources as available. OMKM will require complete documentation of sources and reserves the right to review information used to establish pre-construction site conditions.

4.2.2 Environmental Due Diligence Review

The next component of the decommissioning process consists of conducting an environmental due diligence review (see Figure 1). For all cases of potential future use described in the NOI, a Phase I environmental site assessment (ESA) of the observatory property shall be conducted and the results submitted to UH and DLNR-OCCL. The goal of a Phase I ESA on a parcel of property is to identify recognized environmental conditions. The term recognized environmental conditions means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property. The term is not intended to include *de minimis* conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* are not recognized environmental conditions. A Phase I ESA is intended to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on liability with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. 9601) and petroleum products.

If recognized environmental conditions are identified in the Phase I ESA, additional investigative analysis in the form of a Phase II ESA is typically required. The purpose of a Phase II ESA is to provide sufficient information regarding the nature and extent of contamination to assist in making informed business decisions about the property; and where applicable, providing the level of knowledge necessary to satisfy
the innocent landowner, contiguous property owner, or bona fide prospective purchaser defense under CERCLA. A Phase II Sampling and Analysis Plan (SAP) shall be prepared before conducting any intrusive sampling. Based on the results of the Phase II ESA, additional analysis in the form of a human health risk assessment and/or ecological risk assessment may be needed. Pending the results of the Phase II ESA and health/ecological risk assessments, a remedial action plan (RAP) may need to be developed and implemented to mitigate risks to human health and the environment. Recommendations and proposed activities described in the Phase I and II ESAs, Phase II SAP, health/ecological risk assessments, and the RAP shall be subject to review by UH and DLNR (see Figure 1).

Guidance for conducting environmental site assessments and risk-based corrective action are described in the following American Society for Testing and Materials (ASTM) standards:

- ASTM E1527 – 05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process
- ASTM E2247 – 08 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland and Rural Property
- ASTM E2205 / E2205M – 02(2009)e1 Standard Guide for Risk-Based Corrective Action for Protection of Ecological Resources

The Environmental Protection Agency (EPA) has established federal standards and practices for conducting all appropriate inquiries as required under sections 101(35)(B)(ii) and (iii) of CERCLA (40 CFR, Part 312). The final rule, known as the All Appropriate Inquiries Regulation, became effective November 1, 2006 and establishes specific regulatory requirements and standards for conducting all appropriate inquiries into the previous ownership and uses of a property for the purposes of meeting the all appropriate inquiries provisions necessary to qualify for certain landowner liability protections under CERCLA. EPA now recognizes both of ASTM’s standard practices for Phase I ESAs (E1527-05 and E2247-08) as compliant with the All Appropriate Inquiries Regulation. Either of these ASTM Phase I standards may be used to satisfy the statutory requirements for conducting all appropriate inquiries under CERCLA. Additional information from EPA on CERCLA liability for state and local governments, and the All Appropriate Inquiries Regulation is presented in Appendix C.

### 4.2.3 Site Deconstruction and Removal Plan

The third component of the decommissioning process involves the preparation of a Site Deconstruction and Removal Plan (SDRP) (see Figure 1). The purpose of the SDRP is to document the proposed methods for demolishing, in part or total, any and all observatory structures and related infrastructure; grading and grubbing the site; stockpiling fill materials; and solid waste recovery, reuse and disposal. A SDRP will not be required when there is a transfer of ownership of an observatory to a third party and no deconstruction/construction activities are proposed. The SDRP shall include a description of all proposed activities and include copies of all required plans, drawings, permits, and authorizations. Plans for segregating demolition debris and for recycling/reusing building materials either on-site or off-site shall
be described. A cost benefit analysis and a schedule for implementing all aspects of the SDRP shall also be included.

Should a CDUP be required by DLNR-OCCL after reviewing the NOI (see Section 4.2.1 and Figure 1), a CDUA shall be submitted in coordination with UH and DLNR-OCCL. The CDUA could also require the preparation and submission of an environmental assessment (EA). Although the demolition of structures may be exempted from an EA as defined in HAR §11-200-8, there may be elements in a SDRP (and associated Site Restoration Plan – see Section 4.2.4) that are not exempt. The need for an EA will be based on the review of the NOI by DLNR-OCCL in coordination with OMKM. In conjunction with this process, UH must evaluate the need for and/or satisfy State and Federal environmental impact requirements (HRS Chapter 343 and the National Environmental Policy Act (NEPA)).

Compliance with laws relating to historic properties is also required. Any decommissioning activity funded by Federal funds will require compliance with Federal laws pertaining to historic preservation, including the National Historic Preservation Act (NHPA). The NHPA aims to ensure that historic properties are appropriately considered in planning Federal initiatives and actions. The Advisory Council on Historic Preservation is an independent federal agency responsible for administering the protective provisions of the act. SHPD should also be consulted, and provisions of HRS Chapter 6E, Historic Preservation and HAR §13-300 followed.

Additional permits and authorizations may be required from the County of Hawai‘i, State Department of Health, and DLNR-SHPD, depending on the nature and extent of demolition/construction activities. These may include building, plumbing and electrical permits for total or partial building demolition; authorization to abandon a cesspool/septic tank; and NPDES, grading, grubbing, and stockpiling permits for earth-moving activities. The sublessee will need to coordinate with the County of Hawai‘i Environmental Management Department, Solid Waste Division, to ensure that requirements for disposing of demolition waste are met. Specifically, a description of waste types and quantities, plan for recycling and reusing waste materials, and schedule for disposal should be prepared and submitted with the sublessee’s permit application for building/observatory demolition. For partial demolition (i.e. site recycling), the sublessee should coordinate with the County of Hawai‘i Planning Department and Fire Department to ensure that their requirements are met.

A summary of the permitting/notification requirements for the SDRP is presented in Figure 2. The sublessee is responsible for obtaining these permits and authorizations in coordination with OMKM. The permits and regulatory oversight will identify minimum requirements for each respective statute or ordinance. UH and DLNR-OCCL may require additional actions be taken to protect resources. All deconstruction planning must explore these issues through consultation with OMKM, Kahu Kū Mauna, and the Environment Committee. Compliance with Federal and State laws includes possible consultation with stakeholders.

### 4.2.4 Site Restoration Plan

The fourth and final component of the decommissioning process involves the preparation of a Site Restoration Plan (SRP) (see Figure 1). The purpose of a SRP is to present specific targets for site restoration and to describe the methodology for restoring disturbed areas after the demolition/construction activities described in the SDRP are completed. Each SRP shall be specific to the site and consider...
cultural, biological and physical aspects of site restoration. Each SRP shall include a provision for effectiveness monitoring to characterize success and/or failure of restoration efforts. In addition, the principles of adaptive management shall be applied so that lessons learned from previous efforts can be applied to future restoration projects at the site. Upon request, OMKM can provide copies of previously approved SDRPs and/or SRPs from other observatory sites, as available.

Two primary objectives of site restoration include (1) restoring the look and feel of the summit prior to construction of the observatories, and (2) providing habitat for the aeolian arthropod fauna. These two objectives must be considered in any restoration planning.

1) Topography / Pu‘u Restoration. For many sites in the summit region, restoration to a historical condition could involve reconstruction of portions of cinder cones or pu‘u. When developing restoration plans, an attempt should be made to obtain and review any original site construction documents for an idea of original topography. If relevant information cannot be found, effort should be made to restore the site to a basic topography consistent with the area.

2) Arthropod Community. The summit pu‘u provide habitat for a rare arthropod community, including the wēkiu bug (Nysius wekiuicola), currently a candidate for Federal protection under the Endangered Species Act. Restoration projects at the summit in known or potential wēkiu bug habitat should focus on creating habitat suitable for use by the native arthropods. OMKM shall be consulted with respect to designing restoration for natural resource purposes, including the wēkiu bug.

The starting point for negotiations shall be full restoration. All restoration activities shall also adhere to the applicable permitting requirements for site deconstruction (see Figure 2). UH and DLNR have final approval of the SRP and may require additional restoration activities.

For purposes of the SRP, site restoration is comprised of a physical component and an ecological component. Physical restoration implies returning the site to its pre-construction appearance in terms of topography, vegetation, and ground cover composition. According to the Society for Ecological Restoration, ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.19

Ideally, the target for all sites is restoration to the site’s historical condition prior to construction of the facility. However, the SRP must also consider cultural sensitivities, the extent of infrastructure removal and deconstruction, the size of the site restoration effort, the use of backfill cinder with respect to its source and size. The level of restoration attempted and the potential benefits and impacts of the restoration activities on natural and cultural resources during and post-activity must be carefully evaluated. A cost-benefit analysis shall also be conducted. All site restoration planning must explore these issues through consultation with OMKM, Kahu Kū Mauna, and the Environment Committee.

19 http://www.ser.org/content/adoption.asp
PERMITTING & NOTIFICATION REQUIREMENTS FOR SITE DECONSTRUCTION AND REMOVAL PLAN

Building, Plumbing, & Electrical Permits

Cesspool/Septic Tank Abandonment Approval/Notification

NPDES, Grading, Grubbing, and Stockpiling Permits

Conservation District Use Permit

Total* demo or partial demo and reuse?

Partial**

County Solid Waste Division Requirements

County Solid Waste, Planning and Fire Department Requirements

2 sets of plans prepared by sublessee

3 sets of plans prepared by licensed architect or structural engineer

DOH Clean Water Branch

County Planning Department

County Engineering Division

DOH Site Historic Preservation Division

Determination of effect

NPDES Permit

Grubbing Permit

Stockpiling Permit

Fill > 100 yd³? Excavation > 5 ft deep? Drainage altered?

Yes

No

No NPDES or Grabbing Permit required

No Grading Permit required

No Stockpiling Permit required

3 sets of plans prepared by licensed civil engineer

Stockpiled material > 500 yd³?

Yes

No

Stockpiled material required

County Planning Department

County Engineering Division

Grading Permit

Stockpiling Permit

Discharge > 1000 gpd?

Yes

No

Application and site plan prepared by sublessee

DOH Waste Branch

DOH Safe Drinking Water Branch

Abandonment Instructions

Method selection by qualified geologist or licensed civil engineer

Completion Report

In CDUP required by DOH – Office of Conservation and Coastal Lands per NOE?

Yes

No

In SDRP exempted from Environmental Assessment (EA)?

Yes

No

20 sets of plans, photos, maps, and SMA letter, prepared by sublessee

CDUP

EA prepared by sublessee

* Plumbing & electrical permits not required for total demolition

** See additional requirements for site recycling under the Master Plan Project Approval Process

Figure 2. Permitting and Notification Requirements for Site Deconstruction and Removal Plan

Decommissioning Plan for Mauna Kea Observatories

January 2010
Specific factors that need to be considered during the development of a SRP include:

**Cultural Sensitivity**
The Mauna Kea CMP provides a cultural perspective related to site restoration:

> From a cultural perspective there are many Native Hawaiians who have commented that once a site or pu‘u has been developed it can never be fully restored as the mana (divine power) of the site has been destroyed forever. Although for many people in the Hawaiian community site restoration can never be fully attained, from a responsible management standpoint the CMP needs to address and provide guidance to OMKM and users on site restoration (2009 Mauna Kea CMP Section 7.3.3).

Cultural considerations with respect to deconstruction and restoration activities will be identified as part of the SDRP and SRP assessment and evaluation (see Section 4.3). Given the inherent challenges in the process, the focus will be on what is possible in terms of addressing cultural sensitivities.

**Extent of Infrastructure Removal and Deconstruction**
Many of the telescope facilities have foundations and basements extending below grade that would require considerable excavation to remove and significant material to backfill the voids. The following options exist with regards to removal of a facility and its infrastructure. Each has potential benefits and drawbacks that need to be assessed as part of the feasibility analysis.

*Complete infrastructure removal.* Involves removal of the entire facility, including underground utilities, pilings, and foundation to the extent practicable under normal engineering deconstruction practices. Under this scenario, there will be a very large hole in the substrate that needs to be filled prior to restoration efforts. Questions to consider related to filling this hole include what type of material will be used to fill the hole, where will the fill come from, and how stable will the site be. Bringing fill from offsite has the potential to introduce invasive species, and may also be considered by some as culturally inappropriate. Potential future facilities should consider the logistics of stockpiling excavated material for future use in restoration activities. Depending on the type of subsurface foundation material used in the construction of an observatory, removal may be impractical to nearly impossible. In such cases, the foundation should be considered an irreversible impact, left in place, and capped.

*Infrastructure capping.* Capping involves removal of above ground facilities, with or without utilities, and leaves all or part of the underground portion of the facility in place. The remaining infrastructure would be capped with an impermeable material such as concrete and then topped with cinder materials. This scenario would need to ensure that the capped infrastructure was stable and inert, without long-term effects to the surrounding environment.

**Extent of Site Restoration**
The three-tiered approach to site restoration adopted by the Mauna Kea CMP is designed to ensure the development of appropriate strategies to address restoring the land. This tiered approach recognizes that in addition to the potential benefits of site restoration, there are also potential impacts. The desired goal for site restoration is the site’s historical condition prior to construction of the observatory. The overall
context of the landscape should be considered when assessing any restoration plans. Any plan to restore habitat needs to be analyzed at the landscape level, rather than as only the footprint of a single observatory.

The three levels of restoration include: minimal, moderate, and full. All three require infrastructure to be removed, including buried utilities and underground structures, unless it is determined that removal would cause irreversible damage to resources.

*Minimal restoration* is the removal of all man-made materials and grading of the site, leaving the area in safe condition.

*Moderate restoration* goes beyond minimal to include enhancing the physical habitat structure to benefit the native arthropod community.

*Full restoration* would return the site to its original pre-construction topography, as well as restoring arthropod habitat.

For existing subleases, the extent of site restoration shall be guided by the principles above and shall be negotiated among UH, DLNR and the sublessee in accordance with the terms of the sublease.

For new or renegotiated subleases, the decision as to which level is executed shall be made by UH in consultation with DLNR. If less than full restoration is implemented, the observatory may be required to fund other mitigation measures, support management of the UH Management Areas, or surplus funds could revert to the sublessee. The starting point for determining the level a sublessee needs to restore a site to shall be full restoration.

### Use of Cinder

Site restoration activities will involve using cinder either to fill holes or to reconstruct topography. Moving cinder has implications for 1) the area it is collected from (where will the cinder fill material come from, how will excavation and removal of cinder impact the collection area); 2) the pathway taken by the construction equipment; 3) the habitat surrounding the restoration area; and 4) the introduction of invasive plants and animals. Consideration must also be given to, the cultural implications of bringing cinder from a different place to the summit of Mauna Kea. Best management practices, such as ensuring that cinder is free of invasive species and contaminants and limiting dust released into the environment when cinder is moved, can reduce the impact to the environment, but the impact will never be zero.

### 4.3 SDRP, SRP, and RAP Assessment and Evaluation

The SDRP, SRP, and RAP shall be submitted to UH for assessment and evaluation as part of the decommissioning process. UH will assess the level and extent of these plans and evaluate the benefits to the environment and cultural resources against the potential adverse impacts of implementing the proposed plans. The purpose of the assessment and evaluation is to determine if potential benefits from implementing the plans outweigh their potential negative impacts. After reviewing the plans, OMKM, Kahu Kū Mauna and the Environment Committee will either recommend approval to the MKMB, or not recommend approval and forward comments to the sublessee directing them to revise the plans to address the concerns. After revisions are made the sublessee shall resubmit the plans for another review. Final
versions of the SDRP, SRP, and RAP must be approved by MKMB and the UH President, and if applicable by the BOR, and DLNR-OCCL before a sublessee may implement the plans.

The approved plans may allow for partial removal of infrastructure and restoration that is less than full. A scenario that is less than total removal or full restoration might occur if it is not feasible to remove all infrastructure or if the activities are not culturally acceptable or have the potential to cause adverse environmental impacts. New subleases and renegotiated subleases may require funding for full restoration even if the restoration is not implemented to the full level. The differential in funding could be used for a different purpose (e.g. monitoring of resources, habitat restoration), if allowed, or surplus funds could revert to the sublessee.

A situation may arise in which UH, DLNR, and the observatory disagree on the decommissioning cost estimate or some other issue (i.e. extent of deconstruction and site restoration). In these instances the parties may engage in an alternative dispute resolution process (i.e., mediation, facilitation, or arbitration) as determined by the parties.

4.4 Reporting

OMKM will hold the administrative record for decommissioning activities including documentation of decommissioning decision-making, DFPs, SDPs, permits and approvals, and a close-out inspection report including a final site survey. The close-out inspection shall be performed by UH or its contractor to determine if a sublessee has adequately decommissioned and met the terms of their sublease. Sublessee shall be responsible for close-out inspection costs. DLNR-OCCL may also participate in the close-out inspection. Results of monitoring activities will also be required.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement of intention to demolish, abandon, transfer and/or restore observatory property</td>
<td>At least five years prior to either the termination date of a sublease, or a sublessee’s decision to cease operations, or as soon as is feasible if decommissioning is to take place less than five years after a decision is made to cease operations, whichever occurs first</td>
</tr>
</tbody>
</table>

### Environmental Due Diligence Review

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I ESA</td>
<td>Completed within six (6) months of NOI filing</td>
</tr>
<tr>
<td>Phase II ESA, human health/ecological risk assessment, remedial action plan (RAP), if needed</td>
<td>Within one (1) year of Phase I ESA</td>
</tr>
<tr>
<td>MKMB and DLNR-OCCL approval</td>
<td>Within six (6) months of Phase I ESA, Phase II ESA, risk assessment, or RAP</td>
</tr>
<tr>
<td>RAP implementation, if applicable</td>
<td>One (1) year or more prior to end of sublease or planned departure from the site, depending on project schedule</td>
</tr>
</tbody>
</table>
### Site Deconstruction and Removal Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission of SDRP to UH and DLNR-OCCL</td>
<td>One to two (1-2) years prior to start of deconstruction</td>
</tr>
<tr>
<td>CDUP application, if needed(^{20})</td>
<td>One to two (1-2) years prior to start of deconstruction</td>
</tr>
<tr>
<td>Other permits, as needed(^{21})</td>
<td>One (1) year prior to start of deconstruction</td>
</tr>
<tr>
<td>OMKM Review; MKMB and DLNR-OCCL approval</td>
<td>Required prior to commencing implementation of SDRP</td>
</tr>
<tr>
<td>SDRP implementation</td>
<td>One (1) year or more prior to end of sublease, or planned departure from the site depending on project schedule. Completed according to sublease terms or negotiated schedule agreed to by the sublessee, UH and DLNR.</td>
</tr>
</tbody>
</table>

### Site Restoration Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission of SRP to UH and DLNR-OCCL</td>
<td>One to two (1-2) years prior to start of deconstruction</td>
</tr>
<tr>
<td>OMKM Review; MKMB and DLNR-OCCL approval</td>
<td>Required prior to commencing implementation of SRP</td>
</tr>
<tr>
<td>SRP implementation</td>
<td>One (1) year or more prior to end of sublease, or planned departure from the site, depending on project schedule. Completed according to sublease terms or negotiated schedule agreed to by the sublessee, UH and DLNR.</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Begins upon completion of site restoration and continues for at least three (3) years.</td>
</tr>
</tbody>
</table>

5  The Future of Astronomy on Mauna Kea

IfA oversees long-term planning and visioning of astronomical research in the Science Reserve. Priorities change over time as technological advances are made, and the vision continues to evolve. In addition to the potential construction of new observatories, other possible changes to the astronomy facilities include recycling of existing sites, expansion of existing observatories, and removal of observatories. In order to better understand the factors that influence the decision-making process regarding the timing of decommissioning, a discussion of the lifecycle of a telescope facility is presented (see Section 5.1). The decision to recycle a site, which includes reuse of some facilities and infrastructure, may also involve some elements of the decommissioning process (see Section 5.2).

UH sees a future for sustainable astronomy on the summit of Mauna Kea. The long-term goal is to eventually have fewer observatories in the summit region, but maintain its status as a world class center for education and research in ground-based astronomy. Section 5.3 presents an updated discussion of UH’s current plans for observatory development on the summit of Mauna Kea. A related discussion on

\(^{20}\) CDUP application would likely cover deconstruction and removal plans, as well as restoration plans.

\(^{21}\) Permits would likely cover deconstruction and removal plans, as well as restoration plans.
guidelines for limiting development, including how the siting of telescopes plays a role in the long-term planning process, is included in Appendix D.

5.1 Lifecycle of a Telescope Facility

There are four major components to a ground based optical/infrared (O/IR) telescope facility: the optics that collect and focus the light from the sky; the electro-mechanical structure that holds the optics in place and moves it to point in a desired direction; the enclosure; and the instrumentation that analyzes and records the light. The optics, electro-mechanical components, and enclosure can last indefinitely and continue to perform up to their original specifications so long as routine maintenance is performed and components are replaced at the end of their service life. As a result of technological advances, the performance of these components can often be improved over time at a cost that is modest compared to the original investment. For instrumentation, advancing technology, particularly in the area of detectors, can make instruments truly obsolete in a timeframe of 10-20 years. However, old instruments can be replaced with new ones at relatively small cost. The result is that ground-based O/IR telescopes can remain scientifically productive for many decades provided they receive proper maintenance and timely upgrades of their instrumentation. For example, the famous Mt. Palomar 200-inch telescope was commissioned in 1949 and is still in regular use. Since that time, 32 other O/IR telescopes with aperture three meters or larger have been commissioned (including seven on Mauna Kea), and all of these are still in operation.

Attempts to predict the timeline for removing ground-based O/IR telescopes from service will be difficult. These telescopes do not necessarily wear out or become scientifically unproductive, and the history of the last 60 years does not provide even a few examples for guidance. Barring a major accident, or some other contingency, such as the termination of a sublease, there are two distinct situations that would result in an O/IR telescope being closed and/or decommissioned: (1) replacement with better equipment or (2) loss of operational funding. In the case of replacement, this could be either by the original owner or by a new owner, and would depend on obtaining the required approvals and permits. A loss of operational funding could occur either because the owner simply no longer has the financial resources, or more likely, because the owner has a higher priority for the use of those funds, e.g. operational funding for a newer facility elsewhere. In the latter situation, attempts would almost certainly be made to find alternative sources of operational funding before a decision was made to decommission the telescope. Thus, the timescale on which a particular O/IR telescope is decommissioned will depend on whether and when it is replaced by something better and whether and when it loses its operational funding.

The situation with radio telescopes is somewhat different. Here, technological advances such as larger antennas and the use of interferometry can render older facilities scientifically obsolete. With O/IR telescopes, technological advances can be made by simply changing the instrument. This is much less the case for radio telescopes. Thus, for radio telescopes the situations that would result in decommissioning include the two described above for O/IR telescopes, and also obsolescence.

5.2 Site Recycling

Site recycling is used to describe any action involving use of an existing structure that houses equipment or is used in support of research that is reused, retrofitted, rebuilt, or expanded. There could be a range of options for any particular site, considering both the structure and/or equipment. Recycling plans could include deconstruction and replacement of a current facility with a new one on an existing or expanded
footprint (limited to the immediately adjacent area), facility upgrades, or improvements to utilities. It is possible that site recycling could be partially implemented, if a portion of the observatory infrastructure was removed and a portion left to be reused, with the rest of the site restored. Recycling can include the use of the structure for non-observatory purposes. Site recycling aims to minimize disturbance to undeveloped areas if additional observatories seek to locate in the Astronomy Precinct. It is more cost effective to reuse previously modified sites and previously existing structures when current equipment becomes antiquated or reaches the end of its service life (Group 70 International 2000).

The review of any site recycling options shall be evaluated under the existing BOR-approved Major Project Review Process. The primary difference between site recycling and decommissioning is that the former results in continued use and occupation of structures at a site and the latter results in removal and cessation of site use. However, since rebuilding a site will, by de facto, require the existing site to be removed, at least three phases of the SDP will be required: NOI, environmental due diligence, and the SDRP and associated permits (see Section 4.2). If sublessees are going to remove a structure in part or in total and rebuild, they are advised to utilize the SDP to assist in identifying permits and approval process for deconstruction.

5.3 Observatory Development Plans

Over the last few years IfA has provided an updated vision for the future of observatory development on Mauna Kea. As described in a report to the Hawai‘i State Legislature on the long-term development of observatory sites on Mauna Kea, continued evolution of technology and priorities require modified plans (Kudritzki 2006).

Since the development of the Master Plan, the scientific priorities of astronomy for the new century have become much clearer, and a new more concise concept for future astronomical development has emerged that will guarantee Hawai‘i’s continued world leadership in astronomical research and education, while at the same time being well balanced with the needs for cultural and environmental protection of Mauna Kea.

In this report potential observatory development was grouped into five categories: (1) construction of new telescopes, (2) expansion of existing observatories, (3) redevelopment of existing observatories, (4) operation of existing observatories, and (5) removal of existing observatories (see Table 6 and Appendix B) (Kudritzki 2006). The potential for observatory decommissioning was mentioned, but no specific plans were presented: “We are confident that in this way the number of observatories on Mauna Kea in 20 years from now will be smaller than now,” (Kudritzki 2006).

During the Mauna Kea CMP process (2008-2009), IfA Director Rolf-Peter Kudritzki described IfA’s ‘Revised Plan’ with respect to decommissioning and replacement of telescopes on Mauna Kea (see Appendix B). He also addressed the issue of telescope removal and site restoration, clarifying that the current plan, as stated in the 2006 report to the legislature “is to demolish the old facility, to clean the site and recreate the site in a stage as it was, before the facility had been built.”

This Decommissioning Plan presented an opportunity for IfA to provide additional specifics about their current vision for observatory development and decommissioning. With regard to the 13 existing telescopes on Mauna Kea (nine O/IR, four radio), a possible date can be foreseen for ceasing current operations of one of the telescopes. In May 2009, Caltech announced its intention to decommission the
Caltech Submillimeter Observatory (CSO) and remove it from the mountain during the period 2016 –
2018. This is the time frame in which the Atacama Large Millimeter/Submillimeter Array (ALMA) in
Chile will become fully operational. CSO has one 10-meter antenna, while ALMA will eventually have
60 12-meter antennas. Once ALMA begins operations, CSO will no longer be scientifically competitive.
A NOI is recommended to be developed based on proposed future use or decommissioning of this
facility.

For the other 12 telescopes, no decommissioning date is foreseen at the present time. Five of the O/IR
telescopes are relatively new: Keck I & II, Subaru, Gemini, and the UH Hilo Instructional Telescope. All
have subleases that expire in 2033. Three of the O/IR telescopes, CFHT, IRTF, and UKIRT, have been in
operation for 30 years. Over the years, all have had major upgrades to their instrumentation and to other
aspects of their facility. As a result, they remain scientifically viable and could possibly remain in
operation for another 20 years or more or be recycled. IfA’s plan foresees dismantling the UKIRT facility
and restoring the site at the end of its sublease, or earlier if it decides to cease operations prior to the end
of its sublease. The other O/IR telescope, the UH 2.2-meter, is planned for replacement by the Pan-STARRS
project.

For the other three radio telescopes besides CSO (JCMT, VLBA, and SMA), it is not possible to predict
with any degree of certainty when these might be decommissioned. It will depend on their ability to
remain scientifically competitive and to continue to attract operational funding. The SMA is the newest of
these and will likely remain in operation for at least 20 years. The VLBA, which is not within the
Astronomy Precinct, will not be replaced by another telescope once it is decommissioned. IfA’s plan
envisions that for CSO, JCMT, and SMA, at most one would be replaced by a new facility and the other
two would be decommissioned.

There are currently two projects that are considering Mauna Kea as a site for their observatory facility.
IfA is pursuing a project to replace the UH 2.2-meter Telescope with a wide-field imaging facility called
Pan-STARRS. The second proposed observatory project is the construction and operation of an O/IR next
generation large telescope known as the Thirty Meter Telescope (TMT). The proposed location for the
TMT is on an estimated five acres of presently undeveloped land off the summit in an area referred to as
the northern plateau within the Astronomy Precinct of the Science Reserve. Both projects are described in
the 2000 Master Plan as allowable types of developments for Mauna Kea (see Table 6). PanSTARRS is a
Type 1, redevelopment of an existing facility, and TMT is a Type IV, a next generation large telescope.
As with any proposed observatory project for Mauna Kea, these projects will be required to go through
the BOR-approved Major Project Review Process, and will require securing of and compliance with all
applicable environmental analyses, permits, subleases, and approvals.

In summary, by the end of the current lease (2033) UH foresees there may be ten observatories in the
Astronomy Precinct (see Table 8), based on UH’s current understanding. UH is cognizant that if no new
lease is granted, the observatories will need to be removed and the site restored no later than the lease end
date (December 31, 2033).
Table 6. Evolution of Recent Observatory Development Plans for Mauna Kea

<table>
<thead>
<tr>
<th>Type I. Redevelopment of Existing Observatory Sites on the Summit Ridge</th>
<th>2006 IfA Statement</th>
<th>2009 IfA Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redevelopment or “recycling” of up to five existing telescopes, including NASA/IRTF, CFHT, UH 2.2 m, UKIRT, and UH 0.6 m. Anticipate up to three or four facilities may be redeveloped over the next 20 years.</td>
<td>Redevelopment of the UH 0.6m telescope into an instructional telescope for UH Hilo.</td>
<td>Completed in 2008 as UHH 0.9m telescope.</td>
</tr>
<tr>
<td></td>
<td>Redevelopment of the UH 2.2m telescope into a Pan-STARRS observatory. Redevelopment would involve removal of the existing building and telescope and construction of a new, smaller building to house the PS4.</td>
<td>Plan to decommission UH 2.2m telescope in 2012 for replacement. Project is conducting the required environmental review process (see <a href="http://pan-starrs.ifa.hawaii.edu/">http://pan-starrs.ifa.hawaii.edu/</a>).</td>
</tr>
<tr>
<td></td>
<td>Refurbishment of some facilities if an important scientific case can be made.</td>
<td>Plans to be considered; which facilities and project timing are currently unknown.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type II. Expansion of Existing Observatories</th>
<th>Expansion of Existing Observatories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of the Keck Observatory with the addition of four to six 1.8-m. outrigger telescopes.</td>
<td>Plan no longer being considered.</td>
<td>Plan no longer being considered.</td>
</tr>
<tr>
<td>Addition of up to 12 new antennas and 24 new pads to the Submillimeter Array over the next 20 years.</td>
<td>Addition of two antennas and two pads to the SMA.</td>
<td>Plans still being considered.</td>
</tr>
<tr>
<td></td>
<td>Relocation of two existing SMA antenna pads located at the base of Pu‘u Poli‘ahu, a culturally significant site.</td>
<td>Plans still being considered.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type III. New Conventional Optical/IR Telescope: New conventional telescope comparable to the Keck or Gemini Observatories at a currently undeveloped site.</th>
<th>Construction of New Telescopes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plan no longer being considered.</td>
</tr>
</tbody>
</table>

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22 The 2000 Master Plan was approved by the UH Board of Regents, while the 2006 and 2009 IfA statements were not.
<table>
<thead>
<tr>
<th><strong>2000 Master Plan</strong></th>
<th><strong>2006 IfA Statement</strong></th>
<th><strong>2009 IfA Plan</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Allowable Development</strong></td>
<td><strong>Type IV. Next Generation Large Telescope (NGLT):</strong> A single optical/IR telescope of 25 m. aperture or greater.</td>
<td>Construction of the Thirty-Meter Telescope (TMT) located at a new site on the northern plateau facing Waimea below the summit ridge, at a site called 13N. Would be the largest O/IR telescope in the world.</td>
</tr>
<tr>
<td><strong>Type V. Optical/IR Interferometer Array Site:</strong> A general area is proposed for this observatory. No facilities are included in this Plan.</td>
<td>Plan no longer being considered.</td>
<td>Plan no longer being considered.</td>
</tr>
<tr>
<td><strong>Operation of Existing Observatories</strong></td>
<td>Operation of newer facilities (Keck I &amp; II, Gemini, Subaru, Pan-STARRS, UH Hilo, and SMA) for at least 20 years.</td>
<td>No change.</td>
</tr>
<tr>
<td><strong>Removal of Existing Observatories</strong></td>
<td>IfA’s vision for the future of observatories on Mauna Kea includes a reduction in the overall number of facilities, however there are currently no specific plans for removal of existing facilities:</td>
<td>CSO to be decommissioned and removed during the period 2016-2018. See Table 8.</td>
</tr>
</tbody>
</table>
### Table 7. Mauna Kea Telescopes (2010)

Source: http://www.ifa.hawaii.edu/mko/telescope_table.htm

<table>
<thead>
<tr>
<th>Name</th>
<th>Mirror</th>
<th>Owner/Operator</th>
<th>Year Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical/Infrared</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UH 0.9m</td>
<td>0.9m</td>
<td>University of Hawai'i, Hilo</td>
<td>2008</td>
</tr>
<tr>
<td>UH 2.2m</td>
<td>2.2m</td>
<td>University of Hawai'i</td>
<td>1970</td>
</tr>
<tr>
<td>IRTF</td>
<td>3.0m</td>
<td>NASA</td>
<td>1979</td>
</tr>
<tr>
<td>CFHT</td>
<td>3.6m</td>
<td>Canada/France-Hawai'i</td>
<td>1979</td>
</tr>
<tr>
<td>UKIRT</td>
<td>3.8m</td>
<td>United Kingdom</td>
<td>1979</td>
</tr>
<tr>
<td>Keck I</td>
<td>10m</td>
<td>Caltech/University of California</td>
<td>1992</td>
</tr>
<tr>
<td>Keck II</td>
<td>10m</td>
<td>Caltech/University of California</td>
<td>1996</td>
</tr>
<tr>
<td>Subaru</td>
<td>8.3m</td>
<td>Japan</td>
<td>1999</td>
</tr>
<tr>
<td>Gemini</td>
<td>8.1m</td>
<td>USA/UK/Canada/Argentina/Australia/Brazil/Chile</td>
<td>1999</td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSO</td>
<td>10.4m</td>
<td>Caltech/NSF</td>
<td>1987</td>
</tr>
<tr>
<td>JCMT</td>
<td>15m</td>
<td>UK/Canada/Netherlands</td>
<td>1987</td>
</tr>
<tr>
<td>SMA</td>
<td>8x6m</td>
<td>Smithsonian Astrophysical Observatory/Taiwan</td>
<td>2002</td>
</tr>
<tr>
<td>VLBA</td>
<td>25m</td>
<td>NRAO/AUI/NSF</td>
<td>1992</td>
</tr>
</tbody>
</table>

### Table 8. Projected Observatories on Mauna Kea During Current Lease Term

<table>
<thead>
<tr>
<th>Observatory</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current observatories in the Astronomy Precinct</td>
<td>12</td>
</tr>
<tr>
<td>CFHT, UH 2.2m, Gemini, IRTF, UHH 0.9m, Keck I, Keck II, Subaru, SMA, JCMT, CSO, UKIRT</td>
<td></td>
</tr>
<tr>
<td>Current observatories off the summit</td>
<td>1</td>
</tr>
<tr>
<td>VLBA</td>
<td></td>
</tr>
<tr>
<td>Total observatories currently in the Science Reserve</td>
<td>13</td>
</tr>
<tr>
<td>No replacement of facility; estimated to be removed by the end of the current lease</td>
<td></td>
</tr>
<tr>
<td>UKIRT</td>
<td>-1</td>
</tr>
<tr>
<td>VLBA</td>
<td>-1</td>
</tr>
<tr>
<td>Two of the three radio telescopes (SMA, JCMT, or CSO)</td>
<td>-2</td>
</tr>
<tr>
<td>New facility</td>
<td></td>
</tr>
<tr>
<td>Thirty Meter Telescope</td>
<td>+1</td>
</tr>
<tr>
<td>Total observatories in the Science Reserve approaching end of lease</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Observatory</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continued use or recycling of existing facilities</td>
<td>8</td>
</tr>
<tr>
<td>CFHT, UH 2.2m, Gemini, IRTF, UHH 0.9m, Keck I, Keck II, Subaru</td>
<td></td>
</tr>
<tr>
<td>One of the three radio telescopes (SMA, JCMT, or CSO)</td>
<td>1</td>
</tr>
<tr>
<td>New facility</td>
<td></td>
</tr>
<tr>
<td>Thirty Meter Telescope</td>
<td>+1</td>
</tr>
<tr>
<td>Total observatories in the Science Reserve approaching end of lease</td>
<td>10</td>
</tr>
</tbody>
</table>

---

23 In 2008 the UH 0.6-m telescope (built in 1968) was replaced by the UHH 0.9-m telescope.
6 Plan Updates

Adaptive management involves adjusting management policies and strategies as new information becomes available, and requires that management plans undergo regular review to reduce uncertainty and incorporate lessons learned. This ensures that the most effective tools are in place to protect the resources. This Decommissioning Plan provides a framework for managing the decommissioning process for observatories on Mauna Kea. It will likely need to be revised as the process is gone through based on what works and what does not work. This will help streamline the process in the future for all entities responsible for decommissioning – the sublessees, UH, and DLNR. In addition, it will be important and advantageous to make previous site-specific plans (SDPs and DFPs), or portions of them, available to future decommissioning efforts in order to share lessons learned and streamline the process.

Regular review of the Decommissioning Plan is needed to determine if its provisions are effective over time and are meeting management needs. The plan is process-oriented, and it is possible, that over time, updates will be required based on changes in operations and policies. The Decommissioning Plan should be reviewed and updated every five years as part of the evaluation and revision process for the Mauna Kea CMP (see Mauna Kea CMP Section 7.4.2). Changes to the Decommissioning Plan will reflect changes in conditions noted in the Mauna Kea CMP, including its sub-plans. Updates to the Decommissioning Plan will incorporate changes to DLNR rules and regulations, renegotiated leases, new and renegotiated subleases, new management agreements, or new statutes or changes to existing laws and/or court decisions that are related to deconstruction and site restoration.
7 References


Appendices
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Appendix A. Summary of Information Relating to Decommissioning in CMP, CRMP & NRMP

The table below identifies specific component plans in the Mauna Kea CMP that are relevant to the decommissioning process. It includes those that contain actions directly related to the decision-making process, including options for facility removal and site restoration, and those that contain specific activities that will occur during implementation of the decommissioning process (i.e., deconstruction, habitat restoration).

<table>
<thead>
<tr>
<th>Mauna Kea CMP Management Component Plan</th>
<th>Information Relevant to Decommissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1.1: Native Hawaiian Cultural Resources</td>
<td>Considerations for protection and restoration of cultural resources</td>
</tr>
<tr>
<td>7.1.2: Natural Resources</td>
<td>Considerations for protection and restoration of natural resources</td>
</tr>
<tr>
<td>7.2.2: Permitting and Enforcement</td>
<td>General discussion regarding compliance with CDUPs</td>
</tr>
<tr>
<td>7.3.1: Infrastructure and Maintenance</td>
<td>Consider and follow during any deconstruction and site restoration activities conducted as part of decommissioning</td>
</tr>
<tr>
<td>7.3.2: Construction Guidelines</td>
<td>Consider and follow during any deconstruction and site restoration activities conducted as part of decommissioning</td>
</tr>
<tr>
<td>7.3.3: Site Recycling, Decommissioning, Demolition and Restoration</td>
<td>General guidelines requiring planning for demolition and site restoration</td>
</tr>
<tr>
<td>7.3.4: Future Land Use</td>
<td>Considerations for potential future development</td>
</tr>
<tr>
<td>7.4.1: Operations and Implementation</td>
<td>Provides for stakeholder input</td>
</tr>
</tbody>
</table>

The Cultural Resources Management Plan for the UH Management Areas on Mauna Kea (CRMP) and the Natural Resources Management Plan for the UH Management Areas on Mauna Kea (NRMP) are sub-plans of the Mauna Kea CMP (McCoy et al. 2009; SRGII 2009). These plans were developed to ensure that the mandate to preserve and protect the cultural and natural resources in the UH Management Areas is fulfilled by UH. Many of the recommendations in the plans resulted from the consideration of human activities and uses in the UH Management Areas, including observatory development and operation. Human use of areas with sensitive natural or cultural resources can impact these resources through disturbance, habitat alteration, or introduction of invasive plants and animals. Both plans provide detailed information on Mauna Kea’s resources, identify threats to resources from human activity, and outline management strategies to minimize potential impacts. The table below cross-references sections in related plans with information relevant to decommissioning for ease of reference.

Cross-Referenced Information Relating to Decommissioning

<table>
<thead>
<tr>
<th>Information Relevant to Decommissioning</th>
<th>CMP</th>
<th>CRMP</th>
<th>NRMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion of future land uses including redevelopment of existing sites and removal of observatories</td>
<td>6.2.6, 7.3.3</td>
<td>4.2.7</td>
<td>3.1.1.4, 5.1.1</td>
</tr>
<tr>
<td>Require observatories to develop plans to recycle or demolish facilities once their useful life has ended, in accordance with their sublease requirements, identifying all proposed actions</td>
<td>7.3.3</td>
<td></td>
<td>4.3.3.4.1</td>
</tr>
<tr>
<td>Information Relevant to Decommissioning</td>
<td>CMP</td>
<td>CRMP</td>
<td>NRMP</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Description of HAR §13-5, CDUP</td>
<td>3.4.2</td>
<td>1.6.2</td>
<td>1.4.3.2</td>
</tr>
<tr>
<td>Description of HRS Chapter 343 and HAR §11-200, environmental review</td>
<td>3.4.2</td>
<td>1.6.3</td>
<td>1.4.3.2</td>
</tr>
<tr>
<td>Description of HRS Chapter 6E and HAR §13-300, cultural resources</td>
<td>3.4.2</td>
<td>1.6.1</td>
<td>1.4.3.2</td>
</tr>
<tr>
<td>Enforcement and compliance of all applicable laws, regulations and permit conditions</td>
<td>7.2.2, 7.3.2, 7.3.3</td>
<td>1.1</td>
<td>1.4.2, 1.4.3</td>
</tr>
<tr>
<td>Recommendations and compliance procedures for burial protection and inadvertent discoveries</td>
<td>7.1.1</td>
<td>4.2.7.2</td>
<td>4.3.2</td>
</tr>
<tr>
<td>Recommendations and compliance procedures for the determination of the effect on historic properties from demolition and site restoration activities</td>
<td>7.1.1</td>
<td>4.2.7.1</td>
<td></td>
</tr>
<tr>
<td>Threats to resources related to construction activities</td>
<td>6.3</td>
<td>4.1, 4.2.7</td>
<td>3.1.1, 2.9, 3.2</td>
</tr>
<tr>
<td>Recommendations for minimizing habitat alteration due to the construction and demolition of building and infrastructure, as well as repairing degraded habitats</td>
<td>7.1.2, 7.3.4</td>
<td></td>
<td>4.2.3.1</td>
</tr>
<tr>
<td>Recommendations for minimizing dust generation from construction equipment</td>
<td>7.1.4, 7.3.2</td>
<td></td>
<td>4.2.3.2</td>
</tr>
<tr>
<td>Recommendations for preventing the escape and migration of potential contaminants into the environment and for spill response plans</td>
<td>7.4.1, 7.3.2</td>
<td>4.3.5</td>
<td>4.2.3.3</td>
</tr>
<tr>
<td>Recommendations to guide the management and removal of solid waste/debris from construction sites</td>
<td>7.2.1, 7.3.1</td>
<td>4.3.4</td>
<td>4.2.3.5</td>
</tr>
<tr>
<td>Recommendations for minimizing noise levels from construction equipment</td>
<td>7.3.2</td>
<td></td>
<td>4.2.3.6</td>
</tr>
<tr>
<td>Recommendations to prevent the introduction of invasive species due to construction activities</td>
<td>7.1.2, 7.2.1, 7.3.1, 7.3.2</td>
<td></td>
<td>4.2.3.7</td>
</tr>
<tr>
<td>Recommendations regarding mitigation plans</td>
<td>7.1.2, 7.3.2</td>
<td>4.2.7.3</td>
<td>4.3.3.3</td>
</tr>
<tr>
<td>General recommendations on habitat restoration and rehabilitation</td>
<td>7.1.2, 7.3.4</td>
<td>4.2.3.8, 4.3.3</td>
<td></td>
</tr>
<tr>
<td>Specific recommendations on habitat restoration following telescope decommissioning and removal</td>
<td>7.3.2, 7.3.3, 7.3.4</td>
<td></td>
<td>4.3.3.4.1</td>
</tr>
<tr>
<td>Support and implement inventory, monitoring and research projects to establish baseline status of resources and track changes over time</td>
<td>7.1.2, 7.3.2</td>
<td>4.3.1</td>
<td>4.1, 4.2.2</td>
</tr>
<tr>
<td>Recommendations on educating construction workers about cultural and natural resources that may be directly affected by their work</td>
<td>7.1.2, 7.1.3, 7.2.1, 7.3.2</td>
<td>4.3.3</td>
<td>4.4</td>
</tr>
<tr>
<td>Require use of best management practices (BMP's) for construction</td>
<td>7.3.2</td>
<td>4.2.7</td>
<td>4.1.4.2.3, 4.2.3, 4.3.3.4.1</td>
</tr>
<tr>
<td>Require on site monitors during construction activities</td>
<td>7.3.2</td>
<td>4.2.7</td>
<td>4.1.4.2.3, 4.2</td>
</tr>
<tr>
<td>Require any future observatories to consider site restoration during project planning and include provisions in subleases for funding of full restoration</td>
<td>7.3.3</td>
<td></td>
<td>4.3.3.4.1</td>
</tr>
</tbody>
</table>

---

24 All references to construction also apply to deconstruction of facilities.
Appendix B. Documentation of Long-Term Observatory Development Plans

Response to HCR 314, Regular Session of 2006; Report on long-term development of observatory sites on the summit of Mauna Kea, Rolf-Peter Kudritzki

Mauna Kea CMP Appendix A9: Institute for Astronomy’s Plans to Remove and Decommission Obsolete Telescopes
1. The role of astronomy in Hawaii.

To appreciate the role of astronomy in our state, one first needs to understand the history of astronomy development in Hawaii; the basic philosophy behind that development; the essential role played by the Institute for Astronomy; and the educational, scientific and economic benefits that accrue from astronomy.

The Institute for Astronomy (IfA) is 38 years old and is by far the youngest among top-ranked astronomy programs in the U.S. In this short time, the Institute has grown to become one of the most visible of UH's scientific research programs and one of the most respected astronomy institutes in the world. The IfA plays in the same league as Caltech, Harvard, Princeton, Berkeley, and Cambridge. It attracts the best faculty and the best students from around the world. It has become a pillar of academic excellence and certainly an engine of economic growth in the State. Where once school kids in the world learned that the center of astronomy was Mount Palomar in California, now they learn it is in Hawaii. How has this story of scientific success been possible in such a short time?

The answer to this question is the superior quality of Mauna Kea and Haleakala as the world's best observatory sites and the concept developed by the IfA, the University and the State to build up the most capable observatory in the world. The astronomers of the IfA were the first in the world to dare to build a technologically very challenging and complex observatory with small, but very efficient, telescopes at the extreme elevation and thin air of 13,796 ft. With their exciting astronomical detections they were able to demonstrate to the world that Mauna Kea is unique as an astronomical site. Scientifically, the logical consequence for UH would have been to use this enormous advantage to build the next generation of most powerful telescopes on its own, as the universities in California, Texas, Arizona and on the East Coast did before. However, UH was (and is) a medium size State University with a very limited budget, and Hawaii is a small state with limited resources. Thus, a different concept was developed—the concept of scientific partnerships.

Within this concept the national and international partners contribute the capital funding for the facility, carry most or all of the operational costs, and contribute to the infrastructure development. The University, through the IfA, provides the leadership and know-how to operate an observatory at extreme altitude, the management of the physical and operational infrastructure (roads, power, fiber-optics communications, food, lodging) and ongoing protection from adverse intrusions such as light pollution and radio frequency interference. The University also provides the land for the observatory site from its lease from the State, along with assistance in planning and permitting. The University and its partners collaborate in the scientific use of the telescopes including development of technologically advanced instrumentation. Most importantly, they share the scientific observing time on the facilities with no cost to the University.
In this way, the University and the State did not have to contribute the enormous capital costs to design and build the extremely powerful new telescopes, but were still able to provide researchers with access to these unique facilities and give them the opportunity to build up one of the best research and education programs in the world. The benefits, both economic and otherwise, are substantial as indicated below.

1. Astronomy facilities on Mauna Kea and Haleakala represent a capital investment of close to $1 billion. The economic impact of astronomy to the State amounts to $150 million per year. New projects for Haleakala and Mauna Kea have the potential to double these numbers.

2. The observatories and other astronomy-related activities on Mauna Kea and Haleakala provide 600 quality jobs in a clean high-tech industry on the neighbor islands. It is important to note that only a small fraction of these jobs are for astronomers. Most of them are for technical, administrative and logistic services. This number will increase if we continue to follow the sound policies that have been in place for nearly 30 years. Beyond the simple numbers, there is the fact that astronomy as a high-tech science diversifies the Hawaii economy and gives local young people with scientific and technical talents a wealth of opportunities to realize their potential without having to leave their family and friends in Hawaii to pursue employment elsewhere. Unlike some high-tech industries, astronomy is fundamentally rooted in Hawaii. Once established, an astronomy facility cannot be easily relocated to the mainland or overseas.

3. The IfA has developed into one of the world's preeminent centers for astronomical research. The Institute receives extramural awards totaling between $20 to $25 million annually for astronomical research, for development of new astronomical instrumentation, for improving its own old telescopes and for operating telescopes, such as the NASA Infrared Telescope Facility on Mauna Kea and the Mees Solar Observatory on Haleakula. Its graduate program belongs to the best in the world and about 1,000 undergraduate students per year participate in astronomy courses in Manoa. In addition, UH Hilo has recently developed a very successful astronomy undergraduate program. Astronomy is one of UH's most successful programs.

4. The Mauna Kea Observatories are the world's largest observatory complex, and will remain so for the foreseeable future. Hawaii and its State University are recognized around the world for this outstanding achievement—a source of tremendous prestige for the State. Approximately 1,500 scientists come to work at the Observatories each year; most add some vacation time to their trip. Hundreds of others come to Hawaii each year to participate in astronomy-related conferences. Several small companies make a business of providing quality tours to Mauna Kea. The observatories' base facilities in Hilo, Waimea and on Maui are a major addition to those communities and contribute in many ways.

5. Over the years, the observatories have made significant monetary contributions to the infrastructure, much of which is of benefit to the general community. This includes $2 million for road improvements on Mauna Kea and another $2 million to assist GTE Hawaiian Tel to install a fiber optics cable across the Saddle from Waimea to Hilo. This cable provides state-of-the-art service for both the Big Island telephone system and the observatories.

6. The observatories operate the Visitor Information Station at Hale Pohaku, which provides free public star gazing seven nights a week and welcomes about 100,000 visitors each year.

7. The observatories pay the entire cost of maintenance and snow removal for the road and they pay for emergency services. The public can use the road all the time. The costs for this service and the Visitor Station amount to $700,000 a year.

Although the economic benefits are substantial, it is important to keep in mind that the primary mission of astronomy is not to generate revenue. Astronomy is basic science and concentrates on the scientific exploration of the universe. Astronomy is the mother of all sciences and has changed our understanding of the world and our thinking as humans like no other science. The telescopes on Mauna Kea and Haleakala have contributed fundamentally to the advancement of modern astronomy. They are world-class research facilities, and the best window our planet provides on the strange and wonderful universe we live in.


The 2000 Master Plan is a comprehensive document, which was approved by the Board of Regents in June 2000 after an arduous, two-year process with input from all sectors of the community, and supervised by a community-based advisory committee chaired by two faculty members at UH Hilo's College of Hawaiian Language, Dr. Pila Wilson and Mr. Larry Kimura. It was accompanied by a State Environmental Impact Statement signed by the Governor of the State. The Master Plan has been submitted to the Legislature on many occasions and is available on the Institute for Astronomy's website. The scope of the Master Plan is much broader than future development of astronomy. It addresses the cultural and environmental aspects of the University's use and responsibility for the Mauna Kea Science Reserve and proposes a new organizational structure, which has been implemented by establishing the Office of Mauna Kea Management, based at the University of Hawaii at Hilo, and two important community-based advisory bodies, the Mauna Kea Management Board, and Kahu Ku Mauna, the Office's and Board's cultural advisory council. Within the new organizational structure the Institute for Astronomy's responsibility on Mauna Kea is limited to astronomical operation, research and education, whereas the Office has the responsibility for the cultural and environmental protection and all other aspects of land management. In this report we will not discuss these latter aspects. It is our understanding from the 2006 hearings that the objective of HCR 314 is to obtain information on the prospects and
There are currently 12 observatories on Mauna Kea. The Master Plan identifies five of those (the UH 0.6m, the UH 2.2m, the Canada-France-Hawaii Telescope, the United Kingdom Infrared Telescope, and the NASA Infrared Telescope Facility) as older facilities, several of which could be upgraded or replaced within the next 20 years. The expectation is that the new or upgraded telescopes would come in a range of sizes from 2 to 15 meter mirror sizes (note that the 10m-class mirrors of the existing Keck, Gemini and Subaru Telescopes represent the current state-of-the-art observatory facilities), however there are clear restrictions in terms of the height and volume for these facility redevelopments. The Master Plan also assumes that the other seven existing facilities would remain as is over the next 20 years.

In addition, the Master Plan envisages the expansion of two existing facilities. For the Keck Observatory it proposes the addition of four to six 1.8m outrigger telescopes to create a very powerful infrared interferometer, which would study cosmic objects for spatially resolved fine details, for instance the motion of stars caused by the presence of Jupiter-like planets orbiting around them. For the existing Harvard-Smithsonian Submillimeter Array (SMA) – an array of 12 movable radio telescope antennas distributed over 24 fixed concrete pads – the plan foresees an extension by 12 more antennas and 24 additional pads to increase the sensitivity and efficiency.

Three new projects at three new sites are proposed in the Master Plan. The first is the UH Hilo instructional telescope, a relatively small (1m mirror) telescope planned for a site adjacent to the existing UH 0.6m telescope. This facility is planned to be used for the education and training of undergraduate students in UH Hilo’s Department of Physics and Astronomy program. The second is a new optical/infrared telescope comparable in size and capability to the existing Keck or Gemini telescopes. For environmental and cultural reasons a site below the summit ridge on the north shield is proposed.

The third new facility proposed is a revolutionary new telescope with a very large mirror of 25m to 50m diameter. This would be the largest telescope in the world. The site foreseen for this telescope is on the north-west lava plateau below the summit. This location minimizes visibility of the new facility from Hilo and Honokaa and would not affect Wekiu bug habitat.

The future astronomical development on Mauna Kea as foreseen in the University's Master Plan gives very high priority to the protection of natural and cultural resources, but at the same it also proposes a considerable expansion of future astronomical activity on Mauna Kea. If all facilities discussed in the Master Plan were built, the number of observatories would increase from 12 to 15 and two of the existing ones would be expanded.

In the next section we will introduce a modified plan, which proposes significantly less future development.
3. A modified plan for long-term astronomical development on Mauna Kea.

When future development for the next 20 years was discussed in the Master Plan of the year 2000, the goal was to be as comprehensive as possible in order not to exclude potentially important scientific options for the future. However, now six years later and after detailed scientific discussion within the Institute for Astronomy it has become clear that the number of future projects envisaged for the next 20 years is much smaller than anticipated in the Master Plan. The long-range goal is to have eventually fewer observatories than now, but certainly still the very best in the world.

After six years of successful operation under the Master Plan in coordination and collaboration with the Office of Mauna Kea Management and its community-based advisory boards it is well recognized that future plans for Mauna Kea require balanced management to preserve, protect and enhance the cultural and natural resources as well as providing a world-class center for education and research in astronomy. As laid out in the Master Plan and also described in the previous section, all major future development will be subject to stringent review by the Office of Mauna Kea Management, Mauna Kea Management Board, and Kahu Ku Mauna Council, as well as the community-based Hawaiian Culture and Environment committees, which report to the Board. In addition, as also already described in the section before, all major developments require a Conservation District Use Permit from the State Board of Land and Natural Resources.

The goal of our new plan is to keep Hawaii's world leadership in ground-based astronomy. This achievement and recognition as a world leader will benefit not only UH as an educational and research institution but the entire state. The advancing and leading edge technologies associated with astronomy research and development will aid Hawaii's efforts to boost its technology industry, including software and instrument development.

In the following, we will discuss the new modified plan in detail. We will also compare it with the development as proposed in the Master Plan. We will start with the two observatories, for which significant expansion was proposed, the Keck Observatory and the Submillimeter Array (SMA). For the Keck Observatory the addition of six Outrigger telescopes was planned. In our new plan we do not foresee adding any more telescopes to the Keck Observatory.

For the SMA, the Master Plan proposed 12 more antennas and 24 new concrete pads for the array; however in our new plan, we consider only the very moderate expansion of two more antennas and two pads. UH is also working on the relocation of two existing antenna pads located at the base of Pu'u Poliahu, a culturally significant site.

In the Master Plan a new observatory site on the summit ridge was proposed for the UH Hilo instructional telescope. In order not to increase the number of observatory sites on the summit ridge, the Institute for Astronomy has agreed to give its UH 0.6m telescope and the site to UH Hilo so that the instructional telescope can be built there with only little if any modification of the existing site. This minimizes cultural and environmental impact for this important educational project, which was described in the previous section. An Environmental Assessment of the project by UH Hilo has been completed.

Another redevelopment of an existing site in our new plan is the use of the UH 2.2m site for the Institute for Astronomy's new Pan-STARRS observatory. Pan-STARRS uses completely new technology being developed by the Institute to detect killer asteroids which threaten to impact the Earth. It will detect the majority of the most dangerous objects about 30 years before their potential impact giving some time to develop protection for mankind in case of a serious threat. This project is federally funded. The Institute for Astronomy is preparing a federal EIS in collaboration with the federal funding agency. In addition, UH will submit a comprehensive Mauna Kea management plan to the State Board of Land and Natural Resources for review and approval, before applying for a Conservation District Use Permit for this project.

In addition to the UH Hilo instructional telescope the Master Plan proposes two new telescopes at two new sites, as described in the previous section. One of them, the optical/infrared telescope of Keck or Gemini size, is not pursued any further in our new plan. With the enormously increased efficiencies of Keck, Gemini, and Subaru we do not believe that there is a scientific need anymore for another telescope of this size. It is worth mentioning at this point that the observatories on Mauna Kea are experimenting with the use of new fiber optics technology to combine the light from the already existing telescopes, the so-called Ohana Project. This is a challenging project, which will probably take decades to be successful, but it will greatly expand the capability and utility of the existing observatories.

The only project at a new site proposed in our new plan is the Thirty Meter Telescope (TMT). With its mirror of 30m diameter it will be the largest telescope in the world, and will be ten times more powerful than the Keck telescopes. It will be able to image planets orbiting around other stars and to analyze the light coming from these planets and, thus, to ascertain whether the conditions exist for the formation of life in planetary systems around other stars. It will also be able to detect the most distant galaxies in the universe and will see them in stage when the universe was still very young after its birth in the Big Bang.

As described in the previous section a site is foreseen for this observatory on the northern plateau below the summit ridge. This new site is preferable to a replacement of one of the existing telescopes, because the facility would be less visible and the environmental
The Institute for Astronomy is currently carrying out site testing and atmospheric characterization measurements at this site. The TMT is a $1 billion project and the most ambitious project of modern astronomy. It is the dedicated goal of the Institute for Astronomy and UH to attract this unique project to Hawaii. It will have an enormous scientific, educational and economic impact and it will secure leadership of Hawaii in astronomical science for the next decades. This is the key project for the future of astronomy in Hawaii.

In summary, our new plan does not propose any further extension of the Keck Observatory with Outrigger telescopes and only a very small expansion of the SMA. It proposes two new projects, the UH Hilo instructional telescope and Pan-STARRS, which will use existing sites and will stay within the footprints of the existing facilities. As the most important project it proposes the TMT on a new site on the northern plateau below the summit ridge.

While the Master Plan of the year 2000 assumed that all existing facilities, which would not be replaced by new ones would continue to exist for the next 20 years, we do not make this assumption for the new plan. It is clear that newer facilities such as Keck, Gemini, Subaru, Pan-STARRS, the UH Hilo telescope and the SMA will certainly continue to operate over the next 20 years. However, some of the others will not continue with their operation, because other aspects of astronomical observations will become more important. In such cases our plan is not to refurbish all of them but only a few and only in cases where an extremely important scientific case can be made. Otherwise, our new plan is to demolish the old facility, to clean the site and to recreate the site in a stage as it was, before the facility had been built. (It is important to note that Operating and Site Development Agreements – the contracts between UH and the telescope partners on Mauna Kea – require that the costs for such reestablishment of the site in its original status have to be paid by the telescope partners.) We are confident that in this way the number of observatories on Mauna Kea in 20 years from now will be smaller than now. But with all the new facilities, in particular the TMT, Hawaii will still have the very best in the world.
July 11, 2008

Dr. RoI£-Peter Kudritzki
Director, Institute for Astronomy
University of Hawai‘i
2680 Woodlawn Drive
Honolulu, Hawai‘i 96822

Dear Dr. Kudritzki:

Over the last several months, the Mauna Kea Comprehensive Management Team has been involved in extensive community outreach to gain a better understanding of the community’s views on how Mauna Kea should be protected and managed. We have been raising hard questions about the community’s view on the co-existence of Hawaiian culture and science, specifically existing and potential future development on Mauna Kea.

This question has generated intense discussion fueled with passion and emotion but a true desire to develop a comprehensive management plan that recognizes and protects the cultural integrity of Mauna Kea while continuing to support the University of Hawai‘i as a premier astronomical institution in the world. There are many in the Hawaiian community who recognize the summit of Mauna Kea as one of the most culturally significant sites within the Mauna Kea Science Reserve if not all of Hawai‘i. A recurrent theme by both the Hawaiian and non-Hawaiian community is that since the summit of Mauna Kea is so culturally significant, the community would like to see a specific plan that shows the removal of obsolete telescopes from the summit and decommissioning plans for each of the observatories for restoring the summit. In our view, this plan is critical to addressing the cultural concerns that have been consistently raised in our community outreach efforts.

We are aware of your report to the Legislature in 2007 on the Long Term Development of Observatory Sites on the Summit of Mauna Kea. It would be very helpful if you could update your report and provide a specific plan for decommissioning and removal of telescopes.

Your timely attention to this matter is greatly appreciated as we would like to share this information with the community in our future correspondence and public meetings. Should you have any questions, please don’t hesitate to contact me at 539-3583.

Sincerely,

DAWN N.S. CHANG
Principal

Ms. Dawn N. S. Chang
Principal Ku‘iwalu
1003 Bishop Street
Pauahi Tower, 27th Floor
Honolulu, Hawaii 96813

July 15, 2008

Thank you for your letter dated July 11, 2008. We greatly appreciate the opportunity to address the community’s concerns related to telescope development on Mauna Kea.

In December 2006, responding to a request from the Hawaii State Legislature, I as director of the Institute for Astronomy (IFT), submitted a "Report on long-term development of observatory sites on the summit of Mauna Kea". Prior to its submittal, the report was approved by the President of the University of Hawai‘i. The report describes a long-term development plan that would see a much smaller number of future projects than were described in the UH Master Plan of 2000, but would still maintain Hawai‘i’s world leadership in ground-based astronomy.

The key new developments in this plan are the use of the UH 2.2m telescope site for HIA’s new Pan-STARRS observatory and the Thirty-Meter Telescope (TMT) at a new site on the northwest plateau, below the summit ridge. With Pan-STARRS and an appropriate scientific participation in the TMT, and with the present large telescopes on Mauna Kea, the University of Hawai‘i will be able to retain its world-leading position in astronomical research.

Taking into account the enormous scientific potential of these two new projects for research at UH, the report also addresses the future of the existing facilities:

While the Master Plan of the year 2000 assumed that all existing facilities which would not be replaced by new ones would continue to exist for the next 20 years, we do not make this assumption for the new plan. It is clear that newer facilities such as Keck, Gemini, Subaru, Pan-STARRS, the UH Hilo telescope and the SMA will certainly continue to operate over the next 20 years. However, some of the old facilities will not continue with their operation, because other aspects of astronomical observations will become more important. In such cases our plan is to not to refurbish all of them but only a few and only in cases where an extremely important scientific case can be made. Otherwise, our new plan is to demolish the old facility, to clean the site and to recreate the site in a stage as it was, before the facility was built. (It is important to note that Operating and Site Development Agreements—the contracts between UH and the telescope partners on Mauna Kea—require the cost for such reestablishment of the site in its original status have to be paid by the telescope partners). We are confident that in this way the number of observatories on Mauna Kea in 20 years from now will be smaller than now. But with all the new facilities, in particular the TMT, Hawai‘i will still have the very best in the world.
While this aspect of the report has found substantial support in the community, it has also been noted that the report is not specific about which of the facilities might be replaced or refurbished and which would not, in the event that their current operation ended before the expiration of the sublease with UH. This appears to be consistent with your observations in the community as well.

Accordingly, we present a Revised Plan that addresses this aspect. A fundamental component of our Revised Plan is that Pan-STARRS and the TMT will play a central role in future astronomical research at UH.

Currently, there are four radio telescope facilities on Mauna Kea: the Very Long Baseline Array (VLBA), the Caltech Submillimeter Observatory (CSO), the James Clerk Maxwell Telescope (JCMT) and the Submillimeter Array (SMA). Because of cultural concerns that have been raised about the location of the VLBA, the 2000 Master Plan did not include the VLBA site within the Astronomy Precinct. Therefore, should the operation of the VLBA terminate, or should an alternative site and relocation funding become available, we would not reuse this site for a new project. For the CSO, JCMT, and the SMA, the Revised Plan foresees replacing at most one of these three with a new observatory working preferably in the sub-millimeter or millimeter domain, for which Mauna Kea is well known as the best site in the northern hemisphere. This means that only one of the existing four radio observatory sites would be used in the long term for a new project resulting in possibly three of the radio telescope facilities being removed and those sites restored prior to the expiration of the lease to UH.

There are currently nine optical or infrared observatories on Mauna Kea: the two Keck, Subaru, Gemini, Canada-France-Hawaii Telescope, NASA Infrared Telescope, United Kingdom Infrared Telescope (UKIRT), UH 2.2m (which if permitted would be replaced by Pan-STARRS, assumed to operate for only 10 years), and the UH 24-inch (which IFA has transferred to UH Hilo as the site for their instructional telescope). Here the Revised Plan is that when the operation of UKIRT comes to an end, the facility will be removed and the site restored.

Sincerely yours,

Rolf-Peter Kudritzki
Director

RPK:encl.
Appendix A9: IfA Telescope Plans

April 2009

July 16, 2008

Dr. Christian Veillet
Executive Director
Canada-France-Hawaii
65-1238 Mamalahoa Highway
Kanuena, HI 96743

Dear Dr. Veillet:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku‘iwah, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive. There are, unfortunately, a number of examples in the history of the State of Hawaii (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and the Canada-France-Hawaii Telescope Corporation for the site of the Canada-France-Hawaii Telescope (CFHT) contains two options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) surrender to UH subject to the approval of UH and the Chairman of the Board of Land and Natural Resources
2) removal of the facilities and restoration of the property at the expense of CFHT.

If option 1 is not approved, then option 2 must be exercised.

By this letter we are asking you to confirm that the CFHT is aware of the technical and financial implications of option 2 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 2. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of the CMP and its acceptance by the local community.

Dr. Christian Veillet, CFHT – July 16, 2008 – Page 2

The CFHT is an outstanding facility that continues to deliver important and far-reaching scientific results. That being the case, we understand that this inquiry might seem premature and inappropriate. However, it is vitally important that the University of Hawaii and its partners on Mauna Kea address clearly the legitimate concerns raised by the community, and that we thereby demonstrate our commitment to careful long-term planning that is both environmentally and culturally sensitive.

Please be aware that the information you provide may be made public and included in the CMP. In order to keep the CMP process on schedule, we are asking for at least a preliminary response by August 22.

Thank you very much for your cooperation in responding to this request. Please do not hesitate to call me if you have questions about it.

Sincerely,

[Signature]

Rolf Peter Kudritzki
Director

2660 Woodlawn Drive, Honolulu, Hawaii 96822
An Equal Opportunity/Affirmative Action Institution

Appendix A9: IfA Telescope Plans

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Appendix A9: IfA Telescope Plans

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April 2009
Dr. Alan T. Tokunaga, NASA IRTF – July 16, 2008 – Page 2

Dr. Alan T. Tokunaga
Division Chief
NASA Infrared Telescope Facility
Institute for Astronomy
2680 Woodlawn Drive
Honolulu, HI 96822

Dear Dr. Tokunaga:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku'iwala, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive. There are, unfortunately, a number of examples in the history of the State of Hawaii (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and NASA for the site of NASA Infrared Telescope Facility (IRTF) contains two options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) surrender to UH subject to the approval of UH and the Chairman of the Board of Land and Natural Resources
2) removal of the facilities and restoration of the property at the expense of NASA.

If option 1 is not approved, then option 2 must be exercised.

By this letter we are asking you to confirm that the IRTF is aware of the technical and financial implications of option 2 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 2. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of the CMP and its acceptance by the local community.
Dr. Gary R. Davis, UKIRT – July 16, 2008 – Page 2

The UKIRT is an outstanding facility that continues to deliver important and far-reaching scientific results. That being the case, we understand that this inquiry might seem premature and inappropriate. However, it is vitally important that the University of Hawaii and its partners on Mauna Kea address clearly the legitimate concerns raised by the community, and that we thereby demonstrate our commitment to careful long-term planning that is both environmentally and culturally sensitive.

Please be aware that the information you provide may be made public and included in the CMP. In order to keep the CMP process on schedule, we are asking for at least a preliminary response by August 22.

Thank you very much for your cooperation in responding to this request. Please do not hesitate to call me if you have questions about it.

Sincerely,

Rolf-Peter Kudritzki
Director

RPK

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Dr. Gary R. Davis
Director, Hawaii Operations
Joint Astronomy Centre
660 N. A'ohoku Place
Hilo, HI 96720

Dear Dr. Davis:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku‘iwalu, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive.

There are, unfortunately, a number of examples in the history of the State of Hawaii (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and the Science and Technology Facilities Council (STFC) for the site of the United Kingdom Infrared Telescope (UKIRT) contains four options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) sale to UH
2) sale to a third party acceptable to UH
3) surrender with the approval of the Chair of the Board of Land and Natural Resources
4) removal of the facilities and restoration of the property at the expense of STFC.

If none of options 1 to 3 is available, then option 4 must be exercised.

By this letter we are asking you to confirm that the UKIRT is aware of the technical and financial implications of option 4 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 4. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of the CMP and its acceptance by the local community.

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Dr. Gary R. Davis
Director, Hawaii Operations
Joint Astronomy Centre
660 N. A'ohoku Place
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Joint Astronomy Centre
660 N. A'ohoku Place
Hilo, HI 96720

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Joint Astronomy Centre
660 N. A'ohoku Place
Hilo, HI 96720

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660 N. A'ohoku Place
Hilo, HI 96720

Dear Dr. Davis:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku‘iwalu, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive.

There are, unfortunately, a number of examples in the history of the State of Hawaii (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and the Science and Technology Facilities Council (STFC) for the site of the United Kingdom Infrared Telescope (UKIRT) contains four options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) sale to UH
2) sale to a third party acceptable to UH
3) surrender with the approval of the Chair of the Board of Land and Natural Resources
4) removal of the facilities and restoration of the property at the expense of STFC.

If none of options 1 to 3 is available, then option 4 must be exercised.

By this letter we are asking you to confirm that the UKIRT is aware of the technical and financial implications of option 4 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 4. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of the CMP and its acceptance by the local community.
Dr. Thomas Phillips, CSO – July 16, 2008 – Page 2

The CSO is an outstanding facility that continues to deliver important and far-reaching scientific results. That being the case, we understand that this inquiry might seem premature and inappropriate. However, it is vitally important that the University of Hawaii and its partners on Mauna Kea address clearly the legitimate concerns raised by the community, and that we thereby demonstrate our commitment to careful long-term planning that is both environmentally and culturally sensitive.

Please be aware that the information you provide may be made public and included in the CMP. In order to keep the CMP process on schedule, we are asking for at least a preliminary response by August 22.

Thank you very much for your cooperation in responding to this request. Please do not hesitate to call me if you have questions about it.

Sincerely,
Rolf-Peter Kudritzki
Director

RPK:nll
Dr. Robert L. Dickman, VLBA – July 16, 2008 – Page 2

The VLBA is an outstanding facility that continues in the prime of its scientific life. That being the case, we understand that this inquiry might seem premature and inappropriate. However, it is vitally important that the University of Hawaii and its partners on Mauna Kea address clearly the legitimate concerns raised by the community, and that we thereby demonstrate our commitment to careful long-term planning that is both environmentally and culturally sensitive.

Please be aware that the information you provide may be made public and included in the CMP. In order to keep the CMP process on schedule, we are asking for at least a preliminary response by August 22.

Thank you very much for your cooperation in responding to this request. Please do not hesitate to call me if you have questions about it.

Sincerely,

Rolf-Peter Kudritzki
Director

RPKall

---

Dr. Robert L. Dickman
Assistant Director, VLBA/VLBA Operations
National Radio Astronomy Observatory
P. O. Box O
Socorro, NM 87801-0387

Dear Dr. Dickman:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku‘imaua, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive. There are, unfortunately, a number of examples in the history of the State of Hawaii (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and the National Radio Astronomy Observatory (NRAO) for the site of the VLBA Antenna contains four options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) removal of the facilities and restoration of the property at the expense of NRAO,
2) sale to UH,
3) sale to a third party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the third party and UH,
4) surrender in place.

Options 2, 3, and 4 require the approval of both UH and the Department of Land and Natural Resources. If none of these three alternatives is available, then option 1 (removal and restoration) must be completed within one year.

By this letter we are asking you to confirm that the VLBA is aware of the technical and financial implications of option 1 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 1. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of the CMP and its acceptance by the local community.
Dr. Taft E. Armandroff, W. M. Keck Observatory – July 16, 2008 – Page 2

the CMP and its acceptance by the local community.

Keck is an outstanding facility in the prime of its scientific life. That being the case, we understand that this inquiry might seem premature and inappropriate. However, it is vitally important that the University of Hawaii and its partners on Mauna Kea address clearly the legitimate concerns raised by the community, and that we thereby demonstrate our commitment to careful long-term planning that is both environmentally and culturally sensitive.

Please be aware that the information you provide may be made public and included in the CMP. In order to keep the CMP process on schedule, we are asking for at least a preliminary response by August 22.

Thank you very much for your cooperation in responding to this request. Please do not hesitate to call me if you have questions about it.

Sincerely,

Rolf-Peter Kadritzki
Director

RPK:nll

Dr. Taft E. Armandroff
Director, W. M. Keck Observatory
California Association for Research in Astronomy
65-1120 Mamalahoa Highway
Kamuela, HI 96743

Dear Dr. Armandroff:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku‘iwa‘u, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive. There are, unfortunately, a number of examples in the history of the State of Hawaii (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and the California Institute of Technology (Caltech) for the site of the W. M. Keck Observatory contains four options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) removal of the facilities and restoration of the property at the expense of Caltech,
2) sale to UH,
3) sale to a third party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the third party and UH,
4) surrender in place.

Options 2, 3, and 4 require the approval of both UH and the Department of Land and Natural Resources. If none of these three alternatives is available, then option 1 (removal and restoration) must be completed within one year.

By this letter we are asking you to confirm that Keck is aware of the technical and financial implications of option 1 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 1. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of
Appendix A9: IfA Telescope Plans

April 2009

Dr. Masahiko Hayashi
Director, Subaru Telescope
National Astronomical Observatory of Japan
650 N. A'ohoku Place
University Park
Hilo, HI 96720

Dear Dr. Hayashi:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku'iwalu, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive. There are, unfortunately, a number of examples in the history of the State of Hawaii (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and the National Astronomical Observatory of Japan (NAOJ) for the site of the Subaru Telescope contains four options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) removal of the facilities and restoration of the property at the expense of NAOJ,
2) sale to UH,
3) sale to a third party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the third party and UH,
4) surrender in place.

Options 2, 3, and 4 require the approval of both UH and the Department of Land and Natural Resources. If none of these three alternatives is available, then option 1 (removal and restoration) must be completed within one year.

By this letter we are asking you to confirm that Subaru Telescope is aware of the technical and financial implications of option 1 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 1. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of the CMP and its acceptance by the local community.

Dr. Masahiko Hayashi, Subaru Telescope – July 16, 2008 – Page 2

The Subaru Telescope is an outstanding facility in the prime of its scientific life. That being the case, we understand that this inquiry might seem premature and inappropriate. However, it is vitally important that the University of Hawaii and its partners on Mauna Kea address clearly the legitimate concerns raised by the community, and that we thereby demonstrate our commitment to careful long-term planning that is both environmentally and culturally sensitive.

Please be aware that the information you provide may be made public and included in the CMP. In order to keep the CMP process on schedule, we are asking for at least a preliminary response by August 22.

Thank you very much for your cooperation in responding to this request. Please do not hesitate to call me if you have questions about it.

Sincerely,

Rolf-Peter Kudritzki
Director

RPK:nll
Dr. Douglas A. Simons
Director, Frederick C. Gillett Gemini Observatory
Northern Operations Center
670 N. A'ohoku Place
University Park
Hilo, HI 96720-2700

Dear Dr. Simons:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawai'i (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku'ıwahui, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive. There are, unfortunately, a number of examples in the history of the State of Hawai'i (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and the National Science Foundation (NSF) for the site of the Frederick C. Gillett Gemini North Telescope contains four options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) removal of the facilities and restoration of the property at the expense of NSF,
2) sale to UH,
3) sale to a third party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the third party and UH,
4) surrender in place.

Options 2, 3, and 4 require the approval of both UH and the Department of Land and Natural Resources. If none of these three alternatives is available, then option 1 (removal and restoration) must be completed within one year.

By this letter we are asking you to confirm that Gemini is aware of the technical and financial implications of option 1 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 1. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of


the CMP and its acceptance by the local community.

Gemini is an outstanding facility in the prime of its scientific life. That being the case, we understand that this inquiry might seem premature and inappropriate. However, it is vitally important that the University of Hawai'i and its partners on Mauna Kea address clearly the legitimate concerns raised by the community, and that we thereby demonstrate our commitment to careful long-term planning that is both environmentally and culturally sensitive.

Please be aware that the information you provide may be made public and included in the CMP. In order to keep the CMP process on schedule, we are asking for at least a preliminary response by August 22.

Thank you very much for your cooperation in responding to this request. Please do not hesitate to call me if you have questions about it.

Sincerely,

Rolf-Peter Kudritzki
Director

RPK@nl
Dr. Raymond Blundell
Director, Submillimeter Array
Smithsonian Astrophysical Observatory
60 Garden Street
Cambridge, MA 02138

Dear Dr. Blundell:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku‘iwaiu, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes: before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive. There are, unfortunately, a number of examples in the history of the State of Hawaii (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information.

The sublease between UH and the Smithsonian Institution (Smithsonian) for the site of the Submillimeter Array (SMA) contains four options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) removal of the facilities and restoration of the property at the expense of Smithsonian,
2) sale to UH,
3) sale to a third party, contingent upon the execution of a new Sublease and Operating and Site Development Agreement between the third party and UH,
4) surrender in place.

Options 2, 3, and 4 require the approval of both UH and the Department of Land and Natural Resources. If none of these three alternatives is available, then option 1 (removal and restoration) must be completed within one year.

By this letter we are asking you to confirm that the SMA is aware of the technical and financial implications of option 1 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 1. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of the CMP and its acceptance by the local community.

Sincerely,

Rolf-Peter Kudritzki
Director

RPK

2690 Woodlawn Drive, Honolulu, Hawaii 96822
An Equal Opportunity/Affirmative Action Institution
Appendix A9: 9A Telescope Plans
April 2009
Appendix A9: 9A Telescope Plans
April 2009
Dr. Gary R. Davis
Director, Hawaii Operations
Joint Astronomy Centre
660 N. A'ohoku Place
Hilo, HI 96720

Dear Dr. Davis:

Subject: Mauna Kea Comprehensive Management Plan

As you know, the University of Hawaii (UH) is developing a Comprehensive Management Plan (CMP) for the lands on Mauna Kea managed by UH. A very important part of this effort is consultation and dialog with the local community. The CMP team, led by the consulting firm, Ku‘iwa‘ali, has undertaken a wide range of initiatives to reach all types of interested groups and individuals in every part of the community. A recurrent theme in these discussions is the question of what will happen with a telescope and its site after the sublease expires, or in the event that a facility closes before the sublease expiration for reasons such as a change in funding agency priorities. There is a concern that telescope structures could remain on the summit after a facility closes, because removal turns out to be technically too complicated and/or too expensive. There are, unfortunately, a number of examples in the history of the State of Hawai‘i (not related to astronomy), which make these worries understandable. The CMP team wishes to address this issue to the maximum extent possible under the circumstances. To that end, they have asked the Institute for Astronomy to approach each of the Mauna Kea Observatories with the following request for information:

The sublease between UH and the Science and Technology Facilities Council (STFC) for the site of the James Clerk Maxwell Telescope (JCMT) contains four options for the disposition of the facilities in the event of termination or expiration of the sublease:

1) sale to UH
2) surrender with the approval of UH
3) sale to a third party acceptable to UH
4) removal of the facilities and restoration of the property at the expense of STFC.

If none of options 1 to 3 is agreed upon within six months, then option 4 must be exercised.

By this letter we are asking you to confirm that the JCMT is aware of the technical and financial implications of option 4 and that it can guarantee its implementation, should the need arise at some point in the future. We are also asking for whatever information you can provide regarding the expected cost and source of funding for option 4. Both the confirmation of the awareness and the information about cost and anticipated funding are very important for the development of the CMP and its acceptance by the local community.

Sincerely,

Rolf-Peter Kudritzki
Director

RPK-nil
Revised IFA Plan for Future Development

I am writing to amplify slightly on the letter sent to you by Professor Kudritzki on 15th July. It was stated in that letter that, should UKIRT cease operations before the expiration of the general lease in 2033, the IFA would not seek to re-use the site for astronomy. That decision is entirely the University’s prerogative as holder of the general lease.

I want to emphasize that, whilst it is possible that UKIRT will cease operations before 2033, there is no fixed timeline for this. UKIRT is owned by a scientific research body in the United Kingdom, and the future of the facility is one element of that organization’s forward strategic planning. I can confirm that UKIRT is not scheduled for closure within the organization’s current planning horizon; indeed, as its Director, I believe it has the potential to continue operating for many years at the forefront of infrared astronomy.

I trust this helps to clarify the situation. Should you require any further information pertaining to these issues, please do not hesitate to ask.

Kindest regards,

Professor Gary Davis,
Director JAC.

cc:  Prof. Kudritzki, IFA,
Ms S. Nagata, OMKM
Mr B. Taniguchi, MKMB

August 28, 2008

Ms. Dawn N. S Chang
Principal Kû'îvalu
1003 Bishop Street
Pauahi Tower, 27th Floor
Honolulu, Hawaii 96813

Dear Ms. Chang:

Enclosed for your information are copies of the eight responses we have received to my July 16 letter asking the observatories about their plans for eventual removal and site restoration. We have heard from all of the observatories except for VLBA. Note that the letter from Professor Davis addresses both UKIRT and JCMT.

Sincerely yours,

[Signature]

RPK

encl.
6 August 2008

Dr. Rolf-Peter Kudritzki
Director
Institute for Astronomy
University of Hawaii at Manoa
2680 Woodlawn Drive
Honolulu, HI 96822

Dear Dr. Kudritzki,

Subject: Mauna Kea Comprehensive Management Plan

In response to your letter dated July 16, 2008 inquiring about CFHT's potential obligation to remove its facilities on Mauna Kea and restoring the property at its expense, I am pleased to let you know that this issue is well known to the CFHT Corporation.

Very early on in my directorship, I looked thoroughly at all the options for the future of CFHT, including the one I liked the least, i.e. the closure of the telescope. I asked for a quote from a demolition company located on Oahu, Island Demo Inc. (http://www.islanddemo.com/) which looked at the drawings of the summit facility and pictures of the construction, and visited the site on Mauna Kea. The quote came to approximately $5M, with a strong warning on possible substantial additional cost for cleaning soil contamination that could be found once the facility is removed (a problem often encountered at industrial sites). This quote was issued back in 2004, and corresponded at the time to a one-year operating budget of the Corporation.

I asked at that time to present the observatory at an MKOB meeting, as a first courtesy visit. I outlined not only the current and planned activities of CFHT, but also the various scenarios for the future, including the closure and restoration of the site.

Since then, I have kept in mind that the demolition cost would be the equivalent of one year of operation of the facility. So, the owners of the Corporation should think of the cleaning cost as one year of funding once the observatory is closed.

This cost also happens to be the value of CFHT's property in Waimea, which is a nice piece of land for business use in town. For CFHT, the sale of the Corporation's assets could therefore pay for the cleanup of its Mauna Kea site.

I hope that this information is helpful. Please do not hesitate to come back to me, should you need more information.

Aloha

Christian Veillet
Executive Director

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National Aeronautics and Space Administration
Headquarters
Washington, DC 20546-0001

AUG 14 2008

Planetary Division

Professor Rolf-Peter Kudritzki
Institute for Astronomy
2680 Woodlawn Ave.
Honolulu, Hawaii 96822

Dear Professor Kudritzki:

Through the IRTF Director, Alan Tokunaga, NASA has received your letter dated July 16, 2008, and related recent email communications from Alan Tokunaga of your staff at UH. NASA has also reviewed the November, 1974 Sublease agreement between the University of Hawaii and the agency regarding the NASA Infrared Telescope Facility (IRTF), and has taken into consideration the needs you have expressed regarding information for the Mauna Kea Comprehensive Management Plan.

Your letter of 16 July references the sublease agreement with respect to two (2) options "for the disposition of the facilities in the event of termination or expiration of the sublease:

1) surrender to UH subject to the approval of UH and the Chairman of the Board of Land and Natural Resources
2) removal of the facilities and restoration of the property at the expense of NASA"

Your letter also seeks that NASA "confirm that the IRTF is aware of the technical and financial implications of Option 2 and that it can guarantee its implementation," and also seeks "whatever information [NASA] can provide regarding the expected cost and source of funding" for "Option 2." You letter also indicates that "information [provided by NASA] may be made public and included in the CMP."

In review of the 1974 sublease agreement, it is clear subparts "VII SURRENDER," and "XII TITLE TO FACILITIES, ALTERATIONS, [etc]" are applicable to the potential termination or abandonment by NASA of the Mauna Kea/IRTF site.

Since at this time NASA has no plans for termination or abandonment of the IRTF and no studies have been done related to such action, NASA is not in a position to provide any information about the potential costs in the event of termination because such costs have not been quantified. NASA also points out that, consistent with language in part XII of the
sublease, financial obligations associated with the IRFT are "subject to the availability of appropriated funding." In other words, congressional approval for the expenditure of taxpayer dollars.

Nonetheless, NASA does represent that it will honor the terms of the sublease in the event of termination or abandonment of the site.

Sincerely,

James L. Green, Director
Planetary Division

cc: Alan Tokunaga, Philippe Crane, Richard McCarthy

---

Joint Astronomy Centre

Dr R-P. Kudritzki, Director,
Institute for Astronomy,
by email.

22 July 2008

Dear Professor Kudritzki,

Mauna Kea Comprehensive Management Plan

Thank you for your letters dated 16th July, pertaining to the eventual dispositions of JCMT and UKIRT. I appreciate fully the CMP team's need for viability of these arrangements and it is my pleasure to provide you with the following information.

Both telescopes are managed by the Science and Technology Facilities Council (STFC) of the United Kingdom. I hereby confirm that STFC is fully cognisant of its obligation, should none of the other options specified in the sub-lease prove possible, to remove the facilities and restore the properties. Although neither of the facilities is scheduled for closure within the current planning horizon, STFC has nevertheless made advance provision for these decommissioning costs. I can state unequivocally that STFC will, consistent with the requirements of the sub-lease, meet the full cost of removing the observatories and restoring the sites.

The amount of this provision is based on a quotation which was provided to us in 2006 by a private contractor following a tender exercise. I am regretfully unable to provide you with public details of the expected cost since this quotation was provided to us on a commercial-confidence basis. I can nevertheless offer you my complete assurance that STFC has made provision for the costs of decommissioning based on a sound engineering assessment of the requirements.

I trust this information will satisfy your requirements. Please do not hesitate to contact me should you require anything further.

Kindest regards,

Professor Barry Laves,
Director JAC,

An establishment of the Science and Technology Facilities Council operated in partnership with Canada and the Netherlands
August 21, 2008

Rolf-Peter Kudritzki, Director
Institute for Astronomy University of Hawaii at Manoa
2680 Woodlawn Drive
Honolulu, HI 96822

Dear Dr. Kudritzki:

This letter is in response to your letter dated July 16, 2008 regarding the Mauna Kea Comprehensive Management Plan. You requested that we provide you with certain information regarding the removal of the facilities and restoration of the property at the termination or expiration of the Sublease between University of Hawaii and Caltech.

As you correctly point out, Caltech has a sublease with the University of Hawaii for the site of the Caltech Submillimeter Observatory, and that sublease contains provisions regarding the disposition of the facilities in the event of termination or expiration of the Sublease. Caltech also signed an operating agreement with the University of Hawaii in which the parties agree that the facilities are to be disposed of according to the provisions of the sublease. One option in the event of termination or expiration of the sublease is the removal of the facilities and restoration of the property.

We confirm that we are aware of the technical and financial implications of the removal/restoration option in the event of termination or expiration of the sublease. Consistent with Caltech's legal obligations set forth in the sublease and the operating agreement, if the removal/restoration option becomes necessary, we are able to guarantee its implementation. Caltech will be the source of funding for the removal of the facilities and restoration of the property.

Sincerely,

T. G. Phillips
Director, Caltech Submillimeter Observatory

TGP:smc
xc: D. Currie, Vice President for Business & Finance
    B. T. Soifer, Director, Spitzer Science Center
    K. Dolan, Office of the General Counsel

August 22, 2008

Dr. Rolf-Peter Kudritzki
Director, Institute for Astronomy
University of Hawaii
2680 Woodlawn
Honolulu, Hawaii 96822

Dear Rolf,

This letter is in response to your letter dated July 16, 2008 regarding the Mauna Kea Comprehensive Management Plan. You requested that we provide you with certain information regarding the sublease between University of Hawaii and the California Institute of Technology (Caltech).

As you correctly point out in your letter, Caltech has a sublease with the University of Hawaii for the site of the W. M. Keck Observatory, and that sublease contains provisions regarding the disposition of the facilities in the event of termination or expiration of the Sublease. One option in the event of termination or expiration of the sublease is the removal of the facilities and restoration of the property within one year from the termination or expiration of the Sublease. Caltech and the University of California (UC) also signed an operating agreement with the University of Hawaii in which the parties agree that the facilities are to be disposed of according to the terms of the sublease.

We confirm that we are aware of the technical and financial implications of the removal/restoration option in the event of termination or expiration of the sublease. Consistent with Caltech and UC's legal obligations set forth in the sublease and operating agreement, if the removal/restoration option becomes necessary, we are able to guarantee its implementation. Caltech and University of California will be the source of funding for removal of the facilities and restoration of the property.

Sincerely,

Taft Armandriff
Director, W. M. Keck Observatory

cc: Edward Stone, Chair, California Association for Research in Astronomy
    George Blumenthal, Vice Chair, California Association for Research in Astronomy
Appendix A9: IfA Telescope Plans

April 2009

Dear Dr. Kudritzki:

This is a reply to your letter regarding the "Mauna Kea Comprehensive Management Plan" dated July 16, 2008. You asked us to confirm that Subaru Telescope is aware of technical and financial implications in the event of termination or expiration of the sublease and that the National Astronomical Observatory of Japan (NAOJ) must remove the facilities and restore the property at its own expense within one year.

I have confirmed with the NAOJ administration that it is fully aware of its responsibilities and guarantees the removal of the facilities and restoration of the property, should the need arise at some point in the future.

Regarding the expected cost and source of funding, NAOJ will provide the funds for the necessary cost, which is expected to be more than US$10M. Since this is a significant amount, we need to ask you to give us ample time for securing the funds prior to the implementation.

It is our pleasure that the Subaru telescope is producing world frontier scientific results and no one doubts that Mauna Kea is essential for our successful achievements. We would like to express, at this time, our sincere appreciation to the University of Hawaii and to the local community on the Big Island for making this happen.

Sincerely yours,

Masaao Hayashi
Director, Subaru Telescope
National Astronomical Observatory of Japan

CC: Shoken M. Miyama, Director-General

GEMINI OBSERVATORY
Office of the Director
Gemini Observatory: Teaching Humanity about the Universe
Northern Operations Center
670 N. A'ohoku Place
Hilo, Hawaii 96720

To: Rolf-Peter Kudritzki, Director, IfA Institute for Astronomy
From: Doug Simons, Director, Gemini Observatory
Date: 12 August 2008
Subj: Reply to your letter regarding the CFP

Dear Rolf —

I am writing in response to your letter to me dated 16 July 2008 regarding the CFP process and long-term plans for Gemini in the context of the expiration of our sublease on the summit of Mauna Kea. For reference, you noted 4 options in your letter including —

1) Removal of the facilities and restoration of the property at the expense of the NSF
2) Sale to UH
3) Sale to a third party, contingent upon the execution of a new Sublease and OSDA between that third party and UH
4) Surrender in place

It is important to emphasize that the agreement authorizing Gemini’s use of a portion of the Mauna Kea science reserve for the Gemini-N telescope is formalized by our OSDA, which is an agreement between UH and our executive agency, the NSF. Upon receiving your letter I therefore contacted the NSF about your query and asked Gemini’s engineering team for a rough estimate of the cost (2008 dollars) of deconstructing Gemini-N. Regarding the latter, we estimate a cost of USD9,000,000 to remove the entire facility from the summit and restore the original grade on the site. Of the options listed above, the NSF represented to me that option 4 is certainly the least desirable, given their sensitivities to Hawaiian interests and broader concern for the environment on Mauna Kea. Options 2 and 3 are somewhat speculative and certainly have not been explored in the relatively young lifetime of Gemini-N, which only entered science operations in 2000. Option 1 (removal of the facilities) would require consideration of all the Gemini Partner agencies, which are all stakeholders in the Gemini-N facility under our International Agreement. Any decision to execute option 1 would therefore be contingent upon those discussions and the availability of funds to conduct the deconstruction of Gemini-N. An absolute “guarantee” to execute option 1 is therefore not possible at this point as it would, at a minimum, require funding commitments that to date have not been sought from our funding agencies. Nonetheless I have confidence the NSF would work diligently on behalf of the Gemini partnership to find a mutually agreed solution, in the context of the current OSDA, in the event our sublease is terminated or expires.

Aloha,

Doug Simons
Director, Gemini Observatory

Cc: Wayne van Citters, Craig Foltz
Dear Rolf,

I discussed your request with Charles Alcock (SAO Director) and with Paul Ho (ASIAA Director) and subsequently asked George Nystrom to take a look at how we might remove the SMA from Mauna Kea should the need arise following eventual closure of the observatory. Below please find a draft summary of his findings. With regards to a source of funding for eventual removal of the SMA, Charles has contacted SI Washington for advice. However, we believe that SI (and ASIAA) will take any responsibilities they have in this regard very seriously. We are close to finalizing a cost estimate for complete removal.

Sincerely,

Ray

Below we outline a number of possible options for property disposition of the Smithsonian Institution’s Submillimeter Array in the event of eventual closure of the observatory. We are currently making cost estimates for we are currently costing all the options, starting with complete removal. We would appreciate guidance as to what other options might prove acceptable.

Antennas:

We have 8 antennas which will be dis-assembled one at a time and transported down to a holding area at sea level. The procedure will be the reverse of their construction and deployment.

Antenna Transporter Forklifts etc:

The transporter will be dis-assembled and transported down to a holding area at sea level. The forklifts and other heavy equipment will also be transported down to a holding area at sea level and would likely be placed on the government surplus property list.

Antenna pad:

Complete removal:

The Antenna Pad removal will require excavation, demolition and transport of debris to a refuse site. There are 24 pads all of which have up to 20-30 tons of subsurface concrete. The removal all this material will cause a significant environmental impact and the need to bring new material to back fill and restore the pad area along with its access road.

Optional approach:

The Pads have an approximate above ground projection of about one foot, over a diameter of about nine feet. As an alternative to complete removal, we recommend demolishing the above ground projection to a subsurface level of 2 feet. Removing all the debris and filling and grading the pad area to the natural terrain.

Pad cable runs:

Each Pad location has an underground conduit and a subsurface power cable. The conduit is used for sensitive fiber optic cables and other electrical lines. The power cables are copper wire with protective shields for sub-surface burial. The conduit is buried 3-4 meters below grade and has several junction boxes to allow distribution to several locations. The junction boxes are above ground. The power cables have been buried in a simple trench system.

Complete removal:

Complete removal will require extracting the conduit and demolishing the junction boxes and back filling and grading to the natural terrain. This is true also for the power cables.

Alternative option:

Leave the subsurface conduit and power lines in place and remove only
the junction boxes. This option will have significantly less environmental impact on the summit.

Control building and high bay:

Complete Removal:

This would include removal of all contents, demolishing the structures, foundations and pavement.

Alternative Option:

A property transfer to a federal or state agency. The building contents could be discussed with the recipient and their proper transfer or disposal could be arranged. The high bay building is ideal for storing HP summit equipment (road grader, snow equipment and safety vehicle). The control building could be used as a Ranger station and emergency response area.
Appendix C. All Appropriate Inquires Documentation
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To be eligible for an EPA brownfields grant to address contamination at brownfields properties, eligible entities must demonstrate that they are not liable under CERCLA for the contamination at the site. Accordingly, eligible entities who may be considered “potentially responsible parties” under CERCLA must demonstrate they meet one of the liability protections or defenses set forth in CERCLA by establishing that they are (1) an innocent landowner, (2) a contiguous property owner, (3) a bona fide prospective purchaser, or (4) a government entity that acquired the property involuntarily through bankruptcy, tax delinquency, or abandonment, or by exercising its power of eminent domain.

To claim protection from liability as an innocent landowner, contiguous property owner, or bona fide prospective purchaser, property owners, including state and local governments, must conduct all appropriate inquiries prior to acquiring the property.

What is CERCLA?
The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as “Superfund,” was established to address abandoned hazardous waste sites. Among other things, CERCLA establishes a liability scheme for determining who can be held accountable for releases of hazardous substances. CERCLA also establishes the authority for EPA’s Brownfields Program and sets forth which entities and properties are eligible for brownfields grants.

Can state and local governments be found liable for contamination at brownfields?
Yes. Under CERCLA, persons (including state and local governments) can be liable by virtue of property ownership, or by virtue of their actions with respect to a particular site. For sites from which there is a release or threatened release of hazardous substances, the categories of “potentially responsible parties” include any person or party who:

- Currently owns or operates the property, or owned or operated the property at the time of disposal of hazardous substances,
- Arranged for hazardous substances to be disposed of or transported to the site for disposal; or
- Transported hazardous substances to the site.

Applicants should note that CERCLA employs a “strict liability” scheme—that means it is without regard to fault. Accordingly, a person who owns a property from which there is a release of hazardous substances can be held liable just by virtue of ownership.

If I am applying for a brownfields grant, do I have to worry about CERCLA liability?
Yes. Brownfields grantees are prohibited from using grant money to pay response costs at a brownfield site for which the grantee is potentially liable under CERCLA.

Therefore, all brownfields grantees who may be potentially liable at the site for which they are seeking funds must demonstrate that they are not liable for the contamination that will be addressed by the grant, subgrant, or loan. Applicants who own or operate the property for which they are seeking funding, or who may have owned or operated the property at the time of disposal of hazardous substances, must demonstrate they fall within one of the liability protections.

Cleanup grant applicants in particular should take note of this prohibition. Because cleanup grantees are required to own a site to receive brownfields funding—and because owners of contaminated property are liable under CERCLA—cleanup grant applicants must demonstrate they meet one of the liability protections described above. Some grant applicants who do not own the property for which they are seeking funding, or who are not seeking site-specific grant funds, may not fall within one of the categories of “potentially responsible parties,” and thus may not have to demonstrate they meet a liability protection.

Please contact your Regional Brownfields representative if you are not sure whether you will need to demonstrate a liability protection to be eligible for a grant.
Who may be protected from liability under CERCLA?
The CERCLA statute provides protection from liability for certain parties, provided they comply with specific criteria outlined in the statute. Parties provided protection from CERCLA liability include:

- Innocent landowners (CERCLA §101(35)(A))
- Contiguous property owners (CERCLA §107(q))
- Bona fide prospective purchasers (CERCLA §§101(40) and 107(r))
- Units of state or local government that acquire ownership or control involuntarily through bankruptcy, tax delinquency, or abandonment (CERCLA §101(20)(D))

Government entities that acquire property by eminent domain (CERCLA §101(35)(A)(ii))

What are the conditions for attaining liability protection under CERCLA?
To be eligible for liability protection under CERCLA as an innocent landowner, contiguous property owner or bona fide prospective purchaser, prospective property owners must:

- Conduct All Appropriate Inquiries in compliance with 40 CFR Part 312, prior to acquiring the property;
- Comply with all Continuing Obligations after acquiring the property. (CERCLA §§101(40)(C – G) and §§107(q)(A) (iii – viii)); and
- Not be affiliated with any liable party through any familial relationship or any contractual, corporate or financial relationship (other than a relationship created by the instrument by which title to the property is conveyed or financed).

NOTE: Property acquisition includes properties acquired by gifts and zero price transactions.

How can a state or local government demonstrate that it is not liable for contamination at a brownfield?
All state and local governments that may be potentially liable at a site for which they are applying for funding (including site-specific assessment grants, cleanup grants, or subgrants or loans from revolving loan funds), must demonstrate that they qualify for one of the CERCLA liability protections. All non-profit entities applying for brownfields cleanup grants also must make this demonstration.

To demonstrate that it qualifies as an innocent landowner, contiguous landowner, or bona fide prospective purchaser, the applicant must:

- Conduct All Appropriate Inquires prior to acquiring the property, and
- Comply with all Continuing Obligations after acquiring the property.

State and local governments that acquired a property involuntarily through bankruptcy, tax delinquency, or abandonment, or by exercising their power of eminent domain, do not have
to conduct all appropriate inquiries prior to acquiring the property, but must exercise “due care” after acquiring the property (CERCLA §101(35)(A) and §§107(b)(3)(a – b)).

[Note: One threshold criteria for applicants seeking cleanup grant funding is that a Phase I must be conducted prior to application submission. Accordingly, although state and local governments that acquired property involuntarily are not required to conduct all appropriate inquiries for purposes of establishing a liability protection, they may have to conduct all appropriate inquiries anyway to be eligible for a cleanup grant.]

What is “All Appropriate Inquiries”?  
“All Appropriate Inquiries,” or AAI is the process of conducting due diligence or a Phase I Environmental Site Assessment to determine prior uses and ownership of a property and assess conditions at the property that may be indicative of releases or threatened releases of hazardous substances at, on, in, or to the property. 

The standards and practices established as comprising “All Appropriate Inquiries” are set forth in regulations promulgated at 40 CFR Part 312.

EPA recognizes two ASTM International Standards as compliant with the AAI requirements: ASTM E1527-05 “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process” and E2247-08 “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property.”

When must All Appropriate Inquiries be conducted?  
- All Appropriate Inquiries must be conducted or updated within one year prior to acquiring ownership of a property.  
- Certain aspects or provisions of All Appropriate Inquiries (i.e., interviews of current and past owners, the review of government records, the on-site visual inspection, and searches for environmental cleanup liens) must be conducted or updated within 180 days prior to acquiring ownership of a property.

Who can perform All Appropriate Inquiries?  
The individual who supervises or oversees the conduct of the AAI investigation and signs the final report required in the AAI regulation must meet the definition of an “Environmental Professional” provided in the AAI Final Rule (40 CFR §312.10).  

A person that does not qualify as an “Environmental Professional” as defined in 40 CFR §312.10, may assist in the conduct of the investigation if he or she is under the responsible charge of a person meeting the definition.

What are “Continuing Obligations?”  
After acquiring a property, to maintain the liability protections, landowners must comply with “continuing obligations” during their property ownership. The continuing obligations include:

1. Provide all legally required notices with respect to the discovery or release of a hazardous substance;  
2. Exercise appropriate care with respect to the hazardous substances by taking reasonable steps to stop or prevent continuing or threatened future releases and exposures, and prevent or limit human and environmental exposure to previous releases;  
3. Provide full cooperation, assistance, and access to persons authorized to conduct response actions or natural resource restoration;  
4. Comply with land use restrictions and not impede the effectiveness of institutional controls; and  
5. Comply with information requests and subpoenas.

Where can I get additional information?  
For general information, see the EPA Brownfields website at: www.epa.gov/brownfields  
For more information on the AAI requirements, see: http://www.epa.gov/brownfields/regneg.htm  
For more information on continuing obligations, see: http://www.epa.gov/compliance/resources/policies/cleanup/superfund/common-elem-guide.pdf  
Contact Patricia Overmeyer at: Overmeyer.patricia@epa.gov
All Appropriate Inquiries
Final Rule

What is “All Appropriate Inquiries”? 
“All appropriate inquiries” is the process of evaluating a property’s environmental conditions and assessing potential liability for any contamination.

Why is EPA Establishing Standards for Conducting All Appropriate Inquiries?
The 2002 Brownfields Amendments to CERCLA require EPA to promulgate regulations establishing standards and practices for conducting all appropriate inquiries.

Stakeholder Collaboration 
A Negotiated Rulemaking Committee consisting of 25 diverse stakeholders developed the proposed rule. Following publication of the proposed rule, EPA provided for a three month public comment period. EPA received over 400 comments from interested parties. Based upon a review and analysis of issues raised by commenters, EPA developed the final rule.

When is the Rule Effective?
The final rule is effective on November 1, 2006—one year after being published in the Federal Register. Until November 1, 2006, both the standards and practices included in the final regulation and the current interim standards established by Congress for all appropriate inquiries (ASTM E1527-00) will satisfy the statutory requirements for the conduct of all appropriate inquiries.

Who is Affected?
The final All Appropriate Inquiries requirements are applicable to any party who may potentially claim protection from CERCLA liability as an innocent landowner, a bona fide prospective purchaser, or a contiguous property owner. Parties who receive grants under the EPA’s Brownfields Grant program to assess and characterize properties must comply with the All Appropriate Inquiries standards.

When Must All Appropriate Inquiries be Conducted?
All appropriate inquiries must be conducted or updated within one year prior to the date of acquisition of a property. If all appropriate inquiries are conducted more than 180 days prior to the acquisition date, certain aspects of the inquiries must be updated.

What Specific Activities Does the Rule Require?
Many of the inquiry’s activities must be conducted by, or under the supervision or responsible charge of, an individual who qualifies as an environmental professional as defined in the final rule.

The inquiry of the environmental professional must include:
• interviews with past and present owners, operators and occupants;
• reviews of historical sources of information;
• reviews of federal, state, tribal and local government records;
• visual inspections of the facility and adjoining properties;
• commonly known or reasonably ascertainable information; and
• degree of obviousness of the presence or likely presence of contamination at the property and the ability to detect the contamination.

Additional inquiries that must be conducted by or for the prospective landowner or grantee include:
• searches for environmental cleanup liens;
• assessments of any specialized knowledge or experience of the prospective landowner (or grantee);
• an assessment of the relationship of the purchase price to the fair market value of the property, if the property was not contaminated; and
• commonly known or reasonably ascertainable information.
HOW DOES THE FINAL AAI RULE DIFFER FROM THE INTERIM STANDARD?

The final All Appropriate Inquiries rule does not differ significantly from the ASTM E1527-00 standard. The rule includes all the main activities that previously were performed as part of environmental due diligence such as site reconnaissance, records review, interviews, and documentation of recognized environmental conditions. The final rule, however, enhances the inquiries by extending the scope of a few of the environmental due diligence activities. In addition, the final rule requires that significant data gaps or uncertainties be documented.

Under the final All Appropriate Inquiries rule, interviewing the subject property’s current owner or occupants is mandatory. The ASTM E1527-00 standard only required that the environmental professional make a reasonable attempt to conduct such interviews. In addition, the final rule includes provisions for interviewing past owners and occupants of the subject property, if necessary to meet the objectives and performance factors. Under the ASTM E1527-00 standard, the environmental professional had to inquire about past uses of the subject property when interviewing the current property owner.

The final rule also requires an interview with an owner of a neighboring property if the subject property is abandoned. The ASTM E1527-00 standard included such interviews at the environmental professional’s discretion.

The final rule does not specify who is responsible for performing record searches, including searches for use limitations and environmental cleanup liens. The ASTM E1527-00 standard specified that these record searches are the responsibility of the user and required that the results be reported to the environmental professional.

Unlike the ASTM E1527-00 standard, the final rule requires the examination of tribal and local government records and more extensive documentation of data gaps.

The final rule includes specific documentation requirements if the subject property cannot be visually inspected. The ASTM E1527-00 standard did not include such requirements.

WHO QUALIFIES AS AN ENVIRONMENTAL PROFESSIONAL?

To ensure the quality of all appropriate inquiries, the final rule includes specific educational and experience requirements for an environmental professional.

The final rule defines an environmental professional as someone who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases on, at, in, or to a property, sufficient to meet the objectives and performance factors of the rule, and has: (1) a state or tribal issued certification or license and three years of relevant full-time work experience; or (2) a Baccalaureate degree or higher in science or engineering and five years of relevant full-time work experience; or (3) ten years of relevant full-time work experience.

For more information on the environmental professional definition, please see EPA's Fact Sheet on the Definition of an Environmental Professional.

WILL THERE BE AN UPDATED ASTM PHASE I SITE ASSESSMENT STANDARD?

Yes. ASTM International updated its E1527-00 standard, “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.” EPA establishes that the revised ASTM E1527-05 standard is consistent with the requirements of the final rule for all appropriate inquiries and may be used to comply with the provisions of the rule.

CONTACT INFORMATION

Patricia Overmeyer
U.S. EPA’s Office of Brownfields Cleanup and Redevelopment
(202) 566-2774
Overmeyer.Patricia@epa.gov

Also, please see the U.S. EPA’s web site at www.epa.gov/brownfields for additional information.
Appendix D. Factors for Limiting Development

Guidelines for limiting development of observatories on Mauna Kea are provided in the 1983 Complex Development Plan (CDP), by policy described in the 2000 Mauna Kea Science Reserve Master Plan, as limitations associated with cultural and natural resources, and as observatory siting criteria (Group 70 1983; Group 70 International 2000). The latter evaluates locations for observatories based on scientific feasibility of astronomy operations. These guidelines are essential for developing a long-term strategy for observatory siting as there are inherent constraints based on the combination of factors.

Past Planning for Observatory Siting

In the 1983 CDP, the observatory planning process first considered the technical and physical / environmental criteria, then evaluated sites for potential impact on recreational resources, and finally evaluated the distance and cost to extend basic infrastructure (e.g. roads and power). As described in the 1983 CDP, siting of major telescopes requires years of testing in order to find a suitable site. The 1983 CDP contains an analysis that was conducted to identify general areas that might be suitable for future telescopes.

Technical Criteria. Technical criteria evaluated in the 1983 CDP formed the basis for future planning of observatory siting with respect to astronomical quality. Areas in the summit region were assessed for:

Wind Direction. Optical and infrared telescopes are sensitive to atmospheric turbulence and must be sited where laminar air flow is not disturbed by turbulence generated by cinder cones or other telescopes. Millimeter-wave telescopes should be sited where the natural topography provides a shield against the wind. Outcome from wind direction testing at the summit provided information about which types of telescopes should be considered for different areas.

Obscuration. Obscuration relates to the ability of telescopes to view the sky without being blocked by natural or man-made features – cinder cones and other telescopes in the summit region. Telescopes on Mauna Kea must be able to view all parts of the southern and northern sky down to 12 degrees above the horizon. If the horizon is obscured observing time could be lost or some objects might not be observed at all. Computer analysis identified sites with minimal obscuration by testing obscuring features against potential site locations.

Physical and Environmental Criteria. Physical and environmental criteria evaluated in the 1983 CDP formed the basis for the environmental impact analysis that accompanied the document. Potential telescope siting areas were assessed for:

Geological and soil characteristics in relation to foundation loads, potential for dust and erosion, and possible disturbance of underground water tables

Slope, to eliminate steep areas that would be difficult to construct on

Botany and biology, in order to minimize disturbance to endangered or rare species

Presence of archaeological sites, which may preclude siting in a specific location

Visibility, to determine from where on the Island of Hawai‘i telescopes would be seen.
2000 Master Plan Guidance on Observatory Siting

The 2000 Master Plan updated the information in the 1983 CDP on designated telescope siting areas for existing observatories, proposed redeveloped facilities, and potential new facility sites based on current analyses and refined criteria. The location of cultural and natural (biological and geological) resources played a part in dividing the Science Reserve into two areas, the 10,760 acre Natural/Cultural Preservation Area, and the 525 acre Astronomy Precinct. The Astronomy Precinct is an area where development is to be consolidated to maintain a close grouping of astronomy facilities, roads and support infrastructure, while the Natural/Cultural Preservation Area was designated to protect natural and cultural resources (Group 70 International 2000).

The 2000 Master Plan limited new observatory development to the Astronomy Precinct, except on the undisturbed summit *pu‘us*. Specific siting criteria in the 2000 Master Plan for locating facilities included:

1. Minimal impact on existing facilities, including maintaining a clear line of site to approximately 12 degrees above the horizon in a full circle.
2. Minimum impact of wēkiu bug habitat; only the existing disturbed locations on *pu‘u* or areas outside of the wēkiu bug habitat will be considered as potential siting areas.
3. Avoidance of archaeological sites, including at least a 200 foot buffer from the clustered group of shrines found outside the Astronomy Precinct boundary on the northern slope.
4. Suitability for observations, including acceptable obscuration and wind flow conditions.
5. Minimum visual impact from significant cultural areas, including no interference with the visual connections between the major *pu‘u* and the shrine complexes.
6. Avoid or minimize views from Waimea, Honoka‘a and Hilo.
7. Close to roads and existing infrastructure, to minimize disturbance to the natural terrain.

The 2000 Master Plan summarized the five types of facility development projects for astronomy facilities and their proposed locations as outlined in IfA’s Research Development Program (2000-2020).25

1. Type I. Redevelopment of Existing Observatory Sites on the Summit Ridge
2. Type II. Expansion of Existing Observatories
3. Type III. New Conventional Optical/IR Telescope
4. Type IV. Next Generation Large Telescope (NGLT)
5. Type V. Optical/IR Interferometer Array Site

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25 The University is no longer pursuing options 3 and 5.
Current Thinking on Observatory Siting

Current strategies for protecting cultural and natural resources emphasize recycling sites whenever possible in the siting of any new observatory facilities. As new information on resources becomes available, the criteria against which to evaluate a project may need to be expanded. In addition, detailed information on resources will provide guidance for site-specific siting, including information that can be used in environmental analyses. All future siting of observatories should be based on the best available information on resource inventories, with site-specific studies conducted as needed.

The Mauna Kea CMP emphasized the importance of considering potential impacts to the cultural landscape, which includes both landforms and the recognized cultural significance of the summit region, during any potential siting of new observatories in the summit region (see Mauna Kea CMP Section 5). In addition, archaeological fieldwork of the UH Management Areas has been completed, including the Astronomy Precinct, identifying specific sites and resources. A buffer of 200 feet from archaeological sites may be used as a setback guide. This is based on the 2000 Master Plan that states any new facility will be setback 200 feet from a cluster of a group of shrines located just outside the Astronomy Precinct boundary. However, preservation buffers for the protection of archaeological sites will be established on a case-by-case basis and would need to be approved by SHPD pursuant to HAR §13-300-38.

Baseline inventories for flora and fauna in the summit region are proposed in the NRMP. The reasoning behind this is that there is currently little known about the distribution of flora and fauna on the summit, or habitat requirements for most of the species found there. The purpose of conducting baseline inventories in areas of proposed development is to determine if the area contains sensitive resources such as protected species or unique geological resources, which need to be protected or mitigated for. However, without conducting baseline inventories in other portions of similar habitat on the mountain, it is difficult to know whether the proposed project area is more or less important or unique than surrounding areas. Thus, it is important to understand the distribution of natural resources over a larger area, rather than simply studying the area of proposed impact. Although some limited surveys have been conducted in the past (Smith et al. 1982; Char 1990, 1999), they were restricted in area covered and most were simple presence/absence records. Quality data on species distribution, abundance, densities, and microhabitats utilized will enable planners to determine which areas are high quality habitat and which are lower quality habitat for the summit flora and fauna. This will allow planners to fine tune the placement of new development to minimize habitat destruction or other potential impacts on the natural resources.

As stated in the 2000 Master Plan, all major undeveloped cinder cones and their intervening areas will be protected from future development by astronomical or other interests. These include the following pu‘u: Ala, Hoaka, Kūkahau‘ula, Lilīnoe, Māhoe, Mākanaka, Pōepoe, Poli‘ahu, and Ula. In addition, UH has committed to no new development on undisturbed areas on Pu‘u o Kūkahau‘ula. The most probable scenario for new development, other than recycling and expansion of existing facilities, is off the summit pu‘u in the area within the Astronomy Precinct referred to as the northern plateau.

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Pu‘u o Kūkahau‘ula is the traditional name of the summit cluster of cones on Mauna Kea (Maly and Maly 2005).
August 16, 2019

Dr. Gregory Chun, Ph. D.
Executive Director, Maunakea Stewardship, University of Hawai‘i
200 W. Kāwili St.
Hilo, HI 96720-4091

Dear Dr. Chun,

On behalf of Caltech, I am responding to your letter of August 5, 2019, requesting an update on our current efforts to decommission the Caltech Submillimeter Observatory (CSO).

The documents submitted on this topic by OMKM Director Stephanie Nagata to the Maunakea Management Board’s August 13, 2019 meeting serve as a convenient summary and reference. They are both attached here and available online. The table provided there lists the completed steps: submission of a Notice of Intent and a Phase I Environmental Site Assessment (ESA).

We are currently preparing the Draft Environmental Assessment (EA). As you know, the EA’s core content is a description of current environmental conditions (interpreted broadly; HAR §11-200-12) and the impact of both the decommissioning process and the final state of the site on these conditions for a set of alternatives under consideration. Our preferred alternative is Full Removal and Restoration, which is consistent with UH’s objective and the preferred alternative stated in your letter. We currently know of no environmental or engineering reasons that this alternative cannot be achieved. Other alternatives analyzed in the Draft EA are: 1) No Action; 2) Retention of the Outbuilding for UH Purposes/Full Removal/Full Restoration over the remainder of the site; 3) Full Removal/Moderate Restoration; and 4) Partial Removal (Infrastructure Capping)/Moderate Restoration. Inclusion of (1), No Action, is a requirement of the EA process. The specific technical surveys undertaken to inform the analysis of alternatives are: an Archeological Assessment, a Cultural Setting Analysis, a Hydrogeological Evaluation, a Biological Inventory, a Biological Setting Analysis, a Traffic Analysis, and an Asbestos/Lead Paint/Mold Survey. They will be included as appendices to the EA.

The Draft EA is well along:

- All of the technical surveys are complete, most of the reports have been submitted to OMKM, and many have gone or are undergoing OMKM committee review. The table provided in Ms. Nagata’s MKMB presentation shows the individual report status. The progress by the OMKM committees in reviewing the technical reports has been limited by their meeting cadence.
- Our decommissioning team is internally reviewing a nearly complete draft of the Draft EA text, the Site Deconstruction and Removal Plan (SDRP), and the Site Restoration Plan (SRP), including a Cost-Benefit Analysis (CBA) of the alternatives.
- We received additional OMKM technical guidance on Aug 7, 2019, at a meeting of the Decommissioning Design Review Committee (DDRC).
I expect the Draft EA will be submitted to OMKM in the coming weeks. Since UH will be the party submitting the Draft EA to the Office of Environment and Quality Control (OEQC), this version will be considered “pre-final” and OMKM/UH may modify it prior to submission.

Our team will begin preparation of the CDUA for submission to OMKM/UH as soon as we have submitted the “pre-final” Draft EA. We expect the CDUA to require less time than the EA to prepare and review because, unlike the EA, it is a single-step process with no new technical surveys, plan development, document review, etc. EA approval by OEQC must, however, precede UH submission of the CDUA to DLNR’s Office of Conservation and Coastal Lands (OCCL).

During the process of CDUA review and revision, we will prepare the necessary building and other permits as well as solicit contractors for participation in the deconstruction, removal, and restoration process so physical work at the site may begin expeditiously after the CDUP is issued. Completion of decommissioning will require, after deconstruction, a Phase II ESA and possibly a Remedial Action Plan (RAP).

Caltech is, in parallel, undertaking as many physical steps toward decommissioning as allowed under the existing sublease and agreements. All of the astronomical instruments have been removed from the site. Funds are being sought to remove the telescope itself for reuse elsewhere, and, to that end, there is a plan to remove some telescope control components in the coming months. If funds for telescope reuse become available prior to deconstruction, we will work with OMKM to seek approvals to remove the telescope, prior to or during deconstruction. Otherwise, the telescope will be removed and disposed of during deconstruction.

I hope this letter satisfies your request for an update on the status of the CSO decommissioning process, and I welcome any follow-up requests and/or discussions.

Sincerely,

Sunil Golwala
Professor of Physics, California Institute of Technology
Director, Caltech Submillimeter Observatory
Caltech Submillimeter Observatory (CSO) – Decommissioning Status

Definition and Purpose (2010 Decommissioning Plan)
Decommissioning refers to a process that results in the partial or total removal of all structures associated with an observatory facility and the restoration of the site, to the greatest extent possible, to its preconstruction condition.

The decommissioning process guides the deconstruction of the observatory facility and its supporting infrastructure and restoration of the site. In addition to a funding plan, the four components of the process include (1) a Notice of Intent, (2) an environmental due diligence review, (3) a Site Deconstruction and Removal Plan and, (4) a Site Restoration Plan.

Brief Summary of Process and Requirements (2010 Decommissioning Plan)
The decommissioning process is successful when all regulatory compliance requirements are met and the site is deemed returnable to the State. A Site Decommissioning Plan (SDP) documents the condition of the site, outlines the approach to decommissioning, and proposes a plan for site restoration. The phases and specific details of the SDP are presented in the 2010 Mauna Kea Decommissioning Plan. An SDP should be submitted at least five years prior to either the termination date of a sublease, or a sublessee’s decision to cease operations, or as soon as is feasible if decommissioning is to take place less than five years after a decision is made to cease operations, whichever occurs first.

OMKM is responsible for overall coordination of the decommissioning process. OMKM will liaison with DLNR-Office of Conservation and Coastal Lands (OCCL) as needed, will maintain all required reporting and documentation, and will provide DLNR-OCCL with all relevant documentation. Deconstruction and site restoration efforts will be managed by the sublessees with oversight by OMKM. [The Department of Land and Natural Resources (DLNR) indicated that an Environmental Assessment (EA) and Conservation District Use Application (CDUA) and Permit (CDUP) will be required for CSO decommissioning. Caltech has also chosen to prepare subject-matter specific technical reports to inform the preparation of the Site Decommissioning Plan and Environmental Assessment.]

The Board of Land and Natural Resources (BLNR) is the final authority regarding approval of the (Site) Decommissioning Plan.

There are several elements of the decommissioning process that will incorporate community input. A process similar to the Board of Regents-approved Major Project Review Process will be established to review, guide and recommend the disposition of a site, including site restoration and planning. Reviewers will include OMKM, Mauna Kea Management Board, Kahu Kū Mauna, and the Environment Committee [note: the review process also includes establishment of a technical group to review site-specific documents, the “Decommissioning Review Committee”].

Scope of Documents to Review and Analyze
Following is a non-exhaustive list of the documents reviewed and analyzed in the Environmental Assessment and Site Decommissioning Plan. Review of historical documents in particular should be reviewed for compliance measures.
• Observatory Construction Documents
  o Final Environmental Impact Statement (FEIS) or Environmental Assessment (EA)
  o Conservation District Use Application (CDUA)
  o DLNR Staff comments and correspondence regarding the CDUA
  o Conservation District Use Permit (CDUP)
  o Sub-Lease and Master Lease
• Operating documents
  o Operating and Site Development Agreement (OSDA)
  o Subsequent permits and operating agreements for original and any additional infrastructure and uses
  o Improvements resulting from other Observatory permits
• Planning Documents
  o County General Plan
  o 2000 Mauna Kea Master Plan (and EIS)
  o 2009 Mauna Kea Comprehensive Management Plan (including EA and subplans)

Activities not requiring a permit
• Removal of interior items for reuse or recycling (ongoing).
• Removal and relocating of the mirror (pending funding).
## CSO Decommissioning Process Status

<table>
<thead>
<tr>
<th>Document Description</th>
<th>CSO Submission Date</th>
<th>Review by Decommissioning Review Committee</th>
<th>Kahu Kū Mauna / Env. Committee Consultations</th>
<th>Public Comment or Hearings</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Due Diligence Phase 1 ESA *</td>
<td>Jun ‘18</td>
<td>August 2019</td>
<td>Aug ‘18 / Oct ‘18</td>
<td>Approved by OMKM and MKMB</td>
<td>Completed</td>
</tr>
<tr>
<td>Cost / Benefit Analysis *</td>
<td>Outstanding</td>
<td>Review TBD</td>
<td>TBD</td>
<td>During the EA process</td>
<td>Outstanding</td>
</tr>
<tr>
<td>Site Deconstruction &amp; Removal Plan (SDRP) *</td>
<td>Outstanding</td>
<td>TBD</td>
<td>TBD</td>
<td>Not simply monetary</td>
<td>Outstanding</td>
</tr>
<tr>
<td>Site Restoration Plan (SRP) *</td>
<td>Outstanding</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
<td>Outstanding</td>
</tr>
</tbody>
</table>

### Project Scoping
- Archaeology
- Cultural Setting
- Geology/Hydrology
- Biology (2 reports)
- Transportation, Hazardous Material

- April 18
- May 2018
- Review(s) TBD

### Technical Reports
- August 18
- Outgoing
- August 2019

### Pre-Final DRAFT EA
- Outstanding
- TBD

### Final EA *
- UH submits to OEQC

### DRAFT EA *
- UH submits to OEQC

### Application (CDUA) *
- UH applies to DLNR

### Permit (CDUP)
- Issued by BLNR

### Implementation
- Removal & Restoration
- Phase 2 ESA
- Remedial Action Plan

### Notice of Intent (NOI) *
- Nov ‘15 & Mar ‘16
- May 2018
- April 2016 / Jan 2016
- At May 2016 MKMB mtg.
- Completed

### Environmental Due Diligence Phase 1 ESA *
- Jun ‘18
- August 2019
- Aug 2018 / Oct 2018
- Approved by OMKM and MKMB
- Completed

### Cost / Benefit Analysis *
- Outstanding
- Review TBD
- TBD
- During the EA process
- Outstanding

### Site Deconstruction & Removal Plan (SDRP) *
- Outstanding
- TBD
- TBD
- Not simply monetary
- Outstanding

### Site Restoration Plan (SRP) *
- Outstanding
- TBD
- TBD
- Not simply monetary
- Outstanding

### Project Scoping
- Archaeology
- Cultural Setting
- Geology/Hydrology
- Biology (2 reports)
- Transportation, Hazardous Material

- April 18
- May 2018
- Dec 2018 / Oct 2018
- 2018
- Reviewed as appendices with the EA (below)
- Completed

### Technical Reports
- Archaeology
- Cultural Setting
- Geology/Hydrology
- Biology (2 reports)
- Transportation, Hazardous Material

- April 18
- Outstanding
- April 2019
- May 2019 / Pending
- May 2019 / Pending
- May 2019 / Mar 2019
- December 2019
- Outstanding
- Cultural Setting

### Pre-Final DRAFT EA
- Outstanding
- TBD
- Informal
- Outstanding
- Premature

### Final EA *
- UH submits to OEQC
- TBD
- Comments accepted
- Premature

### DRAFT EA *
- UH submits to OEQC
- Review(s) TBD
- TBD
- Formal

### Application (CDUA) *
- UH applies to DLNR
- Review TBD
- TBD
- OCCL hearing anticipated
- Premature

### Permit (CDUP)
- Issued by BLNR
- TBD
- BLNR public hearing
- Premature

### Implementation
- Removal & Restoration
- Phase 2 ESA
- Remedial Action Plan

- TBD
- TBD
- TBD
- Contaminant testing of cesspool and below dome foundation
- If needed

---

* Per 2010 Decommissioning plan approvals include OMKM, MKMB, and UH President. The final “Site Decommissioning Plan” may include approval by the UH Board of Regents.
Written Direct Testimony of Robert McLaren  
Decommissioning of Telescopes and Limits on Future Development

My name is Robert McLaren. I am the Associate Director at the Institute for Astronomy at the University of Hawai‘i ("UH"). Since joining the Institute in 1990, I have been closely involved in the development of astronomy facilities on Maunakea. Prior to that, I was on the staff of the Canada-France-Hawaii Telescope from 1982-1990. My curriculum vitae was submitted as Exhibit A-119.

The Decommissioning Plan for the Mauna Kea Observatories ("DP") (Exhibit A-13) is a subplan of the Mauna Kea Comprehensive Management Plan ("CMP") (Exhibit A-9). It was approved by both the UH Board of Regents and the Board of Land and Natural Resources ("BLNR") in 2009. The DP provides a framework for both existing and future observatories on Maunakea to ensure that the Department of Land and Natural Resources ("DLNR") as landowner and lessor, UH as lessee, and the observatories as sublessees have clear expectations of the observatory decommissioning process. To that end, the plan calls for an extensive program of advance planning, consultation and approvals that must begin several years before the actual physical removal starts. The attached Figure 1 from the DP (Exhibit A-38) illustrates the broad scope of the decommissioning process. It begins with the submission of a Notice of Intent ("NOI") followed by review and comment at several stages by the Office of Mauna Kea Management ("OMKM"), the Kahu Kū Mauna Council and the Mauna Kea Management Board ("MKMB"), and ultimately approval by the UH President and Board of Regents. The MKMB reviews in particular provide an opportunity for local community input and comment. In parallel, there are the required environmental assessments and any required Conservation District permitting actions.
While the main focus of the DP is on the requirements and process for telescope
decommissioning, Chapter 5 of the document addresses UH’s goal of maintaining a world-
leading observatory complex while limiting future growth. At the time that the DP was adopted,
there were 13 telescopes operating on Maunakea. Two were owned and operated exclusively by
UH: the UH 2.2-meter Telescope and Hokule‘a, the UH Hilo instructional telescope. The other
11 were owned by non-UH organizations and situated on subleased sites: CFHT, UKIRT, IRTF,
CSO, JCMT, VLBA, Kecks I & II, Subaru, Gemini and SMA. In May 2009, Caltech announced
its intention to decommission the CSO and remove it from the mountain during the period 2016-
2018. In September 2015, CSO ended scientific operations. Caltech submitted its NOI to
decommission CSO in November 2015.

When the DP was adopted in 2009, it was assumed, for planning purposes, that the other
10 non-UH telescopes would continue to operate through the term of their subleases, i.e., through
2033. This assumption was based on the fact that, with relatively inexpensive upgrades to their
instrumentation, all of them could maintain their high level of scientific productivity for at least
that period and even longer. In some cases, the upgrades might be more extensive, amounting to
renovations or replacements that would have about the same overall footprint. On the other
hand, it was also understood that policy changes within sponsor organizations could lead to
earlier termination of operations and subsequent decommissioning, but no such changes were
foreseen at that time. With regard to the UH-owned telescopes, the intention was to retain
Hokule‘a indefinitely and to replace the UH 2.2-meter Telescope with the Pan-STARRS wide-
field survey telescope. The latter did not happen, and instead Pan-STARRS was developed on
Haleakala. The other basic assumption in the DP was that the Thirty Meter Telescope (“TMT”)
would be developed at its designated site, known as “13 North.”
Based on the above assumptions, and in line with the goal of limiting future growth while maintaining scientific and educational excellence, Chapter 5 of the DP concludes with a projection that 10 facilities would continue beyond the year 2033, assuming that the master lease is extended. These are: UH 2.2-m, Hokule‘a, CFHT, IRTF, Kecks I & II, Subaru, Gemini, TMT, and one or other of JCMT and SMA. Conversely, the current projection is that four will not extend beyond 2033: CSO, VLBA, UKIRT, and one or other of JCMT and SMA. Thus, starting with the 13 telescopes in operation at the time the DP was adopted, one would be added (TMT) and four would be removed by 2033, leaving 10 in operation. Two points are important to keep in mind. The first is that none of the four telescopes projected for decommissioning by 2033 was selected because it would be obsolete by that time. On the contrary, and as explained above, all of them could remain very productive given adequate sponsor support. Rather, they were selected either because of announced sponsor policy decisions (CSO) or on the basis of a value judgment by UH between future scientific potential and the goal of limiting overall physical presence on the mountain. The second point is that judgments like this are by necessity based on the current prevailing situation and assumptions. Both of these can change with time, and with them, the resulting priorities and projections.

In May 2015, UH responded to two directives from Governor Ige that bear on this topic. The first of these was a confirmation that the TMT site is the last new area on the mountain where a telescope project will be contemplated or sought; any other future development will be at existing sites. This limitation, which was already implicit in the DP, was reaffirmed explicitly in a November 17, 2015 letter from UH President Lassner to BLNR Chairperson Suzanne Case. A copy of the letter is attached as Exhibit A-39. In the same letter, UH responded to the second directive by committing to decommission three telescopes by the time that TMT is operational.
One of these is the CSO, for which the decommissioning process is already underway, as mentioned above. Another is UKIRT, whose decommissioning by the time TMT is operational amounts to an acceleration of the time scale already foreseen in the DP. UH has proposed that Hokuke’ā be the third, which proposal is currently under review by OMKM and MKMB.

[Remainder of page intentionally left blank. Signature page follows.]
DATED: Honolulu, Hawai‘i, October 11, 2016.

Robert McLaren
Associate Director, Institute for Astronomy
CDUP Special Conditions

10. The University will decommission three telescopes permanently, as soon as reasonably possible, and no new observatories will be constructed on those sites. This commitment will be legally binding on the University and shall be included in any lease renewal or extension proposed by the University for Mauna Kea.

11. Notwithstanding any lease renewal or extension, consistent with the Decommissioning Plan, at least two additional facilities will be permanently decommissioned by December 31, 2033, including the Very Long Baseline Array antenna and at least one additional observatory.
<table>
<thead>
<tr>
<th>Identifier</th>
<th>Observatory</th>
<th>Estimated Original Cost (000's)</th>
<th>Telescope Specs</th>
<th>Construction Funding Source</th>
<th>Owner/Operator</th>
<th>Annual Operating Cost (000's)</th>
<th>Year Built</th>
<th>Sublease Term</th>
<th>UH observing time(⁴)</th>
<th>DLNR Issued Permits (⁷)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH 0.6m</td>
<td>UH Hilo Educational Telescope</td>
<td>$100</td>
<td>0.6 meters</td>
<td>U.S. Air Force</td>
<td>University</td>
<td>NA</td>
<td>1968</td>
<td>NA</td>
<td>100%</td>
<td>CDUP 0954, September 1977, Air Force Telescope, Planetary Patrol Telescope, 2.2 Meter Telescope (after-the-fact) ⁶</td>
</tr>
<tr>
<td>UH 2.2m</td>
<td>UH 2.2m Telescope</td>
<td>$5,000</td>
<td>2.2 meters</td>
<td>UH - 40% NASA - 60%</td>
<td>University</td>
<td>$1,000</td>
<td>1970</td>
<td>NA</td>
<td>100%</td>
<td>CDUP 0954, September 1977, Air Force Telescope, Planetary Patrol Telescope, 2.2 Meter Telescope (after-the-fact)</td>
</tr>
<tr>
<td>IRTF</td>
<td>NASA Infrared Telescope Facility</td>
<td>$10,000</td>
<td>3.0 meters</td>
<td>NASA</td>
<td>NASA/University</td>
<td>$5,100</td>
<td>1979</td>
<td>1974-2033</td>
<td>15%</td>
<td>CDUP 0653, September 1975, United Kingdom Infrared Telescope; NASA InfraRed Telescope Facility</td>
</tr>
<tr>
<td>CFHT</td>
<td>Canada-France-Hawaii Telescope</td>
<td>$30,000</td>
<td>3.6 meters</td>
<td>Canada - 50% France - 50%</td>
<td>Canada-France / University</td>
<td>$7,400</td>
<td>1979</td>
<td>1975-2033</td>
<td>15%</td>
<td>CDUP 0527, May 1974, Canada-France-Hawaii Telescope</td>
</tr>
<tr>
<td>UKIRT</td>
<td>UK Infrared Telescope</td>
<td>$5,000</td>
<td>3.8 meters</td>
<td>United Kingdom</td>
<td>University (²) (formerly the UK Joint Astronomy Centre)</td>
<td>$2,200</td>
<td>1979</td>
<td>NA</td>
<td>100%</td>
<td>CDUP 0653, September 1975, United Kingdom Infrared Telescope; NASA InfraRed Telescope Facility</td>
</tr>
<tr>
<td>Keck I</td>
<td>W.M. Keck Observatory</td>
<td>$170,000 (combined cost)</td>
<td>10 meters</td>
<td>Caltech - 30% W.M. Keck Foundation - 70%</td>
<td>Caltech / University of California</td>
<td>$13,500 (combined cost)</td>
<td>1992</td>
<td>1985-2033</td>
<td>10%</td>
<td>CDUP 1646, September 1984, Keck I</td>
</tr>
<tr>
<td>Keck II</td>
<td>W.M. Keck Observatory</td>
<td>$170,000 (combined cost)</td>
<td>10 meters</td>
<td>Caltech - 30% W.M. Keck Foundation - 70%</td>
<td>Caltech / University of California</td>
<td></td>
<td>1996</td>
<td>1985-2033</td>
<td>15%</td>
<td>CDUP 2509, August 1992, Keck II</td>
</tr>
<tr>
<td>Identifier</td>
<td>Observatory</td>
<td>Estimated Original Cost (000's)</td>
<td>Telescope Specs</td>
<td>Construction Funding Source</td>
<td>Owner/Operator</td>
<td>Annual Operating Cost (000's)</td>
<td>Year Built</td>
<td>Sublease Term</td>
<td>UH observing time (4)</td>
<td>DLNR Issued Permits (7)</td>
</tr>
<tr>
<td>------------</td>
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<td>--------------------------</td>
</tr>
<tr>
<td>Gemini</td>
<td>Gemini Northern Telescope</td>
<td>$92,000</td>
<td>8.1 meters</td>
<td>USA - 50% UK - 25% Canada - 15% Argentina - 2.5% Brazil - 2.5% Other - 5%</td>
<td>USA / UK / Canada / Argentina / Australia / Brazil / Chile</td>
<td>$13,700</td>
<td>1999</td>
<td>1994 - 2033</td>
<td>10%</td>
<td>CDUP 2691, April 1994, Gemini North</td>
</tr>
<tr>
<td>CSO(5)</td>
<td>Caltech Submillimeter Observatory</td>
<td>$10,000</td>
<td>10.4 meters</td>
<td>Caltech</td>
<td>Caltech / National Science Foundation (NSF)</td>
<td>NA</td>
<td>1987</td>
<td>1983 - 2033</td>
<td>NA</td>
<td>CDUP 1492, December 1982, Cal Tech, Submillimeter Observatory</td>
</tr>
<tr>
<td>JCMT</td>
<td>James Clerk Maxwell Telescope</td>
<td>$32,000</td>
<td>15 meters</td>
<td>United Kingdom - 55% Canada - 25% Netherlands - 20%</td>
<td>University (3) (formerly the UK Joint Astronomy Centre) / East Asian Observatory</td>
<td>$4,700</td>
<td>1987</td>
<td>NA</td>
<td>12%</td>
<td>CDUP 1515, February 1983, James Clark Maxwell Telescope</td>
</tr>
<tr>
<td>SMA</td>
<td>Submillimeter Array</td>
<td>$80,000</td>
<td>8x6 meters</td>
<td>Smithsonian - 85% Taiwan - 15%</td>
<td>Smithsonian Astrophysical Observatory / Taiwan</td>
<td>$5,500</td>
<td>2002</td>
<td>1995 – 2033</td>
<td>15%</td>
<td>CDUP 2728, November 1994, Smithsonian Submillimeter Array</td>
</tr>
</tbody>
</table>

Notes:

(1) In 2008, UHH began the process to remove the original 0.6m telescope and subsequently installed a 0.9m telescope (known as Hoku Kea) using NSF funding. The telescope did not achieve satisfactory operational performance, and UHH decided to cease the effort to bring it into full operation. UHH has since issued a Notice of Intent (NOI) to decommission. MKMB deferred approval of the NOI until a new location for the Observatory can be determined. In 2016, a new telescope, dome, and peripherals were purchased by the University for approximately $400,000 using Capital Improvement Project funding provided by the State of Hawaii. This observatory is currently not operating pending the determination of the new location.

(2) In 2014, ownership of UKIRT was transferred from the United Kingdom to the University.

(3) In 2015, ownership of JCMT was transferred from the United Kingdom to the University.
Observing time as of September 2018. University observing time is based on a percentage of the overall astronomical observing time, which excludes telescope usage for purposes other than astronomical research (e.g., testing, development, and maintenance of telescopes, etc.). The University's observing time is equally distributed over the seasons of the year and other observing conditions.

CSO is in the process of being decommissioned.

This CDUP also covers the Planetary Patrol telescope, which is no longer on Mauna Kea; it was dismantled in the 1990s to make room for the Gemini North telescope.

Other CDUPs issued for Mauna Kea include: CDUP 0537, June 1974, Mauna Kea Access Road; CDUP 0781, May 1976, UKIRT dormitory at Hale Pohaku; CDUP 0895, May 1977, Hale Pohaku dormitories; CDUP 1430, April 1982, Hale Pohaku Midlevel Facilities and Visitor Center; CDUP 1819, February 1986, Hale Pohaku subdivision and construction workers camp; CDUP 3568, September 2017, Thirty Meter Telescope (Decision and Order); and CDUP 3812, June 2018, Infrastructure improvements at the Maunakea Visitor Center.
HEARINGS OFFICERS’ CONSOLIDATED REPORT

FOR PROPOSED

CHAPTER 20-26, HAWAI‘I ADMINISTRATIVE RULES

PUBLIC AND COMMERCIAL ACTIVITIES ON MAUNA KEA LANDS

Report Compiled by the

University of Hawai‘i
System Government Relations Office
and
The Office of the Vice President for Legal Affairs
and University General Counsel

for

Hearings Officers

Regent Simeon Acoba
Hearing I;

Regent Alapaki Nahale-A
Hearings II and III

and

Regent Jeffrey Portnoy
Hearing IV

August 15, 2019
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I. INTRODUCTION

This report is the Hearings Officers’ consolidated report of the following public hearings on proposed Chapter 20-26, Hawai‘i Administrative Rules, Public and Commercial Activities on Mauna Kea Lands:

- Hearing I
  Monday, June 3, 2019, 5:30 p.m. to 7:30 p.m.
  Mānoa Elementary School
  3155 Manoa Road, Honolulu, Hawai‘i 96822

- Hearing II
  Tuesday, June 4, 2019, 5:30 p.m. to 7:30 p.m.
  Waiākea Elementary School
  180 W. Puainako Street, Hilo, Hawai‘i 96720

- Hearing III
  Wednesday, June 5, 2019, 5:30 p.m. to 7:30 p.m.
  Waikoloa Elementary and Middle School
  68-1730 Ho‘oko Street, Waikoloa, Hawai‘i 96738

- Hearing IV
  Friday, June 7, 2019, 5:30 p.m. to 7:30 p.m.
  Pōmaika‘i Elementary School
  4650 S. Kamehameha Avenue, Kahului, Hawai‘i 96732

Section 304A-1903, Hawai‘i Revised Statutes (“HRS”), authorizes the Board of Regents (“BOR”) to “adopt rules pursuant to chapter 91 to regulate public and commercial activities on Mauna Kea lands.” The public hearings were conducted pursuant to sections 91-3 and 304A-1903, HRS, and section 20-1.1-19, Hawai‘i Administrative Rules.

On April 28, 2019, the University duly noticed the public hearings by the publication of the Notice of Proposed Rulemaking Public Hearing (“Notice”) in the Honolulu Star-Advertiser The Garden Island, Hawaii’i Tribune-Herald, West Hawai‘i Today, and The Maui News, attached as Exhibit “A.” In addition to notice by publication as required by chapter 91, HRS, the University also made direct email notification to approximately 401 individuals and organizations that had provided their email addresses to the University. The notice was also posted on the UH News and Office of Maunakea Management websites.

The purpose of this report is to provide the BOR with all written and oral submissions (contained in Exhibits “B” and “C”) regarding the proposed rules. Under section 91-3(a)(2), HRS, the BOR “shall fully consider all written and oral submissions respecting the proposed rule.” A summary of submissions is also contained herein as required by Administrative Directive No. 18-02, which sets forth the process to be followed in obtaining the Governor’s
approval during rule-making. The summaries provided in the following tables are brief and not intended to take the place of written or oral submissions. Text in quotations are as presented by the author.

II. EXECUTIVE SUMMARY

This section provides information related to the public hearings and written submissions received for the period between the public notice on April 28, 2019, and 11:59 p.m. on Friday, June 7, 2019 (the extended time for submitting written testimony electronically, after the close of the last public hearing).

Written Testimony Received

As stated in the Notice, interested persons had an opportunity to submit data, views, or arguments in writing by five methods:

- at one of the four public hearings;
- by mail to the University System Government Relations Office;
- in person to the University System Government Relations Office;
- by email; or
- through an online site set up for this purpose.

A total of 332 written submissions were received by all methods.

Oral Testimony Received

In addition to submitting written comments, all interested persons also had an opportunity to submit data, views, or arguments orally at four public hearings. Note that some persons testified but chose not to sign-in and/or testified and chose to be anonymous. If they testified at the microphone before the hearing officer, they were counted and their testimony recorded for the record. Information for the four hearings are summarized as follows:

Hearing I, Monday, June 3, 2019, Mānoa Elementary School

- Start Time: 5:30 p.m.
- End Time: 8:10 p.m.
- Oral testifiers on the Record: 37
- Approximate Persons in Attendance: 112
- Written Testimony Submitted at Hearing: 5

Hearing II, Tuesday, June 4, 2019, Waiākea Elementary School

- Start Time: 5:30 p.m.
- End Time: 8:07 p.m.
• Oral testifiers on the Record: 31
• Approximate Persons in Attendance: 99
• Written Testimony Submitted at Hearing: 4

Hearing III, Wednesday, June 5, 2019, Waikoloa Elementary and Middle School

• Start Time: 5:30 p.m.
• End Time: 7:59 p.m.
• Oral testifiers on the Record: 28
• Approximate Persons in Attendance: 75
• Written Testimony Submitted at Hearing: 3

Hearing IV, Friday, June 7, 2019, Pōmaika‘i Elementary School

• Start Time: 5:30 p.m.
• End Time: 7:39 p.m.
• Oral testifiers on the Record: 37
• Approximate Persons in Attendance: 84
• Written Testimony Submitted at Hearing: 0

The total number of individuals providing oral testimony at the four hearings is 133.

III. WRITTEN TESTIMONY RECEIVED BEFORE OR AFTER PUBLIC HEARINGS (VIA POSTAL MAIL) (until 11:59 p.m. June 7, 2019)

Date column indicates when the document was received.

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<tr>
<th>No.</th>
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<th>Date</th>
<th>Position on Rules</th>
<th>Summary of Testimony</th>
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</thead>
</table>
| 1   | Office of Hawaiian Affairs        | Jun 13, 2019 | Comment           | • “The proposed rules lack the transparency and accountability necessary to ensure that Native Hawaiian traditional and customary practices are not impacted by arbitrary decisionmaking[.]”
                                                                  |            |                   | • “Consultation with Kahu Ku Mauna, the Office of Hawaiian Affairs, and/or cultural practitioners and lineal descendants, as appropriate, should be required for all actions and activities that may adversely impact Native Hawaiian traditional and customary practices.”
                                                                  |            |                   | • “CMP actions relevant to Native Hawaiian traditional and customary practices are not impacted by arbitrary decisionmaking[.]” |
practices and requiring rulemaking should be included and implemented in the draft rules.”
- “CMP references are ambiguous in scope and applicability, rendering potential impacts to Native Hawaiian traditional and customary practices difficult if not impossible to evaluate and mitigate.”
- “Reliable and transparent resource-generating mechanisms, including observatory sublease provisions, are necessary to minimize impacts to Native Hawaiian traditional and customary rights resulting from permitted, unregulated, and otherwise allowed activities.”

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<thead>
<tr>
<th>#</th>
<th>Author</th>
<th>Date</th>
<th>Position</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Luella Nohea Crutcher</td>
<td>Jun 13, 2019</td>
<td>Oppose</td>
<td>“PLEASE! UPHOLD YOUR OWN RULE! RESPECT and treat THIS HOLIEST OF MOUNTAINS – the whole top, three thousand (3,000) feet down, AS PROBABLY THE MOST HOLY PLACE ON THIS PLANET!!! Respect our inalienable rights!”</td>
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</tbody>
</table>
IV.  WRITTEN TESTIMONY RECEIVED BEFORE OR AFTER PUBLIC HEARINGS (VIA EMAIL/ONLINE) (until 11:59 p.m. June 7, 2019)

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<tr>
<th>No.</th>
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<th>Position on Rules</th>
<th>Summary of Testimony</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. Paul Athanasiov</td>
<td>Apr 29, 2019</td>
<td>Comment</td>
<td>&quot;Please do not restrict access to the top of the mountain.&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Jeff McDevitt</td>
<td>Apr 30, 2019</td>
<td>Oppose</td>
<td>&quot;I am against this prohibition to allow cyclists above a certain point on the mountain. Bicycles have less of an impact on the roadway than motorized vehicles.&quot;</td>
</tr>
<tr>
<td>3</td>
<td>S Jehn</td>
<td>Apr 30, 2019</td>
<td>Support</td>
<td>&quot;We understand how important Mauna Kea is to contributing to humanity's collective knowledge. It brings so much honor to Hawai'i.&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Marcia Kroll</td>
<td>May 1, 2019</td>
<td>Oppose</td>
<td>&quot;no no no&quot;</td>
</tr>
<tr>
<td>5</td>
<td>Donna Grabow</td>
<td>May 5, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose any and all Proposed Rules...[t]he University of Hawaii is mismanaging the Conservation Zone of the Mauna Kea summit.&quot; Includes link to article entitled, &quot;Settler Fragility: Why Settler Privilege Is So Hard to Talk About.&quot;</td>
</tr>
<tr>
<td>6</td>
<td>Terry Ladwig</td>
<td>May 5, 2019</td>
<td>Support</td>
<td>No comments.</td>
</tr>
<tr>
<td>7</td>
<td>Jeffrey Cho</td>
<td>May 6, 2019</td>
<td>Inquiry</td>
<td>&quot;Where's KONA's meeting?&quot;</td>
</tr>
<tr>
<td>8</td>
<td>Kevin O'Grady</td>
<td>May 6, 2019</td>
<td>Inquiry</td>
<td>&quot;Where is the most up to date copy of the proposed rules available online please?&quot;</td>
</tr>
<tr>
<td>9</td>
<td>Jeffrey Cho</td>
<td>May 7, 2019</td>
<td>Comment</td>
<td>&quot;So we Hawaiians in Kona have to drive 40 miles for a meeting? That's hard for us. Maybe have shuttles. How can we support our mana.[.]&quot;</td>
</tr>
<tr>
<td>10</td>
<td>Anna Graham</td>
<td>May 7, 2019</td>
<td>Comment</td>
<td>&quot;Why is any meeting not being held in the Kona District???? Kona is a huge district....&quot;</td>
</tr>
<tr>
<td>11</td>
<td>Sonny Kelly</td>
<td>May 9, 2019</td>
<td>Comment</td>
<td>&quot;You were never given permission to be the steward of the mountain...the native cultural practitioners have that responsibility so stop acting like you own the mountain and have decision-making rights, all you have done is desecrated the most sacred site against the wishes of the true guardians!&quot;</td>
</tr>
</tbody>
</table>
| 12  | Kiope Raymond        | May 20, 2019 | Oppose            | "The ban on gathering plants...possession of tools...(20-26-22a), access...after sunset (20-26-2 and 20-26-38) and chanting/singing/playing music...(20-26-34)...denying rights to practice as personally appropriate...[b]anning artificial illumination...[and] cell phones not kept in airplane mode...putting the public's safety at
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<td>risk...[and] broad sweeping powers given to the University President and/or his designee...[being] unacceptable.&quot;</td>
</tr>
<tr>
<td>13</td>
<td>Kathleen McDuff</td>
<td>May 20, 2019</td>
<td>Comment</td>
<td>Concerned about mismanagement, rules, revised rules, no proactive environmental protections, UH President's broad discretion and no exemptions for Native Hawaiian traditional and customary practices from rules but for UH and observatory staff.</td>
</tr>
<tr>
<td>14</td>
<td>Jeanyee Teanio-Plaza</td>
<td>May 20, 2019</td>
<td>Oppose</td>
<td>&quot;I am very disappointed in the effort to continue to build the 30 meter telescope atop Mauna Kea.&quot;</td>
</tr>
<tr>
<td>15</td>
<td>Ravi Grover</td>
<td>May 21, 2019</td>
<td>Oppose</td>
<td>&quot;The ban on gathering plants...possession of tools...(20-26-22a), access...after sunset (20-26-2 and 20-26-38) and chanting/singing/playing music...(20-26-34)...denying rights to practice as personally appropriate...[b]anning artificial illumination...[and] cell phones not kept in airplane mode...putting the public's safety at risk...[and] broad sweeping powers given to the University President and/or his designee...[being] unacceptable.&quot;</td>
</tr>
<tr>
<td>16</td>
<td>William Golove</td>
<td>May 30, 2019</td>
<td>Oppose</td>
<td>No comments.</td>
</tr>
<tr>
<td>17</td>
<td>Leimomi Wheeler</td>
<td>May 30, 2019</td>
<td>Oppose</td>
<td>No comments.</td>
</tr>
<tr>
<td>19</td>
<td>Kevin Landers</td>
<td>May 30, 2019</td>
<td>Comment</td>
<td>&quot;Not one person testified in favor of the proposed rules in September 2018. The current draft remains unchanged in critical ways...[t]he University does not need to take the path of most resistance.&quot;</td>
</tr>
</tbody>
</table>
| 20  | Ambrose Kastlides      | May 30, 2019 | Oppose            | Concerned that rules drafted in Fall 2018 
"[were] incredulous and not a single person testified for them...[t]he new rules suggested, had very few things changed, and the most important problems are still present...[and] [t]hese rules would allow UH to completely stop protests, and accelerate the attempts to build the TMT." |
<p>| 22  | Rocky Ishibashi       | May 31, 2019 | Comment           | &quot;Audits of uh management of Mauna Kea was supposed to be created ten years ago to protect the Mauna...[i]t is to late...[y]ou failed to follow the audit requirements...[b]ottom line is the Mauna needs protection from U H themselves.&quot; |</p>
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<tr>
<td>23</td>
<td>Rocky Ishibashi</td>
<td>May 31, 2019</td>
<td>Oppose</td>
<td>&quot;I am against the latest rules created by UH...No to no cell phones, flash lights, tools, camping gear. Big No to Gates and fencing!&quot;</td>
</tr>
<tr>
<td>24</td>
<td>Dea Rackley</td>
<td>May 31, 2019</td>
<td>Oppose</td>
<td>&quot;I am against the latest rules created by UH...No to no cell phones, flash lights, tools, camping gear. Big No to Gates and fencing!&quot;</td>
</tr>
<tr>
<td>25</td>
<td>Rocky Kalani</td>
<td>May 31, 2019</td>
<td>Oppose</td>
<td>&quot;I am against any foreign country creating rules in the kingdom of Hawai‘i. All that ignore this fact and create these rules will be committing a war crime punishable by kingdom officials. No one should be going up to the Wao akua.&quot;</td>
</tr>
<tr>
<td>26</td>
<td>Dea Rose</td>
<td>May 31, 2019</td>
<td>Oppose</td>
<td>&quot;I am against the latest rules created by UH...No to no cell phones, flash lights, tools, camping gear. Big No to Gate and fencing!&quot;</td>
</tr>
<tr>
<td>27</td>
<td>Sarah Hamid</td>
<td>Jun 1, 2019</td>
<td>Oppose</td>
<td>“[T]he rules clearly seek to prohibit Native Hawaiian cultural practices, protocol, ceremonies, and activities through criminalization.”</td>
</tr>
<tr>
<td>28</td>
<td>Leonardo Linsky</td>
<td>Jun 2, 2019</td>
<td>Oppose</td>
<td>No Comments.</td>
</tr>
</tbody>
</table>
| 29  | Ivy McIntosh       | Jun 2, 2019   | Oppose            | • "We would like to express our extreme concern that these proposed rules appear to be partially designed to be punitive to individuals who may be expressing their concerns about future development on Mauna Kea. Ensuring that customary and traditional rights and religious practices of Kanaka Maoli are protected should be your highest priority. We would like to urge you to consider setting aside the adoption of any administrative rules in favor of moving forward in discussions with the native Hawaiian community.”  
• Provides additional comments on sections related to authority, implementation, exemptions for native Hawaiian and locals from fees and parking, delegation to president, and several other sections. |
<p>| 30  | Rama McIntosh      | Jun 2, 2019   | Comment           | Duplicate testimony. See No. 29.                                                                                                                                                                                                                                                                                                                |
| 31  | Don Cooke          | Jun 2, 2019   | Comment           | &quot;[A]s a visitor to the mountain top in the 1980's I was appalled by the amount of trash that UH was responsible for. Over use of offroad vehicles was also out of control. I                                                                                                                                                                      |</p>
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<tr>
<td>32</td>
<td>Kevin O'Grady</td>
<td>Jun 2, 2019</td>
<td>Inquiry</td>
<td>&quot;Please send a pdf of the most recent version.&quot;</td>
</tr>
<tr>
<td>34</td>
<td>Theodora Akau Gaspar</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>&quot;Unless and until the laws of occupation are applied you have no jurisdiction under international and Hawaiian Kingdom law.&quot;</td>
</tr>
<tr>
<td>35</td>
<td>Theodora Akau Gaspar</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>Duplicate testimony. See No. 34.</td>
</tr>
<tr>
<td>37</td>
<td>Norman Gaspar</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>Duplicate testimony. See No. 34.</td>
</tr>
<tr>
<td>52</td>
<td>Kris Bordessa</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>&quot;These proposed rules appear to criminalize customary and traditional practices of Native Hawaiians; practices that should not be criminalized.&quot;</td>
</tr>
<tr>
<td>57</td>
<td>Katherine Bell</td>
<td>Jun 3, 2019</td>
<td>Comment</td>
<td>&quot;The University of Hawaii and their corporate cohort are occupying our island, and exploiting the 'aina for their own offshore profit.&quot;</td>
</tr>
<tr>
<td>58</td>
<td>Chris McCullough</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the administrative rules because they infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious practices and the constitutional rights for those who wish to access Mauna Kea to engage in free speech.&quot;</td>
</tr>
<tr>
<td>59</td>
<td>Jane Au</td>
<td>Jun 3, 2019</td>
<td>Comment</td>
<td>&quot;If UH wants to properly manage this resource, they should not continue construction of any kind on the mauna.&quot;</td>
</tr>
<tr>
<td>64</td>
<td>Allison Welters</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>&quot;...DO NOT impose your restrictions on access by public, ban on photography, hiking, snow play, and permits for all kinds of things now possible without permits.&quot;</td>
</tr>
<tr>
<td>66</td>
<td>Gauhar Nguyen</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>&quot;Even though UH has attempted to remedy audit findings, all remedial actions were retroactive, taken after the UH already inflicted irreversible harm on its students and faculty and misused its resources and tax payers’ money.&quot;</td>
</tr>
<tr>
<td>68</td>
<td>Pono Kealoha</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>&quot;No Treaty Of Annexation No Jurisdiction in Our Recognizes Sovereign Kingdom Nation State since 1843.&quot;</td>
</tr>
<tr>
<td>73</td>
<td>Nanea Lo</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>Various comments on specific sections including:</td>
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<td>No.</td>
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<td>§20-26-23, “Native Hawaiians have a right to be up there and use their phones if they want to.”</td>
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<td>§20-26-24, “digging and the defining of waste needs to be clearly stated, because debris could be considered in colonial concepts as an altar or lei that was made for the gods that frequent that space.”</td>
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<td>§20-26-25, “It's cold up there, us kia‘i and native Hawaiians should be able to make fire up there if we want to.”</td>
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<td></td>
<td>§20-26-27, “utilization of knifes, scissors, adze, cultural objects should be enabled for us [native Hawaiians] to use without restrictions.”</td>
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<td>§20-26-28, “We should be able to use our vehicles to visit Mauna Kea for traditional rights and practices and for the kia‘i.”</td>
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<td>§20-26-33 re Audio devices and noise, “this should be allowed for kia‘i, practitioners, and native Hawaiians.”</td>
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<td>§20-26-34 re Public safety, “This should be better defined and be in agreeable with community members and edited with them.”</td>
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<td>§20-26-35 re Use of drugs or alcohol, “ʻAwa should be permitted”</td>
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<td></td>
<td>§20-26-37, “Camping should be allowed for kia‘i, community members, practitioners, and native Hawaiians.”</td>
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<td></td>
<td>§20-26-38, “Access should be provided to all native Hawaiians, practitioners, and kia‘i of the mauna this needs to be revised with the community members.”</td>
</tr>
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<td>§20-26-40, “This needs to be revised because some native Hawaiians have ancestral lineage to this place and should be able to bury or scatter the remains of their loved ones in the spaces that they chose. It is their right. This needs to be revised with the community.”</td>
</tr>
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| 74  | Jillian Marohnic    | Jun 3, 2019 | Oppose            | “§20-26-41, “This needs to be extremely revised with the community and I do not believe that police force needs to be involved.”  
§20-26-63, “Permits and fees should be waved to all native Hawaiians, kia’i, and practitioners.”  
§20-26-67, “Native Hawaiians, practitioners, community members and kia’i should be able to have a lifelong permits and this should be revised with them as well.”  
§20-26-73, re violations and penalties, “This shouldn't have any hold on students of the UH system, native Hawaiians, and kia’i.”  
§20-26-76, re enforcement, “This needs to be revised and a better payment plan and system needs to be put into place. Some people don't have the funds to pay all up front and native Hawaiians, students, community members, and kia’i shouldn't be fined anyways.” “All the fines need to be lessened and based upon income.” |
| 82  | Kaylene Kauwila Sheldon | Jun 3, 2019 | Oppose            | “I oppose the draft and I would like to address or question the drafters. Where does the power and control lie? Not with the people obviously. The Governor of Hawaii has no genealogical ties to Mauna A Wakea.”  
“State of Hawaii, UH and any research corporations should pay not only an entrance fee for parking but they should pay back rent to every Native Hawaiian.” |

"...Mauna Kea Ice Age Reserve, which is a public nature reserve and not under the jurisdiction of UH, is cut off from the public by way of 'UH Management Corridor'...Mauna Kea belongs to the people of Hawai‘i -- all th people -- the people who paid for the access road to be built and who contribute over $500,000 per year to maintain it..."
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<tr>
<td>83</td>
<td>Kaylene Kauwila</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>Duplicate testimony. See No. 82.</td>
</tr>
</tbody>
</table>
| 86  | Nicole Doner        | Jun 3, 2019| Oppose            | - “[O]pposition to part of the proposed rules, specifically related to bicycling on the Mauna Kea Access Road.”  
- “I am a strong supporter of the plans for the T.M.T.”  
- “[L]anguage regarding bicycles be changed so that all that is required is a registration or “signing in & signing out”. The purpose of this would simply be to allow Mauna Kea personnel to be aware of who was on the access road so that for safety purposes they could keep track of bicyclists as they access and leave the higher elevations.”  
- “[F]irst time fine of $50 to $400. This is way out of proportion to the alleged offense involved.” |
| 90  | Nedi McNight        | Jun 3, 2019| Comment           | "The University doesn’t have the jurisdiction to create administrative rules for Kingdom lands in conservation."                                                                                                                                                                                                                                           |
| 97  | Natalie Santiago    | Jun 3, 2019| Oppose            | "Please be aware that UH has no jurisdiction whatsoever and should not be making any rules to regulate Mauna Kea!"                                                                                                                                                                                                                                           |

Cultural practitioners should not have to pay a fee.”  
- “I am unclear if a permit will be issued to practitioners”  
- “There needs to be the necessary tools for these sacred practices. My grandchild's piko will need to go through this ritual like our ancestors before and bringing our tools is an important and necessary aspect of this traditional practice.”  
- “no cell phones or flashlights leaving tourists to get lost or hurt.”  
- “The caretakers of the mauna should not need to check in.”  
- “Commercial activity-Mauna Kea is where the gods dwell. To have lots of tourists and activity there would be inappropriate.”
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</table>
| 100 | Noe Goodyear-Kaopua   | Jun 3, 2019 | Comment          | • “I am glad to see some of the changes that have been made since the last draft, I ask for further revisions and stipulations”  
• “I am happy to see that language (in §20-26-3-f) assuring the rules are administered in a way that does not abridge the traditional and customary rights of Native Hawaiians under Article XII, section 7 of the Hawai‘i State Constitution”  
• “[P]eople should not be fined for assembling on public lands”  
• “Why don’t groups who intend to visit the mauna simply fill out an online form that goes to OMKM? In addition, there should also be a distinct process of notification, NOT requesting permission, for Kanaka Maoli (Native Hawaiian cultural) practitioners.”  
• “[C]entralization of this much authority to determine access and usage of Mauna a Wākea is deeply troubling”  
  o “UH president is not intended to be a land manager”  
  o How will the president be able to manage both Mauna Kea and the University system?  
  o Conflict if president “make[s] decisions about academic and personnel issues related to kia‘i who have asserted rights to access the Mauna.”  
  o “[G]overning Mauna a Wākea should be a collective process with a structural role for Kānaka Maoli (Native Hawaiians) who have kuleana to the mauna[.]”  
  o “[S]top the TMT project and any other industrial development on the mountain, begin decommissioning existing telescopes, and let the mountain heal.” |
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</table>
| 102 | Mandy Fernandes    | Jun 3, 2019| Comment           | • "The ACLU of Hawai‘i takes no position on the Thirty Meter Telescope ("TMT") on Mauna Kea.”  
• "[T]he proposed rules as they may infringe upon the constitutional rights of individuals seeking to access Mauna Kea for traditional, customary, and religious practices, and the constitutional rights of those who wish to access Mauna Kea to engage in speech around the building of TMT.”  
• "[C]oncerns about the potential for unequal enforcement of the rules and the excessive fines associated with violations.”  
• “UH should clarify that the rules do not regulate or govern access to Mauna Kea for traditional and customary practices.”  
• “There is no legitimate interest served in requiring such a small group to give over two weeks’ advance notice of their intent to enter the relevant areas.”  
• Requiring “ten members or more to obtain insurance and to indemnify UH against liability before registering with UH, in violation of the First Amendment of the U.S. Constitution when applied to those engaged in political speech or other expressive activity.”  
• “Under the proposed rules, excessive fines would be levied against individuals found in violation of what are essentially minor offenses to the public order.”  
• “[A] total ban from entering the area—especially in light of the cultural significance of the land—is cruel and disproportionately punitive.”  
• Concerned about giving a verbal warning before issuing a citation.  
• Seven day appeal period “should be extended to guarantee a meaningful right to appeal citations issued under this chapter.” |
<p>| 103 | Candace Fujikane   | Jun 3, 2019| Comment           | • Self-identified as an English professor at UH.                                                                                                               |</p>
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<th>Summary of Testimony</th>
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<tbody>
<tr>
<td>115</td>
<td>Douglas Vincent</td>
<td>Jun 3, 2019</td>
<td>Support</td>
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</tbody>
</table>
  - "I am proud of the quality of research produced by our faculty and our students, but I cannot say the same for the university’s management of Mauna a Wākea...two main points...1) As KAHEA: The Hawaiian-Environmental Alliance has pointed out...§20-26-21 Preservation of resources...How can these rules be proposed in good faith when the University itself is leading the charge to do these very things to Mauna a Wākea in constructing the TMT?...§20-26-3 Applicability and implementation...[t]he only way that the University can propose these rules in good conscience is if they themselves follow their own rules and stop the construction of the TMT. 2) My second point concerns the delegation of authority to the UH president...[m]y concern is that the UH president has not been a neutral party in the struggle against the TMT...[a]lthough the rules state that Native Hawaiian traditional and customary rights shall not be abridged, the rules appear to grant the UH president the power to prohibit these practices if he determines that they have an impact, no matter how much worse the impact is of existing telescopes."  
  - Self-identified as retired University of Hawai‘i at Manoa professor.  
  - "[S]urprised at the large number of private, non-four wheel drive rental cars on the summit. This must not be permitted to continue. On the other hand, the small group tours provided by Hawaii Forest & Trail should be encouraged." |
<p>| 117  | Sherry Pollack      | Jun 3, 2019 | Oppose   | &quot;UH does not have jurisdiction or any authority to manage the religious and a sacred cultural practices of the Kanaka Maoli people.&quot; |</p>
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<tr>
<th>No.</th>
<th>Name</th>
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<th>Position on Rules</th>
<th>Summary of Testimony</th>
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<tbody>
<tr>
<td>118</td>
<td>Debbie Ward</td>
<td>Jun 3, 2019</td>
<td>Comment</td>
<td>&quot;The Board of Land and Natural Resources approved the University of Hawaii's Comprehensive Management Plan (CMP) with a Public Access Sub-Plan... The second draft of the proposed administrative rules does not provide for the discretion outlined in the PAP, it does not provide for education or situational control, but amplifies the potential “violation” to the level of punitive fines, arbitrary exclusion, and immediate expulsion of members of the public from the UH Management Areas. 20-26-3: Applicability... We note that the rules as proposed would apply solely to the public and commercial tours, while they explicitly exclude any activities conducted by the University, its students, or its agents... 20-26-4 Consistency with other rules: Native Hawaiian practitioners have constitutional protections, yet these are not cited in this section... 20-26-21 Preservation of resources: all entities, including University agents, should be mandated to protect resources... 20-26-23 Preservation of scientific resources: the use of cell phones is allowed by University agents; why should the public be prohibited? How would the use of the cell phone in airplane mode be useful for emergencies? 20-26-30 Hazardous materials: The University and its agents should be held to this standard! 20-26-38 Access:... The University has a non-exclusive easement to use the roadway of the State of Hawaii. Restricting access at the discretion of the president for a broad range of purposes listed could impact the public use and enjoyment... 2-26-52 Selling: Sale of goods of any nature is prohibited within the UH management areas... 20-26-61 General provisions: (f) Agents of DLNR should not need to consult with the president to enter or conduct inspections of compliance on Conservation District land. DLNR has the final say on land use, not UH. 20-26-65 Commercial activity... It is heartening to know that a study is being conducted...&quot;</td>
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<tr>
<td>121</td>
<td>Frederick Trenchard</td>
<td>Jun 4, 2019</td>
<td>Comment</td>
<td>“The University is at risk insofar as the power of the local narrative coupled with the pervasive local bias prevents actual factual legal review of the facts of the situation. Without seeming to promote a conclusion, it is reasonable to state that it is going to take expert legal counsel in federal Indian policy and law to draft workable and enforceable regulations that are not inherently toxic due to contamination by the institutionalized biases constituting management of the situation. The drafters of these regulations is ignorant of recent changes in local federal court and in Washington, DC at the Department of the Interior connected to the supremacy of federal law over local lore and local politics.”</td>
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| 124 | Joan Heller       | Jun 4, 2019 | Comment           | “It is understandable that the university’s board members still do not hear the
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<tr>
<td>125</td>
<td>Cynthia Franklin</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>kanaka's voice. Since, you are foreigners culturally (raised and schooled in the European-style institutions) who think your policy making rules may dominate all people.&quot;</td>
</tr>
<tr>
<td>127</td>
<td>Emalani Case</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;While I acknowledge that there have been some positive changes made since the last proposed draft, I remain wholly opposed to any set of rules that exempts the very entity that continues to pose the most risk and harm to Mauna Kea...§ 20-26-3 indicates that the University of Hawaiʻi will not be held responsible for breaking any of the administrative rules that they themselves are proposing...[t]his statement gives the university permission to damage, destroy, and disrespect the environment and the sanctity of Mauna Kea so long as their activities can be passed off as educational or for research purposes...I cannot stress enough that the proposal of these rules must be read in conjunction with (and not separate from) the construction of the Thirty Meter Telescope (TMT)...I cannot and certainly will not support any rules that do not hold all entities to the same standard of behavior and respect for Mauna Kea.&quot;</td>
</tr>
<tr>
<td>128</td>
<td>Meleana Smith</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;I OPPOSE! Making laws to fit the rules of the oppressor, does not make these 'rules' moral.&quot;</td>
</tr>
<tr>
<td>129</td>
<td>Ronald Fujiyoshi</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;As a Christian pastor of the United Church of Christ, I cannot believe that the State of Hawaii, or even the University of Hawaiʻi, would dare make rules that regulate the practice of our members.&quot;</td>
</tr>
<tr>
<td>130</td>
<td>Ann Wright</td>
<td>Jun 4, 2019</td>
<td>Comment</td>
<td>&quot;I am writing to urge that the University of Hawaii NOT be exempt from the new rules that are proposed for Mauna Kea particularly those rules that prohibit removing, damaging or disturbing paleontological, historical and prehistorical...&quot;</td>
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<td>No.</td>
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<td>remains...urge that the Constitutional free speech rights of naïve Hawaiian cultural and religious practitioners be respected and the large fines ranging from $2,500 to $10,000 for violations of the new rules be reduced if not eliminated entirely.&quot;</td>
</tr>
<tr>
<td>131</td>
<td>Joan Lander</td>
<td>Jun 4, 2019</td>
<td>Comment</td>
<td>&quot;I believe the proposed rules are too extreme in prohibiting cultural activity and public use of Mauna Kea...[t]he fines are too punitive...[t]he proposed rules give those who have no authority over Hawaiian Kingdom lands the power to arbitrarily restrict access to Mauna Kea.&quot;</td>
</tr>
<tr>
<td>132</td>
<td>Kawika Aipa</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>Self-identified Native Hawaiian. &quot;I cannot and certainly will not support any rules that do not hold all entities to the same standard of behavior and respect for Mauna Kea.&quot;</td>
</tr>
</tbody>
</table>
| 133  | Jennifer Kuret-Nadeau | Jun 4, 2019 | Oppose           | • Self-identified as "a subject of the Hawaiian Kingdom, Native Hawaiian and honor student in good standing at the University of Hawai’i in Manoa."
• “take note that there are numerous other sections that are in direct conflict with Native Hawaiian Access, Gathering Rights, Observances, Ceremony and Protocol. You may start the revision process by making the recognition of Native Hawaiians—as the priority.” |
<p>| 134  | R. Malia Nakamura     | Jun 4, 2019 | Comment          | &quot;I am submitting this to the UH Board of Regents as I believe strongly that these set of proposed rules do not provide for the proper use, management, and protection of cultural and natural resources that are under UH managed areas...I realize that money and science is the force behind this however, establishing these set rules is not the answer nor is it the way we should move forward.&quot; |
| 135  | Luella Nohea Crutcher | Jun 4, 2019 | Comment          | &quot;Your Rules state ‘Native Hawai’ian traditional and customary rights as recognized and protected under article XII, section 7, of the Hawai’i State Constitution shall not be abridged.’ Yet this WHOLE Administrative Rules TOTALLY ABRIDGED our rights.&quot;                                                                                     |</p>
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<tr>
<td>141</td>
<td>Charmaine Bugado</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;My testimony is in OPPOSITION of any rules put out by the UH for public behavior while on Mauna Kea...[m]y first reason is that as evidenced by the UN memo issued by A. deZayas in 02/2018 to the State of Hawaii Judiciary and in his end of the year report in 12/2018 the State of Hawaii and therefore UH is situated within the metes and bounds of the Hawaiian Islands government...[m]y second reason is that I noticed that the ACLU Hawaii has concerns &quot;with the informal draft proposed rules as they may infringe upon the constitutional rights of individuals seeking to access Mauna Kea for traditional, customary, and religious practices, and the constitutional rights of those who wish to access Mauna Kea to engage in speech around the building of TMT...[a]nd the third reason is that, Indigenous Religious Traditions of Colorado College states that...[and] [f]inally, the UH does not own Mauna Kea and a lease to operate there does not authorize the UH to manipulate visitor behavior while both are present.&quot;</td>
</tr>
<tr>
<td>142</td>
<td>Asialynn Yap</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;These proposed administrative rules are directly targeted towards the protectors of the Mountain. It is unfair and unjust. This is blatant example of the abuse of power fueled by dirty money. I deeply oppose this act.&quot;</td>
</tr>
<tr>
<td>144</td>
<td>Ida Perez</td>
<td>Jun 4, 2019</td>
<td>Comment</td>
<td>&quot;There already rules and regulations placed on the mountain, Kanaka Maoli should never be banned from visiting Mauna Awakea, we should all have access to the mauna whenever we need to go up there to pule and visit our ancestor, it is not right to keep us away from our religious rights.&quot;</td>
</tr>
<tr>
<td>145</td>
<td>Daniel Wassman</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;Stop looking into space for the answers, the problem is under your feet take care of this planet first.&quot;</td>
</tr>
<tr>
<td>148</td>
<td>Stuart Barrington</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;Access to Mauna Kea and the surrounding area should be allowed to and provided to the public as was originally acknowledged when the access road was constructed.&quot;</td>
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<td>No.</td>
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<td>150</td>
<td>Brice Conquest</td>
<td>Jun 4, 2019</td>
<td>Support</td>
<td>&quot;I support the new rules, especially the regulation of commercial activities.&quot;</td>
</tr>
<tr>
<td>151</td>
<td>Brice Conquest</td>
<td>Jun 4, 2019</td>
<td>Support</td>
<td>&quot;I support the new rules, especially the regulation of commercial activities.&quot;</td>
</tr>
<tr>
<td>152</td>
<td>Michael Konowicz</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;I believe existing laws that already exist in Hawaii, such as those for transportation, fire safety, accessibility, and more, already provide sufficient structure and protection for Mauna Kea...[w]hether you're a resident of the Island, a foreign visitor, or a Native Practitioner, you should have reasonable access to the land under the current rules and regulations of the island.&quot;</td>
</tr>
<tr>
<td>153</td>
<td>Serafina Gajate</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the proposed rules for Mauna Kea, as they are clearly designed to give a free pass to university and astronomy personnel, while simultaneously criminalizing cultural practitioners, and any who disagree with how the Mauna is being managed and express their views publicly...&quot;</td>
</tr>
<tr>
<td>154</td>
<td>Robert Kajiwara</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;The Peace For Okinawa Coalition is writing to inform you that we strongly condemn the University of Hawaii’s construction of the Thirty Meter Telescope (TMT) on Mauna Kea...[a]dditionally, the TMT would have little-to-no benefit for the local people of Hawaii, and would primarily benefit those from elsewhere. Your decision to support malihini over kamaʻaina is a great disservice to all of the local people of Hawaii...I am calling for your immediate resignation, and am asking the University to install a Hawaiian president who truly understands Hawaii. I pledge to withhold all alumni donations from the University of Hawaii until the plans to build the TMT on Mauna Kea are permanently abandoned and you are removed from the University of Hawaii system.&quot;</td>
</tr>
<tr>
<td>155</td>
<td>Darilayne Aiwohi</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;stop the construction of TMT. It’s a shame that we the kanaka maoli of this ‘AINA have to continuously fight for the love our ‘AINA.&quot;</td>
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<td>Name</td>
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<tr>
<td>156</td>
<td>Lewis Donovan</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>&quot;DON'T BLOCK THIS AWESOME PLACE FROM CYCLISTS BECAUSE OF A STUPID UNIVERSITY!!!!&quot;</td>
</tr>
<tr>
<td>157</td>
<td>John Kahawaii</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;Mauna Kea should No longer be a target for war and military practices. Please discard administrative rules,&quot;</td>
</tr>
<tr>
<td>159</td>
<td>Zach Street</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;The University of Hawaiʻi claims these draft rules are intended to protect Mauna Kea, but the timing and language of these rules reveal the true intent: to protect the University's ability to construct the Thirty Meter Telescope (TMT) instead of protecting the ecological, historical, and cultural resources of the mountain.&quot;</td>
</tr>
<tr>
<td>160</td>
<td>Caleb Barville</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;...Mauna Kea Ice Age Reserve, which is a public nature reserve and not under the jurisdiction of UH, is cut off from the public by way of 'UH Management Corridor'...Mauna Kea belongs to the people of Hawaiʻi -- all th people -- the people who paid for the access road to be built and who contribute over $500,000 per year to maintain it...&quot;</td>
</tr>
<tr>
<td>161</td>
<td>Donna &quot;Davina&quot; Dufault</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;These proposed rules appear to criminalize customary and traditional practices of Native Hawaiians...[n]o one should be exposed to potential criminal liability for engaging in routine activities, practices or ceremonies.&quot;</td>
</tr>
<tr>
<td>162</td>
<td>Suzi Paterson</td>
<td>Jun 5, 2019</td>
<td>Support</td>
<td>No comments.</td>
</tr>
<tr>
<td>163</td>
<td>Jennifer Mitchell</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the administrative rules because they infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious rights for those who wish to access Mauna Kea to engage in free speech.&quot;</td>
</tr>
<tr>
<td>164</td>
<td>Elsie Imu</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the administrative rules Chspter 20-26 Public and Commercial Activity on Mauna Kea Lands. Muna Kea is Sacred. Treat her with Respect.&quot;</td>
</tr>
<tr>
<td>165</td>
<td>Merle Pak</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>&quot;I have read the document of Rules and wholeheartedly support the Kahea response to the proposed rules...[i]n fact, the rules have been created to prevent the original caretakers of this land and mauna from...&quot;</td>
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<td>166</td>
<td>Regina Gregory</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>&quot;I think your rules need to be more specific about how Native Hawaiian traditional and customary rights shall not be abridged ... e.g. access for cultural purposes and the right to protest...[t]he University of Hawaii should live up to its goal of becoming the leading indigenous institute of higher learning instead of bending over backwards to provide access to sciences that diminish indigenous beliefs.&quot;</td>
</tr>
<tr>
<td>168</td>
<td>Georjean Adams</td>
<td>Jun 5, 2019</td>
<td>Support</td>
<td>&quot;The proposed Chapter 20 - 26 requirements are well thought out and respectful of all users and the environment of the Mauna Kea Lands area.&quot;</td>
</tr>
<tr>
<td>170</td>
<td>Geoff Shaw</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>&quot;The University of Hawaii should live up to its goal of becoming the leading indigenous institute of higher learning instead of bending over backwards to provide access to sciences that diminish indigenous beliefs.&quot;</td>
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<tr>
<td>171</td>
<td>Anthony Christie</td>
<td>Jun 5, 2019</td>
<td>Support</td>
<td>&quot;The TMT will bring scientific innovations and research to the Hawaiian Islands as well as provide a boost to the economy. The TMT should be built,&quot;</td>
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<tr>
<td>173</td>
<td>No Name (Blank)</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;The owners of Maunakea are the people and Maunakea is not owned by the Office of Maunakea Management (OMKM)...[t]he current property manager, OMKM, is not working with and for the people of Hawai‘i and they should be voted out by the people of Hawai‘i.&quot;</td>
</tr>
<tr>
<td>175</td>
<td>Andy Sheinis</td>
<td>Jun 5, 2019</td>
<td>Support</td>
<td>&quot;I believe that bicycle riding <em>on the road</em> should be fully allowed. It is a public easement and therefore there is no reason not to allow bikes up there, without special permission...I support the rule just not the requirement for permission to bike up there.&quot;</td>
</tr>
<tr>
<td>195</td>
<td>Donna Grabow</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;Governor Ige has approved sending militarized enforcements from other islands. Kanaka go up to Mauna Kea with prayer and chants...[t]here has never been a consensual treaty of annexation. therefore the prolong illegal occupation of Hawaii has is committing war crimes by arresting Hawaiians, only protecting Desecration and illegal construction of a 14th telescope.&quot;</td>
</tr>
<tr>
<td>197</td>
<td>Kaila Razonable</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the administrative rules because they infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious practices and the constitutional rights for those who wish to access Mauna Kea to engage in free speech.&quot;</td>
</tr>
<tr>
<td>206</td>
<td>Jim Albertini</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;I strongly oppose the proposed Mauna Kea Administrative Rules by the University of Hawaii 1. Rules...should be made by Kanaka Maoli cultural and spiritual practitioners...2. It was insulting that in Hilo only 1 (out of 15) UH Board of Regents attended the hearing...3. No Hearings are scheduled for Lanai, Molokai and Kauai...time restriction of 2 hrs. and only 3 min testimonies...4...UH proposed rules does it say that Mauna Kea is considered Sacred...5. The rules are thinly&quot;</td>
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disguised but quite apparent designed to block protest of TMT construction...6...if Hawaii cultural and religious practitioners were to propose rules...to regulate and control commercial, industrial, and military development...it will be done in a pono way and lead...decommissioning and removal of all telescopes...banning of all future commercial and industrial activities...7...the rules go on to abridge these very rights with prohibition...requirements for registration, proof of insurance, limits to group practice...the proposed penalties in the rules are clearly designed to intimidate people from attempting to practice their traditional, cultural and religious rights...8. In Sept. 2018 not one person testified in favor of the UH proposed rules...9. Perhaps the ultimate hypocrisy of the UH proposed rules is the blanket exemption...for UH education and research activities...10. It is clear as day that he proposed rules are tilted to prioritize science over cultural and religious practice...11. It has been repeated over and over that the UH which is the promoter of telescopes should not be the rule maker...

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<tr>
<td>207</td>
<td>Uilani Macabio</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the administrative rules because they infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious practices and the constitutional rights for those who wish to access Mauna Kea to engage in free speech.&quot;</td>
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| 208 | Eileen Cain     | Jun 5, 2019 | Oppose           | "Abuse of power is evident in the University of Hawai‘i’s proposed “rules” for Mauna Kea...racist attitudes pervade this process...the proposed rules would make the university president an autocrat, like an emperor, enabling him to act in an arbitrary and capricious manner...the University of Hawai‘i has been charged with adopting rules to regulate the observatories and university personnel, not the Native Hawaiians...If the practice of science depends upon depriving indigenous people of their rights, it is inherently
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<tr>
<td>210</td>
<td>Joshua Walawender</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>&quot;I am writing again to express my opposition to these rules. They are heavy-handed and are an over reach. My concerns are with two primary sections of the rules: [r]egarding 20-26-28 'Vehicles and transportation' (a) (8) [']Use of two-wheel drive motorized vehicles north of Halepōhaku[']...[r]egarding 20-26-38 'Access' (c) 'Closed areas, public access hours. Public access hours for the UH management areas shall be adopted as set forth in the comprehensive management plan'&quot;</td>
</tr>
<tr>
<td>211</td>
<td>Paul Atho</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;Maunakea remains an important destination for exploration and self contemplation. I don’t want to have to burn fossil fuels to get to the peak and enjoy the view. Please do not restrict access.&quot;</td>
</tr>
<tr>
<td>212</td>
<td>Bethany Bilowus</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;So i ask you, why are these rules not universal? Why are these rules targeted towards the Kiaʻi? Why do these rules affect the ability of Kanaka Maoli to perform ceremony on their sacred land? Why can you not hear that these rules are not wanted?&quot;</td>
</tr>
<tr>
<td>214</td>
<td>Tara Rojas</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>&quot;Give the Mauna back to the Native Hawaiian people, the true caregivers of their land and their culture.&quot;</td>
</tr>
<tr>
<td>215</td>
<td>Simon Radford</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;As a private individual, I strongly oppose the University of Hawaii’s proposal to restrict bicycle riding on the Maunakea access road (draft administrative rules, section 20-26-30(1); April 28, 2019). I urge the University to rescind this proposed restriction.&quot;</td>
</tr>
<tr>
<td>218</td>
<td>Patricia Kaleohano</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>No Comments.</td>
</tr>
<tr>
<td>220</td>
<td>Lisa Jaber</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>&quot;UH has already desecrated the sacred site of Mauna Kea in many ways. The fact that UH leadership continues to create more footprints on the site is disgusting. UH&quot;</td>
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<td>221</td>
<td>Andrew Cooper</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>&quot;Rules are needed. Rules that protect the land and protect the resources should be clear and enforced. The majority of the rules proposed here do just that, address possible abuse and misuse of the mauna. Rules on damaging or removing natural resources, rules on littering, rules on harassing other users, these items are exactly what should be addressed in these rules...Sections §20-26-28, §20-26-29, §20-26-30, §20-26-35, §20-26-36, §20-26-38, and §20-26-39 should be removed entirely...[t]he role of the University of Hawaii and the Office of Mauna Kea Management is to protect and preserve the lands and resources under their care, it is not to regulate public activity that does not fit their limited view of public use. As long as the activity does no harm to the land or resources on the land, as long as the activity has no significant impact on other authorized users, UH and OMKM have no business regulating it.&quot;</td>
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<td>222</td>
<td>Lillian Ah Nee</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;I write with deep regret that the testimonies submitted in September were obviously wholly dismissed; to propose otherwise is offensive, insulting, and patronizing...I strongly object to the far over-reaching powers that would be awarded to the university president by these hypocritical administrative rules...[r]ules or no rules, the construction of the TMT on Mauna Kea will become a stain on the reputation of the University of Hawai‘i.&quot;</td>
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| 223 | Mililani Trask  | Jun 6, 2019| Comment           | • “Proposed Rules Draft #2 fail to acknowledge and “accommodate” the rights of Hawaiian practitioners as required by the State Constitution and the State law (Act 132) transferring the Mauna lands to the ‘Autonomous’ University of Hawaii Science Reserve.”  
• “OMKM & BLNR continue to refuse & ignore ACT 132.” |
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<tr>
<td>224</td>
<td>Jennifer Real</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>&quot;I am writing to object to the proposed Mauna Kea rules banning bicycles above Hale Pohaku. I see the the newest proposed rules make an exception &quot;except by permit&quot; however I think that this is an unnecessarily onerous burden to place on a cyclist.&quot;</td>
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<td>225</td>
<td>Beau Bassett</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;The area of mauna Kea is sacred land and as a resident of the state of Hawaii this land is for the publics use. Closing access and or charging a fee will surely not be taken lightly in the publics eyes and I see no issues with&quot;</td>
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<td>Summary of Testimony</td>
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<td>the current way that's stood for thousands of years. So I ask that instead of closing off public access which is the worst thing possible you in fact do the opposite.&quot;</td>
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<tr>
<td>226</td>
<td>Kini Burke</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;Aloha..I oppose the .building Of TMT....UH...must Stop imposing new rules To benefit them and making Indigenous Hawaiians looking Like criminals.....&quot;</td>
</tr>
</tbody>
</table>
| 227 | Todd Marohnic         | Jun 6, 2019| Comment           | Self-identified as 30 year Big Island resident.  
"There is no reason that I can possibly conceive of why you feel the need to restrict bikes on the mountain. There is no damage, no noise, no danger to anyone by the cyclist themselves...I attended the meeting in Hilo and did not hear one person in favor of these rules. Time to drop it and stop wasting our time and taxpayer$$." |
| 228 | Lois Swisher          | Jun 6, 2019| Oppose            | "I am writing to object to the proposed Mauna Kea rules banning bicycles above Hale Pohaku. I see the the newest proposed rules make an exception "except by permit" however I think that this is an unnecessarily onerous burden to place on a cyclist." |
| 229 | Brendan McKee         | Jun 6, 2019| Comment           | "Limiting or eliminating this access is a terrible policy. If there are concerns about damage to the road then restrict the type of vehicles allowed...To have a state entity such as U of H put forth proposed rules limiting access to one of the island’s greatest treasures is terrible policy." |
| 230 | Susan Herhold         | Jun 6, 2019| Oppose            | "I do not believe that the proposed Hawai'i Administrative Rules for Mauna Kea adequately protect Native Hawaiian traditional and customary rights...The Rules as currently proposed appear to not only violate the Hawai'i Constitution but the US Constitution’s protection of freedom of speech, freedom of assembly, and freedom of religion." |
| 231 | Juhl Rayne            | Jun 6, 2019| Oppose            | "I am opposed to the proposed Administrative Rules...[t]hese proposed rules appear to criminalize customary and traditional practices of Native Hawaiians...[a]rbitrary rules for prosecuting 'made-up or pretend' offenses such as" |

28
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<tr>
<td>233</td>
<td>C. Mellor</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;I am opposed to the proposed HAR chapter 20-26 rules for Mauna Kea...I am disappointed to see drafters did not consider previous comments on the proposed rules in their revision process...[t]he current draft continues to over police and criminalize the Kia<code>i Mauna and Hawaiian cultural practitioners of Mauna Kea...[a]lthough the rules state Native Hawaiian traditional and customary rights shall not be abridged, the rules are written to prohibit customary practices if the UH president determines they do not support University goals...[t]he traditional and customary practices of Hawaiian cultural practitioners are property interests protected under Hawai</code>i law...[m]eanwhile, §20-26-3 explicitly states that the rules do NOT apply to research activities of the University of Hawaii, university personnel, observatory personnel and government workers...[i]n 2018 all testimony was in opposition to the rules and so far all 2019 testimonies have been in opposition too.&quot;</td>
</tr>
<tr>
<td>234</td>
<td>Olympia Beltran</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;Many indigenous peoples have been devastated by similar destruction...[a]side from surviving historical trauma, one of the most deeply profound unifying traits of first peoples is our collective spiritual connection with our mountains and waters.&quot;</td>
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<tr>
<td>236</td>
<td>Marya Mann</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the administrative rules because they infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious practices and the constitutional rights for those who wish to access Mauna Kea to engage in free speech.&quot;</td>
</tr>
<tr>
<td>237</td>
<td>J. Leina’ala Sleightholm</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;The purpose of these rules is to provide for the proper use, management, and...&quot;</td>
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<td>238</td>
<td>Jessa Kaleililahi</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>&quot;By the &quot;Rule of Law&quot;, I demand the proof of JURISDICTION that you so claim over these islands. The world is also watching and waiting...&quot;</td>
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<td>239</td>
<td>Pedro Perez</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose rules that do not encourage prayer and ceremonial practices at all times.&quot;</td>
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<td>240</td>
<td>Namaka DeMello</td>
<td>Jun 6, 2019</td>
<td>Oppose</td>
<td>&quot;(1) The Kingdom of Hawaii continues to exist...The Royal Order of Kamehameha I is the last viable institution of the Kingdom of Hawaii...[t]he summit of Mauna Kea is a special and sacred place...[o]nly those activates that respect shall be permitted and practiced on Mauna Kea...no further development or building of structures...[n]o new observatories and or military installations...[c]urrent observatories...must be decommissioned and removed...within a 15 year period (by 2034)...after...decommissioned and removed...area shall be restored to its pre-construction natural state...stewardship...shall be carried out by a Commission...which consist of right holders...no less than 50%...represent the Native Hawaiian community...County, State, and Federal agencies shall not be numbered amount the 50% Native Hawaiian community...Native Hawaiian community representation...shall have no less than one seat/vote on the Commission...[o]bservatories on Mauna Kea must pay a fair and reasonable rent/lease/use fee...all revenues generated...shall be shared with the...&quot;</td>
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| 241 | Jeannette Soon-Ludes | Jun 6, 2019 | Oppose            | Hawaiian community at no less than 50%...[and] 50% determination...shall not include any funds provided to OHA under law."

"There is a particularly insidious violence with rule-making because rules have the power to cast people into categories of those who abide and those who trespass. The proposed rules do precisely this, framing observatory and university personnel as abiding by and Native Hawaiian cultural practitioners as breaking the rules...[m]y statements here are not meant to imply that rules for the management of Mauna Kea are unwanted or unnecessary. Rather, it is a request to reexamine and change course." |
| 242 | Celine Kitaoka  | Jun 6, 2019 | Oppose            | "I am requesting that the University of Hawai'i revises the rules of Mauna Kea, specifically subchapter 2. These rules have the potential to adversely affect the cultural and traditional practices of the Kanaka ma'oli." |
| 243 | E. Kalani Flores | Jun 7, 2019 | Oppose            | • "These administrative rules are proposed for the lands of Ka’ohe that were designated as Government Lands of the Kingdom of Hawai'i as the result of the Mahele Act of 1848. As such, these lands are subject to the rights of the native tenants – “koe nae ke kuleana o na kanaka”. Also, Kanaka Maoli never relinquished their claims, title, and jurisdiction of these national lands to the United States, or any other entity, either through their monarchy or through a plebiscite or referendum.”
• "Several of these proposed rules have the potential to sever the intimate connection with our beloved Mauna a Wākea and to adversely impact the traditional and customary practices of Kanaka Maoli (aka Native Hawaiians)." |
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<td>• “Despite participating and providing input, the majority of comments previously submitted during the consultation process and hearings in 2018 and 2019 for the proposed rules were systematically ignored and not addressed in this process.”</td>
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<td>Testimony includes several general and specific rule changes, including the following:</td>
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<td>• “The proposed rules are in contraction to Hawai‘i Papa O Ke Ao”</td>
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<td>• “Board of Land and Natural Resources/Department of Land and Natural Resources (Lessor) needs to conduct an independent Ka Pa‘akai analysis to assess any potential impacts the proposed rules would have on customary and traditional practices.”</td>
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<td>• “how would the UH distinguish between a Native Hawaiian exercising their customary and traditional rights vs. someone from the general public who might appear to be in violation of such rules?”</td>
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<td>• “The proposed fines are overly excessive in nature.”</td>
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<td>• “Contested case proceedings were never intended for handling all types of civil violations because in many cases they are inappropriate, time consuming, and not cost effective.”</td>
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<td>• “Several of these proposed rules and the procedures for adoption are not in compliance with the Mauna Kea Comprehensive Management Plan (CMP), 2000 Mauna Kea Science Reserve Master Plan (2000 Master Plan), Act 132 as well as other statutory laws.”</td>
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<td>• “Several of these proposed rules are invalid for being overbroad and thus infringing on the constitutional rights of individuals.”</td>
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<td>244</td>
<td>E. Kalani Flores</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>Duplicate testimony. See No. 243.</td>
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<tr>
<td>245</td>
<td>Joseph Camara</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose these rules because they exempt the University of Hawaii (UH) and anyone affiliated with UH from the penalties and restrictions set forth...I oppose the proposed rules because they aim to criminalize the native Hawaiian religious, cultural practice on Mauna Kea...I oppose the proposed rules because UH and OMKM lack the authority to enact and enforce them...I also assert that as a native Hawaiian lineal descendant of Mauna Kea, I am exempt from these rules, as they are a violation and insult to my rights and customary practices. I incorporate the oral and written testimonies of Deborah Ward and Doctor Noenoe Wong Wilson as my own.&quot;</td>
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<tr>
<td>246</td>
<td>Sharron Cushman</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;I oppose the administrative rules because they infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious practices and the constitutional rights for those who wish to access Mauna Kea to engage in free speech.&quot;</td>
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<td>247</td>
<td>Sharron Cushman</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;I oppose the administrative rules because they infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious practices and the constitutional rights for those who wish to access Mauna Kea to engage in free speech.&quot;</td>
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<td>249</td>
<td>Teddy Lee</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the administrative rules because they infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious practices and the constitutional rights for those who wish to access Mauna Kea to engage in free speech.&quot;</td>
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<td>253</td>
<td>Tiana Malone Jennings</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;UH needs to be regulated on all accounts. There needs to be full transparency on where all the money goes in UH. UH is NOT authorized to take over Mauna Kea.&quot;</td>
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<tr>
<td>254</td>
<td>Gina Kray</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I am writing to object to the proposed Mauna Kea rules banning bicycles above Hale Pohaku. I see the the newest proposed rules make an exception &quot;except by permit&quot; however I think that this is an unnecessarily onerous burden to place on a cyclist...[t]here is certainly not a preponderance of bicycles on that road causing problems.&quot;</td>
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<td>255</td>
<td>Marc Scichitano</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>Offers various redlined changes, but generally:</td>
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<td>• Allows camping for “Hawaiian religious practitioner, member of a religious order or practicing Hawaiian citizen in accordance with their religious and or cultural beliefs”</td>
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<td>• “Private vehicles” should include, “All Vehicles owned and or operated by University of Hawaii staff, faculty, student or otherwise private citizen operated for university business or not.”</td>
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<td>• Rules do not apply to “Native Hawaiian Cultural Practitioners”</td>
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| 257 | Noe Paresa         | Jun 7, 2019 | Oppose            | "I am writing today in opposition to these proposed rules and to the fact that UH has zero jurisdiction on our Mauna...they [UH] confirm the proposed site for the TMT is located in a conservation zone...in this context is derived from the HI state land use Law (act 187) of 1961 which defines conservation as "the protection of watersheds and water supplies; preserving scenic areas; providing park lands, wilderness and beach reserves; conserving endemic plants, fish, and wildlife; preventing floods and soil erosion; forestry; and other"
related activities. MAUNA KEA IS THE TOP OF THE AQUIFER."

259  Chris McCullough  Jun 7, 2019  Oppose  "I strongly oppose the proposed Mauna Kea Administrative Rules by the University of Hawaii 1. Rules...should be made by Kanaka Maoli cultural and spiritual practitioners...2. It was insulting that in Hilo only 1 (out of 15) UH Board of Regents attended the hearing...3. No Hearings are scheduled for Lanai, Molokai and Kauai...time restriction of 2 hrs. and only 3 min testimonies...4...UH proposed rules does it say that Mauna Kea is considered Sacred...5. The rules are thinly disguised but quite apparent designed to block protest of TMT construction...6...if Hawaii cultural and religious practitioners were to propose rules...to regulate and control commercial, industrial, and military development...it will be done in a pono way and lead...decommissioning and removal of all telescopes...banning of all future commercial and industrial activities...7...the rules go on to abridge these very rights with prohibition...requirements for registration, proof of insurance, limits to group practice...the proposed penalties in the rules are clearly designed to intimidate people from attempting to practice their traditional, cultural and religious rights...8. In Sept. 2018 not one person testified in favor of the UH proposed rules...9. Perhaps the ultimate hypocrisy of the UH proposed rules is the blanket exemption...for UH education and research activities...10. It is clear as day that he proposed rules are tilted to prioritize science over cultural and religious practice...11. It has been repeated over and over that the UH which is the promoter of telescopes should not be the rule maker..."

260  Wilma Healani Holi  Jun 7, 2019  Comment  Enclosure of Land Court recorded document "Exhibit A" for Moi Kamehameha V Lot Kapuaiwa, Articles 21 and 22 of the 1864 Constitution of the Hawaiian Kingdom, the Ahupaa of Kaohe Hamakua.

261  Tomas Belsky  Jun 7, 2019  Comment  "None dare doubt that the HAWAIIAN religion and culture is established and
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<td>perpetuated on a Pono - that is a righteous attitude and relationship to the earth and earth - spirit... sacred Mauna Kea must be administered and regulated by the cultural practitioners of the living religion of the Hawaiian People.</td>
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<td>262</td>
<td>Jon Miyata</td>
<td>Jun 7, 2019</td>
<td>Support</td>
<td>&quot;I am in support of the proposed administrative rules... [t]he rules will establish guidelines and define permittable activities. It will make clear what is allowed and spell out the consequences for non-compliance. It will greatly assist those in-charge of managing the lands and help shape public behavior. Without rules, enforcement becomes nearly impossible, but more to the point, the public won’t know what is permitted and what is not. With a good set of rules, I believe that cultural practitioners will thrive as Mauna Kea will be better managed and cared for.&quot;</td>
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<tr>
<td>264</td>
<td>Anonymous</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;a local cyclist and even though I have yet to ride to the top of Mauna Kea, it’s a bucket list endeavor. What possible safety concerns do you see that would warrant a ban on bicycling on that road?&quot;</td>
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| 268 | Kari Robinson| Jun 7, 2019| Comment           | • “The onus should not be on religious and spiritual practitioners of Hawaiian traditions to obtain permits in order to engage in traditional and customary practices.”  
• “[T]he definition of ‘President’ has now changed to include anyone the president or the board designates as her/his representative (HAR 20-26-2). This mechanism of delegation must be more carefully and thoughtfully considered and specified considering the enormous stakes entailed[.]”  
• “[P]hone must be in airplane mode and must not interfere with the telescopes or their construction in any way.”  
• “After reading both sets of Revised Rules, I remain convinced that their primary goal is to criminalize public, |
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<td>270</td>
<td>Navid Najafi</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;The University is making a huge mistake in attempting to implement these proposed rules for Mauna Kea. The main polluter and destroyer of the natural and cultural resources of Mauna Kea has been the University of Hawaii’s commercial and research activities.&quot;</td>
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<tr>
<td>271</td>
<td>Donna Grabow</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the proposed Mauna Kea Administrative Rules by the University of Hawaii. There should be no new rules...Time for UH and the State of Hawaii to step aside. Kanaka Maoli cultural and religious practitioners should be the ones to make the rules for the Sacred Mauna.&quot;</td>
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<td>274</td>
<td>Danny Li</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the proposed UH Administrative Rules due to 3 main reasons...1. UH has been a delinquent manager of the Mauna Kea astronomical district for many decades...2. Instead of learning the hard lessons of its own mismanagement, UH has instead decided to double down on a Corporate-Authoritarian model of scientific culture and management style...3. Finally, a working premise of the UH '[scientific community' has been the perennial neglect and ignorance of kanaka maoli's knowledge and sense of nature.&quot;</td>
</tr>
<tr>
<td>275</td>
<td>Anonymous</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;a local cyclist and even though I have yet to ride to the top of Mauna Kea, it’s a bucket list endeavor. What possible safety concerns do you see that would warrant a ban on bicycling on that road?&quot;</td>
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<tr>
<td>276</td>
<td>Anonymous</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;a local cyclist and even though I have yet to ride to the top of Mauna Kea, it’s a bucket list endeavor. What possible safety concerns do you see that would warrant a ban on bicycling on that road?&quot;</td>
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<td>277</td>
<td>Morgan Olson (Morgan Auli)</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I am totally against the proposed 30 mm telescope on top of the sacred mountain here in Hawaii where I live in Kalapana...[p]lease, allow As Hawaiians access to our sacred places...&quot;</td>
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<td>No.</td>
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<td>278</td>
<td>Williamson Chang</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;The University is not a Paramilitary-Law Enforcement Agency...1. No Agreement displacing County Authority—Relationship Unclear...2. The University of Hawaii does not Possess the Police Power of the Executive Branch—Improper Assumption of Executive Police Power...The University has a certain degree of autonomy—but such is limited autonomy over its own internal affairs.&quot;</td>
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<td>279</td>
<td>Dean Taise</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;.[M]y first comment relative to the Mauna Kea issues, I have seen the emotional and often troubling developments here and there...briefly looked at the Mauna Kea Science Reserve Master Plan...I see Figure 1-2 that illustrates the &quot;Mauna Kea Science Reserve&quot; area, the &quot;Mauna Kea Ice Age Natural Area Reserve&quot; area, and location of Hale Pohaku...QUESTIONS: 1. I see that the Mauna Kea Ice Age Natural Area Reserve is separate and not a part of the Science Reserve. Therefore, is this area excluded from the subject areas of the proposed rules? 2. Is there a better aerial map that you have that delineates the areas better and more clearly?...Another thing I thought about but did not explore, is whether the U of H efforts included discussions of helping build a &quot;cultural&quot; building reflecting all the important aspects that has been described in the Master Plan.&quot;</td>
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<tr>
<td>283</td>
<td>Maxwell Young</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;The planed Mauna Kea Bike Ban is like a sloppy shit. Whoever wants to charge a bicyclist to ride up Mauna Kea is out of their minds. I object to the proposed ban.&quot;</td>
</tr>
<tr>
<td>285</td>
<td>Tiana Henderson</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;I do not support nor can I believe that the proposed rules for Mauna Kea are being drafted...[t]he proposed rules continue to overpolice the Kia‘i Mauna and Hawaiian cultural practitioners of Mauna Kea for the same behaviors and actions that observatory and University personnel and government workers are allowed to engage...[n]ot one person testified in favor of the proposed rules in September 2018.</td>
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<td>No.</td>
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<td>Summary of Testimony</td>
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<td>286</td>
<td>Shelley Muneoka</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>&quot;I want to address the ways that these proposed rules specifically target Hawaiians and exempt the very people who have caused the most negative impacts to Mauna Kea -- and have more destruction planned in pursuing the TMT...[t]he requirement of having groups of 10 or more acquire a permit 15 days ahead of gathering at the mauna is unreasonable...[w]hile there is a section in these rules included that vows that Hawaiian traditional and customary practices (TCP) will not be “abridged” the rub is in how one defines TCP...[w]hat happens when someone is regulated in a sacred/spiritual place?...[t]hese rules were supposed to be created to protect the mauna from damage to the unique cultural and natural resources that exist there...[a]t hearings for the previous draft rules, not one person testified in favor and yet, the current draft remains unchanged in critical ways. Unfortunately, I'm not hopeful you'll take these comments seriously, scrap the process, do what we're asking, which is have meaningful conversation with the people affected most by these rules. So, I guess, we'll see you on the Mauna.&quot;</td>
</tr>
<tr>
<td>287</td>
<td>Kaori-Lei Hanohano</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I write this testimony opposing the adoption of chapter 20-26 Hawaii Administrative Rules...[t]hese rules are created for who? When will these rules be applied to the University of Hawaii? When will the Hawaiian people be able to make rules for the management team? A new rule should be adopted as soon as possible the board of regents should have at least 3 Hawaiian regents that are pro-Hawaiian! &quot;</td>
</tr>
<tr>
<td>289</td>
<td>Mia Akau-LaClair</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I am providing testimony in opposition to the proposed rules AGAIN for the following foremost reason...[r]esearch and education activities are still excluded from these rules which means that any activity including new construction can continue to desecrate, damage, and pollute our ‘āina on the mauna</td>
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<td>No.</td>
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<td>290</td>
<td>Kisha Borja-Quichocho-Calvo</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;CHamoru from the island of Guåhan in the Mariana Islands, I stand in solidarity with the many Kānaka Maoli of Hawai‘i Nei who stand in opposition toward the construction of the thirty meter telescope (TMT) on Mauna Kea on Hawai‘i Island...In terms of the Hawai‘i Administrative Rules more specifically, there are a few areas of concern that I would like to raise...[t]he president of the University of Hawai‘i system should not have the sole authority to make decisions...[a]s the UH management areas are within state government lands, Kānaka Maoli and their allies should be able to access designated UH management areas for cultural purposes and even for peaceful demonstrations, without suffering any negative repercussions (such as fines or arrests)...[s]pecific types of permits identified in the Hawai‘i Administrative Rules include: “Research activities”; “special use”; “commercial tour activity”; and “commercial film and recording”...Hawai‘i Administrative Rules and leaders...fail to acknowledge and respect the significance of Mauna Kea to the Native people of these islands.&quot;</td>
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<td>292</td>
<td>Anela Akau-LaClair</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>Self-identified as a 13 year old 9th grader at Kamehameha Schools Hawaii - Keeau campus. &quot;The administrative rules tell me that everyone except research and education activities are prohibited from...&quot;</td>
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<td>293</td>
<td>Jules Martin</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;You have no jurisdiction to impose these rules on the public and especially Kanaka Maoli. These rules should be imposed on the University of Hawaii’s commercial and research activities. They are the contributors of polluting and destroying the sacred Mauna Kea. I oppose the construction of the TMT and the University’s proposed rules for Mauna Kea! We see the truth. The world is watching.&quot;</td>
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<tr>
<td>294</td>
<td>Kimberly Corbin</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I oppose the construction of the TMT and as a student and faculty member, I strongly oppose the University’s proposed rules for Mauna Kea!&quot;</td>
</tr>
<tr>
<td>295</td>
<td>Aubrey Matsuura</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I strongly and completely oppose the building and construction of the TMT, the proposed rules, the continued oppression upon us...this testimony and the testimonies shared for years are falling upon dead ears.&quot;</td>
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<tr>
<td>296</td>
<td>Papaikanī'au Kai'anui</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I am in strong opposition of the Public and Commercial Activity rule revisions on Mauna Kea. One of the main issues that I have with these rules is that it gratefully and continuously disrespects and desecrates a place of worship and a place of cultural practice...the impact of this structure will last for generations and for decades and will affect the water, the soil and the entire environment forever. I will continue to oppose TMT...&quot;</td>
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</table>
| 297  | Allison Shiozaki            | Jun 7, 2019  | Oppose            | "I write to you now on occupied Ohlone lands in the Bay Area. I write to you now, very disturbed by UH and the lack of respect for Kanaka Maoli people, for the land, the water, the air and all the living beings effected by these proposed rules so called about safety and protocol...the Kanaka
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<td></td>
<td>Mary Begier</td>
<td>Jun 7, 2019</td>
<td>Support</td>
<td>&quot;The idea that this version of the rules is only to address the construction of one specific building project may seem that way to some but I ask that it be viewed as a sign of the UH System/OMKM having learned from past mistakes...[t]he mountain needs to be a safe place to worship, work and play. I don't see that we are restricting any specific group or ethnicity but we all have to pay closer attention to our land stewardship than maybe we have in the past. Please move this Rules process to the next step in a most expeditious way.&quot;</td>
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<tr>
<td>299</td>
<td>Mary Begier</td>
<td>Jun 7, 2019</td>
<td>Support</td>
<td>&quot;I am in support of thoughtful management of Mauna Kea and her resources. It seems to me that we need to respect the natural resources, the numerous historical properties with the UH managed lands...[m]y understanding of the updated rules is not that anyone group is being discriminated against but we all are being asked to be more responsible than maybe we have had to be in the past.&quot;</td>
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<td>300</td>
<td>John McClung</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I am opposed to the proposed Administrative Rules...[t]hese proposed rules appear to criminalize customary and traditional practices of Native Hawaiians. In order to preserve the moral authority of our legal system you should be extremely mindful, exceptionally careful and highly AWARE before enacting any laws, regulations or Administrative rules that can cause an individual to be unfairly branded as a criminal...[t]he most critical, extensive, and immediate danger to Mauna Kea however, remains the construction of the massive TMT telescope and the priority given to astronomical development at the expense of Mauna Kea’s natural ecosystem and invaluable cultural resources.&quot;</td>
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| 302 | Pi’ikea Everett       | Jun 7, 2019| Oppose            | • “At the root of the problem is the University of Hawai’i seeking to dictate rules that will enable them to maintain total control and access of the summit by limiting and putting parameters and boundaries regarding what we can and cannot do on the mauna.”  
• “There needs to be a section of rules for astronomy personnel, UH employees, and contractors to ensure that they are being held accountable for the preservation and protection of our cultural and natural resources.”  
• “I am concerned as to what ‘activities’ and whether those ‘activities’ are targeting to family and friends who are within their constitutional rights to peacefully assemble[.]”  
• “[T]he University of Hawai’i do not have a perfect title to the lands at Mauna Kea and the surrounding lands at Pohakuloa[.]” |
| 303 | Martha E. Martin       | Jun 7, 2019| Oppose            | "I oppose the proposed Administrative Rules because they don't define the proper use, management and protection of cultural, natural and scientific resources, access to the summit, or foster co-management with the DL&NR. The permit conditions for the public are too burdensome and the fines excessively large...[n]o operational or financial audit is required, so the activities on the summit are undemocratic...Please do not approve these rules as proposed. They arbitrarily squash the rights of native practitioners, the public, and the State of Hawaii." |
| 305 | Asia Kimura           | Jun 7, 2019| Oppose            | "Both native and foreign voices alike stood together in opposition and I also stand with those who spoke tonight. I oppose to ensure the chance for my children and those who come after me to live a life that is well, for the well-being of my people and those who merely live in the Hawaiian archipelago." |
| 306 | Ruth Aloua            | Jun 7, 2019| Oppose            | "Sharing my letter in opposition to the proposed administrative rules for Mauna a
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<tr>
<td>307</td>
<td>Josephine Keliipio</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;I am opposed to the proposed Administrative Rules...[t]hese proposed rules appear to criminalize customary and traditional practices of Native Hawaiians. In order to preserve the moral authority of our legal system you should be extremely mindful, exceptionally careful and highly AWARE before enacting any laws, regulations or Administrative rules that can cause an individual to be unfairly branded as a criminal...[t]he most critical, extensive, and immediate danger to Mauna Kea however, remains the construction of the massive TMT telescope and the priority given to astronomical development at the expense of Mauna Kea’s natural ecosystem and invaluable cultural resources.&quot;</td>
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| 308  | Mark Stanway    | Jun 7, 2019 | Comment          | "Many of these rules directly hinder any effort to protest effectively...[r]equiring cultural practitioners to obtain a permit, which could be denied, withheld, or revoked, is not acceptable. I oppose the administrative rules because the rules infringe upon the constitutional rights of individuals seeking access to Mauna Kea for traditional, customary and religious practices and the constitutional rights of those who wish to access Mauna Kea to engage in free speech. These rules also reference criminal activity, without adequately and specifically defining civil versus criminal acts...[a]ccess is key to preserving the cultural significance and ongoing use for traditional practices and ceremonies. Writing rules that help you control and restrict those who choose to express their freedom of religion and
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<td>309</td>
<td>Michael Ryan (sent for Masako Ryan)</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;My impression is that these meetings are a public relations show.&quot;</td>
</tr>
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</table>
| 310 | Susan Rosier          | Jun 7, 2019  | Oppose            | • "[T]he current use on these lands does not conform to the LAW set up for it!"  
• "UH is under the Executive Branch as is the Department of Education. That branch of government has no law making power."  
• "Any rules that UH comes up with MUST go back to the legislature for approval by both houses!"  |
| 311 | Dexter Kaiama         | Jun 7, 2019  | Oppose            | The Hawaiian Kingdom is under illegal occupation.                                                                                                       |
| 312 | Dexter Kaiama         | Jun 7, 2019  | Oppose            | Duplicate testimony. See No. 310.                                                                                                                          |
| 313 | Wendy Laros           | Jun 7, 2019  | Support           | "Please accept this testimony in support of the proposed Hawaii Administrative Rules entitled "Public and Commercial Activities on Mauna Kea Lands." We believe these rules are very important in managing Mauna Kea and perpetuating this precious resource. Founded in 1968, the Kona-Kohala Chamber of Commerce exists to provide leadership and advocacy for a successful business environment in West Hawaii. With over 500 members, we work to strengthen the local economy and promote the community." |
| 316 | Bristol Dunlap        | Jun 7, 2019  | Oppose            | "This email is to confirm my opposition of any further building on mauna kea by tmt or any other institution...[p]lease just do what is right and drop the build a telescope thing and put that very same amount money (energy, life and resources) into investigating and improving upon what we have to work with right here, right now." |
| 317 | James Long            | Jun 7, 2019  | Oppose            | Self-identified as a subject of the Hawaiian Kingdom and as a Hawaiian national by birth. "Let it be clearly understood by all
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<tbody>
<tr>
<td>318</td>
<td>Elizabeth Laliberte</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>&quot;Of specific concern are passages contained in the rules pertaining to noise levels, parking, fines and preservation of property and educational and scientific resources...[c]ontained within these rules are provisions allowing authorized individuals to carry out enforcement actions. It is possible (and perhaps even likely) that some targeted enforcement activities may interfere with lawful protests, and/or lawful and sanctioned cultural practices.&quot;</td>
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V. **SUMMARIES OF WRITTEN (FORM) TESTIMONY RECEIVED BEFORE OR AFTER PUBLIC HEARINGS (until 11:59 p.m. June 7, 2019)**

This section summarizes testimony received through emails based on KAHEA, The Hawaiian-Environmental Alliance’s written testimony. An example of the form testimony is attached in Exhibit “B,” at the end of the section entitled, “Written (Form) Testimony Received Before or After Public Hearings (until 11:59 p.m. June 7, 2019).”

Six main paragraphs were provided in the form testimony, which individual testifiers could select for their written testimony:

1. We are disappointed that the drafters did not more fully consider our previous comments on the proposed rules in their revisions.
2. The proposed rules continue to overpolice the Kia’i Mauna and Hawaiian cultural practitioners of Mauna Kea for the same behaviors and actions that observatory and University personnel and government workers are allowed to engage.

3. The reduced fine schedule does nothing to resolve concerns that regular and expected actions of Kia’i Mauna, their supporters, and Hawaiian cultural practitioners could result in thousands of dollars in fines.

4. The University’s assertion that these rules are not meant to prejudice the rights of Hawaiian cultural practitioners illustrates their ignorance of the ways cultural practices work.

5. The traditional and customary practices of Hawaiian cultural practitioners are property interests protected under Hawai’i law.


The below table identifies which paragraph, or variation thereof, was selected by each testifier. Any additional comments that individual testifiers included were summarized in the “Additional Comments” section of the table below.

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<th>No.</th>
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<tr>
<td>18</td>
<td>Joanna Pokipala</td>
<td>May 30, 2019</td>
<td>Oppose</td>
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<td>Ravi Grover</td>
<td>May 31, 2019</td>
<td>Comment</td>
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<td>&quot;Please work hand in hand with local religious leaders and groups like KAHEA to revise these rules that are beneficial for native Hawaiians, not just university officials.&quot;</td>
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<td>33</td>
<td>Lauren Muneoka</td>
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<td>MaryAnn Omerod</td>
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<td>Kelly Kraemer</td>
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<td>Anakala David &amp; Anake Jamie Kawauchi</td>
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<td>Tia Pearson</td>
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<td>Eada Webb</td>
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<td>Rosemary McCune</td>
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<td>Lehua Kaulukukui</td>
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<td>Alizon Atkins</td>
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<td>Nicole Fournier</td>
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<td>Kailani Ross</td>
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<td>NaniFay Paglinawan</td>
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<td>Ku'ulei Vickery</td>
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<td>Cristina Bacchilega</td>
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<td>Luwella Leonardi</td>
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<td>Shannon Rudolph</td>
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**Summary of “Additional Comments”**

Self-identified as 35 year Hawai’i resident.
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<td>&quot;The continued commercialization of Mauna Kea to the exclusion of Indigenous interests shows just how contemptuous those charged with ['']administering[''] Mauna Kea are to the original peoples of this (and all Hawai‘i Islands) are. Shame on you&quot;</td>
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<td>&quot;[F]ollowing critical comments...continued surveilling, policing, and incarcerating of Kanaka Maoli and our allies that would result&quot;</td>
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|     |                       |          |          |   |   |   |   |   |   | from these rules are disconcerting...[f]ailing to address the ways in which these rules police and incarcerate Kanaka Maoli and violate our consent perpetuates not only a larger structure of colonial violence but also impacts campus climate significantly."
<p>| 169 | Kealoha Pisciotta      | Jun 5, 2019 | Comment  | x | x | x | x | x | x | &quot;We ask you to consult and wait to receive the to the informed consent of the communities that care and use Mauna Kea to exercise their cultural, traditional and religious practices and who do not and have not been legitimately consulted or have give their free and informed consent to the UH or the TMT—in fact over 60,000 + people have submitted their testimony in opposition to any further development on Mauna Kea.&quot; |
| 172 | Koohan Paik-Mander     | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 174 | Sasha Grant           | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 176 | Ellen Hanaki          | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 177 | Whitney Parker        | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 178 | Travis Larsen         | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 179 | Hailey Domingo        | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 180 | Kehau Lindsey         | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 181 | Faith Chase           | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 182 | Jaycie Abe-Cameron    | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 183 | Kahealani Alapa’i     | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 184 | Keoni Thompson        | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |
| 185 | Courtney Noah         | Jun 5, 2019 | Comment  | x | x | x | x | x | x | |</p>
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<tr>
<td>188</td>
<td>Sanoe Sakata</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>189</td>
<td>Justin Barit</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>190</td>
<td>Leila Moniz</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
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<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>191</td>
<td>Kainalu Kekoa</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
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<td>192</td>
<td>Mellissa Noah</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>193</td>
<td>Monica Parker</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>194</td>
<td>Moani Mahuna</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Self-identified a Native Hawaiian, active community member and alumni graduate of the University of Hawai‘i.</td>
</tr>
<tr>
<td>196</td>
<td>Tyler Fujie</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</tr>
<tr>
<td>198</td>
<td>Kimiko LaHaela Walter</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>&quot;I stand in solidarity with the kia‘i Mauna and demand the UH rules for the management of Mauna Kea reflect the sovereign and legal rights of Kanaka Maoli to engage in cultural practices at their discretion and under purview of the law. It is unacceptable that the University's telescope operations trump the rights of the people indigenous to this land to practice their culture, a statutory right protected under Hawai‘i State Law.&quot;</td>
</tr>
<tr>
<td>199</td>
<td>Chelsea Ann Furtado</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>Jeff McKnight</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
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<tr>
<td>201</td>
<td>Aaron Nahina</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>202</td>
<td>J. Stone</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</tr>
<tr>
<td>203</td>
<td>Iokepa Ahia</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
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<tr>
<td>204</td>
<td>Danielle Burnside</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Date</td>
<td>Position</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>Summary of “Additional Comments”</td>
</tr>
<tr>
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<td>-----------------------------------------------------------</td>
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<tr>
<td>205</td>
<td>Sloanne HewLen</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>209</td>
<td>GinnyJo MinaMishin</td>
<td>Jun 5, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>213</td>
<td>William Price</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>216</td>
<td>Jamie Wakayama</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>217</td>
<td>Joelle Sato</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
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<tr>
<td>219</td>
<td>Clare Loprinzi</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>&quot;the drafters are blatantly siding with the corporations of the DOE, DOH and DOW (department of war) which continue the war crimes against a sovereign nation under seize from the US military which leaves the military occupation in inhabitable condition, continuing to jeopardize our safety and make Hawaii a target because of military bases where the signals for drones and sonar come from hawaii. we are people of aloha and you continue to side with those who are killing apaau. The many military capacities, continue to cause great harm to papahonua, na keiki, na kanaloa, na mauna, na wai, na kai and to worlds' wars.&quot;</td>
<td></td>
</tr>
<tr>
<td>232</td>
<td>Marina Karides</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>235</td>
<td>Shannon Taylor</td>
<td>Jun 6, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>&quot;Everytime the public gives you an inch, you take 10 miles. You all promised that you would allow the public access as it was prior to being given the go ahead to increase development on Mauna Kea. Apparently you never intended to play fair, you want the entire thing to yourselves forgetting who ultimately pays your excessive salaries. We will fight for our rights and we're not going away.&quot;</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Date</td>
<td>Position</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>Summary of “Additional Comments”</td>
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<td>----------------------------------</td>
</tr>
<tr>
<td>248</td>
<td>Mason Kaawa-Loa</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>And you just give yourself another black eye in the eyes of the locals.</td>
</tr>
<tr>
<td>250</td>
<td>Katherine Achacoso</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
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<tr>
<td>251</td>
<td>Katherine Achacoso</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>252</td>
<td>Katherine Achacoso</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
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<td>256</td>
<td>Preston Kuilipule</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>258</td>
<td>Nicole Kealoha</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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<tr>
<td>263</td>
<td>Elaine Wender</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>265</td>
<td>Nathan Yuen</td>
<td>Jun 7, 2019</td>
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<td>x</td>
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<td>266</td>
<td>Tatiana Young</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>267</td>
<td>Elise Dela Cruz-Talbert</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>269</td>
<td>Brian Jahn</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>272</td>
<td>Simbra Lynn Kanaka'ole</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>273</td>
<td>Leilani Basham</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>280</td>
<td>Maka Feliciano</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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<tr>
<td>281</td>
<td>Noe Lopes</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>282</td>
<td>Kyle Kajihiro</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>284</td>
<td>Marie Alohala Brown</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>288</td>
<td>Harrison Wigglesworth</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</tr>
<tr>
<td>301</td>
<td>Noe Lopes</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>304</td>
<td>Nohea Santimer</td>
<td>Jun 7, 2019</td>
<td>Oppose</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>314</td>
<td>Junko Iaela</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>315</td>
<td>Caterina Desiato</td>
<td>Jun 7, 2019</td>
<td>Comment</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</table>
### VI.  SUMMARIES OF WRITTEN TESTIMONY RECEIVED AT PUBLIC HEARINGS

**HEARING I: MONDAY, JUNE 3, 2019, MĀNOA ELEMENTARY SCHOOL**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Date</th>
<th>Position on Rules</th>
<th>Summary of Testimony</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tek Yoon</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>Please see handwritten notes in Exhibit “B”, under Hearing I.</td>
</tr>
<tr>
<td>2</td>
<td>George Bussey</td>
<td>Jun 3, 2019</td>
<td>Oppose</td>
<td>Strong supporter of TMT. “I believe that the proposed rules as they relate to bicycling activities ON THE ACCESS ROAD are unnecessary...[and] specific objections and comments are [related to]...20-26-5: Orientation...20-26-6: Fees...20-26-30: Outdoor sports activities...20-26-38: Access...[and] penalties section...”</td>
</tr>
</tbody>
</table>
| 3   | Ciera Ka‘ihilani Ihupani Lasconia | Jun 3, 2019| Oppose            | • “University and its affiliates should not be exempt to the implications of said rules.”
  |                               |            |                   | • “[T]here is not nor ever will be any amount of amendments to be made to undo the injustice woven into these proposed rules.” |
| 4   | Ka Lahui Hawai‘i               | Jun 3, 2019| Oppose            | • “University of Hawaii does not have the Jurisdiction to create Administrative Rules for the Mauna Kea summit which sits on Hawaiian Kingdom National lands that are now part of the ‘Public Lands’ and zoned ‘Conservation’” |

**HEARING II: TUESDAY, JUNE 4, 2019, WAIĀKEA ELEMENTARY SCHOOL**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Date</th>
<th>Position on Rules</th>
<th>Summary of Testimony</th>
</tr>
</thead>
</table>
| 1   | Cory Harden     | Jun 4, 2019| Comment           | • “The University of Hawai‘i (UH) deserves credit for re-writing the rules and holding more hearings. However, the rules are still deeply flawed.”
  |                               |            |                   | • “Cell phones should be allowed”
<p>|                               |            |                   | • No camping “would make it impossible for practitioners to observe the stars over the course of the night.” |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Date</th>
<th>Position on Rules</th>
<th>Summary of Testimony</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Hanalei Fergerstrom , Na Kupuna Moku O Keawe</td>
<td>Jun 4, 2019</td>
<td>Comment</td>
<td>Special use permits are burdensome to practitioners.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fines are excessive.</td>
</tr>
<tr>
<td>3</td>
<td>Tom Peek</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>“[R]eject this rulemaking charade and embrace Hawaiian proposals for a new management</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>agency that has no conflict of interest-and distance yourselves from this OMKM mess.”</td>
</tr>
<tr>
<td>4</td>
<td>Catherine Robbins</td>
<td>Jun 4, 2019</td>
<td>Oppose</td>
<td>“[W]e face a set of rules to regulate islanders’ access, some of which would actually</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>make criminals of Native Hawaiians and residents like me, just for being on the mountain</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>in some way UH deems inappropriate.”</td>
</tr>
</tbody>
</table>

**HEARING III: WEDNESDAY, JUNE 5, 2019, WAIKOLOA ELEMENTARY AND MIDDLE SCHOOL**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
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<th>Position on Rules</th>
<th>Summary of Testimony</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clarence ku Ching</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>“[A]ny rules you may promulgate, will not affect my continuing behavior.”</td>
</tr>
<tr>
<td>2</td>
<td>Cindy Freitas</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>“Office of Hawaiian Affairs (’OHA’) dose NOT speak on behalf of me as a Native Hawaiian</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>descendant[.]”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The proposed rules do not “accommodate” practitioners</td>
</tr>
<tr>
<td>3</td>
<td>Shelley S. Mahi-hanai</td>
<td>Jun 5, 2019</td>
<td>Oppose</td>
<td>“Mauna Kea is located within Kaohe which is Hawaiian Kingdom Crown Land.”</td>
</tr>
</tbody>
</table>

**HEARING IV: FRIDAY, JUNE 7, 2019, PŌMAIKA’I ELEMENTARY SCHOOL**

*No written testimony submitted.*

**VII. SUMMARY OF ORAL TESTIMONY**

**Hearing I: Monday, June 3, 2019, Mānoa Elementary School**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Position on Rules</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tek Youn</td>
<td></td>
<td>Mauna Kea is sacred. Auditor’s reports show mismanagement. Discussed issues related to unique resources. It is a mistake to put a “telescope on somebody’s church.” Let an appropriate agency take over</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Position on Rules</td>
<td>Comments</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------</td>
<td>-------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>with more respect for the sacredness of the mountain. For example, Mt. Fuji and Mt. Sinai do not have telescopes.</td>
</tr>
<tr>
<td>2.</td>
<td>Keiki o Kalani</td>
<td>Oppose</td>
<td>The rules are an international war crime. What about my Kingdom. Follow me on Instagram.</td>
</tr>
</tbody>
</table>
| 3.  | George Bussey       | Oppose (in part)  | - “[O]pposition to only one part of the proposed rules, specifically related to bicycling on the Mauna Kea Access Road.”  
- Rules unfairly restrict bike uses on the access road. Permits for bikes make no sense re protecting the environment and resources. So long as bikes stay on the road, there should not be an issue.  
- “Written permission” is vague in rules. Automobiles are allowed on roads so should bikes be allowed.  
- Registration, singing-in and signing-out, to keep track of bikes is OK.  
- $2500 fine is too high.  
- Orientation requirement too stringent.                                                                                                           |
<p>| 4.  | Sam Mitchell        |                   | Fines seem to be extreme--$500 is too high. Maybe OK with rules restricting activities that cause destruction. It sounds like rules are directed at native Hawaiian practitioners. Rules do not address who will enforce these fines—private contractors, DLNR people, sheriffs, police department. Who is giving out tickets? Rules are needed—it has become a free for all up there. |
| 5.  | Cynthia Franklin    | Oppose            | Faculty at the University. UH is permitting construction of a massive telescope. The rules protect the telescope, not the mountain. Aloha ‘Aina is an overarching theme of UH, and it is a Hawaiian place of learning—this is shameless. I object to the delegation of rules to President because he is for TMT, which violates kanaka maoli rights. |
| 6.  | Dexter Kaiama       | Oppose            | Illegal occupation of the Kingdom. Rules infringe on Kingdom.                                                                                                                                               |
| 7.  | Manu Kaiama         | Oppose            | Self-identified as Hawaiian National. Rules are flawed. Rules are inspired by money. Astronomy coopts culture; rules pretend to include kanaka maoli. We cannot be bought.                                         |
| 8.  | Ka’ihilani Lasconia | Oppose            | Self-identified as UH student. Rules are an act of violence. Hearings are limited. Kauai, Molokai, and Lanai excluded. I do not like 20-26-3 exemptions. UH is on stolen land—UH has no jurisdiction. The rules cannot be amended to make them acceptable. |
| 9.  | Pumehana Howard     | Oppose            | Defend Mauna Kea. As a Hawaiian place of learning, the rules should protect Mauna Kea. The rules target our kia’ai. Fines are too high. I have a constitutionally  |</p>
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<th>No.</th>
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<th>Position on Rules</th>
<th>Comments</th>
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<tr>
<td>10</td>
<td>Candice Fujikane</td>
<td></td>
<td>Self-identified as UH faculty. Worked hard to decolonize the university. As KAHEA points out, the rules ignore the context within which the rules are drafted. Section 20-26-21(3), (4), and (5) prohibits certain activities that the university is engaging in; 20-26-3, exempts UH. Delegation to the president—the president, has not been a neutral party in TMT CDUP. How can he be impartial in the adjudication of rules? The rules are so the President can put up roadblocks and gates while construction of TMT is done. UH must forfeit CDUP before it can stand for the ethical stewardship of Mauna Kea—you cannot break the laws you are writing.</td>
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<td>11</td>
<td>Luwella Leonardi</td>
<td></td>
<td>Hawaiian homesteader. Use the “big N” not the “little n” in the rules.</td>
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<tr>
<td>12</td>
<td>Harvey King</td>
<td></td>
<td>Self-identified as UH student. Heartbreaking that a town hall meeting could not be held re TMT. The US has no jurisdiction over Mauna Kea.</td>
</tr>
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</table>
| 13  | Mandy Fernandez       | Comment           | ACLU concerns:  
• Rules could affect practitioners’ constitutional rights.  
• Registration requirements for a group of 10 is problematic.  
• Insurance and indemnity are excessive and a judicial challenge would be successful.  
• Excessive fines for public order violations.  
• Failure to leave. Banishment for an indeterminate time.  
• The seven-day appeal period is short for citations—more time should be required.  
• Violation for verbal not defined. |
| 14  | Bianca Isaki          | Oppose            | KAHEA concerns:  
• Went through a history of audits with a focus on observatory actions such as trash.  
• Severely limiting oversight of Mauna Kea exempts UH, and restricts practitioners.  
• Wrong to make people pay for their own contested cases. |
<p>| 15  | Gwen Kim              |                  | Retired social worker. Charges UH with continuing crimes against the “government of Kupa'a'ina Moananu.” Rules project hegemony and manifest destiny. TMT is a monstrosity.                                                                                                                                                                 |
| 16  | Shelley Muneoka       |                  | KAHEA. Group of 10, 15-day notice, unreasonable. The rules will humiliate practitioners, like when I was recently... |</p>
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<tr>
<td>17</td>
<td>Puna Kealoha</td>
<td>No jurisdiction on the Mauna.</td>
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<tr>
<td>18</td>
<td>Baron Ching</td>
<td>Oppose</td>
<td>Clinical faculty at JABSOM. Illogical, capricious, inconsistent. Cannot take eyeglasses, sawtooth instrument, radios, etc. What about cultural access, 26-34. UH has no police power—UH can call the cops if there is an issue. Whom do we call?</td>
</tr>
<tr>
<td>19</td>
<td>Mikey Inouye</td>
<td>Oppose</td>
<td>Democratic Socialists of Honolulu. This is all about TMT. These rules are regulating the rightful managers of the Mauna. We are not going to find answers in space. Solutions already exist—it was passed down by ancestral knowledge. Consider just putting the money toward reparations.</td>
</tr>
<tr>
<td>20</td>
<td>Kaliko Martin</td>
<td>Notice to BOR in testimony—“Misprision of Felony, Misadministration, Misconduct, and Malfeasance with respect to the fabrication of these rules upon the protected persons, Hawaiian Nationals, from exercising their &quot;inherent rights, their sovereignty.&quot;</td>
<td></td>
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<tr>
<td>21</td>
<td>Kaukaohu Kalani Wahilani</td>
<td>Oppose</td>
<td>I am against the rules. “[W]e going protect our mauna to the day we die. Mauna Kea as we has brought us lahui back. That was the focal point for all of us.”</td>
</tr>
<tr>
<td>22</td>
<td>Merle Pak</td>
<td>Support KAHEA response. Rules do not apply to UH or entities under agreement with UH. The rules prevent original caretakers from taking care of the mountain, but it is ok for TMT to build. All the rules are meant to stop protectors and civil disturbance. I am not against science—no such thing as pure science. Challenge astronomy scientists to malama the ‘aina. Be on the Mauna when the call comes.</td>
<td></td>
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<tr>
<td>23</td>
<td>Kapuhuolahaina</td>
<td>Science is looking to indigenous people for answers. The people here are not protesters; they are protectors. You, decision-makers, can stop escalation and harm. Follow your laws—do not blame people. You have kuleana, so do we. You cannot apply rules to our religious practices. We allowed temples and churches, but what about our temple? Bring us to the table, we want to participate. Our Mauna is very delicate—why are we building there. This is what happened to Kahoolawe, you cracked it; you won’t crack the Mauna.</td>
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<td>24</td>
<td>Dee Green</td>
<td>Oppose</td>
<td>These rules criminalize customary and traditional practices. Arbitrary rules—introduction materials,</td>
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<td>No.</td>
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<td>Position on Rules</td>
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<td>25.</td>
<td>Cheryl Burghardt</td>
<td>Oppose</td>
<td>camping, hiking on pu‘u. There should not be criminal liability for practices. TMT is massive and priority is given to astronomy. Recognize and value cultural and natural resources on the most sacred place in Hawaii.</td>
</tr>
<tr>
<td>26.</td>
<td>Kim Compoc</td>
<td></td>
<td>I’m opposed to rules. Infringe on constitutional rights with no checks and balances. UH is the judge, jury, and executioner. UH has no jurisdiction. You are declaring war on the protectors.</td>
</tr>
<tr>
<td>27.</td>
<td>Kekailoa Perry</td>
<td></td>
<td>Alumna of UH. You cannot practice without access to the land. This is not just a Hawaii issue—the numbers are going to get bigger.</td>
</tr>
<tr>
<td>28.</td>
<td>Laulani Teale</td>
<td></td>
<td>Spoke Hawaiian. Center for Hawaiian Studies faculty. Subject of the Kingdom. Rules are racist, illegal, inappropriate. The rules look almost identical. You did not listen to the community. At what point are you going to admit this is a thinly veiled attack on practitioners? Get rid of the rules. I’m going to see you every day—not just on the Mauna.</td>
</tr>
<tr>
<td>29.</td>
<td>Kahala</td>
<td></td>
<td>“You can choose peace, you can choose pone, or you can choose violence and you can choose war, and that is your choice.”</td>
</tr>
<tr>
<td>31.</td>
<td>Imai Winchester</td>
<td>Oppose</td>
<td>“[E]ducator for Hawaiian children for Hawaiian schools.”</td>
</tr>
<tr>
<td>32.</td>
<td>Bronson Azama</td>
<td>Oppose</td>
<td>Student of Castle High School. Oppose the rules. Does not like commercial film permitting. Does not like groups and child to adult ratio. Rules violate international law. UH does not have authority to implement rules. When you deny us access you deny us access to our family, our kupuna. Aina is the most natural resource—our culture cannot survive without it.</td>
</tr>
<tr>
<td>33.</td>
<td>Makoa Freitas</td>
<td>Oppose</td>
<td>Opposition to draft rules. “All these rules alone in stewarding the mauna’s resources still won't suffice. As</td>
</tr>
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<td>Auntie Pua Case says, ‘This is about the source and the resource.’ These rules do not address the source, our piko, our pilina, our mo'oku'auhau, our Wao Akua. These proposed rules work in managing the access of Kia'i and Hawaiian practitioners while ensuring the stability of continued astronomy development no different than 21 years ago. These rules target the source while disguising itself as targeting the resource. These rules, what are they supposed to be? The conservation of what? Our piko, our histories, or your commercial exploitation? Enough with the rules already.”</td>
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<tr>
<td>34</td>
<td>Kapua Keli'ikoa-Kamai</td>
<td></td>
<td>Meetings are limited and far and few between. JABSOM was too convenient that’s why UH moved it here. The rules are hewa. The rules should be applied to UH. We want to malama not hewa like UH. This is our life. There’s no jurisdiction because there’s no jurisdiction—these are war crimes.</td>
</tr>
<tr>
<td>35</td>
<td>Simberlynn Kanakaole</td>
<td></td>
<td>“You not going see me on the mauna.” “I'll come to your church and I'll kanekapu because I cannot go up on the mauna because (indiscernible) with your rules. So do away with your rules, or else you going see me in your church.”</td>
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<tr>
<td>36</td>
<td>Karen Murray</td>
<td></td>
<td>Concerned that we forgot the whole idea of conservation. None of the telescopes meet the eight criteria. We do not want to see the pilau that happened on Kahoolawe happen on Mauna Kea.</td>
</tr>
<tr>
<td>37</td>
<td>Marco</td>
<td></td>
<td>“Anything that goes against Mother Nature, anything that destroys Mother Nature is being wronged for many years now, and it's time for us to change that.”</td>
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**Hearing II: Tuesday, June 4, 2019, Waiākea Elementary School**

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<th>No.</th>
<th>Name</th>
<th>Position on Rules</th>
<th>Comments</th>
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| 1   | Todd Marohnic         |                   | • There is no reason why there should be any restriction on bikes on the mountain.  
• “I feel safer riding up there than I do on the Queen Kin Kana where fellow cyclist had been hit at an alarming rate.”  
• What I do see is more commercial tours. Stop the commercial tours, not recreational users. |
<p>| 2   | Jillian Marohnic      |                   | Management corridor cuts off ice age area. Charging entrance fees will cut off access to this area. Scrap the rules. The only one damaging the mountain is you. |</p>
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| 3.  | Cory Harden           |                   | • “The rules should state explicitly that Native Hawaiians have the right to exercise protected, customary, and traditional rights. If not, people may assume the access for these rights has to follow the general rules.”  
• “It's not right that UH and its agent and students are exempt from following the rules”  
• “The Department of Land and Natural Resources is the one that should be writing and administering these rules, not UH.”  
• “UH's stated person-purpose is education, not protection of natural and cultural resources. UH lacks expertise in protecting resources and has conflict of interests. To provide education, UH wants as many telescopes as possible.”  
• Concerned about the limitation on camping, access, group use, and commercial film permits. |
| 4.  | Catherine Robbins     | Oppose            | • “Now we face a set of rules to regulate islander access, some of which would actually make criminals of Native Hawaiians and residents like me just for being on the mountain in some way that UH deems inappropriate.”  
• “Kama'aina should be exempt from this rule.”  
• “Cultural practitioners should be exempt from” group use registration.  
• “Draconian penalties and fines.” |
<p>| 5.  | Tom Peek              |                   | “These rules are part of that unsavory history of malfeasance--tools to completely take over the mountaintop, as Big Islanders feared in the 1980s, and to further empower an illegitimate OMKM.” |
| 6.  | Stephen Paulmier      |                   | The rules are an effort to prepare for TMT.                                                                                              |
| 7.  | Kehaulani             |                   | “Mauna Kea is Crown Lands. Crown Lands are private lands of monarchy and their descendants. The State of Hawai‘i has no authority in the Hawaiian Kingdom. I never read your rules. They don't apply to me. They don't apply here at all. Don't care about your rules because you have no authority to make them and to enforce them.” |
| 8.  | Andrea Illima Decosta | Oppose            | “I oppose any efforts to create any kind of rules, administrative or legislatively, that would give anybody the impression that Mauna Kea is the property or under the control of either the University of Hawai‘i or even the State of Hawai‘i seeing as the State of Hawai‘i is not a legitimate entity to begin with.” |
| 9.  | Shana Wailana Logan   |                   | • The people are also a cultural and natural resource and should be considered                                                              |</p>
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| 10  | Hanalei Fergstrom           |                   | • “I’m reading through the rules and nothing gives authority to DLNR officers, unless I missed something, to have weapons.”  
• “I’m very against having a permit to get to a natural resource”                                                                                                                                                                                                                                                                                                                                                                                                   |
| 11  | Nelson Ho                   | Oppose            | • “[S]pokesperson for Na Kupuna Moku o Keawe, a kupuna for elders organization with representatives from all six districts of the island of Hawai’i[.]”  
• The state of Hawaii has no lawful authority. The US has no jurisdiction. The Hawaii Kingdom exists.  
• “[T]hese proposed rules still attempt to criminalize customary and traditional practices of Native Hawaiians and to improperly keep the public off the mountain.”  
• “The UH is not ready to promulgate any administrative rules governing the public use and access to Mauna Kea.”  
• “Do you and the TMT corporation think that these rules will stop thousands of people from protecting their mauna?” |
| 12  | Iokepa Ka'eo                | Speaking for homestead wai-listers. Kanaka Rangers collected data for waste management. Where is all the waste going? Rules incriminate beneficiaries. How do telescopes get access? Who does that land belong to? You are not allowed to monitor the gathering of resources. “Kanaka must lead the way.” |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 13  | Geoff Shaw                  |                   | Rules should preserve the mountain and preserve the rights of indigenous people. Discontinue abusive relationship.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 14  | Stop Genocide               |                   | “I wanna mahalo the University for the proposed rules because they give me a good piece of evidence to use that actually support this claim”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 15  | Deborah Ward                |                   | • “The residents, the practitioners and the visitors were not responsible for the damage. The University bore the responsibility.”  
• “And now comes the University promulgating rules to criminalize residence, practitioners and visitors for actions that would otherwise be considered reasonable and rational.”                                                                                                                                                                                                                                                                                                                                                                       |
| 16  | Jim Albertini               | Oppose            | • “These rules miss the mark, and the key mark is that Mauna Kea is sacred. Nowhere in the proposed rules is this mentioned: Mauna Kea is sacred. Mauna Kea is the realm of Akua.”  
• “[A]tempt to violate the constitutional rights of Kanaka Maoli to access Mauna Kea for traditional,”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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<td>cultural and religious practice, and the constitutional rights of those who wish to join Kanaka Maoli to protest -- to protect the sacred mauna by exercising free speech constitutional rights.”</td>
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<td>• “We definitely need rules to control commercial, industrial, military, development on Hawai‘i’s most sacred temple.”</td>
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<td>17.</td>
<td>Mark Van Heukelem</td>
<td>Oppose</td>
<td>Why 45 day waiting period for a permit? What are the grounds? Who decides? Why ban bikes?</td>
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<td>18.</td>
<td>Millicent Cummings</td>
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<td>• “These rules very articulately reveal how racist these institutions are, how illegal they are, and how little shame they have.”</td>
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<td>• “[S]top fucking with Mauna a Wakea.”</td>
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<td>19.</td>
<td>Kamaki Rathburn</td>
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<td>“The proposed rules are nothing more than attempt to criminalize Hawaiians for being Hawaiians in Hawaii[.]”</td>
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<td>20.</td>
<td>Dr. Noe Noe Wong-Wilson</td>
<td>Oppose</td>
<td>• “[T]he development of telescopes on Mauna Kea is an intrusion into that sense of well-being, and it affects us in ways that are immeasurable[.]”</td>
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<td>• “I practice on Mauna Kea, and as I do practice in other areas on the island. And particularly on Mauna Kea, when I read the current set of rules, all I could see was that I have been breaking every single proposed rule that exist there.”</td>
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<td>• “[T]he University has no business being in that place to manage the mauna.”</td>
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<td>• “I think the University should be a user and have the same rules applied to them as applied to anyone else.”</td>
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<td>21.</td>
<td>Ronald Fujiyoshi</td>
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<td>• “The rules that are being proposed overstep the rights of anyone that believes Mauna Kea to be a sacred mountain.”</td>
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<td>• “[T]he State of Hawai‘i and the University should not be proposing any rules that regulate the practice of those who believe Mauna Kea to be sacred according to their religious and spiritual beliefs.”</td>
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<td>22.</td>
<td>Mary Begier</td>
<td></td>
<td>We should work with the rules we have and work to address native Hawaiian cultural issues better.</td>
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<td>23.</td>
<td>Ruth Aloua</td>
<td>Oppose</td>
<td>• “I was thinking about these rules that we keep calling ‘em rules, rules, rules. But what they are, they’re act of war upon the very existence of Kanaka Maoli, right? They’re act of war, right, because we’ve gone beyond criminalization. We’ve been criminalized.”</td>
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<td>• “So when I see these rules, what am I hearing? I’m hearing that UH is proceeding – TMT is proceeding with their plans. So what does that mean we have to</td>
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do? Ho'omakaukau. Get ready, folks. Get ready to ascend the mauna because we will need to be there. And if you can't be up there, we will need your support. So this is a Kahea. This is a Kahea to all of our people throughout Hawai'i, to our relatives abroad. We will need you. If you stand for peace, if you believe in indigenous rights, in peace for the earth, we will need you to stand with us and to spread the message of aloha.”

24. Jasmine Cabanilla Oppose Rules impose on rights of kanaka maoli. UH has no authority. Over 60,000 people oppose these rules.

25. Mala Landt I call on the ancestors. They are speaking.

26. Susan Rosier Rules have a business perspective but UH is a school. The kingdom never left. People are not protesting; they are protecting the mountain.

27. Kehaulani La’a Oppose The state is not listening to us.

28. Luana Jones Oppose • The kingdom still exists.
• “[W]e definitely need some regulation up the mauna and starting with the telescopes.”

29. Nani Pai Oppose • UH doesn’t need to follow the rules.
• “[T]hese proposed rules will supersede the rules governing conservation districts, forest reserves, and historic preservation.”
• “Many of these proposed rules will directly impact cultural practitioners on the mauna.”
• Concerned about delegation of authority to president.

30. Kanueuluwehianuhea Case Oppose • “[R]ules criminalizes the efforts of our people while we seek to preserve our mauna.”

31. Bronson Kobayashi “We’re going to stay here until the further desecration of this mauna is no longer a threat.”

Hearing III: Wednesday, June 5, 2019, Waikoloa Elementary and Middle School

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<tr>
<th>No.</th>
<th>Name</th>
<th>Position on Rules</th>
<th>Comments</th>
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</table>
| 1.  | Andrew Cooper       | Oppose            | • “[R]ules are much better than the last drafts.”
• We need access at all hours for stargazing.
• “Bicycles, tobacco, hours of access, what you’re doing there, that’s not the University's business. You—as long as whatever you’re doing has no harm to the land, has no interference with other users of the mauna, they should be permitted.” |

2. Therisa (Ikea) Oppose • “There was an incident of skiers on the mauna. Were they criminalized? Did UH go further enough on that instance to say where they came from, who gave them permission? We didn’t hear anything further about...”
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<th>Comments</th>
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| 3.  | Kathleen Ku'uualoha Lacerdo          | Oppose            | • “I do oppose these rules that the UH is trying to impose on our citizens and me.”  
• “UH is the problem because they are the ones that are just desecrating and doing that mass destruction of the mauna[.]”  
• “[W]hy do I need permission to go up to the mauna to do good things?” |
| 4.  | Jennifer Leina’alakaulani Sleightholm| Oppose            | • “[T]hese proposed rules it does not make me feel like I’m in a state of happiness or well-being.”  
• “Only our Akua owns the mauna.”  
•                                                                                                                        |
| 5.  | Tiare Flores                         | Oppose            | The agencies who are supposed to protect the mountain have not. If the public is not allowed to go up there, who is going to hold UH accountable? UH has no jurisdiction. The mountain belongs to no one. |
| 6.  | Patricia Puanani Ikeda               | Oppose            | • “I am against the rules.”  
• “We can work together without the TMT otherwise we’ll see you on the mauna.”                                                                                                                         |
<p>| 7.  | Piikea                               | Oppose            | “The rules are a sham.”                                                                                                                                                                                  |
| 8.  | Warren Hahlbeck                      | Oppose            | “You gotta stop not including the people of Hawai‘i into your decisions. Cutting them out from access is not the way to go. Including them is the way to go. Thank you very much.” |
| 9.  | Clarence Ching                       | Oppose            | • “[T]hese rules do not apply to cultural practitioners as they can’t[.]”                                                                                                                                  |
| 10. | Shelley Mahi-Hanai                   | Oppose            | • “You shouldn't be telling Hawaiians what to do.”                                                                                                                                                        |
| 11. | Shannon Rudolph                      | Oppose            | “We don’t need your rules. We have—you have no real authority or jurisdiction. The rules are already in place and have already been written long ago.”                                                      |
| 12. | Shama Dawn Prevost                    | Oppose            | We are protecting the sacred mother earth.                                                                                                                                                               |
| 13. | Mala Lant                            | Oppose            | The ancestors are here.                                                                                                                                                                                  |
| 14. | Maxine Kahaulelio                    | Oppose            | “I want you folks to know that you have touched someone that got arrested and it’s a kupuna. And that’s going be me. I have committed myself. So I’m not going—this—all these rules are all manmade.” |
| 15. | Bimo Akiona                          | Oppose            | • “So if I left flowers at my father’s ahu, that's any item. That's a violation.”                                                                                                                        |
| 16. | E. Kalani Flores                     | Comment           | • “Kanaka Maoli never relinquished their claims, title, and jurisdictions of these national lands to the United States or any other entity[.]”                                                              |</p>
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<th>No.</th>
<th>Name</th>
<th>Position on Rules</th>
<th>Comments</th>
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<tbody>
<tr>
<td>17.</td>
<td>Clare Loprinzi</td>
<td></td>
<td>“I’m a nationalist here.”</td>
</tr>
<tr>
<td>18.</td>
<td>Myron Lindsey</td>
<td></td>
<td>“I didn’t study the rules. I can do that. I can do that. But my time -- I still gotta work. I’m a builder.”</td>
</tr>
<tr>
<td>19.</td>
<td>Billy Freitas</td>
<td></td>
<td>“Until you clear that mauna off, then fine, but we need to be there as long as those people are there. As long as science is up there, we need to be there because the record shows how badly desecrated that mauna is.”</td>
</tr>
<tr>
<td>20.</td>
<td>Liliuokalani</td>
<td></td>
<td>I am Liliuokalani. Judgment is going to come. And, the traditional elders that stood with us. The traditional elder tribunal is in session.</td>
</tr>
<tr>
<td>21.</td>
<td>Cindy Freitas</td>
<td></td>
<td>The cart before the cart again. OHA does not speak on behalf of me. I was not called to the table for this process.</td>
</tr>
<tr>
<td>22.</td>
<td>Lanakila</td>
<td></td>
<td>Kukulu, continuing to build in righteousness. The rules are targeting a specific group of people. UH not using law students because it would be written correctly. You are making it illegal to protest. $400 for a parking ticket? That’s ridiculous. Rules tailored to intimidate and support one corporation.</td>
</tr>
<tr>
<td>23.</td>
<td>Kathrine Patricia</td>
<td>Oppose</td>
<td>I am in opposition to UH’s proposed rules. Seeking out to criminalize people.</td>
</tr>
<tr>
<td></td>
<td>Benjamin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Donna Grabow</td>
<td>Oppose</td>
<td>I’m opposed to these rules; there should be no rules.</td>
</tr>
<tr>
<td>25.</td>
<td>Nicole Collins</td>
<td>Oppose</td>
<td>You have not “heard” us in these revised rules. The rules are an absolute disgrace. Rules are written to protect TMT. Why is UH exempt from following their own rules? Time controlling is oppressive. Go back to the drawing board.</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Position on Rules</td>
<td>Comments</td>
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</tr>
<tr>
<td>26.</td>
<td>Meleana Adams</td>
<td>Oppose</td>
<td>“I oppose of all these rules. I haven't read into these rules, just from my fellow Kia'i on social media, from what I hear.”</td>
</tr>
<tr>
<td>27.</td>
<td>Kapulei Flores</td>
<td></td>
<td>We have been fighting since Kahoolawe and need to say the same thing over and over. Who gave you the authority to have control over a whole island, a whole moku, and a whole culture?</td>
</tr>
<tr>
<td>28.</td>
<td>Lamaku Mikahala Ro</td>
<td></td>
<td>I am kahu of Ahu'ena Heiau at Kamakahonu, personal temple of King Kamehameha I.</td>
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**Hearing IV: Friday, June 7, 2019, Pōmaika'i Elementary School**

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<th>No.</th>
<th>Name</th>
<th>Position on Rules</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ke'eaumoku Kapu</td>
<td></td>
<td>“Kuleana lands are those parcels granted to Native Hawaiians and I know that Mauna Kea is kind of touchy when it comes to title, but I’m pretty sure and I guarantee you a lot of Kanaka today still has an undivided interest to those properties, so where are they at the table?”</td>
</tr>
<tr>
<td>2.</td>
<td>Kahu Richard Maele</td>
<td>Oppose</td>
<td>I oppose the new rules. (1) you criminalizing me to be Hawaiian; violating my constitutional rights based on race. (2) you criminalizing my religious rights.</td>
</tr>
</tbody>
</table>
| 3.  | Kaci-Cheree Puaokamele Dizon | Oppose           | • “The land of Mauna Kea is Hawaii national lands, not American. And with this in mind of the rules in question, they have no place.”  
• “[D]efer decision-making indefinitely[.]”  
• “Defeat the proposal at the next meeting.”                                                                                                                                                                                                                                                                                                                                                                           |
| 4.  | Sesame Shim                   | Oppose           | • “We say 'a'ole to these rules.”  
• “The kuleana is ours, the people, the lahui, and not any single person should have any kuleana over us or our mauna.”                                                                                                                                                                                                                                                                                                                                                                                                               |
| 5.  | Cameron Grimm                 | Oppose           | • “I oppose these rules, in particular the permitting and access process, which is an attempt to define the scope of who we are as Kanaka Maoli.”                                                                                                                                                                                                                                                                                                                                                                                   |
| 6.  | Kahele Dukelow                | Oppose           | • Professor at Maui College.  
• “This is not about Mauna Kea, this is not just about UH, it's about us resisting and continuing to resist the idea that you govern us.”  
• “[T]he rules are just a continued process by which UH is trying to disempower Hawaiians from really exercising the only power we have right now, which is the power of protest and opposition.”                                                                                                                                                                                                                                                                   |
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<th>Comments</th>
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<tr>
<td>7.</td>
<td>Kaleikoa Kaeo</td>
<td></td>
<td>• “I oppose the idea that Lassner and even the BOR gets to decide what happens not just on our mauna, but on all of our—all of our lands in Hawaii.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>professor, University of Hawaii, Manoa</td>
<td>• “We've been here for hundreds of years, maybe thousands, and yet this mother here who just got here -- how long? Several decades? -- put on an aloha shirt and he thinks he's going to regulate us in our lands? Who the hell does he think he is? What arrogance. But it's not arrogance, it's the sickness of white supremacy, so you've gotta understand the sickness. And I will always fight the sickness of racism.”</td>
</tr>
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</table>
| 8.  | Tiare Lawrence        | Oppose            | • “As you know, commercial activity and tourism has had major impacts on our natural resources and so that's probably like the only manini thing that I would support, but other than that, I would say scrap the rules altogether.”  
  |     |                       |                   | • “I strongly believe that a halau or a group of practitioners should never have to ask UH for permission, that is just hewa.”  
<p>|     |                       |                   | • “Currently there is nothing in the rules that requires the UH president to even seek guidance from Hawaiian practitioners and experts, that is hewa too.” |
| 9.  | Jennifer McGurn       |                   | “And the wrongs that have been done to the Hawaiian people for generations, centuries, it needs to stop.” |
|     |                       |                   | • “If anything, the designation -- the designee should be the true stakeholders, the Kanaka Maoli, lineal descendants and community members who have shown the -- and who have committed to the proper management of Mauna Kea via aloha 'aina and through research and through the support of like-minded communities.” |
| 11. | Katrina Oliveira      |                   | • Teacher at the University of Hawaii, Manoa |</p>
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<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>12.</td>
<td>Noelani Ahia</td>
<td>Oppose</td>
<td>“These rules are hewa and we will not stand by and watch you continue to inflict violence upon our people.”</td>
</tr>
<tr>
<td>13.</td>
<td>Kanoe Pacheco</td>
<td>Lassner is not the konohiki.</td>
<td></td>
</tr>
</tbody>
</table>
| 14. | Kymberlynn Kaohinani Burk  | Oppose            | • “The University presents itself as a Hawaiian place of learning, but it's making these proposed rules specifically against Hawaiians, rules that target us.”  
• “[C]ultural practitioners should not be regulated to pay an entrance fee or a parking fee when they're going on mauka for cultural practices, whether it be for gathering or religious purposes.”  
• “The right to gather will be infringed upon under these rules.”                                                                                   |
| 15. | Puanani Pali                |                   | • “This is not about the rules that you guys are making, this is about oppression of our people, the Hawaiian people, Kanaka Maoli, the true people of this 'aina.”                                                   |
| 16. | Sunny Savage               | Oppose            | • “I'm just really in strong opposition and it's really—it's so clear when you look at the paid parking and it's like, oh, you're going to fine somebody for, you know, harvesting something that's part of their—you know, their medicinal practice or whatever.” |
| 17. | Cecelia Rose Reilly        |                   | Understands illegal occupation. There is a whole line of people who understand the resources. The TMT project—new ground being broken—it’s frustrating.                                                |
| 18. | Jon Kinimaka               | Oppose            | “You shouldn't be able to make the rules. We should come under Hawaii Kingdom law and that's what we should be doing.”                                                                                     |
| 19. | Sophia Keel                | Oppose            | “I just ask that you have integrity with what you do and respect and listen to the people that are here today[.]”                                                                                         |
| 20. | Russel Kahookele           | Oppose            | • “I'm the elected representative for the lawful Hawaiian government.”                                                                                                                                      |
| 21. | Hauoli Hiwahiwa Moniz      |                   | Student at University of Hawaii, Manoa. “I'm going to take the 'ike that I have from UH Manoa, I'm gonna come back to the school with my PhD, I'm gonna be a                                                                 |

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<th>Comments</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>“[T]he rules proposed will not allow for people to stand up like we are tonight.”</td>
</tr>
<tr>
<td>23.</td>
<td>Stephen Hart</td>
<td>Oppose</td>
<td>Graduated 2014 from UHM. Spent $100,000 in student loans.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“I don't want that violence done in my name, so I'm completely—I oppose this, I oppose the rules, I don't—I don't think you guys have jurisdiction to do this.”</td>
</tr>
<tr>
<td>24.</td>
<td>Nigel Rozet</td>
<td></td>
<td>Student at University of Hawaii, Manoa</td>
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<td></td>
<td></td>
<td></td>
<td>“I think it's a matter of control. Like Kalei Kaeo and folks said earlier, you're filtering our language, you're filtering what we're saying and the true mana'o[.]”</td>
</tr>
<tr>
<td>25.</td>
<td>Wahinehula Ka’eo</td>
<td>Oppose</td>
<td>“What's his kuleana on Mauna Kea? He only—he only pretend like he's our ali'i. He's not my ali'i. He no more kuleana out there. How come -- I am not, I will reject that, I will not ask Lassner if I can go up to my own kupuna, visit my own kupuna. Who the hell is Lassner to tell us when and when not we can go up there.”</td>
</tr>
<tr>
<td>26.</td>
<td>Adam Mahiai Dochin</td>
<td></td>
<td>“These rules are meant to deter folks from showing up in defense of Mauna Kea.”</td>
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<td></td>
<td></td>
<td></td>
<td>“The fines are steep[.]”</td>
</tr>
<tr>
<td>27.</td>
<td>'Auli'i Aikau</td>
<td></td>
<td>“So might as well just stop, 'cause we're gonna win anyway.”</td>
</tr>
<tr>
<td>28.</td>
<td>Susan Quipatla</td>
<td>Oppose</td>
<td>“I just want to say that everything's been said over and over, but I really want everybody to take a look at the people that are in the room right now.”</td>
</tr>
<tr>
<td>29.</td>
<td>Keanoalohaihikimai Ka’aha’a’aina</td>
<td>Oppose</td>
<td>“I am opposed to any new rules[.]”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“When do you -- why do you need permission to go to a place of healing and a place of knowledge?”</td>
</tr>
<tr>
<td>30.</td>
<td>Pahnelepi McKenzie</td>
<td>Oppose</td>
<td>“UH is not following any of these rules[.]”</td>
</tr>
<tr>
<td>31.</td>
<td>Sam Peralata</td>
<td></td>
<td>“[W]e're going to stand firm until this wrong is made a right.”</td>
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<td>No.</td>
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<td>Comments</td>
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<tr>
<td>32.</td>
<td>Joe Bardwell</td>
<td></td>
<td>“The University has to realize that they are facing a serious force of opposition and they need to be careful as they move forward because that is a force to reckon with.”</td>
</tr>
<tr>
<td>33.</td>
<td>Harry Kahiau Brown</td>
<td>Oppose</td>
<td>• “I want you to know that I am in opposition of what you’re trying to do in this making rules and regulations against us Hawaiians.”</td>
</tr>
<tr>
<td>34.</td>
<td>Kaleialoha Kaniaupio-Crozier</td>
<td>Oppose</td>
<td>“How are you continuing the path for the next generation? How are your keiki gonna continue the path for the next generation to come?”</td>
</tr>
<tr>
<td>35.</td>
<td>Nalei Pokipala</td>
<td></td>
<td>“[W]ho even got that—the land award commission? Where is the paperwork for that, that even that UH is being able to be there? I don't understand.”</td>
</tr>
<tr>
<td>36.</td>
<td>Kailie Aina</td>
<td>Oppose</td>
<td>“I oppose these rules, but starting with the past, there is no treaty, there is no consent, and, therefore, there should be no TMT or rules.”</td>
</tr>
<tr>
<td>37.</td>
<td>Kamea Hoopili</td>
<td>Oppose</td>
<td>“I oppose this, my kids will oppose this, my kids' kids will oppose this as long as we need to oppose it until it's gone.”</td>
</tr>
</tbody>
</table>
EXHIBIT “A” NOTICE OF PROPOSED RULEMAKING PUBLIC HEARING
EXHIBIT “B” COPIES OF WRITTEN TESTIMONY

This Exhibit “B” is divided into the following sections:

- WRITTEN TESTIMONY RECEIVED BEFORE OR AFTER PUBLIC HEARINGS (VIA POSTAL MAIL) (until 11:59 p.m. June 7, 2019)
- WRITTEN TESTIMONY RECEIVED BEFORE OR AFTER PUBLIC HEARINGS (VIA EMAIL/ONLINE) (until 11:59 p.m. June 7, 2019)
- WRITTEN (FORM) TESTIMONY RECEIVED BEFORE OR AFTER PUBLIC HEARINGS (until 11:59 p.m. June 7, 2019)
- WRITTEN TESTIMONY RECEIVED AT PUBLIC HEARINGS
  - HEARING I: MONDAY, JUNE 3, 2019, MĀNOA ELEMENTARY SCHOOL
  - HEARING II: TUESDAY, JUNE 4, 2019, WAIĀKEA ELEMENTARY SCHOOL
  - HEARING III: WEDNESDAY, JUNE 5, 2019, WAIKOLOA ELEMENTARY AND MIDDLE SCHOOL
  - HEARING IV: FRIDAY, JUNE 7, 2019, PŌMAIKA‘I ELEMENTARY SCHOOL
EXHIBIT “C” TRANSCRIPTS OF ORAL TESTIMONY
Astronomy on Maunakea

Astronomy on Maunakea began as a push for much needed economic development following the 1960 tsunami that decimated the town of Hilo. Together, the State, Hawai’i Island leadership, and the University committed to a vision of establishing astronomy as a new source of economic activity. In 1964, through a series of resolutions, the Board of Supervisors and State Legislature approved legislation that set aside an area to establish astronomical research activities on Maunakea and to construct a road to the summit. In 1968 the Maunakea Science Reserve was created and the State granted a 65-year lease to the University to use the Reserve as a scientific complex. As a result, today Hawai’i is globally recognized as a center for research in astronomy and the State benefits from a knowledge-based industry that contributes substantially to our goal of diversifying our economic base.

“$1 Per Year Subleases”

To achieve the goal of excellence in astronomical research, it was necessary for the State and UH to successfully compete with established and venerable research institutions, such as Harvard, Princeton, Berkeley, Caltech and others. It was understood that high quality research would require multiple telescopes with varying characteristics and capabilities. The current suite of optical, infrared and submillimeter telescopes on Maunakea represents at least $1 billion of capital investment (in current dollars) and has an unparalleled capability to support the study of different aspects of the universe. Given the State's and UH’s many pressing needs, it is highly unlikely we could ever have afforded this kind of capital investment, much less the ongoing operating costs currently estimated at nearly $71 million annually. These costs and development risks are borne by the individual operating entities.

The strategic approach adopted was to have UH enter into scientific cooperation agreements with the observatory organizations, whereby UH would contribute the site and provide assistance with land entitlements and infrastructure, and the observatories would provide the capital and operations funding. The observing time was shared, with UH receiving a guaranteed fraction commensurate with its contribution, as is the case with observatory hosting arrangements elsewhere in the world, e.g., Chile and the Canary Islands. Because these arrangements were not landlord-tenant agreements, but rather scientific partnerships with each partner making substantial contributions, it was appropriate that only nominal land rent was contemplated.

This strategic approach was in place from the 1970's until the early 1990's during which period all of the existing observatories were started. (Prior to TMT, the last new scientific
cooperation agreement was the one for the Submillimeter Array, signed 23 years ago.) As a result, Hawai'i is now recognized throughout the global scientific community as one of the best locations in the world for siting astronomy facilities. The observing time has enabled the State through UH to develop a world-renowned astronomy research program at a much-reduced cost to the State. The State of Hawai‘i benefits from having a clean, high tech knowledge sector resulting in high technology jobs, as well as skilled administrative and professional service and sub-professional jobs. And, students throughout the State are inspired by opportunities in Science, Technology, Engineering and Math (STEM).

There have been two major changes, however, from the situation that existed during the first 30 years of astronomy on Maunakea. The first is a broader understanding that proper management of the mountain and the required stewardship of its natural and cultural resources will cost more than was anticipated 30 to 40 years ago. The second is the realization that while it may have been appropriate and customary during the early years for the direct benefits to be almost entirely in the form of observing time, this is no longer the case. With astronomy now well-established on Maunakea, the broader community deserves a share in the direct benefits.

Both of these insights have been acted on in the agreements for the TMT, as described below. The agreement for the TMT includes:

- The sublease payments called “rent” are actually contributions to the cost of management and stewardship, as required by the provisions of Act 132.

- In addition, TMT will pay its fair share of operational costs for common services including road maintenance, Hale Pohaku, the Visitor Information Station, the Maunakea Weather Station and the shared communications network.

- Contributions to both the THINK Fund and workforce development efforts that are direct benefits to the community.

Once a new land authorization has been secured, UH will be in a position to negotiate new subleases with the existing facilities – subleases that will incorporate these new stewardship requirements and broader community benefits.

**Negotiation of the TMT Sublease – 5 years (2009 – 2014)**

The negotiation of the TMT Sublease, including “rent”, lasted 5 years, starting in Spring 2009, and ending with approval of the Board of Regents in February 2014. TMT International Observatory (TIO) pledged to an investment of over $1 billion in capital costs alone. TMT initially offered a package that had consisted of $3.5 million per year in “community benefits,” plus viewing time starting at the time the telescope became operational. The initial negotiating team for the University was headed by Chancellor Rose Tseng, and included Roberta Chu, Richard Ha, Gerald DeMello and Bob McLaren. During the negotiation timeframe, the TMT EIS was being completed, the Comprehensive
Management Plan and subplans were being finalized and implemented, and the University pursued its (first) conservation district use permit (CDUP) before the BLNR (2013).

In July 2009, Act 132 was enacted. Act 132 required that all rents and fees collected by UH relating to activities on Maunakea be deposited into a newly established Mauna Kea Land Management special fund, and dictated that the contents of the fund could only be used for the management of the mountain and implementation of the CMP (not for community benefits).

In June 2010, following approval of the TMT project by the Maunakea Management Board (MKMB), and through the leadership of UHH Chancellor Tseng, Office of Maunakea Management Director Stephanie Nagata and Maunakea Management Board Chair Barry Taniguchi, the University's Board of Regents unanimously approved the TMT project. See Attachment 1 (Minutes for June 28, 2010 Board of Regents meeting). The minutes reflect that TIO had committed to paying $1 million/year into the THINK Fund and $1 million/year sublease rent, as well as provide viewing time for UH, workforce development funds and fair share of common services.

Board of Regents Approval of TMT Sublease– February 2014

In February 2014, following extended negotiations with TIO and obtaining approval by the Mauna Kea Management Board, the University administration sought approval from the Board of Regents for the TMT Sublease. See Attachment 2 (Minutes for February 20, 2014 Board of Regents meeting). At that meeting, then-UHH Chancellor Straney laid out the basis for negotiation of the rent (at pp. 34-35):

... UHH established two components to the rent that would be charged under the sublease: (1) 20% of the rent fee would be set aside towards the payment to the Office of Hawaiian Affairs (OHA) as required by law; and (2) the remaining 80% of the rent would be based on TIO’s share of the management costs for implementing the CMP. The CMP costs $2.2 million (per year) to implement. For the acreage of the observatories on Mauna Kea, to simply apply a pro-rated share, comes out to $100K per acre to implement the management of the CMP. TMT will occupy 8.7 acres, so 80% of the rent is $870K. The two components added together are a bit over $1M per year; that would be the rent that TIO would be charged when the telescope is fully functional....

Unlike customary practices where rent payments commence upon completion of project construction, UH successfully negotiated with TMT for rent payments to start at $300K during the civil engineering phase of surveying which incrementally increase at specific construction benchmarks to the full $1 million when TMT becomes operational. In addition, TIO had committed to 7.5% viewing time, the $1 million THINK Fund package, as well as workforce development monies approximating $1 million. See Attachment 3 (Board action memo dated February 12, 2014).
After full discussion, the Board of Regents voted (13-1) to approve the TMT Sublease. Upon the granting of its permit in July 2014, TMT began paying rent in July 2014. TMT has paid rent for the years 2014 through July 2016. TMT ceased paying rent after its CDUA was vacated and Judge Greg Nakamura ruled in December 2016 that BLNR should have held a contested case hearing before consenting to the TMT sublease.

June 4, 2014 Hallstrom Report – Post BOR Approval of TMT Sublease

The “Hallstrom Report” is dated June 4, 2014, three months after the Board of Regents voted to approve the sublease. See Attachment 4 and Attachment 5 (Hallstrom testimony for June 13, 2014 BLNR hearing on the sublease consent). The Report (and the testimony based on the Report) was not an appraisal, and was done in preparation for the request to the BLNR for consent to the already-negotiated TMT Sublease. See Attachment 6 (Letter from UH Hilo to the BLNR dated June 25, 2014 for full explanation of substantial nature of the rent amount, and the lack of a requirement for a formal appraisal). Hallstrom had been retained both by the University and TIO, in an effort to share costs.

Hallstrom’s conclusion was that the recommended sublease rents were appropriate, rational, and supportable in an economic context, and provided “a superior return to the underlying conservation-classified real estate.” His report specifically noted the following:

1. They are not market-based, for profit entities.
2. The rents are not intended to produce a positive annual cash flow for the underlying land owners and master lessee/developer. They are an attempt to fund the obligations of MKSR with all proceeds ‘spent on the mountain.’
3. The end-user/sublessee (TMT) does not operate in a market environment and is not pursuing positive returns on their investment. It is an academic environment focused on education and the acquisition of scientific knowledge requiring significant capital expenditures.
4. There are no profits at any stage of the operation for UH at MKSR, and in fact it incurs a substantial yearly “loss” (in the form of a cost against the University budget).
5. The contractual ground rents which TMT will pay will be significantly above the rent levels for property on the Big Island and it would be appropriate they be lowered considerably if a “base plus percentage rents” formula was emplaced.

After robust discussion, including regarding the sufficiency of rent, over the course of two meetings, the BLNR consented to the TMT Sublease on June 27, 2014. See Attachment 7 (Minutes for the June 27, 2014 BLNR Meeting).
Astronomy is Not a Commercial Enterprise

Observatories are typically funded by scientific partnerships among some combination of universities, governmental science agencies, and nonprofit organizations, with operating costs and telescope time shared in similar proportions. In these arrangements, telescope time is not “bought” or “sold”; partners’ contributions to costs are used to operate, maintain, and update the telescope and its instruments.

There is no net revenue or financial gain from astronomy-related activities on Maunakea. Rather, telescope operators built the observatories and fund the operating costs. The operators that participate in funding the actual costs then share the available observing time. By design, Hawai‘i’s public institution of higher education, UH also shares in observing time.

The value to the State and its citizens is in being able to operate a world-class astronomy research and education program that would otherwise be unaffordable. Astronomy has become a cornerstone of Hawai‘i’s high technology sector, and additional benefits accrue to the Island and State of Hawai‘i through the observatories’ employment of other professional and sub professional individuals from the local community. The annual economic impact of astronomy in Hawai‘i has been estimated to be almost $169 million, with over $91 million of that on Hawai‘i Island. See Attachment 8 (2014 UHERO report, “The Economic Impact of Astronomy in Hawai‘i”).

At this time, the University is unaware of any patents or patent applications filed as a result of its activities on Maunakea.

UH Use of Viewing Time

There are ten telescopes in operation at the Maunakea summit. UH both owns and operates two of these: the UH 2.2-meter Telescope and UKIRT. In the case of UKIRT, the operation is in a cost-sharing arrangement with other agencies. UH also owns the James Clerk Maxwell Telescope, which is operated by the East Asian Observatory under the terms of a Scientific Cooperation Agreement. The NASA Infrared Telescope (IRTF) is owned by NASA, but operated by the UH Institute for Astronomy under a contract with NASA. The other six telescopes are both owned and operated by other organizations. Among these is the Canada-France-Hawaii Telescope (CFHT), which is owned and operated by the CFHT Corporation, a Hawai‘i not-for-profit corporation. UH is a member of that corporation.

UH is entitled to 100% of the use of the 2.2-meter and receives a guaranteed share of the use of the others as indicated below:

- UH 2.2-meter: 100%
- CFHT: 15%
- NASA IRTF: 15%
- UKIRT: 100%
The viewing time allocated to UH excludes:

- Caltech Submillimeter Observatory, which has ceased operations and is now in the decommissioning process

- UH Hilo Hokulea telescope, which is not currently operational and will be decommissioned and relocated

- VLBA, which is located off the summit and for which UH does not receive viewing time.

For the purpose of scheduling, the year is divided into two six-month “semesters”, usually February through July and August through January. Every six months, there is a call for proposals in advance of the upcoming semester. Any UH scientist is eligible to apply, including faculty, students and postdoctoral researchers. Sometimes the proposal will come from a single scientist, and sometimes from several working together. A Time Allocation Committee (TAC) administered by the IfA evaluates and ranks each proposal on the basis of scientific merit and technical feasibility. The TAC is composed of a peer group of UH astronomers, including faculty, students and postdocs. For each telescope, the TAC awards observing time based on the ranking of proposals submitted until the UH observing time is filled. In some cases, a portion of the UH observing time is reserved for various sorts of shared scientific use (such as collaborative campaigns, surveys, and short-term partnerships) prior to the TAC process. Each telescope is always fully subscribed; no UH observing time is left unallocated. There are typically 1.5 - 2.5 times more high-quality proposals submitted than there is time available to schedule them. Unsuccessful proposers can apply again in the next round.

During the observing semesters between August 2014 through January 2017, UH observing time allocated by the TAC was shared as follows:

- Forty (40) UH faculty were awarded a combined total of 62% of the observing time allocated by the TAC.

- Twenty (20) UH students were awarded a combined total of 23% of the observing time allocated by the TAC.
• Fifteen (15) UH postdoctoral researchers were awarded a combined total of 15% of the observing time allocated by the TAC.

Agreement for Enhanced Collaboration and Sharing of Viewing Time with UH Hilo

In April 2016, the IfA and UH Hilo signed a memorandum of agreement (MOA) to enhance cooperation in astronomy research and education, with the approval of the UH Mānoa Vice Chancellor for Research, the UH Mānoa Chancellor, and the UH System President. This provides for the UH Hilo Department of Physics & Astronomy to play a distinct and visible leadership role in important parts of the program, particularly hands-on education in the STEM pipeline.

To advance this objective, the MOA commits to allocate a portion of all UH time on the Maunakea telescopes to UH Hilo to engage greater participation and improved preparation of Hawai‘i Island students for professional careers. Specifically, it provides that:

• Ten to twenty percent of the observing time on the UH 2.2-meter telescope will be reserved for the undergraduate UH Hilo astronomy education program. UH Hilo will contribute to support ongoing operations by providing a staff technician.

• Up to 16 nights per year distributed over all other telescopes will be reserved for and administered by UH Hilo. This will be implemented in three steps, 6 nights in the first five years, 10 nights in the second 5 years and 16 nights thereafter. These nights will be identified by UH Hilo before the regular TAC process and excluded from competitive UH-wide allocation.

The campuses also agreed to work more closely in the operation of their astronomy programs. UH Hilo agreed to strengthen its astronomy program by hiring two additional faculty, one focused in education and public outreach. And IfA and UH Hilo agreed to cooperate more closely in the following areas:

• IfA faculty located in Hilo who teach in the UH Hilo astronomy program will be offered cross-appointments at UH Hilo. These IfA faculty will contribute half of their teaching duty to the UH Hilo program. Distance learning possibilities for Hilo students participating remotely in Mānoa classes, and personnel visits, between the two sites will be strengthened.

• UH Hilo faculty are invited to supervise graduate students in the UH Mānoa graduate program and will be offered cross-appointments at IfA. UH Hilo will recognize graduate student supervision in assessing its faculty workload.

• UH Hilo will lead education for hands-on aspects of observing, e.g., by developing a class for operating the educational telescopes including the UH 2.2-meter. UH Mānoa undergraduate students interested in getting hands-on experience can participate remotely in UH Hilo classes or visit Hilo for a period of time.

7
Statewide Astronomy and STEM Outreach and Education

The Maunakea Observatories and UH are involved extensively in outreach programs designed to engage K-12 students in preparation for STEM fields. In addition to ongoing outreach activities in classrooms and elsewhere, and individual activities such as science fair mentoring and judging, there are a number of more extensive high-profile programs:

- **Maunakea Scholars**: this program is a partnership between the Maunakea Observatories, University of Hawai‘i, and the Hawai‘i State Department of Education. High school students from Hawai‘i partner schools work for months with mentors from UH and the observatories to learn about astronomical data analysis and to formulate research proposals of their own. The students' proposals are professionally reviewed and the best of them are awarded observing time contributed from participating observatories allocations. This is believed to be the only program in the world that awards observing time to high school students on the very best telescopes anywhere.

- **THINK Fund and Workforce Pipeline Program**: TMT provides $1 million per year for The Hawai‘i Island New Knowledge (THINK) Fund, which is administered by the Hawai‘i Community Foundation. The THINK Fund awards grants and scholarships to improve educational opportunities for Hawai‘i Island students to prepare them for opportunities in science and technology-related fields. TMT has also committed to building a Workforce Pipeline Program to prepare Hawai‘i residents for the full range of positions available in the observatories, beginning in the early construction phase and aiming to prepare workers for positions as they become available when the telescope is operational.

- **Journey Through the Universe**: UH, the Maunakea Observatories, and community groups partner with the DOE to provide an intense week of programming, including teacher workshops, classroom visits by astronomers and scientists, public lectures, and family science nights. This year’s program, in March, included 70 astronomy educators visiting over 8,800 students in 300 classrooms in the Hilo-Waiakea, Pa‘auilo, Honoka‘a, and Waimea schools.

- **HI STAR**: Hawai‘i Student-Teacher Astronomy Research is a UH summer program that encourages middle and high school students to excel in the sciences by teaching them how to do astronomical research. Students who participate in the program develop projects that have a remarkable track record of success in state and national science fairs.

- **MANU 'Imiloa (Modern & Ancient Ways of Navigating Our Universe)**: this 'Imiloa program provides programs in schools and elsewhere across Hawai‘i Island. The interactive curriculum is inspired by the Polynesian Voyaging Society's Worldwide Voyage and explores the skills involved in non-instrument ocean navigation using observation of the positioning of heavenly bodies and other environmental conditions.

- **Kama‘aina Observatory Experience**: This program, which began last year, seeks to inspire a passion for astronomy and an appreciation for the cultural and
environmental future of Maunakea among Hawai‘i residents by providing opportunities to visit the summit, see world-class telescopes, and learn about the mountain in a holistic manner. The program has hosted community members at most of the summit observatories. Participants have appreciated the opportunity to learn more about Maunakea and the observatories.

- **Astro Day:** this one-day annual event in Hilo attracts thousands every year to celebrate both astronomy and Hawaiian culture by featuring exhibits, demonstrations, and activity areas organized by UH and all of the observatories.
- **Solar System Walk:** this event turns Waimea into a scale model of the solar system, with booths and activities to educate and entertain. It is a partnership between CFHT, Keck, and UH that for over a decade has been a signature astronomy education event for the Waimea and West Hawai‘i communities.

**Concluding Remarks**

Astronomy in Hawai‘i is the result of a long history and commitment by the State of Hawai‘i to the development of public-public partnerships that transcend international boundaries producing benefits across multiple values, some of which cannot and should not be measured in strictly economic terms. It is also the result of a commitment by the University of Hawai‘i, who understands these multiple benefits, to leverage the privilege we have as home to the premier astronomy site on the globe for the benefit of the State. The foregoing explains the foundation of where we have come from and lays out the framework of where we need to go to ensure even broader benefits across our communities.
MINUTES
BOARD OF REGENTS’ MEETING
June 28, 2010

I. CALL TO ORDER

Chair Howard Karr called the meeting to order at 9:00 a.m. on Monday, June 28, 2010, at the University of Hawai‘i at Mānoa, Campus Center Ballroom, 2465 Campus Road, Honolulu, HI 96822.

Quorum (13): Chair Howard H. Karr; Vice Chair Dennis I. Hirota; Artemio C. Baxa; Michael A. Dahilig; Ramon S. de la Peña; Clifford C. Dias; Chuck Y. Gee; Mark H. Fukunaga; James J.C. Haynes II; John C. Holzman; James H.Q. Lee; Eric K. Martinson; and Teena M. Rasmussen.

Excused: (2): Carl A. Carlson; Grant T.S. Teichman.

Others in Attendance: President M.R.C. Greenwood, Ph.D.; Vice President for Academic Planning & Policy Linda Johnsrud, Ph.D.; Vice President for Budget & Finance/Chief Financial Officer Howard Todo; Vice President for Community Colleges John Morton, Ph.D.; Vice President for Legal Affairs and University General Counsel Darolyn Lendio, Esq.; Vice President for Research Jim Gaines, Ph.D.; Associate Vice President for Capital Improvements Brian Minaal; Associate Vice President Karen Lee, Ph.D.; Honolulu Community College Chancellor Michael Rota; Kapi‘olani Community College Chancellor Leon Richards; Leeward Community College Chancellor Manuel Cabral; Hawai‘i Community College Chancellor Rockne Freitas; Interim Executive Administrator and Secretary of the Board of Regents Keith Amemiya, and others as noted.

II. PUBLIC COMMENT PERIOD

Interim Executive Administrator and Secretary Amemiya reported that the Board office received 30 written testimonies in support of the Mauna Kea Thirty Meter Telescope project and 9 written testimonies in opposition. Seven people signed up to give oral testimony.

Dean Au from the Hawai‘i Carpenters Union spoke in support of the telescope project, stating that the telescope will greatly improve science, technology, business, and education on Hawai‘i Island and help create jobs for island residents. The union’s motto, “Building Better Communities”, exemplifies what the Thirty Meter Telescope project will give back to the State.

Mary Begier, President of the Hawai‘i Island Chamber of Commerce, stated that its 700 members and 300 businesses on Hawai‘i island support the development of the Thirty Meter Telescope and pledge to continue to educate residents and visitors about its benefits, as well as to participate actively in the activities that surround Mauna Kea. Ms.
Begier also stated that the astronomy industry cares about the environment and will further enhance the island's cultural experience, as many of the scientists will come from different countries. Those scientists that will live on Hawai'i Island will help to ensure that communities will thrive, as astronomers’ families will attend schools and community events, and otherwise keep the economy moving forward.

Roberta Chu, speaking as a mother in support of the project, stated that she believes in the far-reaching educational opportunities that it will bring to Hawai'i Island and the rest of the State. Ms. Chu elaborated that in order for our children to succeed, high-tech, high-skill, and high-paying jobs must be created. The Thirty Meter Telescope is an example of what the future can bring the children of Hawai'i.

Jacqui Hoover, Executive Director of the Hawai'i Island Economic Development Board, asks that the Board help Hawai'i's children think in future-tense and allow them to come home to seek employment. The Thirty Meter Telescope project will allow the State's young scientists an avenue to return home for work.

Mike Kido, representing The Pacific Resource Partnership, spoke on behalf of Executive Director, Kyle Chock. The Pacific Resource Partnership represents over 240 union signatory contractors and the Hawai'i Carpenters Union. Mr. Kido stated that the Thirty Meter Telescope project has demonstrated its respect and reverence for the sanctity of its location by going to great lengths to help ensure its presence atop Mauna Kea will have as little impact on the mountaintop as possible, such as making a conscious effort to reduce hazardous materials, taking measures to help prevent the spread of invasive species, and the placement of the telescope in a location least likely to disturb native wildlife habitats and sacred sites. He continued by saying the project will not only benefit the worldwide scientific community, but will also directly benefit those of Native Hawaiian ancestry and the residents of the Hawai'i Island, and will create work for many unemployed construction workers.

Robert K. Lindsey, Office of Hawaiian Affairs, Hawai'i Island Trustee, presented written testimony from Office of Hawaiian Affairs Chairperson, S. Haunani Apoliona, stating that the OHA Board of Trustees adopted a motion on Thursday, July 2, 2009, to support the Thirty Meter Telescope project atop Mauna Kea.

Dale Olive, Waiakea High School robotics teacher, said he noticed from the start that the Thirty Meter Telescope project was special when proponents approached the school and asked what they can do for Waiakea High School. Because of the support, Waiakea has been able to offer outreach in micro-robotics, allow many students to go to Japan for the first time, and to work with elementary school students on brush-bots that use a vibrating pager motor attached to a toothbrush that helps students to learn circuitry. The first brush-bot competition was held at Imiloa last October, with fourteen schools across the State competing in robot jousting, sumo robots, and racing toothbrush robots. Thanks to the support of the Mauna Kea Thirty Meter Telescope project, students across the state have received invaluable lessons in science and engineering.
III. REPORT OF THE PRESIDENT

President Greenwood said she'd like to share some of the capabilities of the telescope project for Mauna Kea and what it would mean for the field of astronomy, our State, and the world.

President Greenwood stated that the Thirty Meter Telescope (TMT) project was the first project to undergo the Mauna Kea Science Reserve Master Plan's project review process in its entirety. She then acknowledged and thanked UH Hilo Chancellor Rose Tseng, the Office of Mauna Kea Management, led by Stephanie Nagata, the Mauna Kea Management Board, chaired by Barry Taniguchi, and the Native Hawaiian advisory group, Kahu Ku Mauna, for their hard work and constant diligence throughout this process. All steps in the project review process involved public input and review by the Mauna Kea Management Board. The University of Hawai'i is responsible for ensuring good stewardship of this special site for future generations, which has been the priority throughout the process and will continue.

The 30-meter diameter mirror of the Thirty Meter Telescope will have nine times the light collecting area of the world’s current largest telescopes, the Keck telescopes, which sit atop Mauna Kea. Compared to the Hubble telescope, the TMT will have 160 times the light collecting area and will be able to see details 10 times sharper at certain wavelengths. The TMT mirror will be comprised of 492 hexagonal segments, with each approximately two meters across.

TMT will look back in time over 12 billion years to watch the formation of the first stars and galaxies. It will probe the turbulent regions around super-massive black holes, including the one at the center of our own Milky Way galaxy, and will reveal the details of planets around nearby stars, including the possibility of life.

The benefits that will come from TMT go far beyond scientific results. The current telescopes represent a capital investment of close to $1 billion. TMT's capital investment will approximate $1 billion as well. The observatories currently provide over 500 quality jobs in a clean, high-tech industry that will increase by at least 140 jobs. Only a small fraction of these jobs are for astronomers. Most jobs are for technical and administrative services.

Astronomy diversifies the state's economy and gives local young people with scientific and technical talents a wealth of opportunities to realize their potential without having to leave home. In addition, TMT will provide funding for local education initiatives and workforce development programs.

President Greenwood continued on to the Interim Procurement Procedures, the next item before the Board. The Interim Procurement Procedures are based on the passage of Act 82, which was enacted this past legislative session, and is effective July 1, 2010. The Act provides the University with flexibility in relation to the state procurement code. President Greenwood thanked Chair Karr, Vice Chair Hirota, and
Regents Lee and Martinson, who were charged with reviewing the proposed interim procedures.

**President’s Status Report:**

**Honolulu Community College** - President Greenwood stated that on a recent trip to Nashville, Tennessee, she had the opportunity to meet with representatives of Belmont University. The Mike Curb College of Entertainment & Music Business at Belmont has been a key partner for Honolulu Community College’s MELE Program. Students who earn associate degrees in the program can easily transfer to Belmont University, where they can continue their education and get a bachelor’s degree in music business, audio engineering, entertainment industry studies, or songwriting.

Thanks to a generous gift from the Mike Curb Family Foundation, students at Honolulu Community College can now have access to professional recording studio equipment. The Curb MELE Studios at Honolulu Community College were recently completed with the installation of $175,000 worth of control room equipment, including a state-of-the-art Neve Designs 5088 recording console. The newly equipped studio will allow the teaching of advanced audio engineering courses in conjunction with Belmont University, and will serve as a gathering place for music business professionals.

President Greenwood then introduced distinguished guests, Dr. Jean Lou Chameau, President of Caltech, Dr. Henry Yang, Chancellor of UC Santa Barbara, and Dr. Michael Bolte, Director of the University of California Observatories/Lick Observatory and TMT board member. President Greenwood welcomed them each with a lei as they prepared to address the Board.

Dr. Chameau became involved in the TMT project and quickly started to visit Hawai‘i many times to introduce himself and talk to the many stakeholders in the State, to learn form the community, and to try to understand the issues in the community. He said the purpose was to propose a plan to develop a science facility on Mauna Kea that contributes to science and education, and to the local community and the State of Hawai‘i in general. The long term impact of the plan will allow astronomers and scientists on Hawai‘i Island to be key partners in a plan to get young people involved in math, science, and engineering. This project benefits the community and is respectful of the community. Construction of the Thirty Meter Telescope is expected to take 6 to 7 years and create jobs for many island residents.

Dr. Chameau continued by saying this project is probably the most important science project in the world for the next twenty years, as it will allow great discoveries in astronomy going back in time to almost the Big Bang. The telescope is expected to have a long term impact on physics, engineering, and technology. Hawai‘i, along with help from international partnerships with Canada, Japan, China, California, and India, will be the world’s center of science and technology.
Dr. Yang continued by saying that when he and his wife first came to Hawai'i Island, he made it a point, with the help of Chancellor Rose Tseng, to get to know the Hawaiian culture and to really listen to the community. He said Hawaiians were pioneers in astronomy, using the stars and double-hulled canoes to find their way throughout the islands, which will only be enhanced by the development of the Thirty Meter Telescope. The international and local partnerships will benefit jobs, culture, and science. Dr. Yang further stated that we will be able to peel back to the first development of stars in the galaxy and learn things not even imagined yet.

Dr. Yang thanked Senator Daniel Inouye and Jennifer Sabas for their support and explaining to the team the lay of the land. He thanked Chancellor Rose Tseng and the faculties of astronomy and language at UH Hilo. Dr. Yang further thanked community leaders Roberta Chu, Jacqui Hoover, Rachel Hong, Board Chair Barry Taniguchi, Mauna Kea Management Office Director Stephanie Nagata, and Mayor Billy Kenoi. Dr. Yang also thanked Keck Observatory Director, Dr. Taft Armandroff, and his colleagues, as well as Governor Lingle, former Board of Regents Chair Allan Landon, current Board of Regents Chair Howard Karr, former University of Hawai'i President David McClain, UH Mānoa Chancellor Virginia Hinshaw, UH Mānoa's Institute for Astronomy, current UH President M.R.C. Greenwood for her energetic and able leadership, and finally, Ed Stone of the TMT Board, Dr. Michael Bolte, Gary Sanders, and Sandra Dawson, and the rest of the TMT team in Hawai'i.

UH Hilo Chancellor Rose Tseng addressed the Board and asked that they approve the Thirty Meter Telescope Project for the Mauna Kea Science Reserve. The TMT is the first new project to go through the Master Plan 2000 process for approval. The process includes a very rigorous design and review process, and is the first project guided by the Comprehensive Management Plan and that followed the recently approved sub-plans. The TMT team came to the islands and listened to the University and the community to achieve balance between the project and the environment. The Mauna Kea Management Board voted to accept the TMT proposal and Governor Lingle accepted the final environmental impact statement. Chancellor Tseng then asked Stephanie Nagata to do the presentation on the Thirty Meter Telescope project.

IV. ITEMS FOR ACTION - Part A

Presentation for Mauna Kea Thirty Meter Telescope Project

Office of Mauna Kea Management Director, Stephanie Nagata, stated that the scientific power of a telescope is determined by its aperture, or the size of its mirror. Larger aperture mirrors collect more light from astronomical sources and, if blurring of the atmosphere is corrected, can make sharper images. Telescopes with larger primary mirrors can be used to study objects of a given brightness more quickly or to study more distant and fainter objects than can now be observed.

The Thirty Meter Telescope, on a clear night, can study targets that are farther away and fainter, and can provide a much sharper image. TMT-based observations can be
gathered 81 times faster than the Keck Observatory telescopes and 198 times faster than the Gemini North telescope. For the specific case of imaging planets or orbiting stars other than our own sun, TMT can deliver images in one night that would require nearly 2 years of nights at the Keck Observatory or 75 years at Gemini North. The TMT mirror is similar to the Keck mirror in that it is composed of individual segments operating as one. However, Keck has only 36 segments, while TMT will have 492 segments.

The 2000 Master Plan and the Board of Land and Natural Resources approved Decommissioning Plan state that astronomy development is limited to the 525 acre Astronomy Precinct, with the remaining area used as a cultural and natural preservation area. The Astronomy Precinct is defined as where development will be consolidated to maintain a close grouping of astronomy facilities, roads, and support infrastructure. It was designed to minimize impact to the natural and cultural resources of the summit region. The boundaries of the precinct avoid archaeological sites, limit visual impacts, and maintain an open view from Kukahau'ula looking toward the west.

The Master Plan delineated an area on the northern plateau as Area E, in which a next generation large telescope, such as TMT, could be built. Area E was designated as a location for the telescope because it would have minimal impact on existing facilities, minimal impact on the wēkiu bug habitat, it avoids archaeological sites, minimizes views from Waimea, Honokaa and Hilo, and is in close proximity to roads and existing infrastructure.

The Master Plan calls for all astronomy projects to undergo a review process, with the first step to classify the project as major or minor. Major projects, such as TMT, undergo a four-step design review process that includes:

1. Pre-design – all participants are given an orientation on the Master Plan’s goals and objectives, an overview of the design review process, and an introduction to the Master Plan design guidelines;
2. Schematic Phase – the developer provides conceptual drawings, including vehicular circulation and parking, overall building mass, heights, etc., and building characteristics, including architectural renderings;
3. Design Development – the developer provides detailed line drawings to scale of the concepts discussed in the schematic phase;
4. Construction documents are prepared and submitted as part of the Department of Land and Natural Resources permit application process.

In the case of TMT, the Mauna Kea Management Board recommended, and President David McClain concurred, that TMT be classified a major project. To date, TMT has completed the first three of the four phases.

The purposes of the design guidelines are to direct development in a manner that integrates the facility into the summit environment, being sure to avoid known cultural sites, minimize impact on the wēkiu bug habitat, minimize visibility, and to be located close to existing roads and away from existing facilities. Approximately 4.85 acres of land will be
disturbed, including grading and fill. The north and northwest area of the site will be graded similar to the natural contours, giving a more natural look to the site. There will be fill on the south side of the site to help minimize visibility from the summit region.

Visitor parking is designated in front of the building, though visitors will be able to park anywhere on the level site. For safety reasons, a continuous vehicular guardrail will be placed along the entire northern and western boundary of the site to prevent vehicles from driving over the edge.

The dome of the telescope is a calotte style, allowing for a compact design that can minimally enclose the 30-meter telescope. To keep the diameter of the dome to a minimum, TMT’s design has a clearance allowance of only twenty inches between the telescope and the dome. The telescope will have a focal ratio of 1, resulting in a dome size of 66 meters. Advances in technology and telescope design allow the telescope, with its mirror being three times the size of the Keck mirror, to have a dome smaller than the Keck dome. The total height of the dome is 180 feet, with an exterior radius of 108 feet. The summit support facility has been redesigned from a multi-story to a single-story structure, thus reducing the total gross square footage from about 41,000 square feet to about 18,376 square feet.

Another significant modification has been the reduction in the size of the diesel fuel storage tank, from 5,000 to 2,000 gallons, which results from the downsizing of the emergency generator due to the reduction or elimination of some mechanical and electrical equipment.

The Environmental Impact Statement (EIS) contains discussions on visual impact, which are based on a study looking at the site from various locations on the island, including the summit. The telescope’s location on the northern plateau makes the facility less visible from the summit and from certain locations on the island. The EIS incorporated the Comprehensive Management Plan, and the four sub-plans, including a discussion on decommissioning of the project. The process for negotiating a sublease between the University of Hawai’i and TMT is also included, and will require approval of the Board of Regents, the TMT Board, and the State Board of Land and Natural Resources.

The EIS evaluates potential impacts of building and operating the TMT within the framework of all applicable rules, regulations, and requirements, including the Comprehensive Management Plan and the four sub-plans. Some of the notable impacts identified are:

- Impact on spiritual and sacred quality of Mauna Kea from additional degrading of the Kukahau'ula historic property;
- The generation of domestic waste from staff operating the facility;
- Construction related activities, including dust, noise, and fire;
- Socio-economic impacts, which are expected to be beneficial through the creation of jobs, increased purchases of goods and services, and contributions to local and state tax revenues.
The Thirty Meter Telescope project plans to offer training programs in cultural and natural resources. The project also plans to minimize daytime activities to up to four days a year in observance of cultural activities. Further, the project plans to monitor the wēkūi bugs prior to, during, and following construction. Additionally, the project plans to coordinate with the Office of Mauna Kea Management the development and implementation of an invasive species prevention and control program, and coordinate the development of a wēkūi bug habitat restoration study.

Mitigation measures include implementing a ride sharing program to reduce vehicular traffic, employ dust, noise and fire control measures, and to develop and implement waste minimization and management plans.

Community benefits include an annual contribution of $1 million to The Hawai’i Island New Knowledge Fund, which will be locally managed with locally chosen directors to oversee educational programs. Other benefits include partnering with UH Hilo and Hawai’i Community College to develop a workforce pipeline to educate and train today’s students for future TMT careers, and to fill TMT operations positions from the local workforce.

There is also a commitment by TMT to paying sublease rent that will include monetary payments for mountain management. Observing time for the University of Hawai’i will be included in the rent plan.

Kahu Ku Mauna translates to “Guardians of the Mountain”, and is the Hawaiian advisory council to the Office of Mauna Kea Management. This council originally stood against the construction project for the Thirty Meter Telescope, and had strong reservations about building the project on the summit plateau. However, leaders of the TMT project demonstrated intentions of responsible tenancy that strive to meet the standards established by the Office of Mauna Kea Management. Kahu Ku Mauna now supports the project, as there will be responsible stewardship of Mauna Kea and policies that lead to a system of best management practices that encourage collaboration and the sharing of resources among the tenants.

The Office of Mauna Kea Management proposed to the Mauna Kea Management Board that they recommend to the Chancellor of UH Hilo that she submit a recommendation to the President and the Board of Regents to approve the TMT project. This recommendation is based on, among other things, the following:

- The design of the TMT facility, which follows the design guidelines described in the 2000 Master Plan;
- TMT incorporated suggestions and recommendations made by the design review committee and the Mauna Kea Management Board, which included the incorporation of the support structure and fixed enclosure into the surroundings to create a more natural look to the site;
- TMT is trying to minimize site disturbance by orienting the building’s long axis with the existing contours of the site;
• The project will be utilizing existing roads and infrastructure during construction and during operations;
• The facility’s location below the summit, as well as the dome’s design and color, help to reduce visibility;
• Impact to the wekiu bug habitat is limited;
• The Environmental Impact Statement incorporates mitigation measures;
• TMT is committed to carrying out decommissioning;
• There is anticipated substantial rent payment, which is the first for any observatory.

The Mauna Kea Management Board recommends that TMT and the University of Hawai’i enter into a binding agreement, whereby TMT agrees to comply with the mitigation measures described in the Environmental Impact Statement, along with a contractor checklist that will assist in monitoring mitigation. The Office of Mauna Kea Management shall provide periodic reports to the Mauna Kea Management Board on the satisfaction of mitigation conditions, along with any modifications or violations.

Director Nagata concluded by saying the trust that has been established between the Mauna Kea Management Board, Kahu Ku Mauna, and the Office of Mauna Kea Management is what brings her here today to ask the Board of Regents to approve the Thirty Meter Telescope project with the conditions guided by the Mauna Kea Management Board. Director Nagata finished by recognizing Sandra Dawson, TMT Project Coordinator, who has given the Office of Mauna Kea Management the utmost respect during this process.

Mauna Kea Management Board Chair, Barry Taniguchi, added that since the 10 years of the creation of the Mauna Kea Management Board, the Office of Mauna Kea Management and Kahu Ku Mauna, the Plan works and the process resulting in this presentation is working. Three years ago, the project had a strong chance of going to Chile. With everyone’s hard work and dedication, the project has remained in Hawai’i.

Regent Karr said there are a lot of legal issues that need to be discussed regarding the Thirty Meter Telescope project, and therefore asked that the Board convene in Executive Session to discuss these matters.

**VIII. EXECUTIVE SESSION**

Upon motion by Regent Dahilig and second by Regent Gee, the Board unanimously approved convening in executive session, pursuant to HRS §92-5(a)(2)(3)(4). The Board convened in executive session at 10:24 a.m., and reconvened in public session at 11:57 a.m. following a motion to come out of executive session by Regent Gee and seconded by Regent Fukunaga, which was unanimously approved.
VI. ITEMS FOR BOARD ACTION – Part B

Approval of the Thirty Meter Telescope Project

Regent Carlson moved to approved the Thirty Meter Telescope project as submitted in the action memo, subject to amendment of Conditions 1. and 4., as follows:

Condition 1: The TMT and the Board of Regents negotiate in good faith to secure substantial funding in the form of sublease rent that shall be applied specifically for management of the mountain. The Board of Regents shall consult with the Mauna Kea Management Board during the negotiations and will give them the opportunity to vote on whether to recommend approval of the terms; and

Condition 4: TMT and the University of Hawai‘i should enter into a binding Operating Site Development Agreement (OSDA) whereby TMT agrees to comply with all of the mitigation measures described in the Environmental Impact Statement. Failure to comply shall result in agreed upon remedies. The OSDA, along with a contractor’s checklist, will assist in monitoring mitigation.

Regent Dias seconded Regent Carlson’s motion.

Regent Gee said the project does carry risks and has a downside, but the upside far outweighs the downside. The University of Hawai‘i is a space grant university. As such, there is no choice but to approve the project for what it will mean for science and education, and the discoveries made may provide a means of unlocking some of the mysteries of the universe.

Regent Karr mentioned that Hawai‘i Island Mayor Billy Kenoi recently stated that this is a sacred science for a sacred mountain, and that Mauna Kea is the premier site for Hawai‘i. With TMT, science and technology come into our public schools and children will embrace it along with history, culture, and heritage. The best and brightest are coming to Hawai‘i to encourage the best and brightest here at home.

Upon unanimous approval, the Thirty Meter Telescope Project was approved.

Approval of the Interim Procurement Procedures

Vice President Howard Todo informed the Regents that in the 2010 legislative session, the Hawai‘i Legislature passed HB 247, which provides the University with a limited exemption from certain requirements of the state procurement code (HRS 103D). This bill was signed into law by Governor Lingle as Act 82 and becomes effective as of July 1, 2010.

The University supports this legislation because it restores, to a limited extent, the exemption from procurement law that the University was afforded from 1998-2004. During that period, the University used its procurement exemption responsibly, innovatively, and effectively. The University pioneered innovations in procurement, such as the first
e-Procurement system and the first P-Card system in the public sector in Hawai‘i, and increased the small purchase threshold limits. These innovations and changes were later implemented by the State.

Act 82 allows the University to continue its history of procurement innovation for at least a two year period. The University will be able to pilot and test improvements and innovations to the University’s procurement system which, if successful, could be adopted by the Legislature for statewide application.

Regaining limited procurement flexibility enables the University to more quickly start and complete much needed repair and construction projects. With a $368 million maintenance backlog systemwide and more than $250 million in important projects planned and ready to go, the procurement exemption will help enable the University to more expeditiously start construction of these much needed projects and help put men and women in the construction trades back to work, provide a safe and conducive learning environment for the University’s students and faculty, take advantage of the current low-cost construction environment that will save the University and State significant funds, and increase indirect overhead cost recoveries from the federal government to the extent that the capital improvements funds are used for repair, maintenance, and construction of research related facilities.

VP Todo continued by saying the President is in the process of appointing a Blue Ribbon Panel to review and make recommendations to the University regarding its procurement procedures.

The Board of Regents Interim Procurement Procedures Task Group has reviewed the interim procedures, and in their meeting of June 16, 2010, endorsed presenting the proposed procedures to the BOR with a recommendation for approval.

VP Todo concluded by saying the Office of General Counsel also reviewed the procedures and recommended several additional technical changes in order to comply with Act 82.

EXECUTIVE SESSION

Upon motion by Regent Gee and second by Regent Rasmussen, the Board unanimously approved convening in executive session, pursuant to HRS §92-5(a)(2)(3)(4), working through lunch. The Board convened in executive session at 12:15 p.m., and reconvened in public session at 1:40 p.m. following a motion to come out of executive session by Regent de la Peña and seconded by Regent Haynes, which was unanimously approved.

Approval of Interim Procurement Procedures

Upon motion by Regent Gee and second by Regent Lee, the proposed Interim Procurement Procedures were unanimously approved effective July 1, 2010, and includes
the changes proposed by the Office of General Counsel. Additionally, the Board agrees to President Greenwood appointing a Blue Ribbon Panel to review and make recommendations to the University regarding the procurement procedures.

Approval of Emerita Title for Chancellor Rose Tseng

Upon motion by Regent Dahilig and second by Regent Hirota, this motion was unanimously approved.

VII. APPROVAL OF PERSONNEL ACTIONS [Attachment B1 & B2]

Upon motion by Regent Holzman and second by Regent Rasmussen, the Board unanimously approved the items on Attachment B1.

Attachment B2 is for information only.

VIII. ANNOUNCEMENT

Chair Karr announced the next meeting is scheduled for July 15, 2010, at UH Mānoa’s Stan Sheriff Center.

IX. ADJOURNMENT

There being no further business, on the motion of Regent Haynes and second by Regent Rasmussen, and with unanimous approval, the meeting was adjourned at 1:45 p.m.

Respectfully Submitted,

Keith Y. Amemiya
Interim Executive Administrator and Secretary of the Board of Regents
MINUTES

BOARD OF REGENTS’ MEETING

FEBRUARY 20, 2014

I. CALL TO ORDER

Chair John C. Holzman called the meeting to order at 9:20 a.m. on Thursday, February 20, 2014, at University of Hawai‘i at Mānoa, Information Technology Building, 1st Floor Conference Room, 2420 Correa Road, Honolulu, Hawai‘i 96822.

Quorum (14): Chair John C. Holzman; Vice Chair, James H.Q. Lee; Vice Chair, Saedene K. Ota; Jeffrey Acido; Carl A. Carlson; John Dean; Chuck Gee; Ben Kudo; Coralie Matayoshi; Barry Mizuno; Randy Moore; Jeffrey Portnoy; Tom Shigemoto; and Jan Sullivan.

Excused: Eugene Bal (medical).

Others in Attendance: Interim President, David Lassner, PhD; Interim Executive Vice President for Academic Affairs, Joanne Itano, PhD; Vice President for Community Colleges, John Morton, PhD; Vice President for Legal Affairs and University General Counsel, Darolyn H. Lendio, Esq.; Vice President for Budget and Finance/Chief Financial Officer, Howard Todo; Vice President for Research, Vassilis Symos, PhD; Interim Vice President for Information Technology and Chief Information Officer, Steven Smith, PhD; Associate Vice President for External Affairs and University Relations, Lynne Waters; UH Mānoa Chancellor, Thomas Apple, PhD; UH West O‘ahu Chancellor, Rockne Freitas; Leeward Community College Chancellor, Manuel Cabral; Honolulu Community College Chancellor, Erika Lacro; Executive Administrator and Secretary of the Board of Regents, Cynthia Quinn; and others as noted.

II. APPROVAL OF MINUTES OF NOVEMBER 21, 2013 AND JANUARY 21, 2014 MEETINGS

Chair Holzman indicated he had amendments to the November 21, 2013 minutes that were submitted by Regent Matayoshi and asked if there were any other revisions to the minutes.

Regent Moore added amendments to page 5 to state a third of the employees at the Pacific Disaster Center are Maui College graduates and on page 9 to state the sustainability policy. Regent Matayoshi added that on page 10 it should state $28M of annual debt service.

Regent Dean moved to approve the minutes of November 21, 2013 as amended, seconded by Regent Mizuno, and the minutes were approved by unanimous vote.
Regent Moore moved for approval of the January 21, 2014 meeting minutes, seconded by Regent Dean, and the minutes were approved by unanimous vote.

III. PUBLIC COMMENT PERIOD

Executive Administrator and Secretary of the Board of Regents, Cynthia Quinn announced that distributed to the Board are testimony regarding the item for action regarding Mauna Kea Sublease received by the Board office by email and U.S. Mail by 8:30 a.m. Other late testimony after that time period will be distributed to the Board at a later time. She also indicated that only one person signed up to give oral testimony, and announced to the audience that if anyone else wanted to testify to please sign up on the sign-up sheet. She then read aloud the names and position of those who submitted written testimony that was received by the Board office by 8:30 a.m.:

In Opposition:

1. Janna Ahu
2. Michael Alves
3. Diamond Badajos
4. Brandi Balutski
5. Cheryl Burghar
6. Brandy Caceres
7. Deandra Castro
8. Lianne Charlie
9. Amberlee Cotchay
10. Patrick Decayanan
11. Una Flux
12. Alysha Franco
13. Konia Freitas
14. Dee Green
15. Wendy Green
16. Saisamoana Price
17. Lesley Laukea
18. Jesse Kaho‘onei
19. Haley Kailiehu
20. Shaelene Kamaka‘ala
21. Natalie Kurashima
22. Jennifer Nadeau
23. Bryan Kuwada
24. Ilima Long
25. Pūlama Long
26. Keali‘i MacKenzie
27. Julia Morgan
28. Kēlli‘i Nixon
29. Emma Oto-Pale
30. No‘eau Peralto
In Support:

1. Roberta Chu
2. Jay Gibson
3. Saeko Hayashi
4. Carolyn Kaichi
5. Lilikala Kame’elehiwa
6. Vivian Landrum
7. Barry Mark
8. Stephanie Nagata
9. Gregory Mooers
10. Mark Nakashima
11. Barry Taniguchi
12. Peter Young
13. Ka’iu Kimura

Secretary Quinn announced that four people signed up to present oral testimony.

1. Peter Young, testified in support of the Mauna Kea Telescope and referred to his written testimony. He testified about the identifiable use of astronomy to Hawai’i and the world, that it will help generate over 100 million dollars a year, and that the area would be returned to its original condition at the end of the lease when the telescope is decommissioned.

2. Jonathan Osorio, Professor of Hawaiian Studies, testified in opposition the sublease, arguing that the presence of the telescope is intrusive to Hawaiian cultural practices. He stated that there has been a large amount of testimony against the sublease, and that there are scientific uses other than telescope that have been turned away.
3. Jacob Aki, student, testified in opposition to the Mauna Kea Telescope project arguing that he believed that Mauna Kea is one of the only sacred places left that has not been desecrated. He believes it is a significant cultural site to Hawaiians. He believes the “future generations” do not want this area to be desecrated.

4. Laupaka Fried, presented his testimony in Hawaiian and English language, and then presented the Board with a signed petition of over 100 students in opposition to the Mauna Kea Telescope. He testified that he believed that the action regarding the Mauna Kea Telescope is an example of a policy of that continues to marginalize and dismiss the culture and perpetuates the capitalistic establishments created over 100 years ago that exploit land.

5. Sterling Wong, Policy Manager of the Office of Hawaiian Affairs, testified in opposition to the sublease and submitted written testimony. His main concerns were that Mauna Kea is economically, environmentally, and culturally significant lands, that are also Public Land Trust lands for which the Board of Land and Natural Resources and UH have obligations to manage for the beneficiaries of the land trust to Native Hawaiians. They appreciate that TMT sublease is being charged significant rent but do not know how much revenue is being generated by the telescope. He cited CalTech and NASA revenue figures to assume that the TMT telescope will generate greater revenue. They could not find any formula for how the sublease rent is being calculated.

Executive Administrator and Secretary of the Board of Regents, Cynthia Quinn asked if anyone else in the audience wanted to present oral testimony, and Chair Holzman encouraged those interested to present:

1. Illima Long, student, testified in opposition against the TMT Telescope and presented the Board with further signed petitions. She gave a summary of the reasons for opposition such as the environmental impact on the fragile ecosystem from construction, and she believed she was genealogically connected to the mountain and it is a source of her identity and spirituality. She stated she believed that the issue is about who has the voice and authority to determine what happens to Mauna Kea and who has the power to silence that voice.

2. Andre Perez, graduate student, testified in opposition to the development of Mauna Kea because it is contrary to the strategic plan that highlights UH as a Hawaiian place of learning and grounded in Native Hawaiian knowledge because to developing Mauna Kea is not conducive to UH and the Hawaiian community.

3. Pūlama Long, student, testified in opposition to the telescope because she believed there was a lack of public input and that there should be more dialogue share.

4. Joshua Irvine, PhD student, testified in opposition to the telescope because he
believed that the project is not aligned with Hawaiian values.

5. No’eau Peralto, PhD student, testified in Hawaiian and English language, in opposition to the telescope because it conflicts with his cultural, research preservation of Mauna Kea.

6. Jim Hayes, former employee of Hawaiian Institute of Physics, testified in support of the telescope. He explained that he was formerly involved in the project and that the TMT Board has taken steps to interact with the community and address community concerns. He stated they have recorded all the community concerns and how they have tried to address them all.

7. Dan Purcell, testified in opposition to the telescope and commented that because the Hawaiian language being the official language of the state of Hawai‘i, there should be a translator present for those who present testimony Hawaiian, so that the Board can understand what is being said.

There being no further testimony, Chair Holzman announced that the Board had a number of items on the agenda and the approval of the Mauna Kea Sublease and Non-Exclusive Agreement with TMT International Observatory, LLC would first be taken up in Executive Session and then discussion and voting would be done in open session between 2:00 to 2:30 p.m. All were welcome to stay but also could come back later.

IV. REPORT OF THE PRESIDENT

Interim President Lassner began his report by welcoming everyone to the new Information Technology Building. He invited everyone to tour the facility. He thanked Interim Vice President for Information Technology and Chief Information Officer Steven Smith, and the UH Foundation for the reception for the President’s Club, donors who donate at least $1,500 a year to the university. Interim President Lassner said there were over 300 guests, food and drinks were provided and a tour of the building was conducted. He noted they secured one naming opportunity, and received a donation at the event.

Interim President Lassner reported that last week was “conservation week”, and announced that Hawai‘i has been selected as one of two finalists to host the World Conservation Congress, which is the largest conservation related event in the world that meets once every four years. Istanbul, Turkey is the other finalist. The International Union for Conservation of Nature (IUCN), headquartered in Geneva, was visiting Hawai‘i last week and Interim President Lassner met with them on the island of Hawai‘i. The governor hosted a reception at the convention center, and another reception was held at the Bishop Museum. He believes that IUCN left extremely favorably impressed with what Hawai‘i has to offer and how the entire state pulled together on the visit. The governor was lead and William Aila from DLNR, acting on his behalf, along with the university, the National Tropical Botanical Garden, Bishop Museum, and many other organizations worked hard on the visit and the UH Foundation was a great partner.
Interim President Lassner mentioned the National Board of the Smithsonian was also in Hawai‘i, and they signed an MOU with the university regarding the Tennenbaum Marine Observatories Network. They will be partnering with Coconut Island, Hawai‘i Institute of Marine Biology and some of other our systems to share some of our data with the Smithsonian. This is an endowed effort by Mr. Tennenbaum; and G. Wayne Clough, Secretary of the Smithsonian, which is considered a cabinet level post, who were also visiting along with former Regent Al Landon, an emeritus member of the national board. It was a great event and an opportunity to partner with one of the world’s preeminent institutions. The university is one of the first sites outside the Smithsonian property to sign a partnership agreement.

Interim President Lassner reported that the UH officers, vice presidents and chancellors of the four year campuses, had a retreat last month at the IT building before it was fully open. They revisited the strategic directions and recalled that the Board had a conversation on those directions over the last summer. He indicated they were trying to strengthen and articulate the directions the Board has provided to the interim president and the university in the areas of graduating more students, innovation, restoring our facilities, and increasing accountability and transparency. He said they also discussed the cost forum that Regent Carlson pursued last year with them. There is a draft document that will be ready to share more broadly and publicly by next month.

Interim President Lassner said they are also starting searches for the two vacant vice president positions the Board approved—the Vice President for Administration and the Executive Vice President for Academic Affairs. There is no intention to make an appointment if a new president was about to be appointed. However, if the vice president finalists are available and the president is not, then they need to move ahead with filling those positions. The search committees for those positions will include all campus units, faculty, students, and staff. They will take the usual diversity of perspectives into consideration and also include community representation. He will keep the Board informed as those searches progress.

Interim President Lassner reported that Fitch Ratings, one of the three major ratings agencies, has reaffirmed the university’s rating as AA. He thanked VP Todo and Director of Budget and Finance Kalbert Young for their work. Fitch reviews the university’s ratings biannually. Fitch ranked UH as having “very high credit quality, strong capacity for payment of financial commitments, not particularly vulnerable to foreseeable events” based on their assessment and conversation of our strengths. B&F Director Kalbert Young called it “very respectable.”

On the academic front, Interim President Lassner reported that Accrediting Commission for Community and Junior Colleges (ACCJC), which accredited six of UH’s community colleges in January removed Honolulu Community College (HCC) from warning status. He noted the Board may recall that HCC was placed on warning status last year and congratulated Chancellor Lacro, who was seated in the audience, for the wonderful news. He added that all of the community colleges now are in a state of full
Interim President Lassner continued with a legislative update. He addressed two specific themes occurring at the Legislature. First, the major financial initiative involves restoring funding for faculty salaries, that is highly aligned with both UHPA, which is actively lobbying on behalf of this, and B&F on behalf of the governor who is in strong support. This initiative is being brought before the major subject matter and money committees with strong support from UH, UHPA and the State of Hawai‘i. He added that other labor unions are supporting this initiative and testifying in writing because they do not want to see the notion established that a collective bargaining agreement entered into is not funded by the State. Interim President Lassner said it is moving well and there is some discussion about the extent to which the two elements of that restoration and the 3% raises will be funded in a separate bill or in the budget. He hopes that it gets worked out between the House and Senate in the next few weeks. He said there have been some alarming bills introduced that could affect the university's land holdings in different places, primarily UH West O‘ahu, but there are some other possibilities and they are working hard to prevent any of that happening. He credited Regent Kudo for chairing a task group on legislative strategy and noted the participation, leadership and support of the university at the Legislature is welcomed, noted and really quite effective. He thanked and congratulated the regents for taking this task on. He added there was a markedly different tone at the Legislature this year, and while there are issues, it is respectful and productive.

Report of Host Campus

Chancellor Apple reported that the student success rate is on a very positive trajectory and the 6-year graduation rate was above 55% the last year. The graduation rate for Mānoa was in the 69th percentile of public universities, with Harvard in 100th percentile, which means Mānoa would be third best on a scale of 10. The graduation rate for Mānoa was at the 58th percentile for all universities and again at the 63rd percentile in terms of first-year retention, which is good. Mānoa is also doing very well in terms of the accumulated debt of students relative to their earnings upon graduation. The challenge for Mānoa is the cost per student, which is higher than most public universities.

Chancellor Apple noted that unsuccessful registrations have plummeted to almost zero. He said they have made a huge effort here and extended thanks to the deans and the vice chancellors of academic affairs offices for their work.

Chancellor Apple then reviewed budgets regarding sources, efficiencies, planning and reserves. He stated that this year, for the first time ever, they received slightly more money from tuition revenues than general funds so basically, they are equally funded.

Chancellor Apple said the NCES (National Center for Educational Statistics) recently sent all campuses some guidelines on their peers. UH is about 220% more productive on research than their peers. He then explained that of the $17,000 for instruction per
student, about 4.5% is for faculty research activities. UH research faculty are paid full-time to do research, and none of their peers to do that. One of the reasons UH is so successful in bringing in between $300M to $400M a year in external funds for research is because they have a competitive edge in the research arena because they pay faculty full-time to engage in research.

Chancellor Apple then showed recent data from collegemeasures.com that ranks UH at 51st in the country with closest peers being Virginia, Indiana, Florida, Miami, and their cost per degree is high.

Chancellor Apple reviewed the expenditure summary for fiscal year 2013 and noted that tuition was $198M and general funds were $196M. About one-third of the money was spent on faculty, and overall personnel expenses are approaching three-fourths of the revenue. Mānoa funds graduate students at $14M and spends about $5.5M on student health.

Chancellor Apple said there were a lot of student jobs on campus and noted that Executive/Managerial (E/M) salaries are at 1.6% of their budget, which is a very low number compared to their peers. This corresponds roughly to 2.25% of all of salaries. Approximately $44M a year is spent on utilities, which equals to almost $3,000 per student, or one-third of tuition.

Chair Apple mentioned the student to faculty is ratio is between 11:1 and 13:1 and their peers are between 16:1 and 18:1. He said UH was faculty rich but they just needed more students. They can handle more students and need to encourage more to come, particularly from international realms. They are incredibly lean. He also noted that deferred maintenance staff is low and being so lean in some areas such as deferred maintenance actually hinders them.

Chancellor Apple then talked about the reserve policy and noted that after carrying over a reserve that resulted in $100M sitting in the tuition and special funds reserve last year, they are now running a deficit. Mānoa must get more revenues or cut expenses. By far the most important goal for increasing revenue is by attracting more students. They had approximately 18,000 undergraduates in the late 70s and currently there are about 14,600. Mānoa has the capacity, but needs more student housing, especially for international students. Another area that can be explored is doing more to make the federal government pay for research grants.

Chancellor Apple expressed his hope that the Board found this information useful and interesting, and then opened the floor for comments and questions.

Regent Gee said he found the statistics very interesting and informative. He asked about the impact of the Board’s policy, going back a half dozen years or so, of encouraging the system to act as a system and having the community college students transfer to Mānoa and whether it reduces the amount of tuition they would receive. He also asked what the outlook for that was given our demographics and if the university
had a handle on the forecast of kids coming out of the high schools that would choose Mānoa or any of the four year colleges instead of going to the mainland.

Chancellor Apple responded there had been tremendously positive results from working as a system. In any fall semester, approximately 40% of new students coming to Mānoa are transfers and a majority of those are coming from their own community colleges. There is a sizeable transfer from California universities because UH tuition is affordable, especially the WUE tuition. He noted that transfer issues occur with larger number of upper level students that has prevented them from transfer students that they can graduate in four years. He noted that a major thing they have been working on this past year is making sure the various units have the people they need in the different majors. There has never been any direct connection or incentives for various departments, programs, and colleges to have students. They will be changing that, but he noted it was a difficult conversation to have because there might be a redistribution of revenue. He said in general, the expenditures they make per student or per degree in the various different colleges can vary by faculty. Budgetary policies within the campus that have distributed revenue should have at least some motivational factors to encourage students to graduate and they want to make sure there are rewards for students that graduate.

Regent Matayoshi expressed her concern about the use of reserves for operations. Chancellor Apple explained that he expressed reserves as a percentage of the operating budget only to show the reserves based on the operations. Regent Sullivan expressed similar concerns.

Regent Matayoshi reiterated her concern and asked for an explanation on how the $20M in reserves would be used. Chancellor Apple said he shared Regent Sullivan’s concern with expenses exceeding revenues and they have been working frantically on things and there has been a lot of austerity going on. He noted that several administrators have heard about the austerity and they are not hiring like they used to. He indicated they have been doing other things to make sure they can get by and keep their budget on a stable course. He added that they had a surprise last year in a transfer to take care of, so this was not a good trajectory to be on. He reiterated that they were doing everything they could to grow revenues and cut expenses.

Regent Porlino referred back to the statistics on the university’s peer groups and asked if Chancellor Apple could elaborate on the public findings for those schools. Chancellor Apple explained the percent distribution of core revenues for their peers is 20% while Mānoa is at 19%. Their peers receive 19% from their state appropriation while UH gets 24%. Government grants are at 46% while their peers are at 29%. Their peers receive gifts, private gifts, and grants at 9% while the UH received 5%. State collaboration is a large percentage, though that has dropped from $290M to $190M. In 2009, there was $2 from the state for every $1 from the students, and in just 5 years it is now 1:1. He thinks that ratio could actually turn around in 5 years. It does encourage them to attract and retain students. International students bring $23K which helps keep tuition down for in-state students. Mānoa has a higher tuition that other places but it
comes with an obligation to provide more financial aid to all qualified students.

Vice Chair Lee asked Chancellor Apple what the perception of foreign students was and what kinds of efforts were being made to attract more international students. Chancellor Apple stated that international attraction is much higher at the graduate level than the undergraduate level. Most of the science and engineering programs are predominantly international, at the undergraduate level it is a smaller number. He added that there were a number of initiatives to recruit internationally.

Regent Kudo asked for clarification on the cost per student breakdown between tuition and general funds. Chancellor Apple said it was $9K for in-state, $20K for out-of-state, and $13.5K for WUE.

Regent Kudo asked if it is $9,000 per local student, how much of that would be general funds. Chancellor Apple explained that on average, tuition and general funds are virtually equal this year, and therefore the expenditures are about 50/50 or about $10K. Regent Kudo said that meant they were looking at an approximate loss of about $3,000 per student and Chancellor Apple responded that was exclusive of the 20% of tuition given in financial aid.

Regent Gee commented on the ability to track international students. In the past, there had always been public concern about international/out-of-state students, despite the fact that they pay a much higher tuition differential. The university has a policy that limits the number by percentage of international students, but in order to win public support there needs to be more communication from the campus itself. The local in-state students truly benefit from that rich mix of international, mainland, and local so they need to do a little more ground paving and make a solid effort to attract more mainland and international students.

Chancellor Apple agreed with Regent Gee and said it was a tremendous benefit to have international students here and it enriches the experience. However, doing so creates some enormous competitive advantages over other universities when recruiting throughout Asia and the Pacific Islands.

Regent Sullivan thanked Chancellor Apple for trying to shed light and presenting the good as well as the challenges. She expressed concerns about the presenting of the cost per degree at Mānoa and the need for a better system to account for all the costs of the System. She said the Board should look at overall system costs and how to allocate those costs to the campuses otherwise it appears as a $74K cost per degree. This is not a true cost because the system cost per degree isn’t even considered. Her second concern was the trend in the carryover and she would like to see the plan of how this is going to be addressed on the revenue side and the expense side.

Chancellor Apple responded that they have been spending many hours trying to make sure they have a plan to stabilize the budget and they have a short term plan and a long term plan for efficiency.
Interim President Lassner added that they believe the data submitted prorates the cost into the campuses based on the methodology.

Chancellor Apple pointed out that there are some system costs covered by Mānoa that Mānoa uses such as the legal and procurement offices. Mānoa also covers some costs for fiscal as well and houses systems on campus and pays utilities.

Chair Holzman noted that since Chancellor Apple presented salaries for faculty who do research involve 25% of the cost of $19K to $20K year education at Mānoa, what if anything is going to be addressed for many of those faculty who are tenured and do not teach. He said on most campuses researchers seek money from outside the university and a large percentage of their revenues come from outside to support the researchers. He added that if they are tenured then it is a fixed cost.

Chancellor Apple replied that they are having the difficult conversations and in the conversations he has had with the faculty he points out that he was always expected to bring a sizeable fraction of his salary when he was part of the research faculty. There is question about having full time R faculty here who get a full salary and do not have to write their salary into their grants. He said it was an advantage for the university to recruit talent and they are way ahead of their peers in terms of research, such as SOEST and IFA that are world renowned and partly because of this policy. It has a lot of merit in that regard, especially when they are almost 100% funded by general funds. He said they have some units that are moving in that direction, and they have the option when they bring in new people to change the expectation over time. He noted the dean of the medical school had been doing this and they are looking at the cancer center. Over time, that will pass down so eventually it is understood that while a faculty salary may be in the $200K, they should not expect to get more than $75K to $100K from the university. He added that was standard practice at other universities.

Chair Holzman asked if Chancellor Apple could update the Board and the Academic Affairs Committee and Chancellor Apple agreed to do that.

At 10:53 a.m. the Board took a break and reconvened at 11:07 a.m.

V. REPORT OF THE UNIVERSITY OF HAWAI'I FOUNDATION

University of Hawai'i Foundation (UHF) President Donna Vuchinich expressed thanks to the Board of Regents, Interim President Lassner, Interim Vice President for Information Technology and Chief Information Officer, Steven Smith and the IT staff who did a superb job in showing off the capacity and educating over 300 people about the ability this new IT facility. They highlighted how the facility provides for students and particularly researchers in computing and so many areas of excellence where there is large data that needs to be maintained, managed and consolidated for security. She indicated this was a great facility and they are very proud and everyone who came out was extremely excited to see this facility and be part of it. She referred to Interim
President Lassner’s comments about the work with IUC and noted that everywhere they went last week they were met by alumni who were working with DLNR or other land conversation groups and were always the first to say how proud they were to be a UH alum. They also shared how much they loved the foundation, how many of them got UHF scholarships, and how they had furthered their education with advanced degrees or been promoted at their work. She said it was inspiring to hear the stories last week about the work that faculty does and the work philanthropy and many other forms of support provide to our community.

President Vuchinich then provided a report on the status of the UHF through the end of December 2013, which closed at $28.3M, on par with normal years. She noted they try to bring about 40% of their revenues in by December, and as of February 19 they were at $32.6M for this campaign year, with a goal of $61M. They are moving towards that goal in steady fashion.

Regent Dean asked how a 5 year gift or pledge is accounted. President Vuchinich responded that generally on gifts and pledges the total 5 year amount would be counted for accounting purposes, but for accounting only the cash would be counted. For this purpose she noted it would be the full amount.

Chair Holzman announced due to time constraints with additional committee reports they asked President Vuchinich to present on a quarterly basis rather every month, which still allow them to catch trends and that would be sufficient. He added that if UHF had anything of importance that the Board needed to know right away they would be glad to make room.

President Vuchinich said that as required by their contract, they would continue to submit monthly reports to the Board with in person reporting done quarterly.

VI. REPORT ON GIFTS, GRANTS, AND CONTRACTS

VP Syrmos said he attended breakfast at Waialae Country Club hosted by Shidler College of Business. Dean Roley also attended, as well as Susan Yamada, the Executive Director of the Pacific Asian Center for Entrepreneurship (PACE) program, which launched a $2.5M fundraising campaign. He said it was a great event and thanked everyone for their support and noted that he brought materials if anyone else was interested in supporting PACE.

He said they were going ahead with recruiting a new director for the Office of Technology Transfer and Economic Development (OTTED), with Dean Roley chairing the search committee and Mr. Barry Weinman serving as co-chair. He asked that everyone help them get the word out and noted that Dean Roley and Mr. Weinman would be reaching out to several Board members.

VP Syrmos summarized the extramural sponsor awards for the closing of the first half of the fiscal year ending December 31, 2013, which shows $241M, down 4% from
$252M last year. He said they did expect this, and also the Federal government was closed for 2 weeks, and expected to catch up over the next six months. He noted the January extramural sponsor awards were down compared to last year, but usually the first quarter revenue is quite small and small fluctuations in grants make all the difference. He said they expect they will catch up in February or March because they are in negotiations for a few large contracts.

Regent Dean said that he and Vice Chair Lee attended the $2.5M PACE fundraising kick-off and it is a good example of the university working together, beyond just the business school. He said Dean Roley and Executive Director Yamada talked about reaching out to other parts of the university to work together. He thinks if the university is going to do well it is critical they work more and more together to make an impact. The more they can take science and technology and then find efforts—SOEST did a great job of presenting—and commercialize that, then the university is really building long term value for all the people of Hawai‘i.

Vice Chair Lee added that it was an excellent presentation and is a great example of something that needs to be done going forward to help the economy. He said it was great to see whole university working together. He noted he asked Director Yamada to give a presentation to the full Board when time permits. Regent Dean agreed and thanked VP Syrmos for the work he was doing.

VP Syrmos said the next item for agenda is an indemnity clause for a $250K grant from the Michael J. Fox Foundation, which has to do with the study of certain protein enzymes and how they affect Parkinson’s Disease. The research is being done by Dr. Nicholas James from the Department of Cell and Molecular Biology at JABSOM and involves data analysis from spectroscopy data.

Regent Moore moved for approval of the indemnity provision, Regent Dean seconded, and the motion was unanimously approved.

VII. COMMITTEE REPORTS

a. Report from the Committee on Academic Affairs

Regent Gee reported that the committee met earlier in the morning to discuss Agenda Items 5 and 6 this morning and said it was a great pleasure to approve the UH Foundation request to establish two new chairs. The chairs will be funded by the single, largest bequest from a single donor of $9.2M. The donor did specify where the money should go and two of these chairs are in strategic areas for the University of Hawai‘i at Mānoa, a chair/professorship in the School of Ocean and Earth Science and Technology (SOEST) and director’s chair at the Institute for Astronomy (IFA). These are selectivity areas of excellence for UH Mānoa. Regent Gee mentioned that chairs lend prestige to universities, especially in building up the reputation of those departments, so having each chair funded with $2M worth of endowment, plus $80K of immediately expendable funds to establish those chairs is a very positive thing. He said
the committee was a little concerned about whether these chairs would require requests for additional positions and they do not, as existing positions would be used. The director’s chair in astronomy will be occupied by the director of the IFA himself, and the other chair in SOEST will be occupied by either an existing professor at associate rank or higher or through recruitment.

b. Report from the Committee on Budget and Finance

Regent Sullivan said there were four items on the committee agenda. The first item is the new financial management report that is being worked on that Interim President Lassner mentioned earlier, which will eventually replace the Board’s standard financial report. Although not in the Board materials, it was reviewed in committee. She then gave some highlights. First, several committee members noted a large increase in our expense, primarily from compensation and VP Todo noted it was due to salaries and UHPA and other contract obligations. The second item of note was the unencumbered balances. As of the end of September there was $109M of general obligation bonds that had to be encumbered by the end of June. There was also $34M worth of revenue bonds that have not been encumbered or utilized. She thinks at some point this has to be addressed on a broader basis, in particular the $23M of revenue bonds not being used by the University of Hawai‘i Cancer Center on which we are paying debt service since 2010. The third item is the biennium budget policy. Regent Sullivan said that University Budget Director Laurel Johnston did a draft schedule and noted that for those regents who are new to the Board, it is Board policy to adopt this policy paper, which is supposed to happen at the next Board meeting. The purpose of the paper is to set the blueprint for the biennium budget. The next thing that will happen in May after the legislative session ends is the Board will have to review the final outcomes of the session and the impact on the budget assumptions. In September, the goal is to bring the fiscal year 2015-2017 budget requests to the Budget & Finance Committee and the full Board. She said that to date, the policy discussions have begun and they welcome input from the rest of the Board, and will focus on five ambitious points.

1. To integrate academic programs and priorities for the upcoming year into the budget;
2. Include facility maintenance, operating costs and utility costs into the budget for existing facilities as well as planned facilities;
3. To implement the reserve policy and there are a lot of complexities around how that will happen;
4. To establish metrics that will allow us to measure efficiency, delivery of service, etc.; and
5. To include tuition piece that integrates with Regent Moore’s and other board members on the task group.

She reiterated that they welcome any input the rest of the Board may have on these items they are focusing on.

The last item was the Investment Task Group report the committee reviewed, which
was headed by Regent Dean, and Regent Mizuno participated. She thanked them for their participation.

Chair Holzman asked VP Todo for the status of a reserve policy. VP Todo responded the work continues. It is complicated and part of the plan is to be iterative as they work on the budget and see how that plays into how they develop the budget, which will give them more insight into what kind of policy might work. They need to simultaneously develop a budget and address the reserve issue that will inform them better as to what kind of formal executive policy can be implemented. VP Todo confirmed that there is a Board policy, so the focus is now on how they can implement the policy on a detailed basis.
c. **Report from the Committee on Planning & Facilities**

Regent Mizuno reported that the committee met on February 5 and addressed some interesting projects came up including two private/public partnerships. The first item was a student housing project at UH West O‘ahu. The committee did approve going forward with the call for offers which doesn’t require Board approval since they are only seeking offers. The second was the University Village II at UH Hilo, which is more the commercial end of the new housing facility that came up this past summer and the call for offers was approved to seek a possible developer for that area. He clarified that if there were contracts it would need to come back to the Board for final approval. He added that they also had an executive session and one item would be coming up today which was extending the lease for five years on the Adult Student Housing at UH Hilo. He noted this had come up previously for a one year extension, and the committee is recommending the Board approve granting an additional 5 year extension. The other executive session item was the TMT lease, which is going to be discussed later on today.

Regent Shigemoto asked if there was a difference between call for offers and requests for proposal (RFPs). Regent Mizuno responded there was a difference. Interim President Lassner explained RFP is the term used in the procurement code when something is bought on non low-bid and call for offers is asking someone to come in and build on our lands to serve a specific purpose, no buying or procurement is involved.

Regent Sullivan thanked VP Todo and Chancellor Apple for the meeting with Regent Mizuno and herself with the staff from the Office of Capital Improvement and the Office of Facilities and Grounds. She said they had some good discussions and it drove home the depth of the challenge being faced in executing deferred maintenance. She hopes it does not get lost that everybody is pulling together to promote the request for deferred maintenance funds although, the position counts are needed. This is in UH Mānoa’s request and while she does not think those positions are enough, and are absolutely essential. She does not want that request to get lost in the context of just pushing for revenue bonds because she is afraid if that request cannot be accompanied with staff then they will definitely not be able to execute.

Chair Holzman recollected that there were 17 positions. Chancellor Apple clarified that there are 22 positions at the system level and 17 at Mānoa being requested.

d. **Report from the Committee on Personnel Affairs**

Regent Matayoshi reported that the committee met on February 6 and had a teleconference with Nancy Stepina-Robinson of MGT of America, Inc. to further discuss the executive/managerial salary survey findings. She noted there will be one more meeting before the committee decides on recommendations to the Board.
Chair Holzman asked for clarification if Interim President Lassner would get back to the committee on executive/managerial salaries in March. Regent Matayoshi said she hoped to, but was not sure the university housing issue would be ready.

Interim President Lassner said that for the executive/managerial issue the Administration agreed to take the final report and come in with a recommendation to the committee. He indicated there were 18 recommendations from the consultant. In terms of the university housing policy, Interim President Lassner said they were actively consulting unions and hoped to get something as soon as possible but noted they are not in total control of that process.

f. Report from the Committee on Community Colleges

Vice Chair Ota reported the committee had nothing to report at this time because she decided to give the committee a well deserved break. She said that next month the committee will be discussing remedial and developmental education, and VP Morton present.

e. Report from the Committee on Student Affairs

Regent Acido reported that the committee met on February 6 to discuss several issues. Jenn Rose provided information on Title IX, VAWA and campus safety and concerns that had been discussed in previous committee meetings. He said they also have a recommendation for the student fees that requires a budget proposal before fees start getting implemented, which is on the agenda for later. He noted that there are discussions with the Pacific Island student community to see if there is anything that can be done to help their tuition circumstances, and help the community gain access and affordability to the University of Hawai‘i at Mānoa. He indicated this would probably be discussed at the next committee meeting in April.

g. Report from the Committee on Intercollegiate Athletics

Regent Kudo reported that the committee met on February 5 to discuss as an agenda item Board policies related to coaches salaries. The review showed salaries were not part of the Board approval process because they are not considered executive/managerial type staff. Athletics Director Ben Jay gave an update on the Clarence T.C. Ching Athletics Complex and the good news is that the locker rooms have been opened and the female athletes are very happy to be using them. Some of the coaches’ offices are being completed and according to Athletic Director Jay the facility will be completed within the next few months. The committee also received a status report on the memorandum of understanding (MOU) with UH Foundation, AKA and UH Mānoa. The Board had allowed the parties to go forward with negotiations and if they reached an agreement before this meeting they would present the MOU and other documents to the full Board for approval after a number of meetings. He announced that the parties had recently informed him that they reached agreement yesterday, and the agreement is on the agenda later for approval.
Regent Kudo said the committee also looked at the Mānoa athletic's budget plan and received an update on the financial status of the athletics program. Athletics Director Jay indicated to the committee that because of the times and circumstance anticipates incurring a loss of $2M this year, unless more revenue sources are generated in the upcoming months for the department. He said Chancellor Apple set a guideline for Athletics Director Jay that they incur no more than $1M per year. If that is exceeded then they will need to make some important and difficult decisions relative to meeting that budget limitation. Athletics Director Jay assured the committee that they are working on those plans right now.

Regent Gee said he looked at the contract and noted it was a tremendous improvement over the past and there seems to be very clear line of division of responsibility and overlaps in the areas of cooperation between the UH Foundation, the Athletics Department and AKA. He said in respect to AKA itself, it operates as sort of an independent party with its own president who will be paid for by AKA but noted the importance of at least an ex officio representation from the Athletics Department itself.

Chair Holzman interjected that the MOU is going to be addressed as a separate agenda item but indicated Regent Kudo could answer this question briefly if he wanted too.

Regent Kudo responded that they will reserve answering until they get that point in the agenda.

h. **Report from the Committee on Independent Audit**

Vice Chair Lee reported that the committee met yesterday to review a number of audit reports. External auditor Cory Kubota of Accuity presented the University of Hawai‘i consolidated financial statements and supplemental schedules for the years ended June 30, 2013 and 2012. He said CPA Kubota explained that the supplemental schedules were required under generally accepted accounting principles (GAAP) and under GAAP management’s discussion and analysis and schedules of the funding process are required to be presented to supplement the basic financial statements. The supplemental schedules support the opinion of the auditors that the consolidated financial statements present fairly in all material respects the financial position of the University of Hawai‘i as of June 30, 2013 and 2012. The changes in financial position and cash flows for the years ended were in accordance with GAAP. He said the committee viewed and vetted the report and voted to accept the report.

Vice Chair Lee said Mr. Kubota also presented the University of Hawai‘i at Mānoa Intercollegiate Athletics report on agreed upon procedures for the 2013 football season, which stated that the average attendance for football in 2013 was 24,691 attendees per game. He said the committee voted to accept the report.
Vice Chair Lee said the committee also reviewed the audit reports from the Office of the Internal Auditor. Internal Audit Director Glenn Shizumura presented three internal audit reports: (1) sales reports for Rainbowtique at Ward Centre for the 8-month period ended August 31, 2013; (2) a review of selected Associated Students of the University of Hawai‘i (ASUH) operations for the years ended June 30, 2013 and 2012; and (3) an operational review of the University of Hawai‘i West O‘ahu (UHWO) for the year ended June 30, 2013, which was requested by Chancellor Freitas upon his assuming the chancellorship.

Vice Chair Lee said the sales audit for Rainbowtique was unremarkable. During discussions, it was recommended that the Committee on Intercollegiate Athletics review the Athletics Department’s plan to take over the operations at Rainbowtique. He said the committee voted to accept the report.

Vice Chair Lee said the report of selected ASUH operations pointed out some clerical deficiencies which ASUH President Richard Misuzawa stated were corrected. He said the committee voted to accept the report.

Vice Chair Lee said the operational review of UHWO pointed out three areas of latent concern. First, the food service operations which are contracted out to a company called Hawaiian Grown; second, the failure to properly classify capital improvement costs; and third, the lack of management and oversight during the construction of the UHWO campus.

Vice Chair Lee said with respect to the food service operations, it was noted that concession paid only $3,247 to UHWO for use of the facilities in the period beginning January 2012 and ending December 2013. The operator has not provided any financial statements with respect to food operations. In light of the fact that UHWO pays for all of the utilities associated with the operations and the $3,247 payment over 18 months, it can only be concluded that UHWO has not benefitted financially from the food service operations. Chancellor Freitas stated to the committee that the contract with Hawaiian Grown is currently under review.

Vice Chair Lee said with respect to classifying capital improvement costs it was stated that UHWO is working on the matter and will be consulting the System fiscal office to complete the work before the next audit.

Vice Chair Lee said on the matter of construction management, it was pointed out that there were deficiencies in the management of the construction process and there were many lessons to be learned. The takeaways will be summarized and will be considered by the Business Process Council as it promulgates new procedures and policies for the procurement and management of construction projects. Vice Chair Lee said after vetting the internal audit report on UHWO, the committee voted to accept the report, subject to the inclusion of a statement barring the out of the ordinary circumstances surrounding the construction of the campus and inclusion of a response and corrective action plan from the UHWO Administration.
Finally, Internal Audit Director Glenn Shizumura provided an update on the procurement of an outside contractor to provide a whistleblowing, monitoring service to the University of Hawai‘i. The internal audit office received one proposal from EthicsPoint and a contract is currently being negotiated.

Regent Gee asked if the committee had discussed what should have been the fair rent for the food service facilities agreeing that the payment is very low, and the problems of having to subsidize the operations.

Internal Audit Director Glenn Shizumura responded that the original contract had a set commission amount to be paid monthly, which amounted to $3,247.

Regent Gee clarified that the $3,247 amount was all they received to cover the full 18 months and added that it meant they were operating in great arrears. Assuming there was a contract, he wondered how they would collect the money. Internal Audit Director Glenn Shizumura responded that there was a written contract and that $3,247 was the amount they were paid for the 18 month period, which means that is the amount received by UHWO.

Vice Chair Lee said the contract was not well written so it is being renegotiated. He added that one of the problems is the lack of customers.

Chair Holzman said there was a lack of customers and it is not clear that students who are now attending UHWO will provide an adequate customer base, however, when the facility is built at Tokai University and the students are attending there, it is expected that the customer base will significantly increase. He added that it sounds like the issue is the cafeteria is there before the customers are. Shizumura agreed.

Regent Portnoy asked about the portion of the report relating to lack of oversight on construction and noted that the construction of buildings on a university campus is not a novel issue, and whether there was going to be study on how this occurred and a report. He questioned why these problems were not dealt with at the time and asked if there was an explanation of how these problems were allowed to occur on a very routine construction project.

Vice Chair Lee said the best way to answer was the construction or the development of UHWO was not very routine and the project basically started with a lack of funding. The original deal was that a portion of the property was to be sold to Hunt Development, but the deal fell through during the recession. The campus was under a requirement to be completed by 2012 or the land would revert back to the Campbell Estate. Under that urgency, Chancellor Awakuni, who was the principal investigator in charge of the project, tried to complete the project and in a piecemeal fashion as funding was secured. Vice Chair Lee explained that when the project started, his understanding is that the scope was not stated in the contract and everything had to be done by change orders. He agreed this is not a very good way to run a project and it certainly should not
have been run that way. He added there were many lessons learned and the Board needs to talk about the issue surrounding this as they look at other projects. There is a lot to be gained by studying it and making sure these things did not happen again.

Interim President Lassner said one other element why UHWO was not a routine project was that almost a decade ago the Board approved the project and it was executed through RCUH in 2005 rather than the university’s own Office of Capital Improvement. He said this was not the normal process at all and that practice is something the Board has since made sure will not happen again.

Chair Holzman added that it seems people think this is not that credible, but emphasized that it is always worthwhile to think about alternatives that was being faced. One alternative, and a very likely alternative in 2009 or 2010, was not to have the land and not to have the campus. That was a reality staring the university in the face and had that occurred it would have been a catastrophe. He said he was not defending what occurred and all the things they have to learn from that, but if he had to choose between the two problems, he would choose the problem we have now rather the problem they would have had.

i. Report from the Committee on Presidential Selection

Regent Carlson reported that the committee met on January 24 and asked Interim President Lassner to speak about various perspectives of the university. The committee also met the following week on January 30 and at that time the committee heard more testimony on the presidential search process. After much deliberation, the committee took action and voted to conduct the search itself using university Board staff with advice of the university’s Office of Human Resources. He noted the Board may recall that the committee had gone through a very long process of first looking at perhaps employing a search consultant, and then a search firm. They interviewed search firms and negotiated what they though to be a good contract, but in the end the committee thought that rather than expend those funds they would conduct the search themselves using in-house staff. He said that the entire January 30 meeting was conducted in open session and during that meeting the position description and ad were reconciled with the President’s Agenda and Selection Criteria that were already accepted by this Board and the final result was distributed to the committee members and the full Board. He expressed special appreciation to committee member Walter Niemczura for his input and insight. He said that Mr. Niemczura had spent additional time assisting the committee and noted that those efforts were appreciated.

Regent Carlson said that on February 19, online and print advertisements notices and news releases were disseminated statewide and nationally to inform interested candidates or individuals. He said the committee will begin reviewing applications and nominations on March 12 and applications and nominations will be accepted throughout the process until a final selection is made. He said the committee is targeting to make a recommendation to the full Board by June of this year and cautioned Board members if the committee is successful in that regards they may need to have a special Board
meeting in June. He noted the Board office has met with the Office of Human Resources and the Equal Employment Opportunity/Affirmative Action office on process and a timeline. He said the committee was committed to devote the time necessary to get the job done and a timeline and schedule of meetings is being formulated. A briefing with the university Equal Employment Opportunity/Affirmative Action office is being planned for next week.

Regent Carlson said the community outreach has continued, there was a session on February 12 at the Kalihi Valley Neighborhood Board that Regent Acido and Dean Maenette Benham attended. He mentioned that Regent Acido had said it was a very lively discussion and he appreciated the opportunity to meet with everyone. He said another community outreach took place on February 18 with the Chamber of Commerce of Hawaii Executive Committee, which Chair Holzman and ASUH President Richard Mizusawa, and Paul Lococo attended. At that meeting, Chair Holzman shared the status of the presidential search and a copy of the position description with executive committee members. He noted they were planning other outreach sessions in the future going forward to meet with constituencies, share information and to keep the conversation going on issues and questions important to the constituencies and the university. He said that it was a long process which will continue and he was very appreciative of the hard efforts and time the committee members have expended in doing this.

Regent Acido added that even though the committee did not meet yet in February, many committee members have been going out every week everywhere in the community. He noted that Ms. Christine Neves, who has been coordinating the outreach has driven them to places like Kalihi Valley, Waiʻanae, and Māʻili every week and sat through neighborhood meetings that sometimes last for three hours, and waited diligently until their turn. He recognized and thanked Ms. Neves who was seated in the audience. Regent Carlson added that Ms. Neves has been wonderful in this process.

Chair Holzman said that at some point the Board has to ask or tell the Presidential Selection Committee what we expect from them in terms of a list of candidates or one candidate. He said the Board also needs to think about the process and the final stages in the process by which we select a president. For example, if they had a list of candidates, how to deal with that list of candidates as a board and what would we expect of them, or if they had one candidate. He added that he was not exactly sure what the Board wants to do. He indicated he was not sure if this was the right question for the selection committee or the committee chair, but asked if there could be some options presented at the next Board meeting.

Regent Carlson responded that they could certainly present some options at the next Board meeting. He noted that as Chair Holzman rightfully pointed out, there is an expectation of the Board itself on what it would like to receive.

Chair Holzman said he wanted to focus the Board's attention on what some of the options might be on this issue.
Chair Holzman thanked everyone for the committee reports and their hard work, and the recent additional work at the Legislature as reported by Interim President Lassner. He said he certainly understands how much work everyone is doing and appreciates it and hopes everyone else does too. He reminded everyone that he promised the students they should come back at 2:00 p.m. or 2:30 p.m. to address the Mauna Kea sublease. The briefing on Title IX and VAWA by Jenn Rose has been moved to 2:00 p.m., which is a very important topic for everyone. Except for Agenda Item 3, he proposed that the Board proceed to Agenda Item 7 before lunch, by 1:00 p.m.

VIII. ITEMS FOR DISCUSSION/BOARD ACTION

Board of Regents

1. Approval of Revisions to Board of Regents’ Policy, Chapter 8 on Investments

VP Todo noted this matter was discussed at the Budget & Finance Committee meeting and the committee voted to recommend to the Board approval of several revisions to the Board policy on investments. He thanked Regent Dean and Regent Moore for their involvement in this effort and extended special thanks to Regent Dean for volunteering the Central Pacific Bank treasurer who was a great resource in getting this done. He said there were several meetings with UBS and before the Board is several additions to permitted investments vehicles that they are recommending at this time. He noted this was an initial step toward a more full recommendation for update and revisions to the Board policy, but this allows UBS to take some of those investments we currently have, especially in our fixed income portfolio, and invest them in alternative or non-traditional investment vehicles. He said they have recommended three new types of permitted investments and limited them to a percentage of the fixed income portfolio.

Regent Dean said a lot of time was spent on this and thanked Regent Moore, who has already given his vote of support and will continue working with them going forward. He said they have gone through it and there is a bit of risk in the portfolio today from looking at where the university is in the richness of the equity markets, and then in terms of the interest rate yield curve. He added that this fixes part of it for us but there is more work to be done. He strongly recommended the Board approve this and noted it was already approved in the Budget & Finance Committee.

Regent Moore asked if either of the proposed limits, for example the 20% in floating rate securities, was for 20% of the whole portfolio or just the bond portfolio. VP Todo responded it was 20% of the total portfolio because 70% is the total in the fixed income.

Regent Sullivan moved to approve, seconded by Regent Dean. The motion carried by unanimous vote.
VP Todo thanked the Board and Regent Dean and Regent Moore and extended the offer to anyone else who wanted to volunteer to continue this effort.

2. Approval of Revisions to Board of Regents’ Policy, Chapter 6 on Student Fees

Interim President Lassner thanked Interim Associate Vice President for Student Affairs Jan Javinar, who testified at the Legislature this morning. He said the proposal involves simple amendments to Board policy to add to the section on student fees that any student fee proposal include a plan for how the fee will be used specifically beginning from the time the fee is assessed. He added that the Student Affairs Committee reviewed and voted to recommend approval.

Chair Holzman asked Regent Acido if he had any additional comments and Regent Acido responded he thought it was a good proposal.

Regent Gee moved to approve, seconded by Regent Dean. The motion carried by unanimous vote.

University of Hawai‘i at Mānoa

4. Approval of Memorandum of Understanding with ‘Aha Koa ‘Ānuenue, University of Hawai‘i Foundation, and University of Hawai‘i - Mānoa

Chair Holzman noted that the MOU had been distributed to everyone.

Athletic Director Ben Jay said this MOU had been a long time in the works with all parties concerned—‘Ahahui Koa ‘Ānuenue (AKA), UH Foundation (UHF), the Athletics Department and the university—in making sure there was a document that reflects what the parties want to do in terms of helping this Athletics Department raise funds and expand the activities of AKA beyond just selling ticket packages and parking. He said everyone worked long and hard to get to this point, right up to yesterday, but they have it worked out. He indicated the documents had been verbally approved right now by the AKA Executive Board as of yesterday afternoon and he moved it forward to the Board today for approval.

Regent Gee asked his earlier question on representation in at least ex-officio capacity, by the Athletics Department on the AKA Board. Athletics Director Ben Jay affirmed that both he and UHF President Donna Vuchinich serve as ex-officio members on the board and attend all their meetings and it was spelled out in the bylaws of AKA.

Regent Portnoy said he would obviously vote for this and noted that a lot of work had gone into it. He indicated his personal belief that it was very important for the athletics director to run the athletics department. He knows there are a lot of other interested people, several that are in this agreement, but his personal view is the athletic director and chancellor be held accountable for the success or failure of the
department. He personally thinks the athletics director should be given the authority deserved to be able to be held accountable and hoped the agreement, which is a tripartite agreement, will reflect that the individuals responsible for the success or failure should be, in his personal view, the athletics director under the authority of the chancellor. He added that he hopes nothing in this or any subsequent agreement that comes before the Board would be designed to minimize or eliminate what he thinks should be appropriate authority.

Regent Sullivan directed her comments to UHF President Donna Vuchinich and asked whether UHF would be assessing the 5% fee on AKA. President Vuchinich responded that any gifts or donations coming in would still have the fee, which is standard practice for all gifts set by their Board. She added that the ticket sales, which is what the revenues are, or other revenue generated that are not gifts that are not would not.

Regent Sullivan asked for clarification of the fee. President Vuchinich answered that the fee is tied to the type of revenue and said that she could chart that for Regent Sullivan to help her understand the process. President Vuchinich indicated she does not have the authority to waive any fees, as that is a UHF Board decision, and offered to show Regent Sullivan the flow chart of how revenues come and go. Regent Sullivan said her only point was if AKA is going to be paying for its own staffing and expenses now she would not want donations taxed twice and hoped that would be addressed at some point because otherwise the net will be less.

Regent Kudo moved to approve, seconded by Regent Matayoshi. The motion carried by unanimous vote.

Chair Holzman recognized the hard work of the Athletic Department, AKA and the UH Foundation to reach this agreement. He thanked everyone and noted this was really needed given the size of the problem that Regent Kudo just described.

5. Approval of the Establishment of the Victor and Peggy Brandstrom Pavel Endowment Chair in Ocean and Earth Science and Technology at the School of Ocean and Earth Science and Technology, University of Hawai‘i at Mānoa

6. Approval of the Establishment of the Victor and Peggy Brandstrom Pavel Director’s Chair in Astronomy at the Institute for Astronomy, University of Hawai‘i at Mānoa

Regent Gee invited President Vuchinich to present on the largest bequest the University of Hawai‘i has ever received from a single donor and he wanted to take a minute or two to understand the background of the donor and how the university received $9.2M.

President Vuchinich began by saying that not all of the estate was liquidated so more would be coming. She said the two academic positions are only part of the gift
that funds 11 different programs including: scholarships at 10 campuses for underrepresented students; support for a program in aging at the medical school; an endangered species program at Lyon Arboretum; and a dining room named at the Culinary Institute of the Pacific restaurant once that is built. She said the two chairs give much flexibility to the chair holder and noted there is a process for the endowed chair for SOEST for how the chair will be appointed. She said that much of the discretion for use is for academic travel related to the research and noted the flexibility was there to expand and bring excellence to the department and the program. She said the directorship at IFA goes to the sitting director Günther Hasinger. According to the standards that were set, she believes David Karl has been asked to serve in the position of the Victor and Peggy Brandstrom Pavel Endowed Chair in Ocean and Earth Science and Technology. She noted that this was an outstanding and very generous gift and it really expands on the excellence that the Pavels saw within our institution and Hawai‘i and the areas of interest that they had. She added that this was generosity from a financial investor and local business man for many years and said it was really a privilege for the foundation to work with them over the past decade.

Regent Gee said one of the more interesting points was that the principal donor himself really did not have much contact with the university except that he was branch manager of the Mānoa campus branch of First Hawaiian Bank and noted the influence came from his wife. He said that sometimes when they go after donors they forget the importance of spouses and the spouse in this case was the greater influence on the size of the gift. He noted that her association with the university was through volunteer work, and he found that very interesting because normally one would think of donors for this magnitude of gift as having long term, close association with the university. He added that the donors really believed, through Peggy’s influence, in the work that was being done at the university.

President Vuchinich said that this is the type of investment that will produce returns for many decades, will bring excellence to the pioneering research in the microorganisms, will provide food for most of the food web, will harvest solar energy, degrade pollutants, maintain half the oxygen people breathe—this gift is going to be working within all of those areas of expertise which many of our faculty hold keys to the future. She added it was a great day to celebrate and they will be doing more press in celebration of this and the generosity being bestowed upon and accepted, depending on the Board vote, and one of the things in making a gift is it has to be accepted and she would certainly commend and ask the Board to support the acceptance of this gift.

Regent Matayoshi moved to accept, seconded by Regent Dean. Chair Holzman asked if it was a motion to accept both gifts and Regent Matayoshi and Regent Dean responded in the affirmative.

Chair Holzman noted the motion was to accept both gifts and asked if there was any further discussion or questions.
Regent Gee said that the question did come up this morning in public testimony regarding the funds allocated for travel in establishing of the chair and said it was very common for such chairs to have travel money that they would normally not get from state or general public resources and private funds can be used to support the travel that supports the purpose of the chair. Regent Gee added this is generally for research and attending conferences but for no other purposes, so he wanted to clarify that.

Chair Holzman said the motions to accept both gifts had been moved and seconded. The motions carried by unanimous vote.

University of Hawai‘i at Hilo

7. Approval to Authorize the UH Hilo to Enter into a 5 year least term extension with the Adult Student Housing, Inc. (ASH) for the Hale Kauili Apartments

UH Hilo Vice Chancellor for Administrative Affairs Marcia Sakai said that Chancellor Straney was en route so she is reporting and asking the Board for approval of a 5 year extension to a land lease with ASH Housing, otherwise known as Hale Kauili Apartments. She said this constitutes about 100 units and serves 200 students and their families and added it was different from their other housing because it accommodates families. She said they were also asking for the Vice President for Budget & Finance and Chief Financial Officer along with Chancellor Straney, be given the authority to negotiate, finalize, and execute this amendment.

Vice Chancellor Sakai noted this fourth amendment is the second extension, the first two resulting from changes in financing arrangements that ASH housing had with the company that was financing the initial construction. She said as part of the five year extension, ASH has tentatively agreed to continue with refurbishments of the units; they have completed 56 so far and are looking at doing an additional 43. They will be redoing kitchen counters and cabinets, replacing appliances and flooring; changing plumbing, interior doors and range hoods, and painting as needed; they also will be redoing the centrally located parking area that serves the structures; as well as replacing three commercial dryers for the benefit of the occupants. She asked that the Board support the recommendation from the Planning & Facilities Committee to approve the proposal.

Regent Mizuno moved to approve, seconded by Regent Dean.

Regent Matayoshi asked what was going to be done with the apartments after the new complex is built and what will happen to the existing facilities.

Vice Chancellor Sakai noted that one of the things Regent Mizuno described as part of his report was the presentation of call for offers for the development of University Village Phase II which is the commercial, mixed-use concept and as part of that development they will be looking for the successful bidder to put in family style or apartment style housing. She said they anticipate it will happen at about the same time
the five year extension expires. She added they will reevaluate their options in two or three years once construction begins.

Vice Chancellor Sakai added that if student enrollment grows there are several options regarding the existing facilities. If UH decides to take back ownership of the facility, there will be a major capital investment required. On the other hand, they may decide to do another short term arrangement to provide housing at no cost to the university. Their intent is to minimize the risk of the loss of housing in the short term at this time.

Regent Portnoy asked for clarification of the “tentative” agreement to renovate. Vice Chancellor Sakai responded that there is an agreement to renovate the remaining units and is tentative until approved and signed.

There being no other questions, Chair Holzman said there was motion that had been moved and seconded. The motion carried by unanimous vote.

IX. EXECUTIVE SESSION

Upon motion by Regent Gee, seconded by Regent Carlson, the Board unanimously approved convening in executive session, pursuant to HRS §92-5(a)(2)-(4), to discuss personnel matters, consult with attorneys on powers, immunities, and liabilities, consider negotiations concerning acquisition of public property, and discuss authority of persons conducting labor negotiations and conducting negotiations. The Board convened in executive session at 12:30 p.m. Following a motion to come out of executive session by Regent Dean, seconded by Regent Gee, which was unanimously approved, executive session was adjourned at 2:35 p.m.

Chair Holzman said that the Regents discussed the following in Executive Session:

- Discussion of Personnel Actions (Attachments B-1 and B-2)
- Discussion of Mauna Kea Sublease and Non-Exclusive Easement Agreement with TMT International Observatory, LLC

Chair Holzman then called the meeting to resume at 2:26 p.m.

University of Hawai‘i System

3. Board Briefing: Update on Title IX and VAWA requirements for Higher Education Institutions

Interim President Lassner introduced Jennifer Rose, Gender Equity Specialist for UH Mānoa, who is assisting the whole UH system. He said Ms. Rose will brief the Board on landscape for Title IX, Violence Against Women Act ("VAWA"), the new compliance
requirements the university has, and some past compliance requirements the university had and noted that Chancellor Apple will also report on what the campus is doing. He said all campuses are required to comply with all the requirements that will be discussed today. He added that he will summarize what is being done at the system level.

Ms. Rose greeted everyone and extended particular thanks to Chair Holzman and Regent Acido for making this a priority issue, and to Interim President Lassner who is already taking a number of action items which they are really impressed with and expressed her hope that there would be enough time during question and answer to talk about what she thinks could be some recommended action items for the Board. She noted that Title IX is significant in the national landscape and centered on access to education. She added that listening to the Board meeting this morning gave her an understanding of how to make sense and contextualize where this issue falls in the context of what is happening in our local landscape.

Ms. Rose gave her presentation entitled "Gender Equity in Higher Education: The New Federal Landscape of Compliance & Risk Management" which covered Title IX; the random investigations being conducted by the Office of Civil Rights (OCR) throughout the nation; the new mandates of VAWA 2013; the deadlines for Title IX and VAWA compliance; the policies, interim measures and training requirements for Title IX and VAWA; the challenge of the context of the reporting structure at UH; a high level summary of compliance requirements; the critical role of Board leadership and key concepts for Board messaging; and a suggested organizational structure to ensure accountability and compliance at each campus via a Title IX coordinator.

Interim President Lassner said this issue was brought to his attention by the State Commission on the Status of Women and he assembled a systemwide group of people involved in this for advice as to what the university should be doing. The consensus was to update current policies to ensure the university is compliance with new regulations as laid out in the Dear Colleague Letter from the Office on Violence Against Women in the U.S. Department of Justice and the VAWA law. Mie Watanabe, the Director of the Equal Employment Opportunity/Affirmative Action Office is leading that effort and has a systemwide advisory committee specifically to propose interim executive policies by the end of March. He explained that the term "interim" depends on how far the policies reach that may require consultation with multiple unions especially if any disciplinary procedures are built in. He noted they were going to be careful to put something in place that can be in place quickly, i.e. March, and then will move on with the parts that may require more work.

Interim President Lassner said the policies will drive the roles and responsibilities, and then resource requirements will have to be laid out. They will start with what they have are required by law to do. From a resource perspective, he said that this is not generally what people recognize as a required and important expenditure for education. When looking at staff counts, it is staff who are doing things like this that are absolutely essential not just to be compliant but because they need to have safe environments for
all their students. He said it will look different at every campus, Mānoa has what he thinks of as the big three—sports, alcohol and dorms on campus—other campuses may be different. He said the scope will be customized to each campus, but the requirements are the same. He noted there is a real focus on training now that there is an obligation for everyone to report as a representative of the university. He added that there are over 10,000 employees around the campuses who have to be educated to their responsibility if a reportable event has occurred, which is a lot of training. He said it is and continuous to ensure people are up to date and they get new people as they come in.

Interim President Lassner mentioned that as much as possible they want to leverage the power of the System for best practices. He reiterated that will derive from the policies what has to be done, figure out where it can be done, and share expertise. He indicated he wanted Chancellor Apple to say a few words because he had been contacted by legislators, media, and concerned people on campus—it is a big issue here.

Chancellor Apple said he had been working on this issue for about one year. He noted that when VAWA passed in January, Ms. Rose increased training, currently completing 38 education sessions at Mānoa. He said they have been looking at a lot of best practices and received advice from the Commission on the Status of Women. He indicated that for a campus the size of Mānoa, they should have a full time Title IX person. Their path right now is to set up the gender equity compliance office with a full time Title IX coordinator, a VAWA specialist and a chief investigator. He said as they do more education, they are getting lots more cases and beginning to tax resources. He added that Ms. Rose has become a national expert and is too modest to tell everyone that she is on one of President Obama’s commissions to deal with implementation of Title IX on campuses. He said that he is also fortunate to know one of the national experts as well.

They want to have a campus conversation and invite the Hawaii Commission on the Status of Women and each of the involved unions—and they were thinking about March 14, which is a good timeline for the end of March deadline and they would have a framework for various details that involve security. He indicated that policies have to come first but also there are a multitude of procedures as illustrated by the complicated diagram Ms. Rose showed as part of her presentation, and noted there were different incidents that could happen. He said the ideal goal of their education is to make every person on campus a trusted person. They want everyone to know what needs to be done when they become aware of an incident. He added that everyone will know who the Title IX coordinator is and there will be deputy Title IX people in athletics, housing and other various areas around campus.

Chancellor Apple noted they were required under VAWA and on the Cleary Report to also have a list of different remedies and sanctions as well. He said they have a lot to do and are actually now in the process of implementing best practices. He added that when thinking of the legacy of Patsy Mink in Hawai‘i, one ought to feel this as not
only a pressure, but an honor. He said they want to be the best campus and make the campus safer, which ties into the landscape master plan he has talked about and ties into other things as well.

Vice Chair Ota asked if Board policies were being updated concurrently. Interim President Lassner said they will look at that for the Board and make recommendations.

Regent Gee said he had previously asked that safety concerns be addressed in the policy covering student housing. He noted he came out of a private university, but the rule of "in loco parentis" abided and there was a very strict guideline of what the university was responsible for and it was a huge burden. Now that this has become law, he thinks there needs to be a Board policy that mirrors the executive policy being drafted by Interim President Lassner. He suggested a task group be assigned, perhaps through the Student Affairs Committee, to look at this because it is an important issue. He expressed concern about the uniform application of remedies. One involves how to maintain discretion and confidentiality at the health center for students who go for help and the other is the interface with HPD and public authorities. He asked Ms. Rose if there had been much dialogue with the public authorities to which things get referred out versus which things are handled internally.

Ms. Rose responded that 3 of the 22 audit questions specifically ask about our relationship with law enforcement, which is an area many universities were deficient. She said there were cases in which the university might have inadvertently compromised the prosecution case, and there were cases where situations were moving parallel without coordination. She added that she thought it was very important to have that dialogue. She said when the Dear Colleague Letter was issued, she reached out to the community to broker a conversation with all of the county police departments to coordinate protocols even if a formal MOU was not signed. There would be some informal arrangement for how they would co-refer. This is especially critical for Mānoa and how they work with Kapi'olani Hospital and their sex abuse treatment center that works with the Honolulu Police Department.

Regent Mizuno said the Board recently adopted a whistleblower policy that seems to overlap. Chair Holzman agreed and said that should be taken into consideration. Chancellor Apple commented by sharing an experience at his last university where there was a whistleblower hotline (phone and web) that was set up for financial reporting and after a month they received about one financial report and about 50 sexual harassment reports. He indicated that whistleblowing was incredibly important. He added that there were so many complications that they need to provide a method to report without fear of reprisal, and whistleblowing is a big part of that.

Ms. Rose said that in recognition of that concern, OCR put out the Dear Colleague Letter specifically on retaliation. She also noted that Regent Gee was absolutely right about trying to think about what kinds of conversations they need to have with other systems as things happen during the interim before there is a finding and they still have to manage due process and equity in access to education during an investigation and
continue to provide support services.

Vice Chair Ota asked Chair Holzman if he could make sure the Board, besides the policy itself, considers the concepts that Ms. Rose suggested at the Board level and whether it is the little task group that implements those ideas to make sure it is at the top of mind.

Chair Holzman suggested that Executive Administrator and Secretary Quinn work in close consultation with the Student Affairs Committee if there needs to be meetings and come up with a policy that makes sense. He asked for clarification that the timeframe for them to come up with a policy is March 30. Interim President Lassner responded that the deadline was for systemwide policies that layout the requirements. He indicated amending Board Policy Section 11-5 on public health, safety and security would be a good place to start with concepts such as zero tolerance. Chair Holzman added that any other regents who wish to join Regent Acido and Regent Gee are welcome to do so.

Regent Shigemoto asked how increasing reporting helps universities. Ms. Rose responded that showing more transparency in reporting is not going to mean lower numbers in terms of registration. Those universities that got caught for low reporting are suffering from lower enrollments. She said the mandates were not just about reporting but it is about handling the incidences. From a risk management standpoint, if they are doing are doing early intervention, they are doing risk reduction and stopping something from becoming worse. The social science data tell us that only a small number of mostly male students, 5%, are committing the majority of rapes on campus. If the university is able to do better risk reduction and primary prevention to be able to recognize some of those behaviors prior to the rape or sexual assault then they are actually preventing it from happening. She thinks they are trying to give everyone a model for handling all of it and have better reporting. It is not necessarily about the numbers. Universities might see some kind of short term effect. However, transparency will benefit the universities in showing the programs in place to make the campus safe.

Regent Shigemoto said that when an audit is done, whoever is doing the audit is going to see how much implementation is needed and to implement these things will take a lot of time and money. He asked if the federal government will support the university from that end. Ms. Rose said the only thing she could think of was that VAWA is a huge piece of legislation and there are only two sections specifically dedicated to create mandates for higher education, Section 303 and Section 304. She noted that Section 303 is the money component so it does include money for grants, but universities have to apply; there is a source within the Department of Justice. She said that determining the regulations for VAWA was a collaboration between the Department of Justice, the Department of Education and the Department of Health and Human Services, and there are money pots from those sources as well that can be brought to the university. It is soft money, but some of those are two to three year grants that give up to $300K for the support services aspect. She was not sure if there would ever be
money for the investigation side.

Interim President Lassner said this was an unfunded mandate of the federal government, but also made the point that this is not just about compliance, it is something the university should do; it is about creating a safe environment for our students so they can learn.

Regent Dean said as a father of two daughters and a granddaughter he applauds that the university is doing; it is critical and we want to be a leader in this.

Regent Gee said he was more concerned when faculty is involved and he was aware of incidences in the past, sometimes going way beyond an incident, and he was not sure if there was an Executive Policy covering such matters where faculty is concerned or whether it now needs to become part of this new Title IX coverage. Ms. Rose responded that the Dear Colleague letter specifically addresses and emphasizes students, but the interpretation is that any case involving a student, whether with faculty, students, or staff. She said where OCR has been silent is issues between employee to employee whether faculty or staff. Universities across the nation have demanded that OCR to provide some kind of guidance in that respect. She added that there are union issues and other employment sort of property right issues, but she agrees that it will be complicated, but they do not have the luxury to wait on that because VAWA applies to everyone. She said once the policies are created at the BOR, system and campus level that prohibit things like domestic violence and stalking, they are going to have to do something about it. She said that Hawai‘i already has other protections such as Act 206 that requires employers to create reasonable accommodations for victims of domestic violence, sex assault or stalking who are under their employment as long as they can prove they actually are a victim. She added that there is already some kind of mechanism in place, but it will be a challenge and she thinks they should start having those conversations with the unions now.

Chair Holzman thanked Ms. Rose and noted that this was an important topic and he was glad the Board heard about it and know it is out there and needs to be dealt with.

Chair Holzman indicated that Mauna Kea and B-1 were the only remaining items and the first thing he wanted to address was the personnel actions.

**X. PERSONNEL ACTIONS**

[Attachments B-1 (For approval), B-2 (Information only)]

Chair Holzman asked for a motion on the next agenda item on personnel actions on Attachments B-1 and B-2. Regent Carl so moved. Vice Chair Lee seconded the motion. The motion carried upon unanimous vote.

8. **Approval of Mauna Kea Sublease and Non-Exclusive Easement Agreement with TMT International Observatory, LLC**
Chancellor Straney introduced Dr. Henry Yang, chairman of the TMT International Observatory (TIO) Board and Chancellor of UC-Santa Barbara, and Stephanie Nagata, Director of the Office of Mauna Kea Management, who is responsible for implementing the Comprehensive Management Plan (CMP) and managing the science reserve on Mauna Kea. The sublease is for a project that has been in development for quite some time. The thirty meter telescope will be the world’s largest telescope when it is constructed, with a cost in excess of $1.3 billion. The telescope will take ten years to construct before it is usable. Dr. Yang and his colleagues have been working on the technical side of the project for some time. They have also been in Hawai‘i since 2007, holding community meetings and talking with individuals, particularly on Hawai‘i Island, talking about their intentions and the impact that this project will have on Mauna Kea and the surrounding community. They conducted a full Environmental Impact Statement (EIS) on the project, which was approved in 2009 or 2010 by then-Governor Linda Lingle. The approved EIS and the full description of the project (site work that would be required and construction details) were reviewed by two Boards created under the CMP, which was approved by the Board of Regents and the Board of Land and Natural Resources. One of the Boards, Kahu Kū Mauna, composed of Native Hawaiian Hawai‘i Island residents, reviewed the project in its full details and did not object to it. The project was then reviewed by the Mauna Kea Management Board, which is composed of Hawai‘i Island citizens, who are nominated by Chancellor Straney and are approved by the Board of Regents; two regents currently sit on the Board. In May 2010, upon review of the full proposal, the Mauna Kea Management Board approved the proposal and transmitted it to the Board of Regents, recommending the proposal for approval with two conditions: (1) the rents ultimately charged for the project be substantial and be used for the management of the mountain and the implementation of the CMP; and (2) request that the Board approve any sublease in public session. The project description was then approved by the Board in May 2010, and then was taken to the Board of Land and Natural Resources (BLNR) to request a Conservation District Use Permit (CDUP). After hearings and a contested case with more hearings, the permit was granted in April 2013 with substantial conditions including that there be substantial rents charged under the sublease and UHH has negotiated the sublease with TIO.

Chancellor Straney highlighted two aspects of the lease. First, as with many of the elements in the lease that derive from the conditions of the CDUP, there is a decommissioning plan and a financial plan that are both required to demonstrate that the project can be decommissioned at the end of the lease. That is an important component that was required by the CDUP and by the CMP that was approved by the Board for the science reserve, so at the end of the project, UHH will know that it can return it to the conditions that are appropriate when it is decommissioned. The second aspect of the lease is the rent. In 2009, the Legislature passed Act 132, which established a Mauna Kea Land Management special fund that requires that all rents and fees collected by UH relating to activities on Mauna Kea be deposited in that fund, and the contents of the fund could only be used for the management of the mountain and the implementation of the CMP. Therefore, when calculating the rent and
negotiating the rent, UHH established two components to the rent that would be charged under the sublease: (1) 20% of the rent fee would be set aside towards the payment to the Office of Hawaiian Affairs (OHA) as required by law; and (2) the remaining 80% of the rent would be based on TIO’s share of the management costs for implementing the CMP. The CMP costs $2.2 million to implement. For the acreage of the observatories on Mauna Kea, to simply apply a pro-rated share, comes out to $100K per acre to implement the management of the CMP. TMT will occupy 8.7 acres, so 80% of the rent is $870K. The two components added together are a bit over $1M per year; that would be the rent that TIO would be charged when the telescope is fully functional. It is a ten year construction project and UHH is proposing a rent schedule that begins at $300K during the civil engineering phase of surveying, and at specific construction benchmarks, increases to the $1M at full functionality. The rent over this construction period averages out to about half a million dollars a year during the construction phase, as opposed to $1M a year once it is used. He believes that figure represents significant rent as required by the CDUP and as recommended by the Mauna Kea Management Board. As required by Act 132, the proceeds would be divided between funds set aside for OHA and funds deposited in the Mauna Kea Lands Management Special Fund for the implementation of the CMP.

Regent Dean was interested in hearing about the outreach. He heard that there was significant outreach, but he also wants to hear that there was significant outreach towards the Native people of Hawai‘i. Chancellor Straney said that Dr. Yang held several hundred meetings on the Big Island with various community members. During the EIS process, there were formal public meetings and consultation sessions that were involved on the Big Island. There were active discussions with various members of the Native Hawaiian community on the island. The existence of Kahu Kū Mauna, the advisory group of Native Hawaiians from the Big Island, was one result of those discussions and is a demonstration of UHH’s commitment to continuing. Regent Dean said that Chancellor Straney mentioned OHA, and if the group is participating and is benefiting from this, he assumes that OHA is not in opposition of the lease. Chancellor Straney said that he did not hear the testimony this morning. Regent Dean explained that many testified about the price or fairness of the rent, but clarified that he is talking about over the past two years. Chancellor Straney said that he believes that the trustees of OHA did pass a resolution in support of the project.

Vice Chair Lee asked, for clarification that if the lease rent is $1M per year after 10 years and the annual cost of complying with the Office of Mauna Kea Management land is about $2.2M, would the rent would be about 50%. Chancellor Straney answered no, the rent has the two components; 80% of the rent goes to cover the cost of implementing the CMP. On a pro-rated basis on the acreage of the observatory, the other 20% would be set aside into the university’s fund, where it accumulates monies towards the OHA payment.

Vice Chair Lee said that he heard earlier that, from one of the testifiers this morning, that the situation of where the telescope is situated is on the side of Mauna Kea instead being at the top. Chancellor Straney said that is correct. Vice Chair Lee said that he
remembers going up to Mauna Kea one year, and he was told that at the top of Mauna Kea, one cannot really see the top of the dome of the telescope. He asked if that is correct. Chancellor Straney said that he had not personally been on the true summit of Mauna Kea, but had been on summit ridge where the other telescopes are present. Director Nagata added that one cannot see the TMT dome from the true summit, which is Pu'u Wëkiu, but one could see it from certain aspects of the summit ridge, which is west of the true summit.

Regent Gee said that this morning, the regents heard a lot of testimony. The testimony ran 3 or 4:1 in opposition. He saw this as a collision of values. On the one hand, there is the gain to scientific research and progress; on the other hand, the Native Hawaiian values, culture, and heritage. Where students are concerned, to which Regent Gee is a strong advocate, the two questions centered on rents, which was already answered, and the opposition was based on culture and heritage. There was an allusion to environment, but as he can recall, there was a CMP and two versions of the EIS. The environmental questions were already answered. When it comes to a collision of these two values, to make a proper decision, one of which is fiduciary as a regent, and one of which is to act in the best interest of the students being educated at the university, he would have to look at what is the gain for the greater good. He asks what Chancellor Straney sees as the benefit of the 30-meter telescope on Mauna Kea, even for those who do not support the telescope. Chancellor Straney said that he can only speak for himself, as he cannot put himself in other people's lived experiences, but in designing the CMP for the science reserve on Mauna Kea, UH has taken particular care to develop plans for cultural management for the cultural resources on the summit and for cultural access. Sometimes people suggest that a gate should be up on the access road and charge rents to generate revenue that way, but UH has not done that because it would impede access to people who have a traditional right to the mountain. If one goes to the mountain, one would notice that there are no fences and one can access anywhere on the mountain, and there is no restriction for people to go places. UH employs a cadre of rangers who work on the mountain daily, who interact with visitors, who are helpful of visitors who have a flat tire, who manage traffic when it snows, and who are guides, greeters, and observers of what goes on. Their presence makes it tremendously safer to be in what is, physiologically, a very dangerous place to be. Humans were not designed to live at 14,000 feet; it takes time to acclimate to be at that level. Employing the rangers to help create a more safe experience there for visitors is important, whatever the purpose of the visit. Another thing mentioned that is easy to overlook, is the road to Mauna Kea, which was built to construct a telescope. It is maintained by the state in part because of astronomy. The access to Mauna Kea is easily accessible and open because astronomy has been there and because, in this case, from this sublease, the rents that UH has received for their presence there will maintain access for everyone. Regent Gee replied that, Native Hawaiians and the students are not denied access to that mountain and it is correct to assume that cultural practices, such as they are, may also take place, despite the presence of the new telescope. Chancellor Straney said that the cultural practices take place every day; and, in fact, there are two days out of the year when UH suspends operations on the observatories to allow individuals who wish to have cultural practices without others
around to be able to do so. The current mayor of the Big Island has said it best; astronomy is a sacred science and Mauna Kea is a sacred place, and sacred things can go together. That is the idea that Chancellor Straney keeps in mind when thinking about the mountain. Regent Gee thanked Chancellor Straney.

Regent Pootncy said that it sounds as if there is no profit in this for the university. The rents will take care of what has to be given to OHA and to maintain the mountain. There are no additional monies coming from the lease. Chancellor Straney agreed and said that, under Act 132, the university may not use proceeds from Mauna Kea for anything but managing the mountain. Regent Pootncy asked what the benefits are for having telescopes at the top of Mauna Kea, both for the university and for the state, as it is not directly economical. Chancellor Straney said that an example of one benefit is that one of the current Mauna Kea telescopes collects light every night. All telescopes collect photons and filter out the noise and let people see signals in them. At night, it is easier to see because there is less noise in the light. The telescope collecting that light that falls every night on Mauna Kea, was able to decode the noise, filter it out, and allow astronomers to make calculations that allow them to conclude that the universe will not end. This was a discovery to which the Nobel Prize was awarded three years ago, and that was a discovery made at Mauna Kea. It has deep philosophical implications and it is almost difficult to figure out what those words mean. But again, remembering the other importance of Mauna Kea as a spiritual place, that discovery and the view that Mauna Kea is where man was born and created, the depth of the importance of those observations, being able to be made in different ways and in different cultures, in the same spot, makes the combination of the two very important.

Regent Acido said that he heard from many UHM students earlier, in large part, were protesting the telescope. He asked about the reactions of the UHH students and the Native Hawaiian Center at UHH, and whether they were in support of the telescope. Chancellor Straney said that the UHH students are in support and do not object. He has not seen the same commentary from the UHH campus, in part which may reflect the types of discussions and on-going outreach that the office of Mauna Kea Management and the TIO project have been making on the island.

Regent Kudo said that the Regents have not made an independent determination of what the rent should or should not be. The Regents are taking that the rent is in compliance with the requirements imposed upon UHH via the conservation issue that the rent be substantial. As he understands it, if the Regents approve the lease, that it will go to the Land Board for their review and decision-making as well, to which Chancellor Straney said yes. If the Land Board approves this, it is because their condition has been met, to which Chancellor Straney said that is correct. Regent Kudo said that the comments made by OHA are recommendations and one of them was to calculate rent based on fair-market value, and as he understands it, the determination of what the rent would be on the sublease is based in compliance with Act 132, in which the money is restricted to be spent on anything other than the management of the mountain and the OHA payment. Chancellor Straney said that is correct, and that there is a consumer price index and dates escalator to the rent value every year, so the rent
does go up with the CPI. Regent Kudo noted that that the comment of OHA does include a provision that, if there is a finding of good cause based on the facts and economic comparisons, that if the rent is for some reason below fair-market value and that there is an explanation provided of how that rent is determined, then that is also sufficient. Regent Kudo said that ACT 132, by law, requiring UHH to only using the money for specific purposes in establishing rent, would be good cause. Chancellor Straney thanked Regent Kudo for his explanation. Regent Kudo said that a lot of the comments this morning were from students who were concerned about the cultural impact of this telescope, and that Chancellor Straney had mentioned that that a cultural group had reviewed the particular project. Chancellor Straney said that Kahu Kū Mauna, which was established by the CMP. Regent Kudo asked if Kahu Kū Mauna had any recommendations. Chancellor Straney answered that, on the sublease, the only recommendation was that it would have been better if the sublease came with the new master lease, but the new master lease will come after an EIS is completed.

Regent Sullivan noted that in the materials there was a scientific cooperation agreement and asked if the intent was to sign that when the sublease was signed. Chancellor Straney responded that observatories generally have a sublease that deals with the legalities of the station and the scientific cooperation agreement spells out the details of how scientists deal with each other.

Regent Sullivan said one of the things she was glad to see in the agreement was a guaranteed time on the instrument of 7.5% and it occurred to her that dedicated time on a billion dollar instrument was extremely valuable for the university in terms of research. She would like to see the students be able to benefit from use of the telescope. She noted there was a provision in the agreement for a UH-affiliated principal investigator and asked if there was any intent or program to actually tie it into the education of students. Chancellor Straney answered absolutely, observing time is education use, and using the jargon of astronomy, a principal investigator is a senior investigator at the top of their field who has several junior faculty, graduate students and probably more undergraduates working on the project; the days of a single astronomer with a single eye at the end of a telescope are gone and these are very large, collaborative projects. Students are definitely involved in them.

Regent Sullivan asked Chancellor Straney if he anticipated this would be able to assist the university is growing its research funding dollars. Chancellor Straney said absolutely.

Regent Mizuno noted that what was before the Board was the approval of the sublease, but indicated there were new members of the Board that may not familiar with some of the long history and what led up to this. He asked if Director Nagata could provide some of the history that led up to today.

Director Nagata said that in 2000, the Board of Regents had envisioned that there needed to be new management for Mauna Kea and they approved the master plan which created the Mauna Kea Management Board and the Kaha Kū Mauna Council that
advises not only the office, but the chancellor and the university in general about Mauna Kea issues. They also do a review of all projects that come take place on the mountain. She said it was critical at the time to have very dedicated and focused management to protect the resources. She indicated they knew astronomy was one of the resources, but the other resources that were sort of ignored in many years were the cultural and natural resources. She said that was their first mandate and they put most of their efforts towards that and eventually over the course of years they established a range of other programs to kick start the management. Finally in 2005, the office felt there was a need to have a comprehensive plan that integrates both natural and cultural resources so there could be a better management of the mountain. They started this by developing separate cultural and natural resources management plans and they merged into a CMP approved by the BLNR in 2009. In that CMP, it was envisioned to manage impacts, primarily by humans because there are individuals that come up to do recreation. She said another big aspect was project development and the comprehensive management does not cover construction activities. It looks at this to make sure how construction takes place on the mountain does not severely impact the cultural and natural resources. This CMP is very critical for the 30 meter telescope.

She indicated that things have sort of moved in parallel as the 30 meter telescope came and started making inquiries about wanting to come to Mauna Kea, the comprehensive management plan was already in the works so to speak. It is the plan which now governs the 30 meter telescope as it proceeds, including construction. When the CDUP application was done, the CMP’s actions, in particular the construction management actions, are incorporated into this permit. She said the CMP and the CDUP are approved by the BLNR, and are the governing documents.

Vice Chair Lee noted that in all the literature he read the 30 meter telescope is a partnership with the University of California, Caltech, Japan, China and India. He sees a lot of work being put in by the University of Hawai‘i and asked why the university was not named as a partner. Chancellor Straney responded that membership has its privileges and costs and to be a partner in that very specific meaning of that word in an observatory means to have put in a specific amount of the resources needed to construct the telescope.

Vice Chair Lee recalled speaking about this matter to Dr. Greenwood a couple of years ago and it was his understanding the matter was being worked on. Chancellor Straney responded it had been discussed but as of today there was no resolution.

Vice Chair Lee asked Dr. Yang if that would be something they would consider and Dr. Yang replied that it was a fantastic idea.

Chair Holzman said that one of the points made today is that existing telescopes may rent out time on the telescope to view space and the profits are kept. He asked if that is accurate. Chancellor Straney said that time is not rented and profits are not received. Chair Holzman clarified and asked if people pay to use the telescope. Chancellor Straney answered that people pay for the cost of using the telescope.
Telescopes are incredibly complex machines that require a large staff of trained professionals who work every day to keep the telescopes functioning. He said to allow the telescopes to be pointed to one very specific spot in the sky takes significant money. For example, if someone would like to use the CFHT telescope because one wanted to look at a star, the question would be, is there time to find the star among the times in which the partners are using, and how much would it cost to point the telescope in that direction while doing so. The cost is making the observations. Chair Holzman asked if, in terms of money, organizations that have observatories on the mountain, the net return on the investment is zero or less. Chancellor Straney said that, in terms of money, organizations make no money and are providing the funds to operate the telescopes from their own resources. The return is enormous in intellectual understanding. Chair Holzman said that the point that he is trying to make is that the telescope is used for a certain amount of time for a huge amount of money, and the implication is that the money was some degree of profit. Chancellor Straney said that there was no profit, and the money was required to use the telescope at "no money, no use" because there would not have been a way to work the telescope without paying people to do so.

Regent Matayoshi said that it seems like the university benefits from the use of the telescope without having to pay for it because the university is receiving in-kind ability to use it for research. Chancellor Straney said that is correct.

Regent Gee said that before there was a CMP, there were a lot of concerns regarding the stewardship of the mountain. He asked what the experience has been since the implementation to approve the CMP as it is in practice and in stewardship in recent years. Chancellor Straney said that the result has been tremendously more people are enjoying visiting the mountain safely; the mountain is clean and managed well. Litter and trash are not seen. People have ready access. The road is plowed. The CMP has turned the science reserve into the best example in the world of how science can be done respectfully and within the context of the rest of society.

Regent Dean moved and Vice Chair Lee seconded the motion to approve the Mauna Kea Sublease and Non-Exclusive Easement Agreement with TMT International Observatory, LLC.

Regent Portnoy asked to make a comment that is not directed at Chancellor Straney, as he is not responsible for this. He said that, this morning, despite an unbelievable amount of outreach, which he commends, almost all of it was domiciled on the Big Island. From the testimony of the students this morning, all of whom were from UHM, they felt rightfully wronged that they had not been included in any of the outreach programs. They just learned about the issue in the last couple of days, which resulted in last minute petitions that were presented that morning. There is a lesson that can be learned that there may be island-located matters that are really statewide in significance, particularly Mauna Kea and its relationship to the Hawaiian community, regardless of whether they live on the Big Island or are students at UHM on O'ahu. In the future, when an issue like this can be anticipated, a larger effort can be made to
engage more than just where the issue is domiciled, but a better effort should be made to reach out to additional campuses. Regent Portnoy said it is not a criticism of the phenomenal job done by the Big Island outreach, but a lesson can be learned this morning and, taking it at face value, it just seems like a number of Native Hawaiian students here at Mānoa felt that they were not involved in the process.

With a motion on the table, 13 Regents voted to approve the Mauna Kea Sublease and Non-Exclusive Easement Agreement with TMT International Observatory, LLC. Regent Acido voted against the item.

**XI. ANNOUNCEMENTS**

Chair Holzman announced that the next meeting is scheduled for March 20, 2014 at the University of Hawai‘i at Hilo.

**XII. ADJOURNMENT**

Having no further business, upon motion by Regent Carlson and seconded by Vice Chair Ota, and unanimous vote, the meeting adjourned at 4:10 p.m.

Respectfully Submitted,

Cynthia Quinn
Executive Administrator and
Secretary of the Board of Regents
MEMORANDUM

TO: John C. Holzman
Chairperson, Board of Regents, University of Hawai‘i

VIA: David Lassner
Interim President, University of Hawai‘i

FROM: Donald Straney
Chancellor, University of Hawai‘i at Hilo

SUBJECT: Approval of Sublease and Non-Exclusive Easement Agreement with TMT International Observatory, LLC

SPECIFIC ACTION REQUESTED:

It is requested that the Board of Regents approve a Sublease and Non-Exclusive Easement Agreement (the “Sublease”) with TMT International Observatory, LLC (“TIO”), for a portion of the lands leased by the University from the Department of Land and Natural Resources (“DLNR”) on Mauna Kea, to be used for construction and operation of the Thirty Meter Telescope (“TMT”). Specifically, it is requested that the Board: (1) approve the rents set forth in the form of Sublease attached hereto as Attachment 1; (2) delegate to the President, the Chancellor of the University of Hawai‘i at Hilo, and the Vice President for Budget & Finance/Chief Financial Officer the authority to finalize and execute the Sublease on behalf of the University, provided the rents are as set forth in Attachment 1 and the other terms and conditions of the final Sublease are not materially inconsistent with Attachment 1; and (3) authorize the President, the Chancellor of the University of Hawai‘i at Hilo, and the Vice President for Budget & Finance/Chief Financial Officer to negotiate and execute such other documents and instruments as may be necessary or appropriate in connection therewith.

RECOMMENDED EFFECTIVE DATE:

Upon approval of the Sublease by the Board of Land and Natural Resources.

ADDITIONAL COST:

None.
PURPOSE:

To establish the terms and conditions on which TIO will sublease a portion of the lands leased by the University on Mauna Kea for the purpose of constructing and operating the TMT.

BACKGROUND INFORMATION:

The site on which the TMT is planned to be constructed 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. The Master Lease and the easement for the summit access road terminate on December 31, 2033, and the general lease for Hale Pohaku expires on February 27, 2041. The University currently has pending before the BLNR a request to terminate the current leases and concurrently enter into new 65 year leases on terms and conditions updated to conform to current management and stewardship standards. BLNR action on that request has been deferred until after completion of an environmental review of the proposed action under Chapter 343 of the Hawaii Revised Statutes.

On June 28, 2010, the Board of Regents approved the TMT project in accordance with the Mauna Kea Master Plan (2000). The TMT project is the first new telescope project undertaken under the review process set forth in the Master Plan, and also conforms to the management and stewardship standards set forth in the Mauna Kea Comprehensive Management Plan (2008) and its four subplans. The Board imposed a number of conditions on its approval, including a requirement that the Board and TMT “negotiate in good faith to secure substantial funding in the form of sublease rent that shall be applied specifically for management of the mountain.” The Board also required that the Mauna Kea Management Board (“MKMB”) have the opportunity to vote on whether to approve the sublease terms.

Following Board of Regents approval, a Conservation District Use Application (“CDUA”) for the TMT project was submitted to the BLNR. The BLNR approved the application and issued a Conservation District Use Permit (“CDUP”) on April 12, 2013. The CDUP requires the payment by TMT of a “substantial amount” of sublease rent, to be used solely for the management of Mauna Kea. The CDUP also requires compliance with mitigation measures described in the CDUA and the Final Environmental Impact Statement (“FEIS”) for the TMT project. With the CDUA process now complete (aside from opponents’ appeal, which is pending in the Third Circuit Court, but which does not stay construction of the TMT), completion and execution of the Sublease is the last step needed to enable construction to begin.
The Sublease covers an area of approximately 8.7 acres on the northern plateau below the Mauna Kea summit. It provides for substantial rent of $1,080,000 per year beginning in year 11 of the Sublease term, when the TMT will be commissioned and in operation, and a phase-in of the full rental amount over the construction period, as follows:

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</tr>
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</table>

Rents will be adjusted annually for inflation.

The term of the Sublease will expire on December 31, 2033, the termination date of the Master Lease. The Sublease requires the University to use its best efforts to complete the process currently underway with the BLNR to obtain mutual cancellation of the current Master Lease and concurrent issuance of a new master lease for a term of 65 years, as submitted to the BLNR in November, 2013. Upon successful completion of that process, the Sublease provides that its term will automatically be extended to 65 years after its effective date, or upon expiration or termination of the new master lease, whichever first occurs.

The Sublease also contains provisions expressly requiring TIO to conform to current community-based management and stewardship standards for Mauna Kea. The TMT project will be the first project constructed under the new paradigm established by the 2000 Master Plan, the Comprehensive Management Plan and its subplans (the Natural Resources Management Plan, Cultural Resources Management Plan, Decommissioning Plan, and Public Access Plan), and Act 132 (2009), which formally establishes a mechanism for sublease rents and fees for the use of Mauna Kea lands to be devoted to management and stewardship of the mountain. The Sublease expressly recognizes that customary and traditional native Hawaiian rights are protected by the Hawaii Constitution and is expressly subject to the right of Native Hawaiians to exercise protected traditional and customary practices as provided in the CMP and consistent with the laws of the State of Hawaii.

Upon termination or expiration of the Sublease, TIO will be responsible for decommissioning and removing the TIO facilities and restoring the land in accordance with the CMP and the Decommissioning Plan. The Sublease also requires TIO to develop and periodically update a Decommissioning Funding Plan, which will include financial mechanisms in accordance with the Decommissioning Plan to provide assurance that sufficient funds will be available for decommissioning the premises and for restoring the site. If the Sublease expires or is terminated prior to the expiration of
the Master Lease and the TMT facilities still have remaining useful life, UH has the
option to relieve TIO of its decommissioning obligations and allow TIO to surrender the
premises to the University on mutually agreed terms, which may include payment of an
amount to be held in reserve for future decommissioning.

Kahu Kū Mauna, which serves as the Hawaiian advisory council (Council) to the Office
of Mauna Kea Management (OMKM) as well as the University on matters relating to
Maunakea, reviewed and discussed the sublease terms at its February 5, 2014
meeting. Kahu Kū Mauna did not have any objections to the amount of rent to be paid
by TMT, the progressive payment schedule which calls for a lesser amount in the years
leading up to operational status 10 years following the start of construction, nor other
Sublease terms. The Council expressed concern about the University fulfilling its
financial obligation to cover management costs that exceed sublease rents collected
from this Sublease and any future subleases (e.g. if a new master lease is obtained and
certain other observatories then negotiate new subleases extending beyond 2033). The
Council was reassured that the University is committed to its financial obligation. Kahu
Kū Mauna wished to remind the University of its position when it reviewed the TMT
project prior to approval by the BOR:

Kahu Kū Mauna stands against any construction project that brings
substantive impact to the summit of Maunakea. As such, we have strong
reservations about the TMT project being planned for the North Plateau.
After considerable deliberations, we find that our reservations are not
sufficient to stand against the project, and we are in agreement that the
leaders of the TMT project have demonstrated intentions of responsible
tenancy that strives to meet the standards established by OMKM,
therefore making their proposal less objectionable to the council.

As the Hawaiian advisory council to OMKM, we support the responsible
stewardship of Maunakea and the policies that lead to a system of best
management practice. We encourage collaboration and the sharing of
resources among the tenants, the eventual decommissioning and removal
of all observatories, and the complete restoration of the summit of
Maunakea.

The Council realizes that the removal of telescopes will not occur right away, but it
continues to seek the eventual removal of more telescopes over time while bearing in
mind that without the University, there would no longer be an entity with the ability and
resources to actively and earnestly manage and steward Mauna Kea.

Subsequently, MKMB reviewed and discussed the Sublease at its meeting on February
12, 2014, and voted unanimously to recommend approval of the Sublease by the Board
of Regents.
The Master Lease provides that BLNR approval is required for the University to sublease any portion of the Mauna Kea lands. Accordingly, the Sublease will be submitted to the BLNR for its review and approval after it has been approved by the Board of Regents and by the governing body of TIO. Execution of the Sublease will occur after BLNR approval.

Concurrently with execution of the Sublease, the University and TIO will enter into a Scientific Cooperation Agreement ("SCA"), which addresses scientific cooperation between the University and TIO. The proposed SCA is attached as Attachment 2. Under the SCA, TIO will be solely responsible for design, construction, and operation of the TMT and for the costs thereof. After the TMT is completed and commissioned, the University will be entitled to 7.5% of the scientific observing time on the telescope. The University will also be entitled to appoint one member to the TIO Board, who will have non-voting observer status, and to be represented on the TIO Science Advisory Committee. The University’s research and education programs will benefit substantially from the University’s access and involvement in the TMT.

ACTION RECOMMENDED:

It is recommended that the Board of Regents: (1) approve the rents set forth in the Sublease; (2) delegate to the President, the Chancellor of the University of Hawaii at Hilo, and the Vice President for Budget & Finance/Chief Financial Officer the authority to finalize and execute the Sublease on behalf of the University, provided the rents are as set forth in Attachment 1 and the other terms and conditions of the final Sublease are not materially inconsistent with Attachment 1; and (3) authorize the President, the Chancellor of the University of Hawaii at Hilo, and the Vice President for Budget & Finance/Chief Financial Officer to negotiate and execute such other documents and instruments as may be necessary or appropriate in connection therewith.

Attachments

c: Executive Administrator and Secretary of the Board Cynthia Quinn
SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT
BETWEEN
TMT INTERNATIONAL OBSERVATORY, LLC
AND
THE UNIVERSITY OF HAWAII

THIS SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT (this "SUBLEASE") is made and entered into on this ___ day of ______, 2014, effective as of April 1, 2014 (the "Effective Date"), by and between TMT International Observatory, LLC, a Delaware limited liability company ("Sublessee"), and the University of Hawaii, a public body corporate and the public university of the State of Hawaii ("Sublessor").

RECITALS

This SUBLEASE is entered into with reference to the following:

A. Sublessor leases certain lands located on and around the summit of Mauna Kea, Island of Hawaii from the State of Hawaii, Board of Land and Natural Resources ("Lessor") pursuant to General Lease No. S-4191, dated June 21, 1968 (the "Master Lease"), a copy of which is attached hereto as Exhibit A and incorporated herein by reference.

B. Sublessee desires to sublease a portion of said lands, as more fully described below, for the purpose of constructing and operating an optical/infrared telescope facility known as the Thirty Meter Telescope ("TMT") in the manner described in, and in accordance with, this SUBLEASE and that certain Scientific Cooperation Agreement Between Sublessee and Sublessor Concerning the Design, Construction and Operation of the Thirty Meter Telescope on Mauna Kea, Hawaii (the "Scientific Cooperation Agreement") executed simultaneously herewith and to be effective on the same Effective Date indicated above. The TMT facilities will include, but are not limited to, the TMT telescope and enclosure; the support building (the space necessary to support scientific observers and technical personnel while at the summit); together with instruments, electrical conductors, cableways and tunnels; driveways and parking lots; power, telephone and communications conduits and lines; and access roads within the border of the Subleased Premises (as defined in Section 1 below) ("TMT Facilities"). "TMT Facilities" does not include any facilities outside the Subleased Premises.

C. The Master Lease provides that Sublessor may not enter into a sublease without the prior written consent of the Lessor. Prior written consent to this SUBLEASE has been obtained pursuant to that certain Consent to Sublease Under General Lease No. S-4191 dated __________, 2014, a copy of which is attached hereto as Exhibit B and incorporated herein by reference.
D. In 2000, Sublessor adopted the Mauna Kea Science Reserve Master Plan, which establishes the management structures for Sublessor’s stewardship of the areas it manages on Mauna Kea. In 2009 and 2010, Sublessor adopted, and Lessor approved, the Mauna Kea Comprehensive Management Plan ("CMP") and its subplans the Cultural Resources Plan, Natural Resources Management Plan, Public Access Plan, and Decommissioning Plan. These plans commit Sublessor to exercise responsible stewardship of Mauna Kea and to ensure that astronomical activities are conducted in a manner that respects the cultural significance of Mauna Kea, protects the environment, and is responsive to the needs and concerns of Native Hawaiians and the public.

E. In May 2010, Sublessor completed an Environmental Impact Statement for the TMT. In September 2010, Sublessor filed an Application for a Conservation District Use Permit to construct the TMT. The permit was approved in April 2013. TIO is now seeking a long term sublease to build and operate the TMT.

F. Sublessor has submitted a request to the Lessor for the mutual cancellation of the current Master Lease and issuance of a new master lease for a term of sixty-five (65) years from issuance. Sublessee desires to continue operation of the TMT Facilities beyond 2033. It is desirable for management and planning purposes, including appropriate stewardship of Mauna Kea, to address the potential continued operation of the TMT Facilities beyond 2033 in this Sublease.

AGREEMENT

Now, therefore, in consideration of the foregoing and of the mutual promises and agreements set forth herein, Sublessor and Sublessee agree as follows:

1. **Subleased Premises.** Sublessor does hereby sublease to Sublessee, and Sublessee does hereby sublease from Sublessor, the parcel of land identified in Exhibit C attached hereto and incorporated herein by reference (the "Subleased Premises"), constituting a portion of the land leased by Sublessor under the Master Lease.

2. **Non-Exclusive Easements.** Sublessee shall have the right of access to and egress from the Subleased Premises over and across the Mauna Kea Science Reserve, utilizing the common entrances and rights of way, together with others entitled thereto under such rules and regulations as may be established by and amended from time to time by Sublessor. Sublessee shall also have the rights to (i) utilize and construct in, grade, fill, and perform work approved by Lessor and Sublessor in the easement area depicted in Exhibit C hereto (the "Easement Area"), (ii) utilize and construct in and perform work approved by Lessor and Sublessor and consistent with the TMT Access Way Agreement dated September 13, 2012 by and among UH, the Smithsonian Institution Astrophysical Observatory, and the TMT Observatory Corporation in the spur road from the Mauna Kea Observatory Access
Road to the Subleased Premises, (iii) install and utilize power and communications conduits and lines from a central handhole or handholes in the Mauna Kea summit area to the Subleased Premises, and (iv) utilize and access the Batch Plant staging area as authorized by the TMT CDUP (as defined in Section 4 below).

3. **Survey/Site Specific Description.** The site designated in Exhibit C hereto is subject to survey by Sublessee within six months from the Effective Date of this Sublease. The exact area covered by the Subleased Premises and by the Easement Area shall be more specifically described in a written addendum to this Sublease after the survey has been completed, which shall be signed by and binding upon Sublessor and Sublessee, and which shall be provided to the Chair of the Board of Land and Natural Resources within 30 days of execution.

4. **Use of Subleased Premises.** Sublessee shall use the Subleased Premises solely to construct and operate the TMT Facilities in accordance with this Sublease and the Scientific Cooperation Agreement. The construction and operation of the Subleased Premises shall be conducted in strict compliance with the terms and conditions of Conservation District Use Permit HA-3568 approved by the Lessor on April 12, 2013 (the "TMT CDUP"), including performance of all mitigation conditions set forth therein, and any amended or subsequent Conservation District Use Permit. Sublessee shall not at any time during the term of this Sublease construct, place, maintain, or install on the Subleased Premises any other building, structure, or improvement without the prior written approval of Sublessor and Lessor and upon such conditions as Sublessor or Lessor may impose. For purposes of the foregoing sentence, any other "improvement" means improvements that are not specified in or contemplated by the TMT CDUP and not contained within the building envelop of TMT observatory plans approved in accordance with Section 37 below. For the avoidance of doubt, the addition of any instruments, equipment or any other additions that are fully contained within the observatory structure or buildings shall not require the prior written approval of Sublessor or Lessor provided that such additions are otherwise in compliance with the terms of this Sublease and the Master Lease.

5. **Management and Stewardship Obligations.** This Sublease shall be subject to the following:

a. The Subleased Premises are within the State Land Use Conservation District and all uses shall comply with the applicable rules and regulations of the State Conservation District, including but not limited to Hawaii Revised Statutes ("HRS") Chapter 183C and Hawaii Administrative Rules ("HAR") Chapter 13-5.

b. Sublessee shall comply with applicable State rules and regulations related to historic preservation including but not limited to HRS Chapter 6E, and HAR Chapters 13-197, 13-198, 13-275 through 13-284 and 13-300, and any applicable amendments of or supplements to such historic preservation regulations.
c. Sublessor shall exercise management jurisdiction over the Subleased Premises pursuant to management plans approved by the Lessor, including the CMP and its subplans, the Natural Resources Management Plan, Cultural Resources Management Plan, Decommissioning Plan, and Public Access Plan, the TMT Management Plan, and any amendments of or supplements to management plans approved by the Lessor for lands that include the Subleased Premises. Sublessee acknowledges that it has reviewed and is familiar with the CMP and subplans. Sublessor shall keep Sublessee informed regarding any future amendments or supplements thereto, and shall promptly provide copies of such documents to Sublessee.

d. All public and commercial activities in the areas of Mauna Kea managed by Sublessor, including recreational activities, shall be governed by administrative rules promulgated pursuant to the authority granted Sublessor by Act 132 (SLH 2009), following consultation with DLNR, the Office of Hawaiian Affairs, and the public in accordance therewith.

e. The Constitution of the State of Hawaii mandates the protection of recognized customary and traditional native Hawaiian rights subject to State regulation. This Sublease shall be subject to the right of Native Hawaiians to exercise protected traditional and customary practices as provided in the CMP and consistent with the laws of the State of Hawaii.

f. Sublessor has established a management structure to manage the lands of which the Subleased Premises are a part, which structure includes the Office of Mauna Kea Management at the University of Hawaii at Hilo, the volunteer community-based Mauna Kea Management Board and the Kahu Kū Mauna advisory council on Hawaiian cultural matters.

6. **Operation of the TMT Facilities.** Neither Sublessee nor any successor or assign shall operate the TMT Facilities for purposes of research without a valid and effective Scientific Cooperation Agreement with Sublessor. The TMT Facilities may be operated in the absence of a valid and effective Scientific Cooperation Agreement only when necessary to ensure the safety of personnel or of the TMT Facilities.

7. **Rent.** In consideration for the use of the Subleased Premises, Sublessee shall pay to Sublessor annual rents based on calendar years during the term of this Sublease as set forth below. The annual rent during the construction period is based on the incremental value of the major milestones achieved during the construction of the TMT Facilities. The milestones are set forth below and generally span approximately two (2) year periods. The annual rents shall be paid based upon the specified calendar years below regardless of whether the respective milestone is achieved.
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Rent shall be paid in advance, in equal semi-annual installments, on or before January 31 and July 31, of each calendar year during the term of this Sublease. The first installment of rent for the initial, partial year (which will be prorated) shall be due within 30 days of the date of execution of this Sublease. Beginning in January of 2015, and in January of each year thereafter, the annual rental amount for the year shall be based on the initial annual rental amount adjusted for the annual rate of inflation recorded for subsequent years in accordance with the Consumer Price Index for all Urban Consumers, U.S. City Average (not seasonally adjusted) (base year 1982-1984 - 100) ("CPI"), published by the United States Department of Labor, Bureau of Labor Statistics. The calculation shall be made by comparing the CPI last published for the date nearest to the Effective Date (the "Base Index") with the CPI last published for the date nearest to the current anniversary date (the "Current Index"). If the Current Index has increased or decreased over the Base Index, then the amount subject to adjustment shall be set for the ensuing year by multiplying the initial annual rental amount by a fraction, the numerator of which is the Current Index and the denominator of which is the Base Index. If the base of the CPI changes from the 1982-84 base (100), the CPI shall, thereafter, be adjusted to the 1982-84 base (100) before the computation indicated above is made. If the CPI Index is at any time no longer published, a comparable index generally accepted and employed by the real estate profession shall be used.

Sublessor shall receive, deposit, and apply the rents received hereunder in accordance with the laws of the State of Hawaii, including, without limitation, Section 304A-2170 of the Hawaii Revised Statute, as amended from time to time. Such deposit shall be net of the funds required by law to be transferred or paid to the Office of Hawaiian Affairs. Sublessor shall be responsible for paying over to the Office of Hawaiian Affairs its ratable share of the rents received in accordance with the laws of the State of Hawaii.

8. **Master Lease: Order of Precedence.** The rights granted to Sublessee pursuant to this Sublease are subject to the terms and conditions of the Master Lease, as the same may be amended. In the event of any conflict between the terms of this Sublease and the Master Lease, the Master Lease shall be controlling. In the event of any conflict between the terms of this Sublease and the Scientific Cooperation Agreement, this Sublease shall be controlling. Sublessee shall comply with the terms and conditions of the Master Lease at all times. If Sublessee causes a breach or default of any term, covenant, restriction, or condition of the Master Lease, and this breach or default shall continue for a period of more than forty-five
(45) days after delivery by the Sublessor of a written notice of breach or default and demand for cure (plus any additional period as the Lessor may allow for good cause), then Sublessor may, subject to the provisions of Section 171-21, Hawaii Revised Statutes, at once re-enter the Subleased Premises, or any part, and upon or without the entry, at its option, terminate this Sublease without prejudice to any other remedy or right of action for arrears of rent or for any preceding or other breach of contract; and in the event of termination, at the option of the Sublessor, all buildings and improvements shall remain and become the property of the Sublessor or shall be removed by Sublessee in accordance with the Site Decommissioning Plan at Sublessee’s sole cost and expense; furthermore, Sublessor shall retain all rent paid in advance to be applied to any damages.

9. **Term and Termination.** The term of this Sublease shall begin on the Effective Date and shall expire on December 31, 2033, unless extended or sooner terminated as provided herein.

a. **Mutual Cancellation of Master Lease and Concurrent Issuance of New Master Lease.**

(1) Sublessor shall use its best efforts to continue to and shall diligently pursue and take all actions necessary or advisable to complete the process currently underway with Lessor to obtain mutual cancellation of the current Master Lease subject to and concurrent with issuance of a new master lease (the "**New Master Lease**"), for a term of sixty-five (65) years and on terms and conditions materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013. In the foregoing sentence, such "actions" shall include, without limitation, continuing to prepare and process an Environmental Impact Statement for the New Master Lease and such "terms and conditions" shall include, without limitation, that the New Master Lease shall include the provisions stating that "The lease shall be subject to all existing subleases entered into by the Lessee and approved by the Lessor pursuant to General Lease No. S-4191 dated June 21, 1968" and "Should this lease be rendered or declared invalid, illegal, or unenforceable by a court of competent jurisdiction, such invalidation shall cause, without further action, General Lease No. S-4191 dated June 21, 1968 to be revived in its entirety for the duration of the term therein, unless and until the parties subsequently agree otherwise".

(2) If the New Master Lease is approved and duly executed by Lessor and Sublessor, Sublessor shall promptly provide a copy of the New Master Lease to Sublessee. Effective as of the effective date of the New Master Lease, the following shall apply:

i) The provisions of this Sublease shall continue, whether by extension, issuance of a new sublease, or otherwise, provided that any continuance shall be in accordance with the terms herein as a sublease under the New Master Lease (including, without limitation, the rents set forth herein);
ii) The New Master Lease shall become the Master Lease for all purposes of this Sublease or any new sublease, and all references to the Master Lease in this Sublease or any new sublease shall thereafter refer to the New Master Lease; and

iii) The term of this Sublease shall automatically be extended, and shall thereafter expire sixty-five (65) years after the Effective Date, or upon expiration or termination of the New Master Lease, whichever shall first occur.

(3) If the New Master Lease is approved, but the term is not for sixty-five (65) years or the terms and conditions thereof are not materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013, subsections (a)(2)(i), (ii), and (iii) above shall apply unless Sublessee, at its sole option, provides a notice of termination to Sublessor in accordance with Section 9.d. below within one hundred twenty (120) days after Sublessee’s receipt of the New Master Lease from Sublessor. Sublessor further agrees to diligently negotiate in good faith with Sublessee regarding mutually acceptable amendments to this Sublease during such one hundred twenty (120) day period and to promptly and diligently pursue approval by the Lessor of such amendments.

(4) If the New Master Lease is approved on terms and conditions materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013 or is otherwise acceptable to Sublessee in Sublessee’s sole judgment, Sublessor agrees to execute an amendment to this Sublease to reflect compliance with subsections (a)(2)(i), (ii), and (iii) above or a new sublease on the same material terms and conditions as set forth in this Sublease (including, without limitation, the rents set forth herein) and reflecting compliance with subsections (a)(2)(i), (ii), and (iii) above.

(5) Sublessee acknowledges that the Lessor has sole authority to determine whether to approve and enter into the New Master Lease, pursuant to and in accordance with Hawaii law, that no such approval has been granted as of the date of this Sublease, and that no prior commitment to issue such approval has been or can be made.

b. **Failure to Obtain New Master Lease.** If the New Master Lease is not approved by Lessor or if Sublessor otherwise fails to obtain a New Master Lease that automatically extends the term of this Sublease in accordance with subsection (3) or (4) of Section 9.a. above, Sublessor agrees to use its best efforts to and will immediately and diligently pursue another means of acquiring sufficient rights to continue to lease the Subleased Premises to Sublessee on substantially the same terms and conditions herein, but for an additional term extending to on or about March 31, 2079. If a subsequent master lease is approved and duly executed by Lessor and Sublessor, Sublessor shall promptly provide a copy of such subsequent master lease to Sublessee and, at Sublessee’s sole option: (I) the provisions of
Section 9.a.(2)i), ii), and iii) above shall apply as if the subsequent master lease is the "New Master Lease" referred to in Section 9.a. above and Sublessor shall execute an amendment to this Sublease to reflect compliance with Sections 9.a.(2)i), ii), and iii) above or a new sublease on the same material terms and conditions as set forth in this Sublease (including, without limitation, the rents set forth herein) and reflecting compliance with Sections 9.a.(2)i), ii), and iii) above, or (II) Sublessor shall diligently negotiate in good faith a new sublease with Sublessee, if so desired by Sublessee, on the same material terms and conditions as set forth in this Sublease (including, without limitation, the rents set forth herein and compliance with the Master Lease then in effect) or on such other terms and conditions as may be mutually agreeable to Sublessor and Sublessee, with a term ending on or after March 31, 2079.

c. **Option to Extend Term.** Notwithstanding the foregoing in Sections 9.a. and 9.b. above, Sublessee shall have an option to extend the term of this Sublease beyond December 31, 2033 if Sublessor acquires rights to sublease the Subleased Premises to Sublessee, whether under the New Master Lease or other master lease, and such extension shall be coterminous with such New Master Lease or other master lease, but in no event shall the term of this Sublease extend beyond March 31, 2079. Such option shall expire on December 31, 2033 and Sublessee shall have sole discretion regarding whether or not to exercise such option.

d. **Termination Without Cause.** Sublessee shall have the right to terminate this Sublease at any time upon six (6) months prior written notice to Sublessor.

e. **Termination for Breach.** This Sublease may be terminated for breach as provided in, and in accordance with, Sections 8 above or 25 below.

f. **Non-use and Abandonment.** If the Sublessee shall, at any time for a continuous period of eleven (11) months, fail or cease to use, or abandon the Subleased Premises, this Sublease shall cease and terminate. Sublessor shall provide written notice to Sublessee within thirty (30) days after the sixth (6th) month of such eleven (11) month period and shall allow Sublessee three (3) months to cure any such purported abandonment.

10. **Effect of Termination or Expiration: Decommissioning.** Upon termination or expiration of this Sublease, Sublessee shall, at Sublessor's sole option and at Sublessee's sole cost and expense either (a) surrender the Subleased Premises with all improvements existing or constructed thereon, or (b) decommission and remove the TMT Facilities and restore the land in accordance with the CMP and the Decommissioning Plan for Mauna Kea Observatories, A Sub-Plan of the Mauna Kea Comprehensive Management Plan (dated January, 2010 and approved by Lessor in March, 2010) ("Decommissioning Plan"), and any amended, supplemental, or successor plans adopted by Sublessor with the approval of the Lessor.
a. **Decommissioning Funding Plan.** Sublessee shall develop and periodically update a Decommissioning Funding Plan as described in, and in accordance with, the Decommissioning Plan, to provide assurance to Sublessor that sufficient funds will be available to carry out deconstruction and site restoration activities upon termination or expiration of this Sublease. The Decommissioning Funding Plan shall include one or more financial assurance mechanisms as described in the Decommissioning Plan. Sublessee shall provide the initial Decommissioning Funding Plan on or before the execution date of this Sublease as set forth above. Sublessee shall submit an updated Decommissioning Funding Plan to Sublessor for Sublessor's review and approval as provided in the CMP, and shall provide such information and documents as Sublessor may reasonably request from time to time to verify the availability and adequacy of funding to meet Sublessee's decommissioning and restoration obligations. If, at any time during the term of this Sublease, Sublessor reasonably determines that the Decommissioning Funding Plan is insufficient, Sublessee shall consult with Sublessor and shall negotiate in good faith to determine the amount of such additional funding and provide such additional funding assurance mechanisms.

b. **Site Decommissioning Plan.** Upon expiration or termination of this Sublease or any extended sublease, decommissioning, including site restoration, shall be carried out in strict compliance with a Site Decommissioning Plan developed and approved in accordance with the Decommissioning Plan ("Decommissioning Obligations").

c. **Delivery of Possession.** Except as otherwise provided herein, upon expiration or termination of this Sublease or any extended sublease and completion of Sublessee's Decommissioning Obligations, Sublessee shall peaceably deliver to Sublessor possession of the Subleased Premises in a clean and orderly condition.

d. **Payment of Decommissioning Costs of Sublessor or Lessor.** Sublessee shall promptly pay on demand any reasonable and necessary costs incurred by Sublessor or Lessor to remedy any failure on the part of Sublessee to fully and timely perform its Decommissioning Obligations.

e. **Survival.** The obligations of Sublessee under this Section 10, the rights and obligations of Sublessor and Sublessee under Sections 9.a., 9.b., and 9.c. above, and the obligations of Sublessee under Section 11 below shall survive expiration or termination of this Sublease.

f. **Termination Without Decommissioning: Assumption of Decommissioning Obligations by Sublessor.** If this Sublease expires or is terminated prior to the expiration of the Master Lease and at a time when the TMT Facilities have remaining useful life, at Sublessor's sole option Sublessee shall be relieved of its Decommissioning Obligations and permitted to surrender its subleasehold interest in the Subleased Premises without removal of the TMT Facilities on such
terms as may be mutually agreed in writing by Sublessor and Sublessee, which may include payment to Sublessor of an amount to be held in reserve for future decommissioning in exchange for Sublessor’s assumption of the Decommissioning Obligations.

11. **Indemnity.** Sublessee shall indemnify, defend, and hold harmless Lessor, Sublessor, and their officers, agents, employees, and other persons acting on their behalf, from and against any claim or demand for loss, liability, or damages (including, but not limited to, reasonable attorneys’ fees and claims for property damage, personal injury, or death, based upon any accident, fire, or other incident on or about the Subleased Premises) to the extent arising or resulting from: (1) any act or omission on the part of Sublessee relating to Sublessee’s use, occupancy, maintenance, or enjoyment of the Subleased Premises; (2) any failure on the part of Sublessee to properly maintain the Subleased Premises, and areas adjacent thereto in Sublessee’s use and control, including any accident, fire, or nuisance, arising from or caused by any failure on the part of Sublessee to maintain the Subleased Premises in a safe condition; or (3) Sublessee’s non-observance or non-performance of any of the terms, covenants, and conditions of this Sublease or the Master Lease or the rules, regulations, ordinances and laws of the Federal, State, or County governments. Sublessee further agrees to indemnify, defend, and hold harmless Lessor and Sublessor from any damages or claims arising from the release of "hazardous material" (as defined in Section 31 below) on the Subleased Premises occurring while Sublessee is in possession, or elsewhere if caused by Sublessee or any person acting under Sublessee.

12. **Insurance.** Sublessee shall, at its own cost and expense, maintain the following insurance. Such insurance shall be subject to the reasonable approval of Sublessor and Lessor and, except as to any property insurance, shall name Sublessor and Lessor as additional insureds. Sublessee shall deliver executed certificates thereof to Sublessor on or before the Effective Date of this Sublease and thereafter within a reasonable time prior to the expiration of the term of each such policy. As often as any such policy shall expire or terminate, renewal or additional policies shall be procured and maintained by Sublessee in like manner to like extent. If Sublessee has only provided Sublessor with certificates evidencing the policies required to be carried by Sublessee under this Sublease, Sublessee agrees to deliver executed copies of all such required policies to Sublessor within ten (10) days of Sublessor’s written request for the same.

a. **Property Insurance.** Sublessee shall at its own expense and at all times during the term keep Sublessee’s property, including but not limited to the TMT Facilities, insured against (i) all of the risks covered by a standard ISO Commercial Property Special Causes of Loss Form (or equivalent) which shall be in an amount equal to the full replacement cost of such property and shall not have a deductible in excess of Two Hundred and Fifty Thousand Dollars ($250,000), and (ii) such other hazards or risks which a reasonably prudent telescope operator on Mauna Kea would insure against. Sublessee hereby waives any and all rights of
subrogation which it may have against Lessor and/or Sublessor, except to the extent of available insurance. In case the property required to be insured above or any part thereof shall be destroyed or damaged by fire or such other casualty required to be insured against, then and as often as the same shall happen, the proceeds of such insurance shall be paid to Sublessee to be used by Sublessee to promptly repair and restore any damage to such property.

b. **Liability Insurance.** Sublessee shall procure at Sublessee's expense and keep in force during the term of this Sublease and any extension thereof, the following insurance:

i) **General Liability Insurance.** Commercial general liability insurance (including coverage for liability caused by the fault of Sublessee, products-completed operations liability, personal and advertising injuries and coverage for contractual liability to the extent provided by ISO Form CGL #00-01-04-13 (or equivalent) covering Sublessee and naming as additional insureds: (i) Sublessor, (ii) Lessor, (iii) Sublessor's and Lessor's managers, officers, agents and employees, and (iv) such other parties as Sublessor may specify, insuring against liability arising out of the use, occupancy or maintenance of the Subleased Premises and areas appurtenant thereto by Sublessee with limits of not be less than One Million Dollars ($1,000,000) for property damage, and Five Million Dollars ($5,000,000) for injuries and deaths in any one occurrence or a combined single limit of Five Million Dollars ($5,000,000) per occurrence and deductibles of no more than Two Hundred and Fifty Thousand Dollars ($250,000). Such insurance shall be primary and shall not limit the liability of the Sublessee under Section 11 above.

ii) **Auto Liability Insurance.** Auto liability insurance covering all automobiles used by Sublessee in connection with its operations in the Subleased Premises with limits of not less than Five Hundred Thousand Dollars ($500,000) for property damage, and Five Million Dollars ($5,000,000) for injuries or deaths in any one occurrence or a combined single limit of Five Million Dollars ($5,000,000) per occurrence, with deductibles of no more than Five Thousand Dollars ($5,000) per occurrence and naming Sublessor and Lessor as an additional insureds.

iii) **Pollution Liability Insurance.** Pollution liability insurance in the amount of not less than Five Million Dollars ($5,000,000) and with deductibles of no more than Two Hundred and Fifty Thousand Dollars ($250,000) per occurrence and naming Sublessor and Lessor as an additional insureds. Such insurance shall cover bodily injury, property damage, and environmental damage, including clean up and defense and remediation costs, for occurrences that arise from the occupancy or use of the Subleased Premises during the Term by Sublessee.

c. **General Insurance Requirements.**
i) Sublessee shall use its best efforts to obtain the following terms in each policy of commercial property insurance and general liability insurance required in Sections 12.a. and 12.b. above to the extent that such terms are reasonably available in the commercial marketplace:

a) a provision that the liability of the insurer thereunder shall not be affected by, and that the insurer shall not claim, any right of set-off, counterclaim, apportionment, proration, or contribution by reason of, any other insurance obtained by or for Sublessee, Lessor, Sublessee, or any person claiming by, through, or under any of them; and

b) no provision relieving the insurer from liability for loss occurring while the hazard to buildings and personal property is increased, whether or not within the knowledge or control of, or because of any breach of warranty or condition or any other act or neglect by Sublessee, Lessor, Sublessee, or any person claiming by, through, or under any of them.

ii) Each policy of commercial property insurance and general liability insurance required in Sections 12.a. and 12.b. above shall:

a) be written by an insurance company rated A- or better, Class size VIII or better, by the Best's Key Rating Guide, based upon the rating system in effect on the date this Sublease is signed. In the event that Best's changes its rating system or ceases to provide ratings at some later date, then such insurance company shall have a rating from Best (or some other comparable rating service if Best's ceases to provide ratings) comparable to the "A- or better, Class VIII or better" requirement of the immediately preceding sentence; and

b) be specifically endorsed to provide that they are primary policies, not contributing with and not in excess of any coverage that Sublessor and/or Lessor may carry, notwithstanding anything to the contrary contained in any policies obtained by Sublessee and/or Lessor.

In addition, Sublessee shall request that each such policy be specifically endorsed to provide that such policy may not be cancelled except upon the insurer giving at least thirty (30) days' prior written notice thereof (ten (10) days in the case of nonpayment of premium) to Sublessor, Lessor, Sublessee, and other person having an interest in the property who has requested such notice of the insurer.

13. **Taxes, Assessments, etc.** Sublessee shall pay or cause to be paid, when due, the amount of all taxes, rates, and assessments of every description as to which the Subleased Premises or any part, or any improvements, or the Lessor, Sublessor, or Sublessee, are now or may be assessed or become liable by authority of law during the term of this Sublease; provided, however, that with respect to any assessment made under any betterment or improvement law which may be payable
in installments, Sublessee shall be required to pay only those installments, together
with interest, which becomes due and payable during the term of this Sublease.

14. **Utility Services.** Sublessee shall be responsible for obtaining
any utility services and shall pay when due all charges, duties and rates of every
description, including water, sewer, gas, refuse collection or any other charges, as to
which the Subleased Premises or any part, or any improvements, or the Lessor,
Sublessor, or Sublessee may become liable for during the term, whether assessed to
or payable by the Lessor, Sublessor, or Sublessee.

15. **Covenant against discrimination.** The use and enjoyment of
the Subleased Premises shall not be in support of any policy which discriminates
against anyone based upon race, creed, sex, color, national origin, religion, marital
status, familial status, ancestry, physical handicap, disability, age or HIV (human
immunodeficiency virus) infection.

16. **Sanitation.** Sublessee shall keep the Subleased Premises and
improvements in a strictly clean, sanitary and orderly condition.

17. **Waste and Unlawful, Improper or Offensive Use of Subleased
Premises.** Sublessee shall not commit, suffer or permit to be committed any waste,
nuisance, strip or unlawful, improper or offensive use of the Subleased Premises or
any part, nor, without the prior written consent of the Lessor and Sublessor, cut
down, remove or destroy, or suffer to be cut down, removed or destroyed, any trees
now growing on the premises.

18. **Compliance with Laws.** Sublessee shall comply with all
applicable requirements of all municipal, state, and federal authorities and observe
all municipal, state and federal laws applicable to the Subleased Premises, now in
force or which may be in force.

19. **Inspection of Subleased Premises.** Upon reasonable notice by
Sublessor to Sublessee, Sublessee shall permit the Lessor, Sublessor, and their
respective agents, at all reasonable times during the Sublease term, to enter the
Subleased Premises and examine the state of its repair and condition.

20. **Improvements.** Sublessee shall not at any time during the term
of this Sublease construct, place, maintain and install on the premises any building,
structure or improvement of any kind and description except with the prior written
approval of the Lessor and the Sublessor and upon those conditions as the Lessor or
Sublessor may impose, unless otherwise provided in this Sublease. Construction of
the TMT Facilities in accordance with Section 4 above is authorized. Except as
otherwise provided in this Sublease, Sublessee shall own all improvements
constructed by and installed by Sublessee on the Subleased Premises.

21. **Repairs to Improvements.** Sublessee shall, at its own expense,
keep, repair, and maintain all buildings and improvements now existing or hereafter
constructed or installed on the Subleased Premises in good order, condition and repair, reasonable wear and tear excepted.

22. **Liens.** Sublessee shall not commit or suffer any act or neglect which results in the Subleased Premises, any improvement, the leasehold estate of the Sublessor, or the subleasehold estate of the Sublessee becoming subject to any attachment, lien, charge, or encumbrance, except as provided in this Sublease, and shall indemnify, defend, and hold the Lessor and Sublessor harmless from and against all attachments, liens, charges, and encumbrances and all resulting expenses.

23. **Assignments, etc.** Sublessee shall not sublease, subrent, transfer, assign, or permit any other person to exclusively occupy the Subleased Premises or any portion or transfer or assign this Sublease or any interest therein, either voluntarily or by operation of law, without the prior written approval of the Lessor and the Sublessor.

24. **Costs of Litigation.** Sublessee shall pay all costs, including reasonable attorney's fees, and expenses incurred by or paid by the Lessor or Sublessor (i) in enforcing the covenants and agreements of the Master Lease or this Sublease with respect to Sublessee, (ii) in recovering possession of the Subleased Premises, or (iii) in the collection of delinquent rental, taxes, and any and all other charges.

25. **Breach.** Time is of the essence in this Sublease and if the Sublessee shall become bankrupt, or if this Sublease and Subleased Premises shall be attached or taken by operation of law, or if Sublessee shall fail to observe and perform any of the material covenants, terms, and conditions contained in this Sublease and on its part to be observed and performed (other than a failure that causes a breach of the Master Lease, in which case Sublessor and Sublessee hereby agree that Section 8 above applies), and this failure shall continue for a period of more than sixty (60) days after delivery by the Sublessor of a written notice of breach or default and demand for cure, by personal service, registered mail or certified mail to the Sublessee at its last known address and to each holder of record having a security interest in the premises, then Sublessor may, subject to the provisions of Section 171-21, Hawaii Revised Statutes, at once re-enter the premises, or any part, and upon or without the entry, at its option, terminate this Sublease without prejudice to any other remedy or right of action for arrears of rent or for any preceding or other breach of contract; and in the event of termination, at the option of Sublessor, all buildings and improvements shall remain and become the property of the Sublessor or shall be removed by Sublessee in accordance with Section 10 above; furthermore, Sublessor shall retain all rent paid in advance to be applied to any damages.

26. **Condemnation.** If at any time, during the term of this Sublease, any portion of the Subleased Premises should be condemned, or required for public purposes by any government authority, the rental shall be reduced in proportion to
the value of the portion of the Subleased Premises condemned. Sublessee shall be entitled to receive from the condemning authority the proportionate value of the Sublessee's permanent improvements so taken in the proportion that it bears to the unexpired term of the Sublease; provided, that the Sublessee may, in the alternative, remove and relocate its improvements to the remainder of the lands occupied by Sublessee. Sublessee shall not by reason of the condemnation be entitled to any claim against the Lessor or Sublessor for condemnation or indemnity for leasehold interest and all compensation payable or to be paid for or on account of the leasehold interest by reason of the condemnation shall be payable to and be the sole property of the Lessor or Sublessor. The foregoing rights of the Sublessee shall not be exclusive of any other to which Sublessee may be entitled by law. Where the portion taken renders the remainder unsuitable for the use or uses for which the Subleased Premises were leased, Sublessee shall have the option to surrender this lease and be discharged and relieved from any further liability; provided, that Sublessee shall remove the permanent improvements constructed, erected and placed by it within any reasonable period allowed by the Lessor and Sublessor, in accordance with Section 10 above.

27. **Right to Enter.** The Lessor, Sublessor, or the County of Hawaii and their agents or representatives shall have the right to enter and cross any portion of the Subleased Premises for the purpose of performing any public or official duties; provided, however, in the exercise of these rights, the Lessor, Sublessor, or the County of Hawaii shall not interfere unreasonably with the Sublessee or Sublessee's use and enjoyment of the Subleased Premises.

28. **Extension of Time.** Notwithstanding any provision contained in this Sublease, when applicable, Sublessor may for good cause shown, allow additional time beyond the time or times specified in this Sublease for the Sublessee to comply, observe, and perform any of the Sublease terms, conditions, and covenants.

29. **Quiet Enjoyment.** Sublessor covenants and agrees with Sublessee that upon payment of the rent at the times and in the manner provided and the observance and performance of these covenants, terms, and conditions on the part of the Sublessee to be observed and performed, the Sublessee shall and may have, hold, possess, and enjoy the premises for the term of the lease, without hindrance or interruption by the Lessor, Sublessor or any other person or persons lawfully claiming by, through, or under the Lessor or Sublessor.

30. **Non-warranty.** Neither the Lessor nor Sublessor warrants the conditions of the Subleased Premises, as the same are being subleased as is.

31. **Hazardous Materials.** Sublessee shall not cause or permit the escape, disposal or release of any hazardous materials except as permitted by law. Sublessee shall not allow the storage or use of such materials in any manner not sanctioned by law or by the highest standards prevailing in the industry for the
storage and use of such materials, nor allow to be brought onto the premises any such materials except to use in the ordinary course of Sublessee's business where the Sublessee has provided Sublessor with a list that contains the identity of such materials used or stored by Sublessee in the ordinary course of its business and in compliance with all applicable federal and state regulations; provided, that if Sublessor disapproves in writing any such materials, the disapproved materials shall not be brought onto the Subleased Premises. If any lender or governmental agency shall ever require testing to ascertain whether or not there has been any release of hazardous materials by Sublessee, then the Sublessee shall be responsible for the reasonable costs thereof. In addition, Sublessee shall execute affidavits, representations and the like from time to time at Lessor's or Sublessor's request concerning Sublessee's best knowledge and belief regarding the presence of hazardous materials on the Subleased Premises placed or released by Sublessee.

For the purpose of this Sublease, "hazardous material" shall mean any pollutant, toxic substance, hazardous waste, hazardous material, hazardous substance, or oil as defined in or pursuant to the Resource Conservation and Recovery Act, as amended, the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, the Federal Clean Water Act, or any other federal, state, or local environmental law, regulation, ordinance, rule, or by-law, whether existing as of the date hereof, previously enforced, or subsequently enacted.

32. **Hawaii Law.** This Sublease shall be construed, interpreted, and governed by the laws of the State of Hawaii.

33. **Exhibits - Incorporation in Sublease.** All exhibits referred to herein are attached to this Sublease and hereby are deemed incorporated by reference.

34. **Headings.** The article and section headings herein are inserted only for convenience and reference and shall in no way define, describe or limit the scope or intent of any provision of this Sublease.

35. **Partial Invalidity.** If any term, provision, covenant or condition of this Sublease should be held to be invalid, void or unenforceable, the remainder of this Sublease shall continue in full force and effect and shall in no way be affected, impaired or invalidated thereby.

36. **Withdrawal.** If and to the extent that Lessor exercises its power of withdrawal under the Master Lease to withdraw any portion of the Subleased Premises for public uses or purposes upon giving reasonable notice and without compensation except as otherwise provided in the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease pursuant to Section 9.b. above, then Sublessor shall have the right to withdraw these same portions of the Subleased Premises during the term of this Sublease upon giving reasonable notice to Sublessee and subject to the Sublessee's claim for any compensation provided
under the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease between Sublessor and Lessor that includes in the Subleased Premises for any permanent improvement constructed upon the Subleased Premises that is destroyed or made unusable in the process of the withdrawal or taking. Upon such withdrawal, or upon the taking which causes any portion of the Subleased Premises to become unusable for the specific use or uses for which it was subleased, the rent shall be reduced in proportion to the value of the land withdrawn or made unusable, and to the extent permitted in the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease pursuant to Section 9.b. above, if any permanent improvement constructed upon the land by Sublessee is destroyed or made unusable in the process of the withdrawal or taking, the proportionate value shall be paid based upon the unexpired term of the lease (which value shall also include the cost of decommissioning such improvements including site restoration as required in the Decommissioning Plan).

37. **Building Construction.** All building construction shall be in full compliance with all applicable laws, rules and regulations of the federal, state, and county governments and in accordance with plans and specifications submitted to and approved by the Sublessor and the Chairman of the Board of Land and Natural Resources prior to commencement of construction.

38. **Clearances.** Sublessee shall be responsible for obtaining all necessary federal, state or county clearances.

39. **Time of Essence.** Time is of the essence in all provisions of this Sublease.

40. **Written Notice.** All notices shall be in writing and shall be deemed to have been delivered on the date sent if sent by certified mail (return receipt requested) or recognized courier (with delivery confirmation) or transmitted by facsimile (with written confirmation of transmission) and in each case with a copy sent by email on the same date as follows:

Sublessor:
Chancellor
University of Hawaii at Hilo
200 West Kawili Street
Hilo, Hawaii 96720-4091
Telephone: (808) 932-7348
Facsimile: (808) 932-7338
Email: dstraney@hawaii.edu

Sublessee:
Project Manager (during construction) or Observatory Director (after first light; contact information for Observatory Director to be delivered to Sublessor by written notice following construction)
41. **Dispute Resolution.** Any dispute relating to or arising as a result of or in connection with this Sublease, if not resolved by negotiation, shall be submitted first to non-binding mediation with Dispute Prevention & Resolution, Inc. and if such mediation is not concluded within six (6) months after submission, then shall be decided in legal or equitable proceedings in accordance with Hawaii law in any court having jurisdiction in the State of Hawaii. Such mediation shall take place in the County of Honolulu, State of Hawaii. Each party shall bear its own costs and fees for such mediation and the fees and expenses of the mediator shall be borne by the parties equally.

42. **Historic preservation.** In the event any historic properties or burial sites, as defined in section 6E-2, Hawaii Revised Statutes, are found on the Subleased Premises, Sublessee and Sublessee's agents, employees and representatives shall immediately stop all land utilization and/or work and contact the Historic Preservation Office in compliance with Chapter 6E, Hawaii Revised Statutes.

43. **Removal of Trash.** Sublessee shall be responsible for the removal of all illegally dumped trash upon the premises within ninety (90) days from the date of execution of this Sublease and shall so notify the Sublessor in writing at the end of ninety (90) days.

44. **Phase I Environmental Site Assessment.** Prior to termination or revocation of this Sublease, Sublessee shall conduct a Phase I environmental site assessment of the Subleased Premises and conduct a complete abatement and disposal of any such sites, if necessary, satisfactory to the standards required by the Federal Environmental Protection Agency, the Department of Health, and the Department of Land and Natural Resources. Failure to comply with the provisions of this Section 44 shall not extend the term of this Sublease or automatically prevent termination or revocation of the lease. Sublessor, at its sole option, may refuse to approve termination, unless this evaluation and abatement provision has been
performed. In addition or in the alternative, Sublessor may, at its sole option if Sublessee does not do so, arrange for performance of the provisions of this Section 44, all costs and expenses of such performance to be charged to and paid by Sublessee.
IN WITNESS WHEREOF, Sublessor and Sublessee have executed this Sublease on the date first written above.

FOR THE UNIVERSITY OF HAWAII:  

By ______________________
Name:
Title:
Date:

TMT INTERNATIONAL OBSERVATORY, LLC:

By ______________________
Name:
Title:
Date:

By ______________________
Name:
Title:
Date:

Approved as to form:

By ______________________
Name:
Title:
Date:
Exhibit A to Sublease

Master Lease (General Lease No. S-4191)

(attached)
GENERAL LEASE NO. S-4191

THIS INDENTURE OF LEASE, made this 28th day of January, 1968, by and between the STATE OF HAWAII, by its Board of Land and Natural Resources, pursuant to the provisions of Section 103A-90(b), Revised Laws of Hawaii 1955, as amended, hereinafter referred to as the "LESSOR", and the UNIVERSITY OF HAWAII, a body corporate, whose post office address is 2444 Dole Street, Honolulu, City and County of Honolulu, State of Hawaii, hereinafter referred to as the "LESSEE",

WITNESSETH THAT:

FOR and in consideration of the mutual promises and agreements contained herein, the Lessor does hereby demise and lease unto the said Lessee and the said Lessee does hereby rent and lease from the Lessor, all of that certain parcel of land situate at Kaahe, Hamakua, County and Island of Hawaii, State of Hawaii, and more particularly described in Exhibit "A", hereto attached and made a part hereof.

TO HAVE AND TO HOLD, all and singular the said premises, herein mentioned and described, unto the said Lessee, for and during the term of sixty-five (65) years, to commence from the 1st day of January, 1968, and to terminate on the 31st day of December, 2033.
RESERVING unto the LESSOR the following:

1. **Water Rights.** All surface and ground waters appurtenant to the demised premises, together with the right to enter and to capture, divert or impound water; provided, that the Lessor shall exercise such rights in such manner as not to interfere unreasonably with the Lessee's use of the demised premises; provided, further, that the Lessee shall have the right to use the waters of Lake Waiau for any purpose necessary or incidental to the use permitted by this lease on the following conditions:

   a. No drilling or disturbance of Lake Waiau's bottom, banks or areas adjacent thereto shall be permitted;

   b. No activity shall be permitted which will result in the pollution of the waters of Lake Waiau;

   c. Lessee shall not take or divert any of the waters arising from springs which furnish the water supply for Pohakuloa, and no alterations to said springs shall be made by Lessee.

2. **Access.** All rights to cross the demised premises for inspection or for any government purposes.

3. **Hunting and Recreation Rights.** All hunting and recreation rights on the demised lands, to be implemented pursuant to rules and regulations issued by said Board in discharging its fish and game or state parks responsibilities; provided, however, that such hunting and recreation activities shall be coordinated with the activities of the Lessee on the demised lands; and provided, further, that such hunting and recreation activities shall be limited to daylight hours only.
4. **Right to use Demised Lands.** The right for itself, and its successors, lessees, grantees and permittees, to use any portion of the lands demised and the right to grant to others rights and privileges affecting said land; provided, however, that, except as otherwise provided herein, no such use shall be permitted or rights and privileges granted affecting said lands, except upon mutual determination by the parties hereto that such use or grant will not unreasonably interfere with the Lessee’s use of the demised premises; provided, further, that such agreement shall not be arbitrarily or capriciously withheld.

THE LESSEE, IN CONSIDERATION OF THE PREMISES, COVENANTS WITH THE LESSOR AS FOLLOWS:

1. **Surrender.** The Lessee shall, at the expiration or sooner termination of this lease, peaceably and quietly surrender and deliver possession of the demised premises to the Lessor in good order and condition, reasonable wear and tear excepted.

2. **Maintenance of the Premises.** The Lessee shall keep the demised premises and improvements in a clean, sanitary and orderly condition.

3. **Waste.** The Lessee shall not make, permit or suffer, any waste, strip, spoil, nuisance or unlawful, improper or offensive use of the demised premises.

4. **Specified Use.** The land hereby leased shall be used by the Lessee as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex.

Activities inimical to said scientific complex shall include light and dust interference to observatory operation.
during hours of business and certain types of electric or
electronic installation on the demised lands, but shall not
necessarily be limited to the foregoing.

5. Assignments. The Lessee shall not sublease, sub-
rent, assign or transfer this lease or any rights thereunder
without the prior written approval of the Board of Land and
Natural Resources.

6. Improvements. The Lessee shall have the right
during the existence of this lease to construct and erect build-
ings, structures and other improvements upon the demised pre-
ises; provided, that plans for construction and plot plans of
improvements shall be submitted to the Chairman of the Board
of Land and Natural Resources for review and approval prior to
commencement of construction. The improvements shall be and
remain the property of the Lessee, and shall be removed or
disposed of by the Lessee at the expiration or sooner termina-
tion of this lease; provided, that with the approval of the
Chairman such improvements may be abandoned in place. The
Lessee shall, during the term of this lease, properly maintain,
repair and keep all improvements in good condition.

7. Termination by the Lessee. The Lessee may ter-
minate this lease at any time by giving thirty (30) days' notice
in writing to the Lessor.

8. Termination by the Lessor. In the event that (1)
the Lessee fails to comply with any of the terms and conditions
of this lease, or (2) the lessee abandons or fails to use the
demised lands for the use specified under paragraph 4 of these
covenants for a period of two years, the Lessor may terminate
this lease by giving six months' notice in writing to the Lessee.

9. Non-Discrimination. The Lessee covenants that the
use and enjoyment of the premises shall not be in support of any
policy which discriminates against anyone based upon race, creed, color or national origin.

10. General Liability. The Lessee shall at all times, with respect to the demised premises, use due care for safety, and the Lessee shall be liable for any loss, liability, claim or demand for property damage, personal injury or death arising out of any injury, death or damage on the demised premises caused by or resulting from any negligent activities, operations or emissions of the Lessee on or in connection with the demised premises, subject to the laws of the State of Hawaii governing such liability.

11. Laws, Rules and Regulations, etc. The Lessee shall observe and comply with Regulation 4 of the Department of Land and Natural Resources and with all other laws, ordinances, rules and regulations of the federal, state, municipal or county governments affecting the demised lands or improvements.

12. Objects of Antiquity. The Lessee shall not appropriate, damage, remove, excavate, disfigure, deface or destroy any object of antiquity, prehistoric ruin or monument of historical value.

13. Undesirable Plants. In order to prevent the introduction of undesirable plant species in the area, the Lessee shall not plant any trees, shrubs, flowers or other plants in the leased area except those approved for such planting by the Chairman.

IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board of Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be duly executed this 1/4, 20__.
day of _____, 1968, and the UNIVERSITY OF
HAWAII, by its ___________________________________________ and ___________________________________________, has caused these presents to be duly executed this __________ day of __________, 1968, effective as of the day and year first above written.

STATE OF HAWAII

By: ____________________________
   Chairman and Member
   Board of Land and
   Natural Resources

And By: ____________________________
   Member
   Board of Land and
   Natural Resources

UNIVERSITY OF HAWAII

By: ____________________________
   Its Acting President

And By: ____________________________
   Its

APPROVED AS TO FORM:

Deputy Attorney General
Dated: ____________________________

Proofed by: ____________________________
EXHIBIT "A"

MAUNA KEA SCIENCE RESERVE

Kaoba, Hamakua, Island of Hawaii, Hawaii

Being a portion of the Government Land of Kaoba

Beginning at a point on the south boundary of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "SUMMIT 1955" being 12,325.95 feet South and 471.84 feet West, as shown on Government Survey Registered Map 2789, thence running by azimuths measured clockwise from True South:

1. Along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 123° 00' 18,667.62 feet;

2. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 225° 00' 18,667.62 feet;

3. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 281° 19' 04.6" 5173.56 feet;

4. 207° 49' 06.5" 841.83 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

5. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1200.00 feet, the chord azimuth and distance being: 297° 49' 06.5" 2400.00 feet;
6. 27° 49' 06.5" 841.63 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909.

7. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 306° 59' 47.4" 1824.16 feet.

8. 227° 29' 00.9" 2805.06 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909.

9. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1500.00 feet, the chord azimuth and distance being: 317° 29' 00.5" 3000.00 feet.

10. 47° 29' 00.9" 2805.06 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909.

11. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13200.00 feet, the chord azimuth and distance being: 325° 31' 55.2" 701.07 feet.

12. 245° 46' 12.7" 2760.45 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909.

13. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 2000.00 feet, the chord azimuth and distance being: 335° 46' 12.7" 4000.00 feet.

14. 65° 46' 12.7" 2760.45 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909.

15. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 352° 14' 32.9" 3563.50 feet.
16. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 3,200.00 feet, the chord azimuth and distance being 45° 00' 18.667.62 feet to the point of beginning and containing an AREA OF 13,321.034 ACRES.

EXCEPTING and RESERVING to the State of Hawaii and to all others entitled thereto, the Mauna Kea-Maumua and Mauna Kea-Makakea Trails, and all other existing trails within the above-described parcel of land, together with rights of access over and across said trails.

ALSO, EXCEPTING and RESERVING to the State of Hawaii, its successors and assigns, the waters and all riparian and other rights in and to all the streams within the above-described parcel of land.
Exhibit B to Sublease

Consent to Sublease Under General Lease No. S-4191

(attached)
CONSENT TO SUBLEASE OF GENERAL LEASE NO. S-4191

CONSENT is hereby given by the STATE OF HAWAII, by its Board of Land and Natural Resources, Lessor under unrecorded General Lease No. S-4191 dated June 21, 1968, leased to the University of Hawaii, a body corporate, as Lessee, to the attached Sublease and Non-Exclusive Agreement ("Sublease") dated _______________, 2014, from the UNIVERSITY OF HAWAII, a body corporate, as "Sublessor," to the TMT INTERNATIONAL OBSERVATORY, LLC, a Delaware limited liability company, recorded in the Bureau of Conveyances of the State of Hawaii as Document No. __________, as "Sublessee"; SUBJECT, HOWEVER, to the provisions of Section 171-21, Hawaii Revised Statutes, as amended, relating to the rights of holder of security interests, PROVIDED, FURTHER, that noting contained herein shall change, modify, waive or amend the provisions, terms, conditions and covenants or the duties and obligations of the Lessee or Sublessee under General Lease S-4191.

DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P. O. Box 621
Honolulu, Hawaii 96809

EXHIBIT B
IT IS UNDERSTOOD that except as provided herein, should there be any conflict between the terms of General Lease No. S-4191 and the terms of the Sublease, the former shall control; and that no further sublease or assignment of any interest of the premises or any portion thereof shall be made without the prior written consent of the Board of Land and Natural Resources.

FURTHERMORE, Lessee hereby acknowledges that the Lessor's consent to sublease under General Lease No. S-4191, does not release the Lessee of any and all responsibilities, obligations, liabilities, and claims respecting or arising under or out of said General Lease prior to the effective date of this sublease.
IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board and Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be fully executed on this ___ day of _____________, 2014.

STATE OF HAWAII

Approved by the Board of Land and Natural Resources at its meeting held on _____________, 2014

By ________________________________
Chairperson and Member
Board of Land and Natural Resources

LESSOR

UNIVERSITY OF HAWAII, a body corporate

By ________________________________
Its ________________________________

By ________________________________
Its ________________________________

LESSEE

APPROVED AS TO FORM:

______________________________
Deputy Attorney General

Dated: ______________
Exhibit C to Sublease

Subleased Premises and Easement Area

(attached)
SCIENTIFIC COOPERATION AGREEMENT

BETWEEN

TMT INTERNATIONAL OBSERVATORY, LLC

AND

THE UNIVERSITY OF HAWAII

CONCERNING THE DESIGN, CONSTRUCTION AND OPERATION
OF THE THIRTY METER TELESCOPE
ON
MAUNA KEA, HAWAII
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SCA ATTACHMENT A: SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT BETWEEN TMT INTERNATIONAL OBSERVATORY, LLC AND THE UNIVERSITY OF HAWAII

   Exhibit A to Attachment A – Master Lease (General Lease S-4191)
   Exhibit B to Attachment A – Consent to Sublease under General Lease S-4191
   Exhibit C to Attachment A – Subleased Premises and Easement Area

SCA ATTACHMENT B: ACCESS ROADS
SCIENTIFIC COOPERATION AGREEMENT

THIS AGREEMENT is made this __________ day of __________, 2014, by and between TMT INTERNATIONAL OBSERVATORY, LLC, a Delaware limited liability company ("TIO"), and the UNIVERSITY OF HAWAII, a public body corporate and the public university of the State of the Hawaii ("UH"), and shall be effective as provided in Section XV below.

RECITALS

WHEREAS, the optical and infrared regions of the electromagnetic spectrum have shown great scientific potential for contributing to our understanding of the astronomical universe;

WHEREAS, the summit area of Mauna Kea is exceptionally well-endowed as a site for observations in these wavelengths;

WHEREAS, TIO and UH believe that the best interests of both parties are to be served through a program of close scientific cooperation centered around the TMT Telescope (as defined below) and related facilities;

WHEREAS, the operation of the TMT Telescope on Mauna Kea will greatly benefit the educational and research programs at UH;

WHEREAS, TIO and UH have a common interest in ensuring that the development of the Mauna Kea site will enhance the effective operation of the TMT Telescope; and

WHEREAS, the presence of the TMT Telescope on Mauna Kea will bring substantial community benefits, in addition to educational and research benefits;

NOW, THEREFORE, in consideration of the mutual agreements herein contained, TIO and UH agree as follows:

I. DEFINITIONS

For purposes of construing the provisions of this Scientific Cooperation Agreement, the following definitions apply:

"Base Support Facilities" refers to any possible headquarters in Hawaii for the operations of TIO on Mauna Kea.

"BLNR" stands for the Board of Land and Natural Resources of the State of Hawaii.
“HELCO” stands for the Hawaii Electric Light Company, Inc., the public utility which provides electricity to the Mauna Kea Observatories (as defined below).

“IfA” stands for the Institute for Astronomy, an organized research unit of the University of Hawaii at Manoa.

“Information Station” is the building and associated infrastructure (access, parking, utilities) near the Mid-Level Facilities which is used as a public information building.

“Infrastructure Improvements” are any capital improvements made for the common good of the Mauna Kea Observatories including, but not limited to, roads, power, telephone and communications installations, and the Mid-Level Facilities.

“Instruments” include cameras, spectrometers, and other special-purpose equipment used to detect and analyze light, together with computers, test equipment, and tools required to equip the Facilities.

“Major Astronomical Facilities” are: UH 88-inch Telescope, Canada-France-Hawaii Telescope (CFHT), NASA Infrared Telescope Facility (IRTF), United Kingdom Infrared Telescope (UKIRT), James Clerk Maxwell Telescope (JCMT), Caltech Submillimeter Observatory (CSO), Keck I, Keck II, VLBA Antenna, Subaru, Gemini North, and the Submillimeter Array. Future telescope facilities forming a part of the Mauna Kea Observatories shall be considered “Major Astronomical Facilities” unless otherwise agreed in writing by UH.

“Mauna Kea Observatories” includes, but is not limited to, the Mauna Kea Science Reserve, the astronomical facilities and infrastructure improvements on Mauna Kea, and UH operations which support the astronomical facilities on Mauna Kea.

“Mauna Kea Observatory Access Road” is the roadway between the Mid-Level Facilities and the Mauna Kea Summit including roadways currently in use through the Mauna Kea Science Reserve.

“Mauna Kea Science Reserve” is the land in the summit area of Mauna Kea consisting specifically that which is leased by UH from the BLNR under General Lease S-4191.

“Mauna Kea Users’ Committee” is the committee established by UH to serve as the official forum in which the Major Astronomical Facilities may discuss aspects of the management of the Mauna Kea Observatories. The committee is chaired by the Director of the IfA. Currently, each Major Astronomical Facility is entitled to two representatives on the Mauna Kea Users’ Committee.

“Mid-Level Facilities” include, but are not limited to, the Information Station, bedrooms, laboratories, common areas, and offices at Hale Pohaku on Mauna Kea.
“MKSS” stands for Mauna Kea Observatories Support Services, which is operated by UH through the IfA, and is responsible for providing services to support the Mauna Kea Observatories.

“MKSS Oversight Committee” is the committee established by UH to oversee the activities and management of MKSS and to recommend changes to the Director of the IfA. Currently each Major Astronomical Facility is entitled to one representative on the MKSS Oversight Committee.

“Principal Parties” are TIO and UH, and refer to the Principal Parties to this SCA.

“SCA” stands for this “Scientific Cooperation Agreement Between TMT International Observatory, LLC and the University of Hawaii Concerning the Design, Construction, and Operation of the Thirty Meter Telescope on Mauna Kea, Hawaii,” and to which is attached the Sublease.

“Sublease” is the Sublease and Non-Exclusive Easement Agreement between TIO and UH, and approved by BLNR, attached hereto as Attachment A, including the exhibits thereto.

“Subleased Premises” refers to the land subleased to TIO by UH with the approval of the BLNR. The Subleased Premises are a portion of that certain land area leased to UH by BLNR and described in General Lease S-4191, which is included as Exhibit A of Attachment A hereto, and which Subleased Premises are more specifically identified in Exhibit C of Attachment A hereto; both Exhibits A and C of Attachment A hereto are incorporated herein by reference.

"TIO Board" refers to the governing and policy setting body for TIO.

“TMT Director” means the Observatory Director for the TMT Telescope.

“TMT Facilities” include, but are not limited to, the TMT Telescope and enclosure; the support building (the space necessary to support scientific observers and technical personnel while at the summit); together with Instruments, electrical conductors, cableways and tunnels; driveways and parking lots; power, telephone and communications conduits and lines; and access roads within the border of the Subleased Premises. "TMT Facilities" does not include the Mid-Level Facilities, the Base Support Facilities, or any other facilities outside the Subleased Premises.

“TMT Infrastructure Contribution” has the meaning set forth in Section VI.D.1.c below.

“TMT Parties” refers to the members of TIO.

“TMT Telescope” means the Thirty Meter Telescope on Mauna Kea, to be located on the Subleased Premises and used for astronomical observations.
II. LOCATION OF THE TMT FACILITIES

The Sublease (Attachment A) specifies the location on Mauna Kea where the TMT Facilities will be situated.

III. INTERACTION BETWEEN TIO AND UH

Day-to-day interaction between the Principal Parties regarding design, construction and operation of the TMT Facilities shall usually be carried out by specified representatives of TIO and UH or their designees. In the case of UH, the specified representative will normally be the IfA Director (or the designee of the IfA Director) and, in the case of TIO, this will normally be the Project Manager for the TMT Facilities (during construction) and the TMT Director (during operations, commencing at first light).

IV. SOLE RESPONSIBILITIES OF UH

A. Management of the Mauna Kea Observatories

UH shall provide a forum to allow the Major Astronomical Facilities which form a part of the Mauna Kea Observatories to discuss, on an equal footing, aspects of the management of the Mauna Kea Observatories. Such a forum currently exists and is referred to as the Mauna Kea Users' Committee. TIO shall be entitled to appoint two representatives to the Mauna Kea Users' Committee. Should this committee be replaced with another forum at some time in the future, TIO shall be entitled to participate on the same basis as the other agencies, entities, or persons operating Major Astronomical Facilities. Since UH, the Sublessee under the Sublease, is the Lessee with the State of Hawaii, it is recognized that final responsibility for management of the Mauna Kea Science Reserve resides with UH.

V. SOLE RESPONSIBILITIES OF TIO

A. Design, Fabrication, Construction, Installation, and Operation of the TMT Facilities

TIO shall be solely responsible for securing the funding for the design, fabrication, construction, installation, and operation of the TMT Facilities. TIO commits to taking reasonable measures consistent with Conservation District Use Permit HA-3568 and the TMT Access Way Agreement dated September 13, 2012 by and among UH, the Smithsonian Institution Astrophysical Observatory, and the TMT Observatory Corporation to minimize inconvenience which TMT construction activities may create for other telescope facilities.

B. Power and Communications Conduits and Lines

TIO shall fund and arrange for the installation of electric power and communications conduits from handholes near the TMT Telescope site to the TMT Facilities. These handholes
will be at the new terminus of the summit electric power and communications distribution system as indicated in Section VI.D.1.c.(ii) below. The conduits shall conform to the standards set for the summit power and communications distribution system. TIO shall also fund and arrange for connection of commercial power and communications service via these conduits to the TMT Facilities.

VI. RESPECTSIBILITIES SHARED JOINTLY BY TIO AND UH

A. Research Environment

Under General Lease S-4191 between UH and BLNR (Exhibit A of Attachment A), UH is to use the Mauna Kea Science Reserve as a scientific complex. UH carries the responsibility also to protect the site from interference that may emanate from within or from outside the Mauna Kea Science Reserve.

1. UH:

   a. UH shall continue to protect the interests of the astronomical facilities in the Mauna Kea Science Reserve from interference emanating from within the Mauna Kea Science Reserve which would affect the scientific integrity of the sites on which the astronomical facilities are located.

   b. UH shall continue to pursue actively the initiation and/or improvement of such State and County laws and ordinances as are necessary to assure that man-made light emanating from outside the Mauna Kea Science Reserve during nighttime does not over time increase significantly or change in character, so as to interfere with the effectiveness of optical or infrared observations.

   c. UH shall ensure that no other astronomical facilities will be constructed or operated within an 800-foot radius surrounding the TMT Telescope during the term of the Sublease, as it may be extended pursuant to Sections 9.a., 9.b., or 9.c. thereto.

2. TIO:

   TIO shall conduct its activities in the Mauna Kea Science Reserve in a manner compatible with the activities of other astronomical facilities located there, and shall conform to applicable regulations established by UH and by federal, state, and county authorities for the preservation of the environmental quality and the scientific integrity of the Mauna Kea Science Reserve.

B. Rights of Access

1. UH:
UH shall ensure TIO’s right of access to the Subleased Premises, to the Mauna Kea Observatory Access Road, and to the Mid-Level Facilities (to be documented separately) and shall ensure its right to have access to a handhole or handholes for the electric power, and communications described in Section V.B. above. UH shall grant to or use its best efforts to obtain for TIO such other rights of access as may be needed for utilities and cableways.

2. TIO:

TIO shall pay any additional costs, fees and other charges assessed by third parties (such as HELCO) associated with the rights of access described in Section VI.B.1. above.

C. Access Roads to the TMT Facilities

1. UH:

UH shall provide to TIO the use of existing roads for access to the TMT Facilities, subject to any limitation in the TMT Access Way Agreement dated September 13, 2012 by and among UH, the Smithsonian Institution Astrophysical Observatory, and the TMT Observatory Corporation. The existing roads in the vicinity of the Mauna Kea summit are shown in Attachment B hereto. Improvements to the access road to the TMT Telescope site are discussed in Section VI.D.1.c.(i) below.

D. Infrastructure Improvements Shared in Common with Other Astronomical Facilities at the Mauna Kea Observatories

UH has taken responsibility to fully or partially fund and arrange for Infrastructure Improvements to the Mauna Kea Observatories which are and will be of common benefit to all the astronomical facilities which operate there. All such Infrastructure Improvements are subject to State and County permits, approvals, and funding.

1. Commercial Power, Data Communications Conduits and Lines, and Road Improvements

a. Description of Improvements:

UH has installed commercial electric power infrastructure at Hale Pohaku and at the Mauna Kea summit. At the summit, the power is distributed by means of a distribution loop, comprising two conduits containing the electrical cables, and conforming to HELCO standards, which passes near each of the Major Astronomical Facilities. Each facility accesses the commercial power by connecting to the distribution loop at a suitable handhole near its location. UH has also provided two communications conduits from Hale Pohaku to a central point at the summit, and from there to a distribution system comprising two or more conduits which generally follows the same path as that used for the power. UH has installed fiber-optic cable in one of these conduits. This cable is part of the Mauna Kea Observatories Communications Network, a high-bandwidth communications system which is intended to link the facilities of the Mauna Kea Observatories with each other, with base facilities, and with
commercial carriers which can provide links to home institutions and other institutions around the world. UH has completed improvement and paving of the upper section of the Mauna Kea Observatory Access Road (above elevation 11,800 feet) and of the connecting roads to the existing facilities at the summit.

b. Access to Existing Improvements by TIO:

For purposes of TMT, TIO shall have access to the Infrastructure Improvements described in Section VI.D.1.a. above as follows:

(i). The TMT Facilities shall connect to the electric power and communications lines as described in Section V.B. above.

(ii) Use of the access roads within the Mauna Kea Science Reserve in accordance with Section VI.C. above.

(iii) The right to join the Mauna Kea Observatories Communications Network and to participate in the network on the same terms as other network members. The costs associated with connecting the TMT Facilities to the network shall be borne by TIO.

c. Contribution by TIO to Future Improvements:

Subject to the provisions below in this Section VI.D.1.c., TIO shall contribute a total of SIX MILLION, SIX HUNDRED THOUSAND Dollars ($6,600,000) (in first-half 2013 dollars, with escalation following the most recently published State of Hawaii All Urban Consumer Price Index) (not seasonally adjusted) ("TMT Infrastructure Contribution") toward the cost of continued development of the Mauna Kea infrastructure.

This TMT Infrastructure Contribution shall first be used to fund three specific improvements, to the extent these funds allow:

(i) Extension of the summit spur road system to the TMT Telescope site.

(ii) Extension of the summit electric power and communications distribution system from its current terminus near the Submillimeter Array to a new terminus near the TMT Telescope site.

(iii) Upgrade of the electrical power infrastructure to accommodate the eventual requirements of the TMT Facilities. This includes an upgrade to the substation at Hale Pohaku and new cable from there to the summit.

TIO shall be responsible for the design and construction of items (i) and (ii) above and for the implementation of item (iii) above in collaboration with HELCO. The design and implementation of these improvements shall be subject to approval by UH, by HELCO, and by the Department of Land and Natural Resources of the State of Hawaii, and subject to the funds allowing for the improvements.
TIO shall make this TMT Infrastructure Contribution on or before the date that is SIXTY (60) days after the effective date of this SCA pursuant to Section XV below. UH agrees that TIO may withhold from the payment an amount equal to TIO’s initial cost estimate provided to UH for any infrastructure improvements described in (i) through (iii) above. Should the sum of the approved cost estimates equal or exceed the TMT Infrastructure Contribution, then TIO may withhold the entire contribution.

Before any contracts for these improvements are let, TIO shall provide UH with a cost estimate for the improvements, which figure may include a contingency factor up to 10% and be subject to revision following the receipt of actual bids for the improvements. If UH approves this cost estimate, as revised, then UH shall authorize TIO to use all or part of its infrastructure contribution to pay for the actual cost of these improvements, as verifiable by contractors’ invoices, up to a maximum amount equal to the above-mentioned cost estimate, as revised, or the entire contribution, whichever is less. Should the contractor(s) default or otherwise fail to complete these improvements necessitating additional contracts and/or expense, or should major change orders be required, then TIO shall provide UH with a new cost estimate. If UH approves this new cost estimate, TIO may continue to use all or part of its infrastructure contribution to pay for the actual cost of these improvements, as verifiable by contractors’ invoices, up to a maximum amount equal to the new cost estimate or the entire contribution, whichever is less.

Should the TMT Infrastructure Contribution be insufficient to complete items (i) through (iii) above, TIO shall be responsible for providing the required additional funding.

Should the TMT Infrastructure Contribution exceed the amount needed to fund items (i) through (iii) above, then UH shall be free to use such excess funds for other Infrastructure Improvements which UH considers desirable.

Following acceptance of the work and within NINETY (90) days of the receipt of final invoices, TIO shall provide UH with a final accounting of the cost of these infrastructure improvements, and shall remit to UH the amount, if any, by which the sum withheld exceeds the actual cost.

2. Other Infrastructure Improvements to the Mauna Kea Observatories

It may become necessary or desirable for the greater benefit of the Mauna Kea Observatories to construct Infrastructure Improvements beyond those described in Section VI.D.1. above. If such Infrastructure Improvements are funded entirely by contributions from new funding sources (e.g., new astronomical facilities which join the Mauna Kea Observatories) and/or UH, then TMT shall enjoy access to such improvements on an equal footing with the other astronomical facilities. If such Infrastructure Improvements require contributions from some or all of the astronomical facilities for which there are signed agreements with UH, then TIO shall have access to such improvements, and TIO shall be liable to contribute to the cost of such improvements, only if and to the extent that TIO and UH have agreed in writing to such access and contributions. If TIO elects to participate in any such improvements, TIO and UH
shall negotiate in good faith to determine the fair share of the cost of such improvements which TIO shall contribute. The amount of this fair share shall be set forth in separate written agreements and normally shall be based on the fractional utilization by TIO of any such improvements. In cases where utilization is not readily quantifiable, the share paid by TIO shall not exceed a fraction, the numerator of which is ONE (1), and the denominator of which is the number of Major Astronomical Facilities, including the TMT Telescope.

E. Operations and Maintenance

1. UH:

   a. UH shall provide services on a basis of no profit, no loss to TIO through MKSS. Such services may include, but shall not be limited to: food and lodging; fuel, water and utilities; data communications; road maintenance; snow removal; weather forecasting; emergency services; public information, outreach and educational services including access control and facilities; and general administration.

   b. The cost of MKSS services shall be shared among the astronomical facilities operating or under construction at the time the costs are incurred. For some services the costs may be allocated to each facility as shares. For others a rate will be set and the charge to the facility will be based on actual utilization of that service. Each year, in its budget, MKSS will establish the shares and rates so that projected costs equal projected revenue for each service. MKSS will adjust said shares and rates if actual expenditures or revenues differ significantly from the projections.

   c. TIO, or its designee, shall be represented on the MKSS Oversight Committee, which reviews MKSS activities, recommends changes to the activities, and reviews and makes recommendations on the MKSS budget.

2. TIO:

   a. TIO shall provide the funds necessary to operate and maintain the TMT Facilities.

   b. TIO shall pay its share of the cost of MKSS services as described in Section VI.E.1. above. Said share shall include all MKSS services except that data communications is not included until TIO becomes a participant in the Mauna Kea Observatories Communications Network.

   c. TIO shall fund the cost of operating and maintaining the power and communications lines from the handhole described in Section V.B. above to the TMT Facilities.

F. Sublease; Order of Precedence
a. Immediately upon execution of this SCA, and for so long as this SCA shall remain in force, UH and TIO shall each fulfill all of their respective obligations, as Sublessor and Sublessee, respectively, as specified in Attachment A hereto.

b. In the event of any conflict between the terms of this SCA and the Sublease, the Sublease shall be controlling.

VII. DELEGATION OF RESPONSIBILITIES BY TIO

TIO may delegate certain of its obligations and responsibilities hereunder to other agents for the purpose of constructing or operating the TMT Facilities. However, it is understood and agreed that TIO shall remain ultimately responsible for the obligations and responsibilities undertaken by it in this SCA.

VIII. ASSIGNMENT OF RIGHTS BY TIO

Any proposed assignment of ownership rights to the TMT Facilities shall require the consent of UH and shall be to the same person or entity to which the Sublease (or any rights therein) is to be assigned in accordance with Section 23 of the Sublease. In the event that TIO decides that it would be beneficial to involve yet further parties in the construction and/or operation of the TMT Facilities, TIO shall so notify UH so as to provide adequate time for UH to review the proposed terms and conditions of such partnership and to obtain the necessary prior consent of the UH Board of Regents, the State of Hawaii Board of Land and Natural Resources, and any other bodies whose consent is required under the terms of the Lease, the Sublease, or other agreements and documents; provided, however, that nothing in this SCA shall be interpreted or construed to require that TIO obtain any consent or approval of UH, the UH Board of Regents, the State of Hawaii Board of Land and Natural Resources, or any other entities or bodies regarding any parties to be admitted as liability limited company members of TIO or regarding any use of Federal grant funds for construction and/or operation of the TMT Facilities. TIO shall further provide UH with written assurance that such new party or parties concur with this SCA and that they are legally bound to abide by it. In any case, TIO shall not assign or transfer any of its rights under this SCA without the prior written consent of UH.

IX. SCIENTIFIC COOPERATION

In recognition of the potential for scientific interaction between TIO and UH which the TMT Facilities offer, and of the contribution of UH in making the site available for TIO, TIO and UH agree on the following matters with regard to the operational phase of the TMT Facilities.

A. UH Use of the TMT Facilities
1. Recognizing UH's considerable investment in the development of Mauna Kea as an astronomical site, UH shall be entitled to a guaranteed fraction of the observing time on the TMT Telescope. The UH observing time shall be allocated to proposals sponsored by UH as follows:

   a. TMT Telescope observing time shall be scheduled in blocks of no more than six (6)-month intervals. During each scheduled block, UH shall be entitled to seven and one-half percent (7.5%) of the observing time after engineering time has been subtracted from the total time. Engineering time is telescope time whose purpose is not astronomical research (e.g., including demonstration science) but is rather the development, modification, or maintenance of the TMT Telescope, including commissioning of Instruments. During the third and subsequent years after first light, and for the purpose of determining the UH entitlement to observing time, engineering time may include time allocated to an extended shutdown of the TMT Telescope for the purpose of major repair or improvements, provided the shutdown has been approved by the TIO Board.

   b. The UH observing time shall be equally distributed over the seasons of the year and the phases of the Moon.

   c. In the event of a major failure of the TMT Facilities, the resulting lost observing time shall be accommodated by reducing the UH entitlement and the entitlement of the TMT Parties in the same proportion.

   d. Only proposals having a UH-affiliated Principal Investigator, and forwarded by the IfA Director, shall be considered in scheduling the UH allocation of observing time. UH shall be solely responsible for evaluation and selection of proposals to be included in the UH allocation of time. The selection shall be made on the basis of scientific merit. There shall be no restrictions on the eligibility of co-investigators to collaborate on observing programs utilizing the UH observing time.

   e. Detailed scheduling of observing time is the responsibility of the TMT Director.

   f. In the event that UH and one or more of the TMT Parties each forward proposals for the same time-critical observation, the TMT Director shall attempt to achieve a resolution satisfactory to TIO and UH. If this cannot be achieved, selection between the proposals shall be done by the TMT Director on the basis of scientific merit.

   g. TIO and UH recognize that, in order to achieve the full scientific potential of the TMT Telescope, it may be necessary to adopt innovative and flexible approaches to the scheduling of the TMT Facilities. Policies for scheduling of observations shall be approved by the TIO Board and shall in general apply to UH in the same manner as they apply to the TMT Parties.
2. UH-sponsored observers shall receive technical and logistic support while at the TMT Facilities and shall have access to the TMT Facilities, all on the same basis as TIO-sponsored observers.

3. UH-sponsored personnel shall be subject to the authority of the TMT Director when using the TMT Facilities and shall follow all rules, policies and procedures of TIO.

4. Data obtained by UH observers during UH time on TMT shall be proprietary to UH and subject to UH policy for eighteen (18) months after their collection. Thereafter the data shall become available to any qualified researcher in accord with general principles approved by the TIO Board. TIO and UH agree that UH may request the TMT Director to extend the proprietary period for valid scientific reasons, said extension not to be unreasonably withheld.

B. UH Participation in TMT Facilities Instrument Development

TIO shall provide UH with opportunities to participate in the development of Instruments for the TMT Facilities. Any decision concerning awarding Instrument proposals to UH shall be in TIO’s sole discretion.

C. UH Participation in the TIO Board

UH shall be entitled to appoint one member to the TIO Board, which member shall have non-voting observer status.

D. UH Participation in TIO Science Advisory Committee

UH shall be entitled to have either one representative or representation in proportion to its share of observing time, whichever is greater on the TIO Science Advisory Committee.

E. TMT Facilities Attribution

In all publications and news releases regarding results obtained from work performed at the TMT Facilities, the TMT Telescope shall be given appropriate credit in a form approved by TIO. Results obtained at the TMT Facilities by IfA faculty shall have credit for these results also given to “the University of Hawaii, Institute for Astronomy” in any publications or news releases.

F. Interaction with News Media

Except for the publication of scientific results, external communications regarding the TMT Telescope or the TMT Facilities shall be reasonably coordinated between TIO and UH. UH and/or TIO may request one another to coordinate specific media events. Each party shall keep the other informed of press releases, filming and live television transmissions.
X. INSURANCE

TIO shall, at all times, maintain insurance as required under the Sublease.

XI. ATTORNEY’S FEES

Except as otherwise provided in Attachment A hereto, TIO and UH shall each pay their own attorney’s fees and any other legal expenses.

XII. DISPUTE RESOLUTION

Any dispute relating to or arising as a result of or in connection with this SCA, if not resolved by negotiation, shall be submitted first to non-binding mediation with Dispute Prevention & Resolution, Inc. and if such mediation is not concluded within six (6) months after submission, then shall be decided in legal or equitable proceedings in accordance with Hawaii law in any court having jurisdiction in the State of Hawaii. Such mediation shall take place in the County of Honolulu, State of Hawaii. Each party shall bear its own costs and fees for such mediation and the fees and expenses of the mediator shall be borne by the parties equally.

XIII. GOVERNING LAW: SEVERABILITY

The validity, construction and performance of this SCA and the legal relations between the Principal Parties shall be governed by and construed in accordance with the laws of the State of Hawaii. In the event any provision of this SCA shall be held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions of this SCA shall remain in full force and effect.

XIV. AMENDMENTS TO THIS SCA

This SCA may be amended in writing at any time by mutual agreement of the Principal Parties.

XV. TERM OF THIS SCA

This SCA shall become effective on the effective date of the Sublease and shall terminate as provided in Section XVII below.
XVI. RENEGOTIATION OF THIS SCA

If the Master Lease (as defined in the Sublease) is replaced with a New Master Lease (as defined in the Sublease) as contemplated by Section 9.a. of the Sublease or other master lease between UH and the BLNR pursuant to Section 9.b. of the Sublease and the Sublease is not thereafter terminated or if the term of the Sublease is extended pursuant to Section 9.c. of the Sublease, the Principal Parties agree to negotiate in good faith any revisions to this SCA proposed at the time by either TIO or UH, provided that the material terms of this SCA shall be substantially the same and not changed.

XVII. TERMINATION

This SCA shall be terminated upon the first of any of the following events to occur:

1. Mutual written agreement of the Principal Parties.

2. Termination of the Sublease (Attachment A), including as it may be extended pursuant to Sections 9.a., 9.b., or 9.c. thereto.

3. Termination of management or operation of the TMT Facilities by TIO or its assignee, if any, as approved under Section VIII above.

XVIII. DISPOSITION OF TMT FACILITIES ON TERMINATION

Disposition of the TMT Facilities on termination of this SCA shall be conducted pursuant to the provisions of the Sublease.

[Remainder of page intentionally left blank; signature page follows.]
IN WITNESS WHEREOF, the parties hereto have executed this Scientific Cooperation Agreement on the day and year first above written.

FOR THE UNIVERSITY OF HAWAII:  

By ______________________  Date __________________

By ______________________  Date __________________

TMT INTERNATIONAL OBSERVATORY, LLC:

By ______________________  Date __________________

Approved as to form:

By ______________________  Date __________________
Attachment A to Scientific Cooperation Agreement Between TIO and UH

Sublease

(attached)
SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT
BETWEEN
TMT INTERNATIONAL OBSERVATORY, LLC
AND
THE UNIVERSITY OF HAWAII

THIS SUBLEASE AND NON-EXCLUSIVE EASEMENT AGREEMENT (this "Sublease") is made and entered into on this _____ day of ______, 2014, effective as of April 1, 2014 (the "Effective Date"), by and between TMT International Observatory, LLC, a Delaware limited liability company ("Sublessee"), and the University of Hawaii, a public body corporate and the public university of the State of Hawaii ("Sublessor").

RECITALS

This Sublease is entered into with reference to the following:

A. Sublessor leases certain lands located on and around the summit of Mauna Kea, Island of Hawaii from the State of Hawaii, Board of Land and Natural Resources ("Lessor") pursuant to General Lease No. S-4191, dated June 21, 1968 (the "Master Lease"), a copy of which is attached hereto as Exhibit A and incorporated herein by reference.

B. Sublessee desires to sublease a portion of said lands, as more fully described below, for the purpose of constructing and operating an optical/infrared telescope facility known as the Thirty Meter Telescope ("TMT") in the manner described in, and accordance with, this Sublease and that certain Scientific Cooperation Agreement Between Sublessee and Sublessor Concerning the Design, Construction and Operation of the Thirty Meter Telescope on Mauna Kea, Hawaii (the "Scientific Cooperation Agreement") executed simultaneously herewith and to be effective on the same Effective Date indicated above. The TMT facilities will include, but are not limited to, the TMT telescope and enclosure; the support building (the space necessary to support scientific observers and technical personnel while at the summit); together with instruments, electrical conductors, cableways and tunnels; driveways and parking lots; power, telephone and communications conduits and lines; and access roads within the border of the Subleased Premises (as defined in Section 1 below) ("TMT Facilities"). "TMT Facilities" does not include any facilities outside the Subleased Premises.

C. The Master Lease provides that Sublessor may not enter into a sublease without the prior written consent of the Lessor. Prior written consent to this Sublease has been obtained pursuant to that certain Consent to Sublease Under General Lease No. S-4191 dated ____________, 2014, a copy of which is attached hereto as Exhibit B and incorporated herein by reference.
D. In 2000, Sublessor adopted the Mauna Kea Science Reserve Master Plan, which establishes the management structures for Sublessor's stewardship of the areas it manages on Mauna Kea. In 2009 and 2010, Sublessor adopted, and Lessor approved, the Mauna Kea Comprehensive Management Plan ("CMP") and its subplans the Cultural Resources Plan, Natural Resources Management Plan, Public Access Plan, and Decommissioning Plan. These plans commit Sublessor to exercise responsible stewardship of Mauna Kea and to ensure that astronomical activities are conducted in a manner that respects the cultural significance of Mauna Kea, protects the environment, and is responsive to the needs and concerns of Native Hawaiians and the public.

E. In May 2010, Sublessor completed an Environmental Impact Statement for the TMT. In September 2010, Sublessor filed an Application for a Conservation District Use Permit to construct the TMT. The permit was approved in April 2013. TIO is now seeking a long term sublease to build and operate the TMT.

F. Sublessor has submitted a request to the Lessor for the mutual cancellation of the current Master Lease and issuance of a new master lease for a term of sixty-five (65) years from issuance. Sublessee desires to continue operation of the TMT Facilities beyond 2033. It is desirable for management and planning purposes, including appropriate stewardship of Mauna Kea, to address the potential continued operation of the TMT Facilities beyond 2033 in this Sublease.

**AGREEMENT**

Now, therefore, in consideration of the foregoing and of the mutual promises and agreements set forth herein, Sublessor and Sublessee agree as follows:

1. **Subleased Premises.** Sublessor does hereby sublease to Sublessee, and Sublessee does hereby sublease from Sublessor, the parcel of land identified in Exhibit C attached hereto and incorporated herein by reference (the "Subleased Premises"), constituting a portion of the land leased by Sublessor under the Master Lease.

2. **Non-Exclusive Easements.** Sublessee shall have the right of access to and egress from the Subleased Premises over and across the Mauna Kea Science Reserve, utilizing the common entrances and rights of way, together with others entitled thereto under such rules and regulations as may be established by and amended from time to time by Sublessor. Sublessee shall also have the rights to (i) utilize and construct in, grade, fill, and perform work approved by Lessor and Sublessor in the easement area depicted in Exhibit C hereto (the "Easement Area"), (ii) utilize and construct in and perform work approved by Lessor and Sublessor and consistent with the TMT Access Way Agreement dated September 13, 2012 by and among UH, the Smithsonian Institution Astrophysical Observatory, and the TMT Observatory Corporation in the spur road from the Mauna Kea Observatory Access...
Road to the Subleased Premises, (iii) install and utilize power and communications conduits and lines from a central handhole or handholes in the Mauna Kea summit area to the Subleased Premises, and (iv) utilize and access the Batch Plant staging area as authorized by the TMT CDUP (as defined in Section 4 below).

3. **Survey/Site Specific Description.** The site designated in Exhibit C hereto is subject to survey by Sublessee within six months from the Effective Date of this Sublease. The exact area covered by the Subleased Premises and by the Easement Area shall be more specifically described in a written addendum to this Sublease after the survey has been completed, which shall be signed by and binding upon Sublessor and Sublessee, and which shall be provided to the Chair of the Board of Land and Natural Resources within 30 days of execution.

4. **Use of Subleased Premises.** Sublessee shall use the Subleased Premises solely to construct and operate the TMT Facilities in accordance with this Sublease and the Scientific Cooperation Agreement. The construction and operation of the Subleased Premises shall be conducted in strict compliance with the terms and conditions of Conservation District Use Permit HA-3568 approved by the Lessor on April 12, 2013 (the "TMT CDUP"), including performance of all mitigation conditions set forth therein, and any amended or subsequent Conservation District Use Permit. Sublessee shall not at any time during the term of this Sublease construct, place, maintain, or install on the Subleased Premises any other building, structure, or improvement without the prior written approval of Sublessor and Lessor and upon such conditions as Sublessor or Lessor may impose. For purposes of the foregoing sentence, any other "improvement" means improvements that are not specified in or contemplated by the TMT CDUP and not contained within the building envelop of TMT observatory plans approved in accordance with Section 37 below. For the avoidance of doubt, the addition of any instruments, equipment or any other additions that are fully contained within the observatory structure or buildings shall not require the prior written approval of Sublessor or Lessor provided that such additions are otherwise in compliance with the terms of this Sublease and the Master Lease.

5. **Management and Stewardship Obligations.** This Sublease shall be subject to the following:

   a. The Subleased Premises are within the State Land Use Conservation District and all uses shall comply with the applicable rules and regulations of the State Conservation District, including but not limited to Hawaii Revised Statutes ("HRS") Chapter 183C and Hawaii Administrative Rules ("HAR") Chapter 13-5.

   b. Sublessee shall comply with applicable State rules and regulations related to historic preservation including but not limited to HRS Chapter 6E, and HAR Chapters 13-197, 13-198, 13-275 through 13-284 and 13-300, and any applicable amendments of or supplements to such historic preservation regulations.
c. Sublessor shall exercise management jurisdiction over the Subleased Premises pursuant to management plans approved by the Lessor, including the CMP and its subplans, the Natural Resources Management Plan, Cultural Resources Management Plan, Decommissioning Plan, and Public Access Plan, the TMT Management Plan, and any amendments of or supplements to management plans approved by the Lessor for lands that include the Subleased Premises. Sublessee acknowledges that it has reviewed and is familiar with the CMP and subplans. Sublessor shall keep Sublessee informed regarding any future amendments or supplements thereto, and shall promptly provide copies of such documents to Sublessee.

d. All public and commercial activities in the areas of Mauna Kea managed by Sublessor, including recreational activities, shall be governed by administrative rules promulgated pursuant to the authority granted Sublessor by Act 132 (SLH 2009), following consultation with DLNR, the Office of Hawaiian Affairs, and the public in accordance therewith.

e. The Constitution of the State of Hawaii mandates the protection of recognized customary and traditional native Hawaiian rights subject to State regulation. This Sublease shall be subject to the right of Native Hawaiians to exercise protected traditional and customary practices as provided in the CMP and consistent with the laws of the State of Hawaii.

f. Sublessor has established a management structure to manage the lands of which the Subleased Premises are a part, which structure includes the Office of Mauna Kea Management at the University of Hawaii at Hilo, the volunteer community-based Mauna Kea Management Board and the Kahu Kū Mauna advisory council on Hawaiian cultural matters.

6. **Operation of the TMT Facilities.** Neither Sublessee nor any successor or assign shall operate the TMT Facilities for purposes of research without a valid and effective Scientific Cooperation Agreement with Sublessor. The TMT Facilities may be operated in the absence of a valid and effective Scientific Cooperation Agreement only when necessary to ensure the safety of personnel or of the TMT Facilities.

7. **Rents.** In consideration for the use of the Subleased Premises, Sublessee shall pay to Sublessor annual rents based on calendar years during the term of this Sublease as set forth below. The annual rent during the construction period is based on the incremental value of the major milestones achieved during the construction of the TMT Facilities. The milestones are set forth below and generally span approximately two (2) year periods. The annual rents shall be paid based upon the specified calendar years below regardless of whether the respective milestone is achieved.
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Rent shall be paid in advance, in equal semi-annual installments, on or before January 31 and July 31, of each calendar year during the term of this Sublease. The first installment of rent for the initial, partial year (which will be prorated) shall be due within 30 days of the date of execution of this Sublease. Beginning in January of 2015, and in January of each year thereafter, the annual rental amount for the year shall be based on the initial annual rental amount adjusted for the annual rate of inflation recorded for subsequent years in accordance with the Consumer Price Index for all Urban Consumers, U.S. City Average (not seasonally adjusted) (base year 1982-1984 - 100) ("CPI"), published by the United States Department of Labor, Bureau of Labor Statistics. The calculation shall be made by comparing the CPI last published for the date nearest to the Effective Date (the "Base Index") with the CPI last published for the date nearest to the current anniversary date (the "Current Index"). If the Current Index has increased or decreased over the Base Index, then the amount subject to adjustment shall be set for the ensuing year by multiplying the initial annual rental amount by a fraction, the numerator of which is the Current Index and the denominator of which is the Base Index. If the base of the CPI changes from the 1982-84 base (100), the CPI shall, thereafter, be adjusted to the 1982-84 base (100) before the computation indicated above is made. If the CPI Index is at any time no longer published, a comparable index generally accepted and employed by the real estate profession shall be used.

Sublessor shall receive, deposit, and apply the rents received hereunder in accordance with the laws of the State of Hawaii, including, without limitation, Section 304A-2170 of the Hawaii Revised Statute, as amended from time to time. Such deposit shall be net of the funds required by law to be transferred or paid to the Office of Hawaiian Affairs. Sublessor shall be responsible for paying over to the Office of Hawaiian Affairs its ratable share of the rents received in accordance with the laws of the State of Hawaii.

8. **Master Lease: Order of Precedence.** The rights granted to Sublessee pursuant to this Sublease are subject to the terms and conditions of the Master Lease, as the same may be amended. In the event of any conflict between the terms of this Sublease and the Master Lease, the Master Lease shall be controlling. In the event of any conflict between the terms of this Sublease and the Scientific Cooperation Agreement, this Sublease shall be controlling. Sublessee shall comply with the terms and conditions of the Master Lease at all times. If Sublessee causes a breach or default of any term, covenant, restriction, or condition of the Master Lease, and this breach or default shall continue for a period of more than forty-five
(45) days after delivery by the Sublessor of a written notice of breach or default and demand for cure (plus any additional period as the Lessor may allow for good cause), then Sublessor may, subject to the provisions of Section 171-21, Hawaii Revised Statutes, at once re-enter the Subleased Premises, or any part, and upon or without the entry, at its option, terminate this Sublease without prejudice to any other remedy or right of action for arrears of rent or for any preceding or other breach of contract; and in the event of termination, at the option of the Sublessor, all buildings and improvements shall remain and become the property of the Sublessor or shall be removed by Sublessee in accordance with the Site Decommissioning Plan at Sublessee's sole cost and expense; furthermore, Sublessor shall retain all rent paid in advance to be applied to any damages.

9. **Term and Termination.** The term of this Sublease shall begin on the Effective Date and shall expire on December 31, 2033, unless extended or sooner terminated as provided herein.

a. **Mutual Cancellation of Master Lease and Concurrent Issuance of New Master Lease.**

   (1) Sublessor shall use its best efforts to continue to and shall diligently pursue and take all actions necessary or advisable to complete the process currently underway with Lessor to obtain mutual cancellation of the current Master Lease subject to and concurrent with issuance of a new master lease (the "**New Master Lease**"), for a term of sixty-five (65) years and on terms and conditions materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013. In the foregoing sentence, such "actions" shall include, without limitation, continuing to prepare and process an Environmental Impact Statement for the New Master Lease and such "terms and conditions" shall include, without limitation, that the New Master Lease shall include the provisions stating that "The lease shall be subject to all existing subleases entered into by the Lessee and approved by the Lessor pursuant to General Lease No. S-4191 dated June 21, 1968" and "Should this lease be rendered or declared invalid, illegal, or unenforceable by a court of competent jurisdiction, such invalidation shall cause, without further action, General Lease No. S-4191 dated June 21, 1968 to be revived in its entirety for the duration of the term therein, unless and until the parties subsequently agree otherwise".

   (2) If the New Master Lease is approved and duly executed by Lessor and Sublessor, Sublessor shall promptly provide a copy of the New Master Lease to Sublessee. Effective as of the effective date of the New Master Lease, the following shall apply:

   i) The provisions of this Sublease shall continue, whether by extension, issuance of a new sublease, or otherwise, provided that any continuance shall be in accordance with the terms herein as a sublease under the New Master Lease (including, without limitation, the rents set forth herein);
ii) The New Master Lease shall become the Master Lease for all purposes of this Sublease or any new sublease, and all references to the Master Lease in this Sublease or any new sublease shall thereafter refer to the New Master Lease; and

iii) The term of this Sublease shall automatically be extended, and shall thereafter expire sixty-five (65) years after the Effective Date, or upon expiration or termination of the New Master Lease, whichever shall first occur.

(3) If the New Master Lease is approved, but the term is not for sixty-five (65) years or the terms and conditions thereof are not materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013, subsections (a)(2)(i), (ii), and (iii) above shall apply unless Sublessee, at its sole option, provides a notice of termination to Sublessor in accordance with Section 9.d. below within one hundred twenty (120) days after Sublessee’s receipt of the New Master Lease from Sublessor. Sublessor further agrees to diligently negotiate in good faith with Sublessee regarding mutually acceptable amendments to this Sublease during such one hundred twenty (120) day period and to promptly and diligently pursue approval by the Lessor of such amendments.

(4) If the New Master Lease is approved on terms and conditions materially consistent with the form of lease document submitted to the Lessor for consideration at its meeting of November 8, 2013 or is otherwise acceptable to Sublessee in Sublessee’s sole judgment, Sublessor agrees to execute an amendment to this Sublease to reflect compliance with subsections (a)(2)(i), (ii), and (iii) above or a new sublease on the same material terms and conditions as set forth in this Sublease (including, without limitation, the rents set forth herein) and reflecting compliance with subsections (a)(2)(i), (ii), and (iii) above.

(5) Sublessee acknowledges that the Lessor has sole authority to determine whether to approve and enter into the New Master Lease, pursuant to and in accordance with Hawaii law, that no such approval has been granted as of the date of this Sublease, and that no prior commitment to issue such approval has been or can be made.

b. **Failure to Obtain New Master Lease.** If the New Master Lease is not approved by Lessor or if Sublessor otherwise fails to obtain a New Master Lease that automatically extends the term of this Sublease in accordance with subsection (3) or (4) of Section 9.a. above, Sublessor agrees to use its best efforts to and will immediately and diligently pursue another means of acquiring sufficient rights to continue to lease the Subleased Premises to Sublessee on substantially the same terms and conditions herein, but for an additional term extending to on or about March 31, 2079. If a subsequent master lease is approved and duly executed by Lessor and Sublessor, Sublessor shall promptly provide a copy of such subsequent master lease to Sublessee and, at Sublessee’s sole option: (1) the provisions of
Section 9.a.(2)i), ii), and iii) above shall apply as if the subsequent master lease is
the "New Master Lease" referred to in Section 9.a. above and Sublessor shall execute
an amendment to this Sublease to reflect compliance with Sections 9.a.(2)i), ii), and iii) above or a new sublease on the same material terms and conditions as set forth
in this Sublease (including, without limitation, the rents set forth herein) and
reflecting compliance with Sections 9.a.(2)i), ii), and iii) above, or (II) Sublessor shall
diligently negotiate in good faith a new sublease with Sublessee, if so desired by
Sublessee, on the same material terms and conditions as set forth in this Sublease
(including, without limitation, the rents set forth herein and compliance with the
Master Lease then in effect) or on such other terms and conditions as may be
mutually agreeable to Sublessor and Sublessee, with a term ending on or after
March 31, 2079.

c. Option to Extend Term. Notwithstanding the foregoing in
Sections 9.a. and 9.b. above, Sublessee shall have an option to extend the term of this
Sublease beyond December 31, 2033 if Sublessor acquires rights to sublease the
Subleased Premises to Sublessee, whether under the New Master Lease or other
master lease, and such extension shall be coterminous with such New Master Lease
or other master lease, but in no event shall the term of this Sublease extend beyond
March 31, 2079. Such option shall expire on December 31, 2033 and Sublessee shall
have sole discretion regarding whether or not to exercise such option.

d. Termination Without Cause. Sublessee shall have the right to
terminate this Sublease at any time upon six (6) months prior written notice to
Sublessor.

e. Termination for Breach. This Sublease may be terminated for
breach as provided in, and in accordance with, Sections 8 above or 25 below.

f. Non-use and Abandonment. If the Sublessee shall, at any time
for a continuous period of eleven (11) months, fall or cease to use, or abandon the
Subleased Premises, this Sublease shall cease and terminate. Sublessor shall
provide written notice to Sublessee within thirty (30) days after the sixth (6th)
month of such eleven (11) month period and shall allow Sublessee three (3) months
to cure any such purported abandonment.

10. Effect of Termination or Expiration: Decommissioning. Upon
termination or expiration of this Sublease, Sublessee shall, at Sublessor's sole option
and at Sublessee's sole cost and expense either (a) surrender the Subleased
Premises with all improvements existing or constructed thereon, or (b)
decommission and remove the TMT Facilities and restore the land in accordance
with the CMP and the Decommissioning Plan for Mauna Kea Observatories, A Sub-
Plan of the Mauna Kea Comprehensive Management Plan (dated January, 2010 and
approved by Lessor in March, 2010) ("Decommissioning Plan"), and any amended,
supplemental, or successor plans adopted by Sublessor with the approval of the
Lessor.
a. Decommissioning Funding Plan. Sublessee shall develop and periodically update a Decommissioning Funding Plan as described in, and in accordance with, the Decommissioning Plan, to provide assurance to Sublessor that sufficient funds will be available to carry out deconstruction and site restoration activities upon termination or expiration of this Sublease. The Decommissioning Funding Plan shall include one or more financial assurance mechanisms as described in the Decommissioning Plan. Sublessee shall provide the initial Decommissioning Funding Plan on or before the execution date of this Sublease as set forth above. Sublessee shall submit an updated Decommissioning Funding Plan to Sublessor for Sublessor’s review and approval as provided in the CMP, and shall provide such information and documents as Sublessor may reasonably request from time to time to verify the availability and adequacy of funding to meet Sublessee’s decommissioning and restoration obligations. If, at any time during the term of this Sublease, Sublessor reasonably determines that the Decommissioning Funding Plan is insufficient, Sublessee shall consult with Sublessor and shall negotiate in good faith to determine the amount of such additional funding and provide such additional funding assurance mechanisms.

b. Site Decommissioning Plan. Upon expiration or termination of this Sublease or any extended sublease, decommissioning, including site restoration, shall be carried out in strict compliance with a Site Decommissioning Plan developed and approved in accordance with the Decommissioning Plan (“Decommissioning Obligations”).

c. Delivery of Possession. Except as otherwise provided herein, upon expiration or termination of this Sublease or any extended sublease and completion of Sublessee’s Decommissioning Obligations, Sublessee shall peaceably deliver to Sublessor possession of the Subleased Premises in a clean and orderly condition.

d. Payment of Decommissioning Costs of Sublessor or Lessor. Sublessee shall promptly pay on demand any reasonable and necessary costs incurred by Sublessor or Lessor to remedy any failure on the part of Sublessee to fully and timely perform its Decommissioning Obligations.

e. Survival. The obligations of Sublessee under this Section 10, the rights and obligations of Sublessor and Sublessee under Sections 9.a., 9.b., and 9.c. above, and the obligations of Sublessee under Section 11 below shall survive expiration or termination of this Sublease.

f. Termination Without Decommissioning: Assumption of Decommissioning Obligations by Sublessor. If this Sublease expires or is terminated prior to the expiration of the Master Lease and at a time when the TMT Facilities have remaining useful life, at Sublessor’s sole option Sublessee shall be relieved of its Decommissioning Obligations and permitted to surrender its subleasehold interest in the Subleased Premises without removal of the TMT Facilities on such
terms as may be mutually agreed in writing by Sublessor and Sublessee, which may include payment to Sublessor of an amount to be held in reserve for future decommissioning in exchange for Sublessor's assumption of the Decommissioning Obligations.

11. **Indemnity.** Sublessee shall indemnify, defend, and hold harmless Lessor, Sublessor, and their officers, agents, employees, and other persons acting on their behalf, from and against any claim or demand for loss, liability, or damages (including, but not limited to, reasonable attorneys' fees and claims for property damage, personal injury, or death, based upon any accident, fire, or other incident on or about the Subleased Premises) to the extent arising or resulting from: (1) any act or omission on the part of Sublessee relating to Sublessee's use, occupancy, maintenance, or enjoyment of the Subleased Premises; (2) any failure on the part of Sublessee to properly maintain the Subleased Premises, and areas adjacent thereto in Sublessee's use and control, including any accident, fire, or nuisance, arising from or caused by any failure on the part of Sublessee to maintain the Subleased Premises in a safe condition; or (3) Sublessee's non-observance or non-performance of any of the terms, covenants, and conditions of this Sublease or the Master Lease or the rules, regulations, ordinances and laws of the Federal, State, or County governments. Sublessee further agrees to indemnify, defend, and hold harmless Lessor and Sublessor from any damages or claims arising from the release of "hazardous material" (as defined in Section 31 below) on the Subleased Premises occurring while Sublessee is in possession, or elsewhere if caused by Sublessee or any person acting under Sublessee.

12. **Insurance.** Sublessee shall, at its own cost and expense, maintain the following insurance. Such insurance shall be subject to the reasonable approval of Sublessor and Lessor and, except as to any property insurance, shall name Sublessor and Lessor as additional insureds. Sublessee shall deliver executed certificates thereof to Sublessor on or before the Effective Date of this Sublease and thereafter within a reasonable time prior to the expiration of the term of each such policy. As often as any such policy shall expire or terminate, renewal or additional policies shall be procured and maintained by Sublessee in like manner to like extent. If Sublessee has only provided Sublessor with certificates evidencing the policies required to be carried by Sublessee under this Sublease, Sublessee agrees to deliver executed copies of all such required policies to Sublessor within ten (10) days of Sublessor's written request for the same.

a. **Property Insurance.** Sublessee shall at its own expense and at all times during the term keep Sublessee's property, including but not limited to the TMT Facilities, insured against (i) all of the risks covered by a standard ISO Commercial Property Special Causes of Loss Form (or equivalent) which shall be in an amount equal to the full replacement cost of such property and shall not have a deductible in excess of Two Hundred and Fifty Thousand Dollars ($250,000), and (ii) such other hazards or risks which a reasonably prudent telescope operator on Mauna Kea would insure against. Sublessee hereby waives any and all rights of
subrogation which it may have against Lessor and/or Sublessor, except to the extent of available insurance. In case the property required to be insured above or any part thereof shall be destroyed or damaged by fire or such other casualty required to be insured against, then and as often as the same shall happen, the proceeds of such insurance shall be paid to Sublessee to be used by Sublessee to promptly repair and restore any damage to such property.

b. **Liability Insurance.** Sublessee shall procure at Sublessee's expense and keep in force during the term of this Sublease and any extension thereof, the following insurance:

i) **General Liability Insurance.** Commercial general liability insurance (including coverage for liability caused by the fault of Sublessee, products-completed operations liability, personal and advertising injuries and coverage for contractual liability to the extent provided by ISO Form CGL #00-01-04-13 (or equivalent) covering Sublessee and naming as additional insureds: (i) Sublessor, (ii) Lessor, (iii) Sublessor’s and Lessor’s managers, officers, agents and employees, and (iv) such other parties as Sublessor may specify, insuring against liability arising out of the use, occupancy or maintenance of the Subleased Premises and areas appurtenant thereto by Sublessee with limits of not be less than One Million Dollars ($1,000,000) for property damage, and Five Million Dollars ($5,000,000) for injuries and deaths in any one occurrence or a combined single limit of Five Million Dollars ($5,000,000) per occurrence and deductibles of no more than Two Hundred and Fifty Thousand Dollars ($250,000). Such insurance shall be primary and shall not limit the liability of the Sublessee under Section 11 above.

ii) **Auto Liability Insurance.** Auto liability insurance covering all automobiles used by Sublessee in connection with its operations in the Subleased Premises with limits of not less than Five Hundred Thousand Dollars ($500,000) for property damage, and Five Million Dollars ($5,000,000) for injuries or deaths in any one occurrence or a combined single limit of Five Million Dollars ($5,000,000) per occurrence, with deductibles of no more than Five Thousand Dollars ($5,000) per occurrence and naming Sublessor and Lessor as an additional insureds.

iii) **Pollution Liability Insurance.** Pollution liability insurance in the amount of not less than Five Million Dollars ($5,000,000) and with deductibles of no more than Two Hundred and Fifty Thousand Dollars ($250,000) per occurrence and naming Sublessor and Lessor as an additional insureds. Such insurance shall cover bodily injury, property damage, and environmental damage, including clean up and defense and remediation costs, for occurrences that arise from the occupancy or use of the Subleased Premises during the Term by Sublessee.

c. **General Insurance Requirements.**
i) Sublessee shall use its best efforts to obtain the following terms in each policy of commercial property insurance and general liability insurance required in Sections 12.a. and 12.b. above to the extent that such terms are reasonably available in the commercial marketplace:

a) a provision that the liability of the insurer thereunder shall not be affected by, and that the insurer shall not claim, any right of set-off, counterclaim, apportionment, proration, or contribution by reason of, any other insurance obtained by or for Sublessee, Lessor, Sublessee, or any person claiming by, through, or under any of them; and

b) no provision relieving the insurer from liability for loss occurring while the hazard to buildings and personal property is increased, whether or not within the knowledge or control of, or because of any breach of warranty or condition or any other act or neglect by Sublessee, Lessor, Sublessee, or any person claiming by, through, or under any of them.

ii) Each policy of commercial property insurance and general liability insurance required in Sections 12.a. and 12.b. above shall:

a) be written by an insurance company rated A- or better, Class size VIII or better, by the Best's Key Rating Guide, based upon the rating system in effect on the date this Sublease is signed. In the event that Best's changes its rating system or ceases to provide ratings at some later date, then such insurance company shall have a rating from Best (or some other comparable rating service if Best's ceases to provide ratings) comparable to the "A- or better, Class VIII or better" requirement of the immediately preceding sentence; and

b) be specifically endorsed to provide that they are primary policies, not contributing with and not in excess of any coverage that Sublessor and/or Lessor may carry, notwithstanding anything to the contrary contained in any policies obtained by Sublessee and/or Lessor.

In addition, Sublessor shall request that each such policy be specifically endorsed to provide that such policy may not be cancelled except upon the insurer giving at least thirty (30) days' prior written notice thereof (ten (10) days in the case of nonpayment of premium) to Sublessor, Lessor, Sublessee, and other person having an interest in the property who has requested such notice of the insurer.

13. **Taxes, Assessments, etc.** Sublessee shall pay or cause to be paid, when due, the amount of all taxes, rates, and assessments of every description as to which the Subleased Premises or any part, or any improvements, or the Lessor, Sublessor, or Sublessee, are now or may be assessed or become liable by authority of law during the term of this Sublease; provided, however, that with respect to any assessment made under any betterment or improvement law which may be payable
in installments, Sublessee shall be required to pay only those installments, together with interest, which becomes due and payable during the term of this Sublease.

14. **Utility Services.** Sublessee shall be responsible for obtaining any utility services and shall pay when due all charges, duties and rates of every description, including water, sewer, gas, refuse collection or any other charges, as to which the Subleased Premises or any part, or any improvements, or the Lessor, Sublessor, or Sublessee may become liable for during the term, whether assessed to or payable by the Lessor, Sublessor, or Sublessee.

15. **Covenant against discrimination.** The use and enjoyment of the Subleased Premises shall not be in support of any policy which discriminates against anyone based upon race, creed, sex, color, national origin, religion, marital status, familial status, ancestry, physical handicap, disability, age or HIV (human immunodeficiency virus) infection.

16. **Sanitation.** Sublessee shall keep the Subleased Premises and improvements in a strictly clean, sanitary and orderly condition.

17. **Waste and Unlawful, Improper or Offensive Use of Subleased Premises.** Sublessee shall not commit, suffer or permit to be committed any waste, nuisance, strip or unlawful, improper or offensive use of the Subleased Premises or any part, nor, without the prior written consent of the Lessor and Sublessor, cut down, remove or destroy, or suffer to be cut down, removed or destroyed, any trees now growing on the premises.

18. **Compliance with Laws.** Sublessee shall comply with all applicable requirements of all municipal, state, and federal authorities and observe all municipal, state and federal laws applicable to the Subleased Premises, now in force or which may be in force.

19. **Inspection of Subleased Premises.** Upon reasonable notice by Sublessor to Sublessee, Sublessee shall permit the Lessor, Sublessor, and their respective agents, at all reasonable times during the Sublease term, to enter the Subleased Premises and examine the state of its repair and condition.

20. **Improvements.** Sublessee shall not at any time during the term of this Sublease construct, place, maintain and install on the premises any building, structure or improvement of any kind and description except with the prior written approval of the Lessor and the Sublessor and upon those conditions as the Lessor or Sublessor may impose, unless otherwise provided in this Sublease. Construction of the TMT Facilities in accordance with Section 4 above is authorized. **Except as otherwise provided in this Sublease, Sublessee shall own all improvements constructed by and installed by Sublessee on the Subleased Premises.**

21. **Repairs to Improvements.** Sublessee shall, at its own expense, keep, repair, and maintain all buildings and improvements now existing or hereafter
constructed or installed on the Subleased Premises in good order, condition and repair, reasonable wear and tear excepted.

22. **Liens.** Sublessee shall not commit or suffer any act or neglect which results in the Subleased Premises, any improvement, the leasehold estate of the Sublessor, or the subleasehold estate of the Sublessee becoming subject to any attachment, lien, charge, or encumbrance, except as provided in this Sublease, and shall indemnify, defend, and hold the Lessor and Sublessor harmless from and against all attachments, liens, charges, and encumbrances and all resulting expenses.

23. **Assignments, etc.** Sublessee shall not sublease, subrent, transfer, assign, or permit any other person to exclusively occupy the Subleased Premises or any portion or transfer or assign this Sublease or any interest therein, either voluntarily or by operation of law, without the prior written approval of the Lessor and the Sublessor.

24. **Costs of Litigation.** Sublessee shall pay all costs, including reasonable attorney's fees, and expenses incurred by or paid by the Lessor or Sublessor (i) in enforcing the covenants and agreements of the Master Lease or this Sublease with respect to Sublessee, (ii) in recovering possession of the Subleased Premises, or (iii) in the collection of delinquent rental, taxes, and any and all other charges.

25. **Breach.** Time is of the essence in this Sublease and if the Sublessee shall become bankrupt, or if this Sublease and Subleased Premises shall be attached or taken by operation of law, or if Sublessee shall fail to observe and perform any of the material covenants, terms, and conditions contained in this Sublease and on its part to be observed and performed (other than a failure that causes a breach of the Master Lease, in which case Sublessor and Sublessee hereby agree that Section 8 above applies), and this failure shall continue for a period of more than sixty (60) days after delivery by the Sublessor of a written notice of breach or default and demand for cure, by personal service, registered mail or certified mail to the Sublessee at its last known address and to each holder of record having a security interest in the premises, then Sublessor may, subject to the provisions of Section 171-21, Hawaii Revised Statutes, at once re-enter the premises, or any part, and upon or without the entry, at its option, terminate this Sublease without prejudice to any other remedy or right of action for arrears of rent or for any preceding or other breach of contract; and in the event of termination, at the option of Sublessor, all buildings and improvements shall remain and become the property of the Sublessor or shall be removed by Sublessee in accordance with Section 10 above; furthermore, Sublessor shall retain all rent paid in advance to be applied to any damages.

26. **Condemnation.** If at any time, during the term of this Sublease, any portion of the Subleased Premises should be condemned, or required for public purposes by any government authority, the rental shall be reduced in proportion to
the value of the portion of the Subleased Premises condemned. Sublessee shall be entitled to receive from the condemning authority the proportionate value of the Sublessee's permanent improvements so taken in the proportion that it bears to the unexpired term of the Sublease; provided, that the Sublessee may, in the alternative, remove and relocate its improvements to the remainder of the lands occupied by Sublessee. Sublessee shall not by reason of the condemnation be entitled to any claim against the Lessor or Sublessor for condemnation or indemnity for leasehold interest and all compensation payable or to be paid for or on account of the leasehold interest by reason of the condemnation shall be payable to and be the sole property of the Lessor or Sublessor. The foregoing rights of the Sublessee shall not be exclusive of any other to which Sublessee may be entitled by law. Where the portion taken renders the remainder unsuitable for the use or uses for which the Subleased Premises were leased, Sublessee shall have the option to surrender this lease and be discharged and relieved from any further liability; provided, that Sublessee shall remove the permanent improvements constructed, erected and placed by it within any reasonable period allowed by the Lessor and Sublessor, in accordance with Section 10 above.

27. **Right to Enter.** The Lessor, Sublessor, or the County of Hawaii and their agents or representatives shall have the right to enter and cross any portion of the Subleased Premises for the purpose of performing any public or official duties; provided, however, in the exercise of these rights, the Lessor, Sublessor, or the County of Hawaii shall not interfere unreasonably with the Sublessee or Sublessee's use and enjoyment of the Subleased Premises.

28. **Extension of Time.** Notwithstanding any provision contained in this Sublease, when applicable, Sublessor may for good cause shown, allow additional time beyond the time or times specified in this Sublease for the Sublessee to comply, observe, and perform any of the Sublease terms, conditions, and covenants.

29. **Quiet Enjoyment.** Sublessor covenants and agrees with Sublessee that upon payment of the rent at the times and in the manner provided and the observance and performance of these covenants, terms, and conditions on the part of the Sublessee to be observed and performed, the Sublessee shall and may have, hold, possess, and enjoy the premises for the term of the lease, without hindrance or interruption by the Lessor, Sublessor or any other person or persons lawfully claiming by, through, or under the Lessor or Sublessor.

30. **Non-warranty.** Neither the Lessor nor Sublessor warrants the conditions of the Subleased Premises, as the same are being subleased as is.

31. **Hazardous Materials.** Sublessee shall not cause or permit the escape, disposal or release of any hazardous materials except as permitted by law. Sublessee shall not allow the storage or use of such materials in any manner not sanctioned by law or by the highest standards prevailing in the industry for the
storage and use of such materials, nor allow to be brought onto the premises any such materials except to use in the ordinary course of Sublessee's business where the Sublessee has provided Sublessor with a list that contains the identity of such materials used or stored by Sublessee in the ordinary course of its business and in compliance with all applicable federal and state regulations; provided, that if Sublessor disapproves in writing any such materials, the disapproved materials shall not be brought onto the Subleased Premises. If any lender or governmental agency shall ever require testing to ascertain whether or not there has been any release of hazardous materials by Sublessee, then the Sublessee shall be responsible for the reasonable costs thereof. In addition, Sublessee shall execute affidavits, representations and the like from time to time at Lessor's or Sublessor's request concerning Sublessee's best knowledge and belief regarding the presence of hazardous materials on the Subleased Premises placed or released by Sublessee.

For the purpose of this Sublease, "hazardous material" shall mean any pollutant, toxic substance, hazardous waste, hazardous material, hazardous substance, or oil as defined in or pursuant to the Resource Conservation and Recovery Act, as amended, the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, the Federal Clean Water Act, or any other federal, state, or local environmental law, regulation, ordinance, rule, or by-law, whether existing as of the date hereof, previously enforced, or subsequently enacted.

32. Hawaii Law. This Sublease shall be construed, interpreted, and governed by the laws of the State of Hawaii.

33. Exhibits - Incorporation in Sublease. All exhibits referred to herein are attached to this Sublease and hereby are deemed incorporated by reference.

34. Headings. The article and section headings herein are inserted only for convenience and reference and shall in no way define, describe or limit the scope or intent of any provision of this Sublease.

35. Partial Invalidity. If any term, provision, covenant or condition of this Sublease should be held to be invalid, void or unenforceable, the remainder of this Sublease shall continue in full force and effect and shall in no way be affected, impaired or invalidated thereby.

36. Withdrawal. If and to the extent that Lessor exercises its power of withdrawal under the Master Lease to withdraw any portion of the Subleased Premises for public uses or purposes upon giving reasonable notice and without compensation except as otherwise provided in the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease pursuant to Section 9.b. above, then Sublessor shall have the right to withdraw these same portions of the Subleased Premises during the term of this Sublease upon giving reasonable notice to Sublessee and subject to the Sublessee's claim for any compensation provided
under the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease between Sublessor and Lessor that includes in the Subleased Premises for any permanent improvement constructed upon the Subleased Premises that is destroyed or made unusable in the process of the withdrawal or taking. Upon such withdrawal, or upon the taking which causes any portion of the Subleased Premises to become unusable for the specific use or uses for which it was subleased, the rent shall be reduced in proportion to the value of the land withdrawn or made unusable, and to the extent permitted in the Master Lease, HRS Chapter 171, the New Master Lease, or other master lease pursuant to Section 9.b. above, if any permanent improvement constructed upon the land by Sublessee is destroyed or made unusable in the process of the withdrawal or taking, the proportionate value shall be paid based upon the unexpired term of the lease (which value shall also include the cost of decommissioning such improvements including site restoration as required in the Decommissioning Plan).

37. **Building Construction.** All building construction shall be in full compliance with all applicable laws, rules and regulations of the federal, state, and county governments and in accordance with plans and specifications submitted to and approved by the Sublessor and the Chairman of the Board of Land and Natural Resources prior to commencement of construction.

38. **Clearances.** Sublessee shall be responsible for obtaining all necessary federal, state or county clearances.

39. **Time of Essence.** Time is of the essence in all provisions of this Sublease.

40. **Written Notice.** All notices shall be in writing and shall be deemed to have been delivered on the date sent if sent by certified mail (return receipt requested) or recognized courier (with delivery confirmation) or transmitted by facsimile (with written confirmation of transmission) and in each case with a copy sent by email on the same date as follows:

Sublessor:
Chancellor
University of Hawaii at Hilo
200 West Kawili Street
Hilo, Hawaii 96720-4091
Telephone: (808) 932-7348
Facsimile: (808) 932-7338
Email: dstraney@hawaii.edu

Sublessee:
Project Manager (during construction) or Observatory Director (after first light; contact information for Observatory Director to be delivered to Sublessor by written notice following construction)
TMT International Observatory, LLC  
1111 South Arroyo Parkway, Suite 200  
Pasadena, CA 91105  
Telephone: (626) 395-2997  
Facsimile: (626) 296-1887  
Email: sanders@tmt.org

With a copy to:  
Ann Martin  
General Counsel  
TMT Observatory Corporation  
Telephone: (626) 395-1646  
Facsimile: (626) 395-6841  
Email: ann.martin@caltech.edu

41. **Dispute Resolution.** Any dispute relating to or arising as a result of or in connection with this Sublease, if not resolved by negotiation, shall be submitted first to non-binding mediation with Dispute Prevention & Resolution, Inc. and if such mediation is not concluded within six (6) months after submission, then shall be decided in legal or equitable proceedings in accordance with Hawaii law in any court having jurisdiction in the State of Hawaii. Such mediation shall take place in the County of Honolulu, State of Hawaii. Each party shall bear its own costs and fees for such mediation and the fees and expenses of the mediator shall be borne by the parties equally.

42. **Historic preservation.** In the event any historic properties or burial sites, as defined in section 6E-2, Hawaii Revised Statutes, are found on the Subleased Premises, Sublessee and Sublessee’s agents, employees and representatives shall immediately stop all land utilization and/or work and contact the Historic Preservation Office in compliance with Chapter 6E, Hawaii Revised Statutes.

43. **Removal of Trash.** Sublessee shall be responsible for the removal of all illegally dumped trash upon the premises within ninety (90) days from the date of execution of this Sublease and shall so notify the Sublessor in writing at the end of ninety (90) days.

44. **Phase I Environmental Site Assessment.** Prior to termination or revocation of this Sublease, Sublessee shall conduct a Phase I environmental site assessment of the Subleased Premises and conduct a complete abatement and disposal of any such sites, if necessary, satisfactory to the standards required by the Federal Environmental Protection Agency, the Department of Health, and the Department of Land and Natural Resources. Failure to comply with the provisions of this Section 44 shall not extend the term of this Sublease or automatically prevent termination or revocation of the lease. Sublessor, at its sole option, may refuse to approve termination, unless this evaluation and abatement provision has been
performed. In addition or in the alternative, Sublessor may, at its sole option if Sublessee does not do so, arrange for performance of the provisions of this Section 44, all costs and expenses of such performance to be charged to and paid by Sublessee.
IN WITNESS WHEREOF, Sublessor and Sublessee have executed this Sublease on the date first written above.

FOR THE UNIVERSITY OF HAWAII: TMT INTERNATIONAL OBSERVATORY, LLC:

By ____________________________
  Name: __________________________
  Title: __________________________
  Date: __________________________

By ____________________________
  Name: __________________________
  Title: __________________________
  Date: __________________________

By ____________________________
  Name: __________________________
  Title: __________________________
  Date: __________________________

Approved as to form:

By ____________________________
  Name: __________________________
  Title: __________________________
  Date: __________________________
Exhibit A to Sublease

Master Lease (General Lease No. S-4191)

(attached)
GENERAL LEASE NO. 8-4191

THIS INDENUARY OF LEASE, made this 31st day of

, 1968, by and between the STATE OF

HAWAII, by its Board of Land and Natural Resources, pursuant
to the provisions of Section 103A-90(b), Revised Laws of

Hawaii 1955, as amended, hereinafter referred to as the

"LESSOR", and the UNIVERSITY OF HAWAII, a body corporate,
whose post office address is 2444 Dole Street, Honolulu,
City and County of Honolulu, State of Hawaii, hereinafter
referred to as the "LESSEE".

WITNESSETH THAT:

FOR and in consideration of the mutual promises
and agreements contained herein, the Lessor does hereby demise
and lease unto the said Lessee and the said Lessee does hereby
rent and lease from the Lessor, all of that certain parcel of
land situate at Koloa, Hanalei, County and Island of Hawaii,
State of Hawaii, and more particularly described in Exhibit
"A", hereto attached and made a part hereof.

TO HAVE AND TO HOLD, all and singular the said pre-
ises, herein mentioned and described, unto the said Lessee,
for and during the term of sixty-five (65) years, to commence
from the 1st day of January, 1968, and to terminate on the
31st day of December, 2033.
RESERVING UNTO THE LESSOR THE FOLLOWING:

1. **Water Rights.** All surface and ground waters appurtenant to the demised premises, together with the right to enter and to capture, divert or impound water; provided, that the Lessor shall exercise such rights in such manner as not to interfere unreasonably with the Lessee's use of the demised premises; provided, further, that the Lessee shall have the right to use the waters of Lake Waiau for any purpose necessary or incidental to the use permitted by this lease on the following conditions:
   a. No drilling or disturbance of Lake Waiau's bottom, banks or areas adjacent thereto shall be permitted;
   b. No activity shall be permitted which will result in the pollution of the waters of Lake Waiau;
   c. Lessee shall not take or divert any of the waters arising from springs which furnish the water supply for Pohakuloa, and no alterations to said springs shall be made by Lessee.

2. **Access.** All rights to cross the demised premises for inspection or for any government purposes.

3. **Hunting and Recreation Rights.** All hunting and recreation rights on the demised lands, to be implemented pursuant to rules and regulations issued by said Board in discharging its fish and game or state parks responsibilities; provided, however, that such hunting and recreation activities shall be coordinated with the activities of the Lessee on the demised lands; and provided, further, that such hunting and recreation activities shall be limited to day-light hours only.
4. **Right to use Demised Lands.** The right for itself, and its successors, lessees, grantees and permittees, to use any portion of the lands demised and the right to grant to others rights and privileges affecting said land; provided, however, that, except as otherwise provided herein, no such use shall be permitted or rights and privileges granted affecting said lands, except upon mutual determination by the parties hereto that such use or grant will not unreasonably interfere with the Lessee's use of the demised premises; provided, further, that such agreement shall not be arbitrarily or capriciously withheld.

**THE LESSEE, IN CONSIDERATION OF THE PREMISES, COVENANTS WITH THE LESSOR AS FOLLOWS:**

1. **Surrender.** The Lessee shall, at the expiration or sooner termination of this lease, peaceably and quietly surrender and deliver possession of the demised premises to the Lessor in good order and condition, reasonable wear and tear excepted.

2. **Maintenance of the Premises.** The Lessee shall keep the demised premises and improvements in a clean, sanitary and orderly condition.

3. **Waste.** The Lessee shall not make, permit or suffer, any waste, strip, spoil, nuisance or unlawful, improper or offensive use of the demised premises.

4. **Specified Use.** The land hereby leased shall be used by the Lessee as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex.

Activities inimical to said scientific complex shall include light and dust interference to observatory operation.
during hours of darkness and certain types of electric or
electronic installation on the demised lands, but shall not
necessarily be limited to the foregoing.

5. Assignments. The Lessee shall not sublease, sub-
rent, assign or transfer this lease or any rights thereunder
without the prior written approval of the Board of Land and
Natural Resources.

6. Improvements. The Lessee shall have the right
during the existence of this lease to construct and erect build-
ings, structures and other improvements upon the demised prem-
ises; provided, that plans for construction and plot plans of
improvements shall be submitted to the Chairman of the Board
of Land and Natural Resources for review and approval prior to
commencement of construction. The improvements shall be and
remain the property of the Lessee, and shall be removed or
disposed of by the Lessee at the expiration or sooner termina-
tion of this lease; provided, that with the approval of the
Chairman such improvements may be abandoned in place. The
Lessee shall, during the term of this lease, properly maintain,
repair and keep all improvements in good condition.

7. Termination by the Lessee. The Lessee may ter-
minate this lease at any time by giving thirty (30) days' notice
in writing to the Lessor.

8. Termination by the Lessor. In the event that (1)
the Lessee fails to comply with any of the terms and conditions
of this lease, or (2) the Lessee abandons or fails to use the
demised lands for the use specified under paragraph 4 of these
covenants for a period of two years, the Lessor may terminate
this lease by giving six months' notice in writing to the Lessee.

9. Non-Discrimination. The Lessee covenants that the
use and enjoyment of the premises shall not be in support of any
policy which discriminates against anyone based upon race, creed, color or national origin.

10. **General Liability.** The Lessee shall at all times, with respect to the demised premises, use due care for safety, and the Lessee shall be liable for any loss, liability, claim or demand for property damage, personal injury or death arising out of any injury, death or damage on the demised premises caused by or resulting from any negligent activities, operations or omissions of the Lessee or in connection with the demised premises, subject to the laws of the State of Hawaii governing such liability.

11. **Laws, Rules and Regulations, etc.** The Lessee shall observe and comply with Regulation 4 of the Department of Land and Natural Resources and with all other laws, ordinances, rules and regulations of the federal, state, municipal or county governments affecting the demised lands or improvements.

12. **Objects of Antiquity.** The Lessee shall not appropriate, damage, remove, excavate, disfigure, deface or destroy any object of antiquity, prehistoric ruin or monument of historical value.

13. **Undesirable Plants.** In order to prevent the introduction of undesirable plant species in the area, the Lessee shall not plant any trees, shrubs, flowers or other plants in the leased area except those approved for such planting by the Chairman.

IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board of Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be duly executed this 2/3/6
day of _________, 1968, and the UNIVERSITY OF HAWAII, by its ___________ and ____________,
has caused these presents to be duly executed this ________
day of ____________, 1968, effective as of the day and year first above written.

STATE OF HAWAII

By: ________________________________
    Acting Chairman and Member
    Board of Land and Natural Resources

And By: ________________________________
    Member
    Board of Land and Natural Resources

UNIVERSITY OF HAWAII

By: ________________________________
    Its Acting President

And By: ________________________________
    Its

APPROVED AS TO FORM:

Deputy Attorney General
Dated: __________

EM
Proofed by: __________
EXHIBIT "A"

MAUNA KEA SCIENCE RESERVE
Kaohe, Hamakua, Island of Hawaii, Hawaii

Being a portion of the Government Land of Kaohe

Beginning at a point on the south boundary of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "SUMMIT 1955" being 12,325.95 feet South and 471.84 feet West, as shown on Government Survey Registered Map 2769, thence running by azimuths measured clockwise from True South:

1. Along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 135° 00' 18,607.62 feet;

2. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 225° 00' 18,607.62 feet;

3. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 261° 18' 04.6" 5,173.56 feet;

4. 207° 49' 06.5" 841.83 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

5. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1200.00 feet, the chord azimuth and distance being: 297° 49' 06.5" 2400.00 feet;
6. 27° 49' 06.5" 841.83 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

7. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 306° 59' 47.4" 1824.16 feet;

8. 227° 29' 00.9" 2805.06 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

9. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1500.00 feet, the chord azimuth and distance being: 317° 29' 09.8" 3000.00 feet;

10. 47° 29' 00.9" 2805.06 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

11. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13200.00 feet, the chord azimuth and distance being: 325° 31' 55.2" 701.97 feet;

12. 245° 46' 12.7" 2760.45 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

13. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 2000.00 feet, the chord azimuth and distance being: 335° 46' 12.7" 4000.00 feet;

14. 65° 46' 12.7" 2760.45 feet along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

15. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 352° 14' 32.9" 3563.50 feet;
16. Thence along Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,360.00 feet, the chord azimuth and distance being 45' 00' 18,667.62 feet to the point of beginning and containing an AREA OF 13,321.054 ACRES.

EXCEPTING and RESERVING to the State of Hawaii and to all others entitled thereto, the Mauna Kea-Humula and Mauna Kea-Unikoa Trails, and all other existing trails within the above-described parcel of land, together with rights of access over and across said trails.

ALSO, EXCEPTING and RESERVING to the State of Hawaii, its successors and assigns, the waters and all riparian and other rights in and to all the streams within the above-described parcel of land.
Exhibit B to Sublease

Consent to Sublease Under General Lease No. S-4191

(attached)
CONSENT TO SUBLEASE OF GENERAL LEASE NO. S-4191

CONSENT is hereby given by the STATE OF HAWAII, by its Board of Land and Natural Resources, Lessor under unrecorded General Lease No. S-4191 dated June 21, 1968, leased to the University of Hawaii, a body corporate, as Lessee, to the attached Sublease and Non-Exclusive Agreement ("Sublease") dated _____________, 2014, from the UNIVERSITY OF HAWAII, a body corporate, as "Sublessor," to the TMT INTERNATIONAL OBSERVATORY, LLC, a Delaware limited liability company, recorded in the Bureau of Conveyances of the State of Hawaii as Document No. ____________, as "Sublessee"; SUBJECT, HOWEVER, to the provisions of Section 171-21, Hawaii Revised Statutes, as amended, relating to the rights of holder of security interests, PROVIDED, FURTHER, that noting contained herein shall change, modify, waive or amend the provisions, terms, conditions and covenants or the duties and obligations of the Lessee or Sublessee under General Lease S-4191.
IT IS UNDERSTOOD that except as provided herein, should there be any conflict between the terms of General Lease No. S-4191 and the terms of the Sublease, the former shall control; and that no further sublease or assignment of any interest of the premises or any portion thereof shall be made without the prior written consent of the Board of Land and Natural Resources.

FURTHERMORE, Lessee hereby acknowledges that the Lessor's consent to sublease under General Lease No. S-4191, does not release the Lessee of any and all responsibilities, obligations, liabilities, and claims respecting or arising under or out of said General Lease prior to the effective date of this sublease.
IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board and Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be fully executed on this ___ day of ______________, 2014.

STATE OF HAWAII

Approved by the Board of Land and Natural Resources at its meeting held on ______________, 2014

By ____________________________
Chairperson and Member
Board of Land and Natural Resources

LESSOR

UNIVERSITY OF HAWAII, a body corporate

By ____________________________
Its ____________________________

By ____________________________
Its ____________________________

LESSEE

APPROVED AS TO FORM:

______________________________
Deputy Attorney General

Dated: ______________

DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P. O. Box 621
Honoalulu, Hawaii 96809
Exhibit C to Sublease

Subleased Premises and Easement Area

(attached)
Attachment B to Scientific Cooperation Agreement Between TJO and UH

Access Roads

(attached)
June 4, 2014

James Douglas Ing, Esq.
Watanabe Ing
First Hawaiian Center
999 Bishop Street, 23rd Floor
Honolulu, Hawaii 96813

Analysis of the Proposed Ground Lease Rents
for the Planned Thirty Meter Telescope at
Mauna Kea Summit, Hamakua, Hawaii

Dear Mr. Ing:

At your request we have completed an analysis of the proposed ground lease rents for the site underlying the "Thirty Meter Telescope" (TMT), a multinational venture seeking to construct "the world's most advanced and capable ground-based, optical, near-infrared and mid-infrared observatory". The facility will be located at the summit of Mauna Kea, within the University of Hawaii-administered (UH) Mauna Kea Science Reserve (MKSR), on conservation land owned by the State of Hawaii.

Our assignment was to determine whether the proposed contractual ground lease rent structure is appropriate, rational, and supportable by market standards.

Based on our analysis of the site, its planned use, the proposed agreement, and assessment of Big Island real estate sectors, we conclude the recommended contractual sub-lease rents are appropriate, rational, supportable in an economic context, and provide a superior return to the underlying conservation-classified real estate.

This letter summarizes the proposed ground lease terms and rents, and the focal considerations contributing to our conclusions. The brief discussion is from a real estate market perspective; we acknowledge there are cultural, environmental and academic issues best addressed by others.
The Subject Property

The proposed TMT leasehold site contains a gross land area of 8.664 acres, comprised of 5.999 acres of useable area (the observatory site) and a 2.665 acre non-exclusive access easement. It is currently vacant, unimproved and un-serviced with access available only from an unpaved summit roadway to the point at which the easement will extend to the observatory site.

The holding has "conservation" land use classifications, and the observatory will be built under a Conservation District Use Permit obtained specifically for the project.

Apart from its proposed development with the TMT, the property, one of the most remote on the Big Island, has no meaningful economic potentials through urban (commercial, industrial, residential, resort), agricultural (crop, grazing) or other uses. It would merely be a small component within an 11,215 acre parcel.

Were it a freestanding holding, it is difficult to envision any market demand for the subject property, and its value on a fee simple basis would be that of other rural, highly-protected, conservation/open-classified properties that currently have prices in the range of $500 to $1,200 per acre.

Due to its elevation, isolation and climate, it is unlikely there would be interest in leasing it for agricultural, ranching or recreational purposes; and, even were there interest, rents would of necessity be nominal.

However, the extremely favorable and rare characteristics of the Mauna Kea summit for astronomical observation, coupled with the willingness of the international scientific community to develop telescopic facilities on a not-for-profit basis, indicates the subject property has some level of "value" beyond conservation use from an academic/research perspective.

Despite the "raw" condition of the site and the high costs of constructing, operating and maintaining the observatory, which limits the residual value of the underlying land within a market context, TMT is willing to pay substantial ground rents for the opportunity to pursue its scientific objectives. This is a major evolution as historically observatories worldwide have paid no or nominal ground rents.

The potential for the subject property as the TMT development site within the MKSR is the specialized Highest and Best Use for the holding.
The Proposed Ground Lease

The proposed agreement, a sub-lease, is summarized as follows:

**Fee Owner/Master Lessor:** State of Hawaii Department of Land and Natural Resources

**Master Lessee/Sublessor:** University of Hawaii (via General Lease No. S-4191)

**Sublessee:** TMT International Observatory, LLC

**Demised Area:** A total of 8.664 acres, which is comprised of a useable area (Observatory Site) of 5.999 acres, and Non-Exclusive Access Easement covering an additional 2.665 acres.

**Term:** Initial -- Through December 31, 2033.

**Extension:** Sublessee has the option to extend the lease term through December 31, 2079.

**Rents:** The contract ground rents escalate from $300,000 to $900,000 per year during the 10-year construction period of the TMT, and stabilize at a current value of $1,080,000 annually in Year 11 and thereafter.

The rents will escalate from the contract levels beginning in 2015 at the annual rate of inflation of the Consumer Price Index (CPI) for "All Urban Consumers, US City Average”.

The chart below summarizes the "contract" and estimated "actual" rents which are to be paid by TMT.

<table>
<thead>
<tr>
<th>Year</th>
<th>Contract Rent</th>
<th>CPI Adjustment (1)</th>
<th>Est. Actual Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$300,000</td>
<td>1.0000</td>
<td>$300,000</td>
</tr>
<tr>
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</tr>
<tr>
<td>3</td>
<td>$300,000</td>
<td>1.0490</td>
<td>$314,696</td>
</tr>
<tr>
<td>4</td>
<td>$400,000</td>
<td>1.0744</td>
<td>$429,748</td>
</tr>
<tr>
<td>5</td>
<td>$400,000</td>
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<tr>
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<td>$692,564</td>
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<tr>
<td>8</td>
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</tr>
<tr>
<td>10</td>
<td>$900,000</td>
<td>1.2401</td>
<td>$1,116,106</td>
</tr>
<tr>
<td>11</td>
<td>$1,080,000</td>
<td>1.2701</td>
<td>$1,371,739</td>
</tr>
</tbody>
</table>

(1) From January 2004 through March 2014 the compounded annual rate of growth was 2.42%.
In keeping with the non-market academic/research basis for the Mauna Kea Science Reserve, the sublease ground rents, though substantial, are not intended to generate substantive land returns (profits) for UH, but enable it to fund its programs as conservator of the summit area.

The site will also be encumbered by a "Scientific Cooperation Agreement" describing the going-forward responsibilities between the parties in regards to shared objectives, access to existing infrastructure and facilities on the mountain, and their operation and maintenance. Under the agreement, TMT will contribute $6,600,000 towards the extension/upgrading of the existing MKSR infrastructure systems necessary for their observatory, and contribute a pro rata share to UH operation and maintenance of the systems and support facilities on the basis of "no profit, no loss".

**Value of the Ground Lease**

The present value of the leased fee position held by the UH/State in the ground lease can be estimated by projecting the CPI-escalating future rents over the duration of the agreement (initial and extension terms) and then discounting them back to a current date at an appropriate rate.

In analysis of urban Honolulu leased fee interest purchases of commercial real estate, the prices paid indicate a 9.0 annual discount rate coupled with a 3.0 percent annual appreciation rate, both compounded, as being representative of the market.

As TMT will be an immensely expensive facility financed by an international consortium, there will be a lower risk associated with the non-payment of ground rent being made relative to the general real estate market; a lower discount rate is appropriate. And, we are assuming CPI escalations of only 2.42 percent annually.

We have used a discount rate of 8.0 percent compounded yearly for our analysis; it clearly could be lower (resulting in a higher value for the leased fee interest) given the risk of non-payment and foreclosure. It is not an urban commercial site, but a highly specialized remote conservation holding that will bear a substantial asset.

The calculations for the total 66-year lease term, from 2014 through 2079, are shown on Table 1.

The indicated present value of the UH/State leased fee interest in the TMT holding will be $14,430,000. This is the equivalent to $2.41 million per acre and $55.22 per square foot for the net usable area of the site, which is how the market would view the indicator; or $1.67 million per acre and $38.23 per square foot for the gross site area.
### TABLE 1

**QUANTIFICATION OF THE PRESENT VALUE OF THE TMT GROUND LEASE**

Analysis of the Proposed TMT Ground Lease  
Mauna Kea Summit, Hamakua, Hawaii

<table>
<thead>
<tr>
<th>Year</th>
<th>Contract Calendar</th>
<th>CPI Adj. (1) Adjusted Rent</th>
<th>Rent at 8%</th>
<th>Present Value of Future Rents</th>
</tr>
</thead>
<tbody>
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<td>$300,000</td>
<td>$300,000</td>
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<tr>
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<td>2016</td>
<td>$300,000</td>
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<td>$249,816</td>
</tr>
<tr>
<td>4</td>
<td>2017</td>
<td>$400,000</td>
<td>$429,748</td>
<td>$315,878</td>
</tr>
<tr>
<td>5</td>
<td>2018</td>
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<td>$440,148</td>
<td>$299,558</td>
</tr>
<tr>
<td>6</td>
<td>2019</td>
<td>$600,000</td>
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<td>2044</td>
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<td>2047</td>
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<tr>
<td>47</td>
<td>2060</td>
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<td>$1,218,317</td>
<td>$87,138</td>
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</table>

**INITIAL GROUND LEASE TERMINATES DECEMBER 31, 2033**
<table>
<thead>
<tr>
<th>Year</th>
<th>Contract Calendar</th>
<th>Contract Rent</th>
<th>CPI Adjust (1)</th>
<th>Est. Actual Rent</th>
<th>Discount to Present at 8% Year</th>
<th>Present Value of Future Rents</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>2061</td>
<td>$1,080,000</td>
<td>3.0767</td>
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<td>0.0249</td>
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<td>0.0230</td>
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<td>0.0213</td>
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<tr>
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<td>3.8155</td>
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<td>0.0124</td>
<td>$51,265</td>
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<td>58</td>
<td>2071</td>
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<td>3.9078</td>
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<td>0.0115</td>
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<td>2072</td>
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<td>0.0099</td>
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<td>66</td>
<td>2079</td>
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<td>4.7316</td>
<td>$5,119,153</td>
<td>0.0062</td>
<td>$31,803</td>
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</table>

**Quantification of the Present Value of the TMT Ground Lease**

<table>
<thead>
<tr>
<th>Option/Extension Term Will Extend to December 31, 2079</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total Present Value of Ground Rents During Initial Sub-Lease Term</th>
<th>$8,312,496</th>
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<tbody>
<tr>
<td>Total Present Value of Ground Rents During Extension Sub-Lease Term</td>
<td>$6,115,262</td>
</tr>
<tr>
<td>Total Value of Proposed Ground Lease Rents (1)</td>
<td>$14,427,758</td>
</tr>
<tr>
<td>Rounded,</td>
<td>$14,430,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gross Site Acreage</th>
<th>8.6640</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value per Gross Acre</td>
<td>$1,665,512</td>
</tr>
<tr>
<td>Value per Square Foot</td>
<td>$38.23</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Useable Site Acreage</th>
<th>5.9990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value per Net Acre</td>
<td>$2,405,401</td>
</tr>
<tr>
<td>Value per Square Foot</td>
<td>$55.22</td>
</tr>
</tbody>
</table>

(1) There will be some residual value in the site after termination of the lease and removal of the TMT observatory and restoration of the site, as called for in the agreement. However, whether there will be another site will be another rent-paying observatory constructed or the site will revert back to conservation use is unknown; and it is so far in the future the present value of the reversionary interest is nominal.

Source: Proposed ground lease, and The Hallstrom Group, Inc.
Our calculations do not include the present value of the reversionary interest in the holding following termination of the lease after 2079, at which time the observatory will be dismantled and the parcel restored to its present condition at cost to TMT, per the agreement. This is because it is unknown whether there will be another rent-paying observatory or other scientific facility leasing the property or it will revert back to a vacant conservation status. Regardless, the reversion is so distant its present value impact is nominal.

At $55 per net usable square foot under the proposed lease, the subject property would become more valuable than any off water resort, commercial or industrial land on the Big Island. As summarized on Table 2, this figure exceeds the most valuable resort and commercial land indicators in Kailua-Kona, the highest-priced sector in the county; even for oceanfront hotels.

The proposed ground lease clearly represents a "top of the market" rent structure.

**Additional Value Considerations**

Beyond the high ground rents, the sub-lessee will bear exceptional additional costs not typical of the general market.

In the general market, a landowner, as developer of a master planned project, will:

1. Bear the entire expense, timing and risks of obtaining all entitlements.
2. Be responsible for all funding necessary to meet land use conditions, obligations and requirements.
3. Incur the entire costs of design, engineering and infrastructure emplacement.
4. Provide the final purchaser/lessee or intended user with a fully "finished" net building lot (exclusive of roadways, features or open space) that is well-located and readily accessible.

At the subject property, which is essentially a raw building site within a master planned specialized scientific development project, the efforts required of the developer and the end-product provided, fall well-short of general market parameters. Yet, the ground rents to be paid are significantly higher than those found in any Big Island industrial or commercial park offering finished, net building sites.

The proposed TMT ground lease results in:

a. The sublessee, not the master developer, paying for fundamental portions of the entitlement process (specifically preparation of the EIS and consultants throughout).
## Table 2

### Resort and Commercial Land Transaction Summary for Kailua-Kona

*Analysis of the Proposed TMT Ground Lease*

Mauna Kea Summit, Hamakua, Hawaii

<table>
<thead>
<tr>
<th>I.D. No.</th>
<th>Tax Map Key</th>
<th>Location</th>
<th>Existing/Proposed Use</th>
<th>Zoning</th>
<th>Land Area</th>
<th>Transaction Date</th>
<th>Indicated Total Price</th>
<th>Price Per SqFt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interior</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3-7-5-18-92</td>
<td>75-5915 Walua Road</td>
<td>Vacant</td>
<td>CV-10</td>
<td>0.241</td>
<td>10,486</td>
<td>20-May-13</td>
<td>$379,050</td>
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<tr>
<td>2</td>
<td>3-7-5-5-86 to 89</td>
<td>75-5608 Kuakini Highway</td>
<td>Honda Dealership</td>
<td>CV-10</td>
<td>7.488</td>
<td>326,177</td>
<td>1-Jan-13</td>
<td>$7,854,720</td>
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<tr>
<td>3</td>
<td>3-7-5-6-16 &amp; 17</td>
<td>75-5646 Kuakini Highway</td>
<td>Kona Seaside Hotel</td>
<td>V-.75</td>
<td>2.207</td>
<td>96,137</td>
<td>1-Oct-12</td>
<td>$3,412,864</td>
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<tr>
<td>4</td>
<td>3-7-5-4-28</td>
<td>75-5621 Palani Road</td>
<td>Harley Davidson</td>
<td>CG-20</td>
<td>0.959</td>
<td>41,788</td>
<td>1-Sep-12</td>
<td>$1,411,765</td>
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<tr>
<td>5</td>
<td>3-7-5-5-61</td>
<td>75-5644 Palani Road</td>
<td>Proposed ASB</td>
<td>CV-10</td>
<td>0.436</td>
<td>18,997</td>
<td>1-Mar-12</td>
<td>$845,746</td>
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<tr>
<td>6</td>
<td>3-7-5-5-90</td>
<td>75-5580 Kuakini Highway</td>
<td>West Hawaii Today</td>
<td>CV-10</td>
<td>2.540</td>
<td>110,642</td>
<td>1-Nov-11</td>
<td>$3,117,647</td>
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<tr>
<td>7</td>
<td>3-7-5-9-46</td>
<td>75-5852 Alii Drive</td>
<td>Royal Kona Resort (por)</td>
<td>V-.75</td>
<td>0.313</td>
<td>13,646</td>
<td>1-Aug-11</td>
<td>$573,130</td>
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<tr>
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<td>3-7-5-18-92</td>
<td>75-5915 Walua Road</td>
<td>Vacant</td>
<td>CV-10</td>
<td>0.523</td>
<td>22,802</td>
<td>1-Apr-11</td>
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<td>75-5680 Kuakini Highway</td>
<td>Kona West</td>
<td>V-.75</td>
<td>0.622</td>
<td>27,114</td>
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<td>$867,648</td>
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<td>3-7-5-9-20</td>
<td>Alii Dr./Kahakai Rd.</td>
<td>Parking Lot</td>
<td>V-.75</td>
<td>0.572</td>
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<td>1-Sep-10</td>
<td>$1,016,368</td>
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<td>11</td>
<td>3-7-5-7-9</td>
<td>75-146 Sarona Road</td>
<td>Holiday Inn Express</td>
<td>V-.75</td>
<td>1.316</td>
<td>57,335</td>
<td>30-Apr-10</td>
<td>$1,020,000</td>
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<td>12</td>
<td>3-7-5-4-38</td>
<td>75-5699 Kopiko Street</td>
<td>The Club</td>
<td>CG-20</td>
<td>1.383</td>
<td>60,243</td>
<td>1-Mar-10</td>
<td>$2,024,767</td>
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<td><strong>Oceanfront</strong></td>
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</tr>
<tr>
<td>A</td>
<td>3-7-5-9-8,12,42</td>
<td>75-5852 Alii Drive</td>
<td>Royal Kona Resort (por)</td>
<td>V-.75</td>
<td>3.850</td>
<td>167,708</td>
<td>1-Jan-13</td>
<td>$7,088,000</td>
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<td>3-7-5-9-12</td>
<td>75-5852 Alii Drive</td>
<td>Royal Kona Resort (por)</td>
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<td>$3,536,912</td>
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<td>3-7-5-6-20, 21, 24,32</td>
<td>75-5660 Palani Road</td>
<td>King Kamehameha Hotel</td>
<td>V-.75</td>
<td>8.357</td>
<td>364,031</td>
<td>21-Jun-07</td>
<td>$20,000,000</td>
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(1) Calculated based on fixed rent of Years 1-5. Rent discounted $30,000 in Year 1.
(2) Negotiated rent for existing tenant. Any assignee would step into a rent structure equal to 8% of $42.50 per square foot.

*Source: Hawaii MLS, and The Hallstrom Group, Inc.*
b. The sublessee, not the master developer, paying for the costs of infrastructure to service the site by committing a minimum of $6.6 million (early 2013 dollar estimate), as well potentially-needed electrical main upgrades.

c. The sublessee bearing all risks and timing impacts of the entitlement process and infrastructure emplacement.

d. Being provided not with a finished urban building site, but a "raw" gross acreage parcel that is unserviced and expensive to develop, operate and maintain land in a harsh remote location.

The Percentage Rent Issue

The proposed lease agreement does not call for a percentage rent component. We have evaluated whether some form of percentage rent payments should be included. Our analysis indicates additional percentage (or "overage") rents would be an inappropriate inclusion in the proposed TMT lease.

A limited number of State and DLNR ground leases contain provisions for additional rents above the fixed (or "minimum") amount based on a percentage of gross operating revenues of the lessee or tenants. The additional rents are paid only to the extent they exceed the minimum rent level.

Examples are the new lease for the Waikiki Landing project at Ala Wai Yacht Harbor and the re-opening term at Sea Life Park, where the additional rents are set at 2.0% and 1.5% of gross revenues against the base rent, respectively.

However, these are revenue-producing, market-based, for-profit entities, with a primary goal of creating proceeds above operating costs and consistent positive returns through development of a state-owned holding.

Under such circumstances, within a market environment, the opportunity of the fee owner to share in the cash flow is not an unreasonable expectation in Hawaii real estate; and, this is typically accomplished by coupling at or below market minimum rents with additional percentage overage rents paid once revenues reach a natural "breaker point".

The UH and MKSR are the antithesis of this situation:

1. They are not market-based, for-profit entities.

2. The rents are not intended to produce a positive annual cash flow for the underlying land owners and master lessee/developer. They are an attempt to fund the obligations of MKSR with all proceeds "spent on the mountain". 
3. The end-user/sublessee (TMT) does not operate in a market environment and is not pursuing positive returns on their investment. It is an academic environment focused on education and the acquisition of scientific knowledge requiring significant capital expenditures.

4. There are no profits at any stage of the operation for UH at MKSR, and in fact it incurs a substantial yearly "loss" (in the form of a cost against the University budget).

5. The contractual ground rents which TMT will pay will be significantly above the rent levels for property on the Big Island, and it would be appropriate they be lowered considerably if a "base plus percentage rents" formula was emplaced.

There is no annual gross revenue against which to assess a percentage rent.

**Reduced Rents During Construction**

Reduced ground lease rents during construction are typical for major projects in Hawaii.

The proposed TMT agreement calls for ground rents to start at $300,000 annually at the commencement of construction, escalate up to $1,000,000 per year by its completion in Lease Year 10, and reach maximum/stabilized levels in Year 11 and thereafter at $1,080,000 (subject to an annual CPI adjustment).

Although a ten-year construction period is long, due to the size and complexity of the TMT facility, the concept is appropriate in the island's real estate market. The proposed Waikiki Landing project on state land (referenced foregoing) will have reduced ground rents during its four-year development period. And, we are aware of other new, recent ground leases for developments which provide for no or discounted rents during construction.

We appreciate the opportunity to be of service in this regards to this prominent facility.

**Certification**

I certify that to the best of my knowledge and belief:

- The statements of fact contained in this report are true and correct.
- The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analyses, opinions, and conclusions.
- I have no present or prospective interest in the property that is the subject of this report, and no personal interest with respect to the parties involved.
The Hallstrom Group, Inc. has performed appraisal/consulting services, or services in any other capacity, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.

I have performed services, as an appraiser/consultant, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.

I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.

My engagement in this assignment was not contingent upon developing or reporting predetermined results, a requested minimum valuation, specific valuation, or the approval of a loan.

My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal consulting assignment.

The analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

I have not made a personal inspection of the property that is the subject of this report, but have done so in the past.

Tom W. Holliday provided significant real property appraisal or appraisal consulting assistance to the person signing this certification.

The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute.

The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.

As of the date of this report, James E. Hallstrom, Jr. has completed the continuing education program of Designated Members of the Appraisal Institute.

James E. Hallstrom, Jr., MAI, CRE
Hawaii State Certified General Appraiser, CGA-178
Exp. Date December 31, 2015

/as/5112AL01
ADDENDA
LIMITING CONDITIONS AND ASSUMPTIONS

The research, analysis, conclusions, and certification for valuation or market studies performed by The Hallstrom Group, Inc. are subject to and influenced by the following:

- The report expresses the opinion of the signers as of the date stated in the letter of transmittal, and in no way has been contingent upon the reporting of specified values or findings. It is based upon the then present condition of the national and local economy and the then purchasing power of the dollar.

- Legal descriptions used within the report are taken from official documents recorded with the State of Hawaii, Bureau of Conveyances, or have been furnished by the client, and are assumed to be correct. No survey is made for purposes of the report.

- Any sketches, maps, plot plans, and photographs included in the report are intended only to show spatial relationships and/or assist the reader in visualizing the property. They are not measured surveys or maps and we are not responsible for their accuracy or interpretive quality.

- It is assumed that the subject property is free and clear of any and all encumbrances other than those referred to herein, and no responsibility is assumed for matters of a legal nature. The report is not to be construed as rendering any opinion of title, which is assumed to be good and marketable. No title information or data regarding easements which might adversely affect the use, access, or development of the property, other than that referenced in the report, was found or provided. The property is analyzed as though under responsible ownership and competent management.

- Any architectural plans and/or specifications examined assume completion of the improvements in general conformance with those documents in a timely and workmanlike manner.

- Preparation for, attendance, or testimony at any court or administrative hearing in connection with this report shall not be required unless prior arrangements have been made therefor.

- If the report contains an allocation of value between land and improvements, such allocation applies only under the existing program of utilization. The
separate valuations for land and building must not be used in conjunction with any other purpose and are invalid if so used.

- If the report contains a valuation relating to a geographical portion or tract of real estate, the value reported for such geographical portion relates to such portion only and should not be construed as applying with equal validity to other portions of the larger parcel or tract; and the value reported for such geographical portion plus the value of all other geographical portions may or may not equal the value of the entire parcel or tract considered as an entity.

- If the report contains a valuation relating to an estate in land that is less than the whole fee simple estate, the value reported for such estate relates to a fractional interest only in the real estate involved, and the value of this fractional interest plus the value of all other fractional interest may or may not equal the value of the entire fee simple estate considered as a whole.

- It is assumed that there are no hidden or inapparent conditions of the property, subsoil, or structures which would render it more or less valuable; we assume no responsibility for such conditions or for engineering which might be required to discover such factors.

- Nothing in the report should be deemed a certification or guaranty as to the structural and/or mechanical (electrical, heating, air-conditioning, and plumbing) soundness of the building(s) and associated mechanical systems, unless otherwise noted.

- Information, estimates, and opinions provided by third parties and contained in this report were obtained from sources considered reliable and believed to be true and correct. However, no responsibility is assumed for possible misinformation.

- If additional consultation or appraisal services outside the scope of this specific assignment are required, fees and schedule will be separately negotiated, whether or not this report has been delivered to the Client at the time of the request.

- Each party will hold the other harmless from and against any liability, cost or expense (including attorneys' fees) arising out of any claim or legal proceeding brought by a third party where such claim or legal proceeding is based on the negligent act or omission, or misconduct of the other party.
• With respect to data provided by Client, The Hallstrom Group, Inc. will not violate the confidential nature of the appraiser-client relationship by improperly disclosing any confidential information furnished to the appraisers.

• Possession of the report, or a copy thereof, does not carry with it the right of publication, and the report may not be used by any person or organization except the client without the previous written consent of the appraiser, and then only in its entirety, provided, however, the client is permitted to present the report to the Court and to prospective buyers of the property for information purposes. If the client releases or disseminates the reports to others without the consent of the appraiser, the client hereby agrees to hold the appraiser and the analysts harmless from any liability, damages, or losses which the analysts might suffer, for any reason whatsoever, by reason of dissemination of the report by the client. However, nothing herein shall prohibit the client or analysts from disclosing said report or opinions contained therein as may be required by applicable law.

• If a party shall commence any action or proceeding against another party in order to enforce the provisions of the Agreement or to recover damages as a result of the alleged breach of any of the provisions of the Agreement, the prevailing party shall be entitled to recover from the other party all reasonable costs in connection therewith, including reasonable attorneys' fees.

• Disclosure of the contents of this report is governed by the By-Laws and Regulations of the Appraisal Institute. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraisers or the firm which they are connected, or any reference to the Appraisal Institute or to the MAI designation) shall be disseminated to the public through advertising media, public relations media, news media, sales media, or any public means of communication without the prior consent and approval of the appraisers.

• Unless otherwise stated in this report, the existence of hazardous material, which may or may not be present on the property, was not observed by the appraiser. The appraiser has no knowledge of the existence of such materials on or in the property. The appraiser, however, is not qualified to detect such substances. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value. No responsibility is assumed for any such conditions, or for any expertise or engineering knowledge...
required to discover them. The client is urged to retain an expert in this field, if desired.

- The Americans with Disabilities Act (ADA) became effective January 26, 1992. We have not made a specific compliance survey and analysis of this property to determine whether or not it is in conformity with the various detailed requirements of the ADA. It is possible that a compliance survey together with a detailed analysis of the requirements of the ADA could reveal that the property is not in compliance with one or more of the requirements of the act. If so, this fact could have a negative effect upon the value of the property. We did not consider possible noncompliance with the requirements of ADA in estimating the value of the property.

- The function of this report is for the sole purpose(s) stated herein. It may not be used in connection with any proposed or future construction for a real estate syndicate(s), real estate investment trust(s) or limited partnership to solicit investors or limited partners, and may not be relied upon for such purposes.

- The appraiser's conclusion of value is based upon the assumption that there are no hidden or unapparent conditions of the property that might prevent buildability. The appraiser recommends that due diligence be conducted through the local building department or the municipality to investigate buildability and whether the property is suitable for its intended use. The appraiser makes no such representations, guarantees or warranties.
PROFESSIONAL BACKGROUND AND SERVICES

The Hallstrom Group, Inc. is a Honolulu based independent professional organization that provides a wide scope of real estate consulting services throughout the State of Hawaii with particular emphasis on valuation studies. The purpose of the firm is to assist clients in formulating realistic real estate decisions. It provides solutions to complex issues by delivering thoroughly researched, objective analyses in a timely manner. Focusing on specific client problems and needs, and employing a broad range of tools including after-tax cash flow simulations and feasibility analyses, the firm minimizes the financial risks inherent in the real estate decision making process.

The principals and associates of the firm have been professionally trained, are experienced in Hawaiian real estate, and are actively associated with the Appraisal Institute and the Counselors of Real Estate, nationally recognized real estate appraisal and counseling organizations.

The real estate appraisals prepared by The Hallstrom Group accomplish a variety of needs and function to provide professional value opinions for such purposes as mortgage loans, investment decisions, lease negotiations and arbitrations, condemnations, assessment appeals, and the formation of policy decisions. Valuation assignments cover a spectrum of property types including existing and proposed resort and residential developments, industrial properties, high-rise office buildings and condominiums, shopping centers, subdivisions, apartments, residential leased fee conversions, special purpose properties, and vacant acreage, as well as property assemblages and portfolio reviews.

Market studies are research-intensive, analytical tools oriented to provide insight into investment opportunities and development challenges, and range in focus from highest and best use determinations for a specific site or improved property, to an evaluation of multiple (present and future) demand and supply characteristics for long-term, mixed-use projects. Market studies are commissioned for a variety of purposes where timely market information, insightful trends analyses, and perceptive conceptual conclusions or recommendations are critical. Uses include the formation of development strategies, bases for capital commitment decisions, evidence of appropriateness for state and county land use classification petitions, fiscal and social impact evaluations, and the identification of alternative economic use/conversion opportunities.
**Business Affiliation**

<table>
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<tr>
<th>Position</th>
<th>Organization</th>
<th>Location</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>President</td>
<td>The Hallstrom Group, Inc.</td>
<td>Honolulu, Hawaii</td>
<td>1980 - Present</td>
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</tbody>
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**National Designations and Memberships**

- CRE Designation (1998) - The Counselors of Real Estate
- MAI Designation (1976) - American Institute of Real Estate Appraisers
- SRPA Designation (1975) - Society of Real Estate Appraisers

The American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated in 1991, forming the Appraisal Institute (AI).

**Education**

- M.S. (Real Estate Appraisal and Investment Analysis) 1971, University of Wisconsin at Madison
- B.A. (Economics) 1969, Brigham Young University at Provo
- Numerous specialized real estate studies in connection with qualifying for national professional designations, and uninterrupted Continuing Education.
- Completed Continuing Education requirements with the Appraisal Institute - Current.

**Professional Involvement**

- Past President and Officer of Hawaii AIREA and SREA Chapters
- Past Instructor for Society of Real Estate Appraisers
- Contributing Author to the "Hawaii Real Estate Investor"
- Lecturer at many professional seminars and clinics.
- Appointed numerous times as an Arbitrator and Mediator.

**Qualified Expert Witness**

- Federal and State Courts
- State Land Use and County Hearings
- Arbitration Proceedings

**State of Hawaii Certification**

- Certified General Appraiser
  - License No. CGA-178
  - Exp. Date: December 31, 2015

Territory of Guam - Non-Resident Real Estate Certified Appraiser,
- License No. CA-06-035, Exp. Date March 19, 2013.

**Community Service**

- Active registered member of the Boy Scouts of America. Former Director of Le Jardin Academy, Advisory Board Member of the School of Business-Brigham Young University-Hawaii Campus, and Director of Hawaii Reserves, Inc.

**Email Address**

JEH@HallstromGroup.com
Good afternoon Mr. Chairman and members of the Board. My name is James E. Hallstrom, Jr. I am the President of the Hallstrom Group, Inc. and am here to testify regarding our analysis of the proposed ground lease rents for the site underlying the "Thirty Meter Telescope."

**Background**

The Thirty Meter Telescope (TMT) is a multinational venture seeking to construct "the world's most advanced and capable ground-based, optical, near-infrared and mid-infrared observatory". The facility will be located at the summit of Mauna Kea, within the University of Hawaii-administered (UH) Mauna Kea Science Reserve (MKSR), on conservation land owned by the State of Hawaii.

Our assignment was to determine whether the proposed contractual ground lease rent structure is appropriate, rational, and supportable by market standards.

Based on our analysis of the site, its planned use, the proposed agreement, and assessment of Big Island real estate sectors, we conclude the recommended contractual sub-lease rents are appropriate, rational, supportable in an economic context, and provide a superior return to the underlying conservation-classified real estate.

My testimony summarizes the proposed ground lease terms and rents, and the focal considerations contributing to our conclusions. The brief discussion is from a real estate market perspective; we acknowledge there are cultural, environmental and academic issues best addressed by others.
The Subject Property

The proposed TMT leasehold site contains a gross land area of 8.664 acres, comprised of 5.999 acres of useable area (the observatory site) and a 2.665 acre non-exclusive access easement. It is currently vacant, unimproved and un-serviced with access available only from an unpaved summit roadway to the point at which the easement will extend to the observatory site.

The holding has "conservation" land use classifications, and the observatory will be built under a Conservation District Use Permit obtained specifically for the project. Apart from its proposed development with the TMT, the property, one of the most remote on the Big Island, has no meaningful economic potentials through urban (commercial, industrial, residential, resort), agricultural (crop, grazing) or other uses. It would merely be a small component within an 11,215 acre parcel.

Were it a freestanding holding, it is difficult to envision any market demand for the subject property, and its value on a fee simple basis would be that of other rural, highly-protected, conservation/open-classified properties that currently have prices in the range of $500 to $1,200 per acre.

Due to its elevation, isolation and climate, it is unlikely there would be interest in leasing it for agricultural, ranching or recreational purposes; and, even were there interest, rents would of necessity be nominal.

However, the extremely favorable and rare characteristics of the Mauna Kea summit for astronomical observation, coupled with the willingness of the international scientific community to develop telescopic facilities on a not-for-profit basis, indicates the subject property has some level of "value" beyond conservation use from an academic/research perspective.
Despite the "raw" condition of the site and the high costs of constructing, operating and maintaining the observatory, which limits the residual value of the underlying land within a market context, TMT is willing to pay substantial ground rents for the opportunity to pursue its scientific objectives. This is a major evolution as historically observatories worldwide have paid no or nominal ground rents.

The potential for the subject property as the TMT development site within the MKSR is the specialized Highest and Best Use for the holding.

**The Proposed Ground Lease**

The proposed agreement, a sub-lease, is summarized as follows:

*Fee Owner/Master Lessor:* State of Hawaii Department of Land and Natural Resources

*Master Lessee/Sublessor:* University of Hawaii (via General Lease No. S-4191)

*Sublessee:* TMT International Observatory, LLC

*Demised Area:* A total of 8.664 acres, which is comprised of a useable area (Observatory Site) of 5.999 acres, and Non-Exclusive Access Easement covering an additional 2.665 acres.

*Term:* Initial -- Through December 31, 2033.

Extension -- Sublessee has the option to extend the lease term through December 31, 2079.

*Rents:* The contract ground rents escalate from $300,000 to $900,000 per year during the 10-year construction period of the TMT, and stabilize at a current value of $1,080,000 annually in Year 11 and thereafter.

The rents will escalate from the contract levels beginning in 2015 at the annual rate of inflation of the Consumer Price Index (CPI) for "All Urban Consumers, US City Average".
The chart below summarizes the "contract" and estimated "actual" rents which are to be paid by TMT.

<table>
<thead>
<tr>
<th>Year</th>
<th>Contract Rent</th>
<th>CPI Adjustment (1)</th>
<th>Est. Actual Rent</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>$300,000</td>
<td>1.0000</td>
<td>$300,000</td>
</tr>
<tr>
<td>2</td>
<td>$300,000</td>
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</table>

(1) From January 2004 through March 2014 the compounded annual rate of growth was 2.42%.

In keeping with the non-market academic/research basis for the Mauna Kea Science Reserve, the sublease ground rents, though substantial, are not intended to generate substantive land returns (profits) for UH, but enable it to fund its programs as conservator of the summit area.

The site will also be encumbered by a "Scientific Cooperation Agreement" describing the going-forward responsibilities between the parties in regards to shared objectives, access to existing infrastructure and facilities on the mountain, and their operation and maintenance. Under the agreement, TMT will contribute $6,600,000 towards the extension/upgrading of the existing MKSR infrastructure systems necessary for their observatory, and contribute a pro rata share to UH operation and maintenance of the systems and support facilities on the basis of "no profit, no loss."
Value of the Ground Lease

The present value of the leased fee position held by the UH/State in the ground lease can be estimated by projecting the CPI-escalating future rents over the duration of the agreement (initial and extension terms) and then discounting them back to a current date at an appropriate rate.

In analysis of urban Honolulu leased fee interest purchases of commercial real estate, the prices paid indicate a 9.0 annual discount rate coupled with a 3.0 percent annual appreciation rate, both compounded, as being representative of the market.

As TMT will be an immensely expensive facility financed by an international consortium, there will be a lower risk associated with the non-payment of ground rent being made relative to the general real estate market; a lower discount rate is appropriate. And, we are assuming CPI escalations of only 2.42 percent annually.

We have used a discount rate of 8.0 percent compounded yearly for our analysis; it clearly could be lower (resulting in a higher value for the leased fee interest) given the risk of non-payment and foreclosure. It is not an urban commercial site, but a highly specialized remote conservation holding that will bear a substantial asset.

The calculations for the total 66-year lease term, from 2014 through 2079, are shown on Table 1 attached to this testimony.
<table>
<thead>
<tr>
<th>Year</th>
<th>Contract Date</th>
<th>Contract Value</th>
<th>CPI Adjusted Value</th>
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<td>18</td>
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<td>$1,080,000</td>
<td>$1,421,479</td>
<td>$1,421,479</td>
<td>0.5589</td>
<td>$626,824</td>
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<tr>
<td>19</td>
<td>2032</td>
<td>$1,080,000</td>
<td>$1,460,924</td>
<td>$1,460,924</td>
<td>0.5586</td>
<td>$618,864</td>
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<tr>
<td>20</td>
<td>2033</td>
<td>$1,080,000</td>
<td>$1,701,118</td>
<td>$1,701,118</td>
<td>0.5584</td>
<td>$614,972</td>
<td></td>
</tr>
</tbody>
</table>

INITIAL GROUND LEASE TERMINATES DECEMBER 31, 2033
The indicated present value of the UH/State leased fee interest in the TMT holding will be $14,430,000. This is the equivalent to $2.41 million per acre and $55.22 per square foot for the net usable area of the site, which is how the market would view the indicator; or $1.67 million per acre and $38.23 per square foot for the gross site area.

Our calculations do not include the present value of the reversionary interest in the holding following termination of the lease after 2079, at which time the observatory will be dismantled and the parcel restored to its present condition at cost to TMT, per the agreement. This is because it is unknown whether there will be another rent-paying observatory or other

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scientific facility leasing the property or it will revert back to a vacant conservation status.

Regardless, the reversion is so distant its present value impact is nominal.

At $55 per net usable square foot under the proposed lease, the subject property would become more valuable than any off water resort, commercial or industrial land on the Big Island. As summarized on Table 2, this figure exceeds the most valuable resort and commercial land indicators in Kailua-Kona, the highest-priced sector in the county; even for oceanfront hotels.

<table>
<thead>
<tr>
<th>I.D. No.</th>
<th>Tax Map Key</th>
<th>Location</th>
<th>Existing/Proposed Use</th>
<th>Zoning</th>
<th>Land Area</th>
<th>Structure</th>
<th>Transaction Date</th>
<th>Indicated Total Price</th>
<th>Price Per SqFt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5-7-6-518-92</td>
<td>75-5915 Waialea Road</td>
<td>Vacant</td>
<td>CV-10</td>
<td>0.241</td>
<td>10,616</td>
<td>Deed</td>
<td>20-May-13</td>
<td>$579,000</td>
</tr>
<tr>
<td>2</td>
<td>7-7-6-558-66</td>
<td>75-5408 Kuakini Highway</td>
<td>Honda Dealership</td>
<td>CV-10</td>
<td>2.696</td>
<td>13,308</td>
<td>Gru. Rent Renew.</td>
<td>1-Jan-13</td>
<td>$7,854,720</td>
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<tr>
<td>3</td>
<td>7-7-6-568-1</td>
<td>75-5446 Kuakini Highway</td>
<td>Kona Seaside Hotel</td>
<td>V-76</td>
<td>3.207</td>
<td>62,009</td>
<td>Gru. Rent Renew.</td>
<td>1-May-13</td>
<td>$3,412,864</td>
</tr>
<tr>
<td>4</td>
<td>7-7-6-540-6</td>
<td>75-5401 Polani Road</td>
<td>Harley Davidson</td>
<td>CG-20</td>
<td>0.959</td>
<td>37,031</td>
<td>Gru. Rent Renew.</td>
<td>1-May-13</td>
<td>$1,411,765</td>
</tr>
<tr>
<td>5</td>
<td>7-7-6-456</td>
<td>75-5444 Polani Road</td>
<td>Proposed ASB</td>
<td>CV-10</td>
<td>1.936</td>
<td>63,055</td>
<td>New Lease</td>
<td>1-Apr-13</td>
<td>$405,746</td>
</tr>
<tr>
<td>6</td>
<td>7-7-6-55</td>
<td>75-5180 Kuakini Highway</td>
<td>West Hawaii Today</td>
<td>CV-10</td>
<td>2.540</td>
<td>110,642</td>
<td>Gru. Rent Renew</td>
<td>1-Nov-13</td>
<td>$3,117,647</td>
</tr>
<tr>
<td>7</td>
<td>7-7-6-517-46</td>
<td>75-5852 Ali Drive</td>
<td>Royal Kona Resort (pos)</td>
<td>V-76</td>
<td>0.313</td>
<td>13,646</td>
<td>Gru. Rent Renew.</td>
<td>1-Aug-11</td>
<td>$573,130</td>
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<tr>
<td>8</td>
<td>7-7-6-518-92</td>
<td>75-5915 Waialea Road</td>
<td>Vacant</td>
<td>CV-10</td>
<td>0.523</td>
<td>22,800</td>
<td>Deed</td>
<td>1-Apr-11</td>
<td>$115,000</td>
</tr>
<tr>
<td>9</td>
<td>7-7-6-531</td>
<td>75-5880 Kuakini Highway</td>
<td>Kona West</td>
<td>V-76</td>
<td>0.622</td>
<td>57,114</td>
<td>Gru. Rent Renew.</td>
<td>1-Nov-10</td>
<td>$89,748</td>
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<tr>
<td>10</td>
<td>7-7-6-540-20</td>
<td>All Dr., Kukuihuli Rd</td>
<td>Parking Lot</td>
<td>V-76</td>
<td>0.522</td>
<td>24,911</td>
<td>Gru. Rent Renew.</td>
<td>1-Sep-10</td>
<td>$1,016,368</td>
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<tr>
<td>11</td>
<td>7-7-6-57</td>
<td>75-148 Honokaa Road</td>
<td>Holiday Inn Express</td>
<td>V-76</td>
<td>1.316</td>
<td>57,005</td>
<td>Deed</td>
<td>30-Apr-10</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>12</td>
<td>7-7-6-438</td>
<td>75-5169 Kapaau Street</td>
<td>The Club</td>
<td>CG-20</td>
<td>1.305</td>
<td>60,243</td>
<td>Gru. Rent Renew.</td>
<td>1-Mar-10</td>
<td>$2,024,767</td>
</tr>
</tbody>
</table>

![Table 2](H:\Mauna Kea\Hallstrom Testimony.docx)

The proposed ground lease clearly represents a "top of the market" rent structure.

**Additional Value Considerations**

Beyond the high ground rents, the sub-lessee will bear exceptional additional costs not typical of the general market.

In the general market, a landowner, as developer of a master planned project, will:
1. Bear the entire expense, timing and risks of obtaining all entitlements.

2. Be responsible for all funding necessary to meet land use conditions, obligations and requirements.

3. Incur the entire costs of design, engineering and infrastructure emplacement.

4. Provide the final purchaser/lessee or intended user with a fully "finished" net building lot (exclusive of roadways, features or open space) that is well-located and readily accessible.

At the subject property, which is essentially a raw building site within a master planned specialized scientific development project, the efforts required of the developer and the end-product provided, fall well-short of general market parameters. Yet, the ground rents to be paid are significantly higher than those found in any Big Island industrial or commercial park offering finished, net building sites.

The proposed TMT ground lease results in:

a. The sublessee, not the master developer, paying for fundamental portions of the entitlement process (specifically preparation of the EIS and consultants throughout).

b. The sublessee, not the master developer, paying for the costs of infrastructure to service the site by committing a minimum of $6.6 million (early 2013 dollar estimate), as well potentially-needed electrical main upgrades.

c. The sublessee bearing all risks and timing impacts of the entitlement process and infrastructure emplacement.
d. Being provided not with a finished urban building site, but a "raw" gross acreage parcel that is unserviced and expensive to develop, operate and maintain land in a harsh remote location.

**The Percentage Rent Issue**

The proposed lease agreement does not call for a percentage rent component. We have evaluated whether some form of percentage rent payments should be included. Our analysis indicates additional percentage (or "overage") rents would be an inappropriate inclusion in the proposed TMT lease.

A limited number of State and DLNR ground leases contain provisions for additional rents above the fixed (or "minimum") amount based on a percentage of gross operating revenues of the lessee or tenants. The additional rents are paid only to the extent they exceed the minimum rent level.

Examples are the new lease for the Waikiki Landing project at Ala Wai Yacht Harbor and the re-opening term at Sea Life Park, where the additional rents are set at 2.0% and 1.5% of gross revenues against the base rent, respectively.

However, these are revenue-producing, market-based, for-profit entities, with a primary goal of creating proceeds above operating costs and consistent positive returns through development of a state-owned holding.

Under such circumstances, within a market environment, the opportunity of the fee owner to share in the cash flow is not an unreasonable expectation in Hawaii real estate; and, this is typically accomplished by coupling at or below market minimum rents with additional percentage overage rents paid once revenues reach a natural "breaker point".

The UH and MKSR are the antithesis of this situation:
1. They are not market-based, for-profit entities.

2. The rents are not intended to produce a positive annual cash flow for the underlying land owners and master lessee/developer. They are an attempt to fund the obligations of MKSR with all proceeds "spent on the mountain".

3. The end-user/sublessee (TMT) does not operate in a market environment and is not pursuing positive returns on their investment. It is an academic environment focused on education and the acquisition of scientific knowledge requiring significant capital expenditures.

4. There are no profits at any stage of the operation for UH at MKSR, and in fact it incurs a substantial yearly "loss" (in the form of a cost against the University budget).

5. The contractual ground rents which TMT will pay will be significantly above the rent levels for property on the Big Island, and it would be appropriate they be lowered considerably if a "base plus percentage rents" formula was emplaced.

   There is no annual gross revenue against which to assess a percentage rent.

**Reduced Rents During Construction**

Reduced ground lease rents during construction are typical for major projects in Hawaii. The proposed TMT agreement calls for ground rents to start at $300,000 annually at the commencement of construction, escalate up to $1,000,000 per year by its completion in Lease Year 10, and reach maximum/stabilized levels in Year 11 and thereafter at $1,080,000 (subject to an annual CPI adjustment).

Although a ten-year construction period is long, due to the size and complexity of the TMT facility, the concept is appropriate in the island's real estate market. The proposed Waikiki
Landing project on state land (referenced foregoing) will have reduced ground rents during its four-year development period. And, we are aware of other new, recent ground leases for developments which provide for no or discounted rents during construction.

We appreciate the opportunity to testify in this regards to this prominent facility.
### Professional Qualifications of James E. Hallstrom, Jr., MAI, CRE

<table>
<thead>
<tr>
<th>Business Affiliation</th>
<th>President</th>
<th>The Hallstrom Group, Inc. Honolulu, Hawaii (1980 - Present)</th>
</tr>
</thead>
</table>

#### National Designations and Memberships
- CRE Designation (1993) - The Counselors of Real Estate
- MAI Designation (1976) - American Institute of Real Estate Appraisers
- SEPA Designation (1975) - Society of Real Estate Appraisers

The American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated in 1991, forming the Appraisal Institute (AI).

#### Education
- M.S. (Real Estate Appraisal and Investment Analysis) 1971, University of Wisconsin at Madison
- B.A. (Economics) 1969, Brigham Young University at Provo
- Numerous specialized real estate studies in connection with qualifying for national professional designations, and uninterrupted Continuing Education.
- Completed Continuing Education requirements with the Appraisal Institute - Current.

#### Professional Involvement
- Past President and Officer of Hawaii AIREA and SREA Chapters
- Past Instructor for Society of Real Estate Appraisers
- Contributing Author to the "Hawaii Real Estate Investor"
- Lecturer at many professional seminars and clinics.
- Appointed numerous times as an Arbitrator and Mediator.

#### Qualified Expert Witness
- Federal and State Courts
- State Land Use and County Hearings
- Arbitration Proceedings

#### State of Hawaii Certification
- Certified General Appraiser
  - License No. CGA-178
  - Exp. Date: December 31, 2015
- Territory of Guam - Non-Resident Real Estate Certified Appraiser,
  - License No. CA-06-035, Exp. Date March 19, 2013

#### Community Service
- Active registered member of the Boy Scouts of America. Former Director of Le Jardin Academy, Advisory Board Member of the School of Business-Brigham Young University-Hawaii Campus, and Director of Hawaii Reserves, Inc.

#### Email Address
- JEH@HallstromGroup.com
June 25, 2014

William J. Aila, Chairperson
and Members of the Board of Land and Natural Resources
PO Box 621
1151 Punchbowl Street
Honolulu, HI 96809-0621

SUBJECT: Consent to Sublease under General Lease No. S-4191 to the University of Hawaii, Lessee, to TMT International Observatory LLC, Sublessee, Kaohe, Hamakua, Island, County and State of Hawaii, TMK (3)4-4-015:009 (por.)

Dear Chairperson Aila and Members of the Land Board:

The University of Hawaii at Hilo ("UH Hilo") respectfully requests the approval and consent of the Board of Land and Natural Resources ("BLNR") to sublease an 8.7 acre portion of the Mauna Kea Science Reserve ("MKSR") to TMT International Observatory, LLC ("TIO") to be used for the construction and operation of the Thirty Meter Telescope ("TMT"). This matter came before BLNR at its June 13, 2014 meeting as Agenda Item D.8. BLNR deferred action on this agenda item to address issues raised by Land Board members following the public testimony portion of the BLNR meeting. This matter will come before BLNR again at its June 27, 2014 meeting. Below are the responses to the issues that BLNR asked UH Hilo to address regarding Agenda Item D.8 at its June 13, 2014 meeting.

1. Explain how the sublease rent schedule proposed for the TIO sublease meets the “substantial sublease rent” requirement of Conservation District Use Permit ("CDUP") HA-5668. In order to comply with the “substantial sublease rents” requirement: (a) should an appraisal be performed by UH Hilo in accordance with Hawaii Revised Statutes ("HRS") § 171-17; and (b) should compensation paid for telescope viewing times at other observatories located elsewhere be considered?

The annual rent established for the TIO sublease by the UH Board of Regents pursuant to and in compliance with Act 132 reflects the pro-rata share of the costs incurred for the management of the
University’s managed lands on Maunakea. It is based on the area used for the TMT and satisfies the Land Board’s requirement in CDUP HA-5668 that the sublease rent for the TMT be "substantial". It is substantial because it is much greater than 1) lease rents paid by other observatories on Maunakea, 2) lease rents paid by other observatories presented in Table 2 below, 3) rents TIO would have paid in Chile and 4) lease rents paid for any other state owned parcel and likely all other parcels on Hawaii island whether conservation, commercial or resort. On this last point please refer to the written testimony of James Hallstrom, Jr., MAI, CRE submitted on June 13, 2014.

1 (a) No, an appraisal is not required. As the Board has previously ruled in its approval of CDUP HA-5668, the requirements of HRS §171-17 do not apply to leases issued pursuant to HRS §171-95 to governmental entities such as the University of Hawaii or to its sublease with TIO. The issue of whether the appraisal requirements of HRS § 171-17 applied to either the lease of the MKSR to the University of Hawaii or the sublease for the TMT project was raised by the opponents in the contested case proceedings for CDUP HA-3568. In its Findings of Fact ("FOF"), Conclusions of Law ("COL"), and Decision and Order dated April 12, 2013 which is also attached as Exhibit 3 to June 13, 2014 staff submittal, the BLNR found that the appraisal requirements of HRS § 171-17 did not apply (COL 238, page 117). The Board went on to find that it may lease state land to governmental agencies pursuant to HRS § 171-95 upon such terms and conditions at it may decide "notwithstanding any limitations to the contrary". The Board noted that the legislature's enactment of Act 132 in 2009 required the University to place "all net rents from leases, licenses, and permits, including fees and charges for the use of land and facilities within the Mauna Kea lands", including the sublease rents established by the UH Board of Regents for the TMT into the Maunakea lands management special fund created by HRS § 304A-2170. As noted in the June 13, 2014 staff submittal, the April 12, 2013 decision of the BLNR was affirmed by the Third Circuit Court in its ruling on May 5, 2014 which is attached as Exhibit 4 to the staff submittal. While opponents have appealed the final judgment entered by the Circuit Court, they have neither applied for nor secured a stay of CDUP HA-3568. The procedures followed by both BLNR in its issuance of CDUP HA-3568 and by the UH Board of Regents in establishing the sublease rent for the TMT were proper, equitable and in conformance with all applicable laws.

1 (b) The University has been asked whether "compensation paid for telescope viewing time" should be a factor in determining rent. The answer is "no" as the organizations operating observatories are either governmental agencies (e.g. NASA, NSF) or not-for-profit corporations (e.g. CFHT, CARA, TIO). They do not receive revenue in excess of expenses, and they do not treat observing time as a commodity to be bought and sold. Observatory organizations are usually partnerships but the goal of such partnerships is not the generation of revenue or profits for its members but scientific collaborations where members share in the high cost of operating the observatories in order to participate in the scientific use of their instruments for research and education. There is a misconception that contributions of funds to these observatory organizations are revenue that generates profits for the observatory organizations or its members. In fact, the funds contributed by participating members for operational costs remain with the observatory organization and are dedicated solely to the maintenance of the facility including periodically upgrading its instruments for changes in technology. The use of telescopes is for educational and scientific purposes only and is not for commercial sale. Each partner contributes a share of the operations and capital funding and that partner’s community of astronomers participates in the use of
the telescope, something which has great scientific and educational value, but no commercial value. Yale University, for example, entered into a scientific collaboration agreement with the California Association for Research in Astronomy (CARA) Board that operates the Keck Observatory. As a scientific collaborator, Yale is assessed a pro-rata share of the operations described above and there is no profit made by CARA.

As a way of demonstrating that the proposed TIO sublease rent is "substantial", a comparison was made of arrangements for land usage at other observatory sites around the world. There is an enormous variety in these arrangements, including annual fees, land purchases, and donation of lands by the government.

The first comparison is the proposed arrangements for Maunakea under the TIO sublease and what was earlier proposed for the TMT site in Chile (see Table 1). For Maunakea, TIO will be paying $1,080,000/year for the use of 8.7 acres, or $124,000/acre. If TMT chose to locate in Chile, it would pay an annual concession fee of $30,000 for the use of 1,531 acres or $19.60/acre. In addition to the land usage fees, TIO has made, or would have made, a commitment to annually fund a community program. In the case of Hawaii, TIO is contributing $1,000,000/year to The Hawaii Island New Knowledge (THINK) fund advancing STEM education for Hawaii Island scholars. If Chile had been selected, TIO would have contributed $600,000 annually to the Fund for Development of Astronomy in Chile. The proposed rent for Maunakea is significantly more substantial than what was agreed in Chile.

Research of other sites reveals that many are owned by the observatory organizations, so the issue of rent does not arise. A good example of this is Cerro Paranal, where the European Southern Observatory (ESO, an international organization) operates four 8-meter telescopes (same size as the Subaru and Gemini telescopes on Maunakea). Paranal was donated to ESO by the Chilean government in order to promote astronomy in Chile. Similarly, Cerro Armazones, the site of ESO's 38.5-meter Extremely Large Telescope, was donated to ESO. The major U.S. astronomy sites in Chile are also owned by the observatory organizations that operate them, as are many on the U.S. mainland.

There are several examples, both in the U.S. and in Chile, where land usage fees are currently being paid. In all cases, fees related to land usage are considerably lower than what TIO will be paying for its site on Maunakea (see Table 2). In many respects, the closest comparable is the Atacama Large Millimeter Array (ALMA) in Chile. The ALMA, which was only commissioned in March 2013, is the world's largest radio telescope facility. This radio telescope array is comprised of 66 forty-foot antennas and was built at a cost of $1.4 billion. The ALMA is located high in the Chilean Andes on a 44,000-acre (68 square mile) site owned by the Chilean government and leased to a consortium of international partners that include the ESO, the National Science Foundation (NSF), the National Radio Astronomy Observatory (NRAO), the Associated Universities, Inc. (AUI) and the National Research Council of Canada. The ALMA partners make the following payments and contributions annually: a $194,000 land concession fee or lease rent ($4.40/acre) to the Chilean government; a $137,000 contribution to a regional fund; and a $368,000 contribution to the development of astronomy in Chile; for a total of $700,000 ($16/acre).
Table 1. Comparison of TMT Sublease fee for Maunakea vs. earlier proposed fee for the TMT site in Chile

<table>
<thead>
<tr>
<th></th>
<th>TMT - Maunakea (Sublease)</th>
<th>TMT - Chile (Prior proposal)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LAND USAGE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Fee</td>
<td>$1,080,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Total Acres</td>
<td>8.7</td>
<td>1,531</td>
</tr>
<tr>
<td>Annual Fee/Acre</td>
<td>$124,138</td>
<td>$19.60</td>
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<tr>
<td><strong>COMMUNITY RELATED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THINK Fund (Hawaii)/year</td>
<td>$1,000,000</td>
<td></td>
</tr>
<tr>
<td>Fund for Development of Astronomy in Chile/year</td>
<td></td>
<td>$600,000</td>
</tr>
</tbody>
</table>

Table 2. Summary of land usage fees for various astronomy sites in the United States and Chile

<table>
<thead>
<tr>
<th>Observatory (Location)</th>
<th>Acres</th>
<th>Land Usage Fee ($/yr)</th>
<th>Use Fee ($/yr/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMT-Maunakea (Hawaii)</td>
<td>8.7</td>
<td>1,080,000</td>
<td>124,138</td>
</tr>
<tr>
<td>TMT-Chile (Prior proposal)</td>
<td>1,531</td>
<td>30,000</td>
<td>19.60</td>
</tr>
<tr>
<td>Atacama Large Millimeter Array (ALMA) (Chile)</td>
<td>44,000</td>
<td>194,000</td>
<td>4.40</td>
</tr>
<tr>
<td>Palomar and Lick observatories (California)</td>
<td>Various</td>
<td>Purchased</td>
<td>0</td>
</tr>
<tr>
<td>European Southern Observatory Extremely Large Telescope (Cerro Armazones – Chile)</td>
<td>Various</td>
<td>Donated by Government</td>
<td>0</td>
</tr>
<tr>
<td>European Southern Observatory Very Large Telescopes, (Cerro Paranal - Chile)</td>
<td>Various</td>
<td>Donated by Government</td>
<td>0</td>
</tr>
<tr>
<td>Cerro Tololo Inter-American Obs. Gemini – South (Chile)</td>
<td>Various</td>
<td>Purchased</td>
<td>0</td>
</tr>
</tbody>
</table>

2. Respond to the June 4, 2014 letter from the Advisory Council on Historic Preservation ("ACHP") asking that the National Science Foundation ("NSF") "apprise us of the current status of this project, including the steps NSF has taken to comply with the requirements of the Section 106 process."

According to written comments of both NSF and ACHP, as well as a plain reading of the Section 106 triggers, the receipt of NSF funds in this case does not trigger NHPA Section 106 consultation for BLNR’s sublease consent.
As a preliminary matter, it is important to note that BLNR’s consent to a sublease does not trigger regulatory compliance review of the National Historic Preservation Act. Even if it did, that matter would jurisdictionally be an issue between two federal agencies. More simply, and as acknowledged by OHA, it is not relevant to BLNR’s consent of a sublease.

Federal agencies undertaking a project that may have an effect on historic properties have a responsibility to provide the Advisory Council on Historic Preservation (“ACHP”) with an opportunity to comment pursuant to Section 106 of the National Historic Preservation Act (“NHPA”). See 36 CFR 800.1(a). The first step in initiating the Section 106 process is an agency’s determination of whether the action constitutes an “undertaking,” which is defined as follows:

a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval.

36 CFR 800.16(y). If the agency establishes an “undertaking,” it must also determine “whether it is a type of activity that has the potential to cause effects on historic properties.” 36 CFR 800.3(a) (emphasis added). “Effect” is defined as “alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register.” 26 CFR 800.16(i). Accordingly, not just any provision of federal funds for a project will necessarily trigger Section 106 consultation. Instead, the provision of funds itself must potentially cause an “effect” on an historic property. Without a rational nexus between funding and potential for effect, the section 106 process ends. See 36 CFR 800.3(a)(1). If there is potential for effect, the ACHP regulations in 36 CFR 800.3 prescribe other steps the agency must take to initiate the process.

In this case, there are two National Science Foundation (“NSF”) funding components to be addressed: (1) Cooperative Agreement AST 1241529 (March 15, 2013); and (2) the Association of Universities for Research in Astronomy, Inc. (“AURA”) NSF Award 0443999 and sub-award (March 2006). Neither of these NSF fund awards trigger Section 106 consultation. Neither of the awards were for any construction activities at the MKSR. Instead, as set forth in more detail below, both of these NSF awards were limited to planning for a partnership model and/or potential telescope instruments, without regard to location and without any commitments to potentially fund construction. In other words, the funds were awarded completely separate and without regard to the TMT Observatory site, but were solely related to planning the next generation telescopes that the scientific community had identified as priorities.

Cooperative Agreement AST 1241529
The funds provided by NSF on March 15, 2013 under Cooperative Agreement AST 1241529 do not trigger Section 106 consultation. Under this Cooperative Agreement, NSF will be providing funds for TMT to use in developing a “Partnership Model for a Giant Segmented Mirror Telescope” which NSF will review and consider. This does not involve the TMT project activities at the site of the proposed TMT Observatory. In fact, the Cooperative Agreement specifically prohibits the use of the funds “for pre-
construction design and development, construction, operations, or to support reviews such as Cost, Readiness, Conceptual-, Preliminary-, Final-Design.” Instead, the funds may only be used for limited planning purposes for developing a partnership model for a giant segmented mirror telescope, with no relation to activities at the MKSR. Importantly, the Cooperative Agreement expressly states that it does not obligate NSF to provide any funding related to the pre-construction, construction, or operation of the TMT Observatory.

Caroline Blanco, NSF’s Assistant General Counsel has confirmed in writing NSF’s position that the Cooperative Agreement does not involve TMT project activities in Hawaii and does not create an “undertaking” that would require consultation under Section 106. She has also confirmed that should NSF consider funding the TMT Observatory activities at any future point, NSF would then determine the level of environmental compliance necessary, including Section 106 consultation. Attached is a copy of NSF’s official position on the matter.

Please note that NSF’s position on the matter was previously communicated to the State of Hawaii Historic Preservation Division (“SHPD”). On April 14, 2014, SHPD inquired about the NSF funds and asked about the Section 106 process. A copy of this letter is attached hereto. On May 19, 2014, a response to SHPD’s question was provided, along with a copy of Ms. Blanco’s position:

[I]t is our understanding that the Historic Preservation Officer for NSF has already directly advised your staff of the agency’s determination that the Cooperative Agreement does not create an undertaking requiring consultation pursuant to Section 106....

While I previously explained to your staff that the NSF grant was limited to planning partnership models for a giant telescope and has no association with either the TMT Project activities or the MKSR site, I forwarded your concerns to NSF’s Assistant General Counsel, Caroline Blanco, who also serves as NSF’s Federal Historic Preservation Officer. Ms. Blanco sent your office an email on NSF’s position including an explanation of its determination that CA AST-1251529 is not an “undertaking” as defined by the National Historic Preservation Act requiring Section 106 consultation. Please find attached a copy of the email message sent by NSF’s Federal Historic Preservation Officer on April 29, 2014 to your staff archeologist, Mr. Sean Naleimalie, in SHPD’s Hilo office.

A copy of the foregoing response, which was intended to address the issue prior to BLNR’s June 13, 2014 meeting, is also attached hereto. ACHP also confirmed by letter dated June 25, 2014 to NSF that the Cooperative Agreement did not trigger Section 106 consultation, as is further explained below. The ACHP letter is attached.

NSF Award 0443999 to AURA
This award for the advancement of the technology and design of a thirty meter telescope was granted in March 2006, three years before the TMT concluded its site selection process and when it was unclear where the next generation of telescopes would be located.

On June 4, 2014, after ACHP had received several complaints, ACHP sent a letter to NSF inquiring about the Cooperative Agreement addressed above, as well as NSF Award 0443999.

A number of Native Hawaiian Organizations (NHO) have expressed concerns that NSF is providing a grant to help fund the undertaking but has not complied with Section 106 or consulted with NHOs who have concerns about the effects of the project on historic properties of great significance to them. We have no record of notifications about this undertaking or determinations of adverse effects to historic properties. We would appreciate you apprising us of the current status of the project, including steps the NSF has taken to comply with the requirements of the Section 106 process.

As set forth above, this June 4, 2014 letter from ACHP did not state that Section 106 consultation was required, but rather asked for an appraisal of the current situation.

Since the June 4, 2014 letter, ACHP has been fully apprised of the issues, and has now agreed with NSF’s determination that its prior funding is not an undertaking and no further review under Section 106 is necessary.

3. Does the prohibition on options to renew leases contained in HRS § 171-36 prevent UH Hilo from entering into this proposed sublease with TIO?

No, the prohibition on options to renew leases contained in HRS § 171-36 does not prevent UH Hilo from entering into this proposed sublease with TIO.

HRS § 171-36 provides in relevant part (emphasis added):

(a) Except as otherwise provided, the following restrictions shall apply to all leases:

   (1) Options for renewal of terms are prohibited; . . .

HRS § 171-36(a)(1) applies to all leases and not to subleases. In this case, the lease in question is General Lease No. S-4191 dated June 21, 1968 between the State of Hawaii, by BLNR, and the University of Hawaii ("Master Lease"). Accordingly, HRS § 171-36(a)(1) applies to the Master Lease, but does not apply to the proposed sublease. The term of the Master Lease is 65 years, commencing on June 21, 1968 and ending on December 31, 2033. The Master Lease does not contain any option or mechanism to renew or extend the term of the lease. The only way for the University of Hawaii to continue to lease the area covered by the Master Lease would be for the State of Hawaii and the University of Hawaii to enter into a new lease.
The term of the proposed sublease is scheduled to end on December 31, 2033. Sections 9.a., 9.b., and 9.c. of the proposed sublease provide for the term of the proposed sublease to be extended in certain circumstances, which include if the State of Hawaii and the University of Hawaii enter into a new lease. These Sections for possible extension of the sublease term are permissible since HRS 171-36(a)(1) does not apply to the proposed sublease. If the sublease term is extended, these Sections provide that in no event would the total sublease term exceed 65 years. The term of the Master Lease is not at all affected by these or any other Sections in the proposed sublease.

Finally, it is worth clarifying that though the proposed sublease in Section 9.a.(2)ii provides for a new master lease to be treated as if it were the Master Lease for purposes of the proposed sublease, this does not mean that the term of the Master Lease is being extended by the proposed sublease. Rather, this provision is for the convenience of the parties, so that it is not necessary to re-execute a sublease that refers to specifically to the new lease rather than the current Master Lease. However, in Section 9.a.(4), UH Hilo agrees to execute such an amendment if requested by TIO. We would also note that the proposed sublease by its terms is subject in all respects to the terms and conditions of the Master Lease, and to the terms and conditions of a new master lease if one is issued to the University in the future.

Thank you for your detailed review and consideration of this matter. We look forward to working with your Land Division and the BLNR to process the subject request. Please feel free to contact me at 808-932-7348 or by email at dstraney@hawaii.edu if you have any questions or require additional information.

Sincerely,

Donald O. Straney, Chancellor
University of Hawai‘i at Hilo

Attachments
cc: Dr. David Lassner, President, University of Hawai‘i
    Mr. John C. Holzman, Chair, UH Board of Regents
    Dr. Henry T. Yang, Chairman, TMT International Observatory LLC
April 14, 2014

Yen Wen Fang
Engineering Partners
455 E. Lanikaula Street
Hilo, HI 96720

LOG NO: 2014.01449
LOG NO: 2014.01450
DOC NO: 144SN08

Archaeology

SUBJECT: Chapter 6E-8 Historic Preservation Review—
County of Hawai‘i Grading Permit and Stockpiling Permit for TMT
Ka‘ohe, Hāmākua District, Island of Hawai‘i

Thank you for the opportunity to review the grading and stockpiling permit applications for the proposed project area that were received in our office on March 11, 2014. According to the application, 6.9 acres of the 11,216-acre parcel will be graded to facilitate the construction of the Thirty Meter Telescope. The project will take place within land owned by the State of Hawaii, which triggers historic preservation review pursuant to HRS 6E-8.

New information has indicated that the proposed project will be receiving federal funds in the form of a 2013 National Science Foundation award to TMT for planning later in the construction period. The State Historic Preservation Division was not consulted by the federal agency or the applicant about the nature of this project as an undertaking and its potential to cause effects on historic properties [36 CFR PART 800.3]. In addition, there was no consultation between the federal agency and “Native Hawaiian Organizations that might attach religious and cultural significance to historic properties in the area of potential effects [§ 800.3(f)(2)].” There were no efforts taken by the federal agency to identify historic properties in this area of potential effect pursuant to § 800.4 and, finally, there was no request for SHPO concurrence on a determination of effect for this undertaking as presented by the federal agency pursuant to § 800.5(c). SHPD believes that a reasonable and good faith effort needs to be initiated and that the appropriate parties conduct a comprehensive Section 106 review for this undertaking prior to the commencement of project activities.

Our records indicate that a number of archaeological “find-spots” have been identified in close proximity to the proposed project area (2005.06, 2005.07, and 2005.08, McCoy 2011). The significance and function of these “find-spots” have yet to be determined. In addition, the archaeological inventory survey (AIS) that was completed for the Mauna Kea Science Reserve calls for the development of “a policy for the construction of new Hawaiian cultural features and the long-term management of these features”. There has been little to no consultation on the potential significance of these features to Native Hawaiians. A policy to manage the “find spots” has not occurred in consultation with Kahu Kū Mauna and other interested parties. These “find-spots” will potentially be impacted by the proposed project; additional information and consultation is therefore necessary prior to approving the proposed permit. Notably absent on your plans is the location of SIHP Site 50-10-23-21449 (stacked boulders and stones on a gelifluction terrace) in relationship to the proposed project area. Please include this site on your plans.

Please contact Sean Nāleimaile at (808) 933-7651 if you have any questions or concerns regarding this letter.

Aloha,

Theresa K. Donham
Archaeology Branch Chief
FYI – Given the time difference, I decided to send an email to Sean Naleimaile rather than try to connect by phone. I will let you know if there is a response to my email.

Best,

Caroline

CAROLINE M. BLANCO

From: Blanco, Caroline M [mailto:cblanco@nsf.gov]
Sent: Tuesday, April 29, 2014 1:27 PM
To: 'Sean.P.Naleimaile@hawaii.gov'
Subject: NSF Cooperative Agreement AST 1241529

Greetings – In light of some recent correspondence that has come to my attention, I would like to clarify some apparent confusion regarding the role of the National Science Foundation (NSF) with regard to Cooperative Agreement AST1241529. On March 15, 2013, NSF issued a 5-year award and entered into a cooperative agreement (AST 1241529) with Thirty Meter Telescope (TMT) Observatory Corporation for “Planning a Partnership Model for a Giant Segmented Mirror Telescope.” NSF’s engagement with TMT through this Cooperative Agreement is strictly limited to providing funds solely for planning activities. The primary deliverable of this award is the development of a partnership model for NSF to review and consider. NSF does not have any involvement with TMT Project activities at or associated with the site of the proposed telescope in Hawaii as a result of this Cooperative Agreement. Moreover, the Cooperative Agreement expressly prohibits the use of award funds “for pre-construction design and development, construction, operations, or to support reviews such as Cost, Readiness, Conceptual-, Preliminary-, Final-Design.” Likewise, there is no other arrangement outside of this Cooperative Agreement that provides for any involvement with TMT Project activities at or associated with the site of the proposed telescope.

Importantly, the language of the Cooperative Agreement expressly states that this Cooperative Agreement shall have no bearing on future commitments of NSF: “[this Cooperative Agreement] does not obligate the NSF to future funding for the preconstruction, construction, or operations phases of the TMT Observatory.” Further, NSF made clear in the Cooperative Agreement that any future “involvement of NSF with the TMT Project subsequent to this CA [Cooperative Agreement] depends on the outcome of this planning award, among other factors.” Accordingly, if NSF were to consider, at some point in the future, becoming involved with the TMT Project, NSF would determine, among other things, what level of environmental compliance, including compliance with Section 106 of the National Historic Preservation Act, would be appropriate before making a decision regarding whether or not to become involved with the TMT Project. At this stage, however, the only activity that is being funded by NSF with regard to the TMT Project is planning and, thus, it is NSF’s position that the Cooperative Agreement does not create an undertaking that would require further consultation under Section 106 of the National Historic Preservation Act.

I hope that this clarifies NSF’s position on this issue. If you would like to discuss this further or would like additional information, please do not hesitate to contact me directly.

Many thanks and best regards,

Caroline M. Blanco
May 19, 2014

Ms. Theresa K. Donham
Archaeology Branch Chief
State Historic Preservation Division
601 Kamokila Boulevard, Suite 555
Kapolei, Hawaii 96802

Re: Comments of SHPD on Applications for Grading and Stockpiling Permits for Thirty Meter Telescope (TMT) Project, Mauna Kea Science Reserve, Ka’ohe, Hāmākua District, Island and County of Hawaii
TMK: (3) 4-4-05:009
Doc No: 144SN08

Dear Ms. Donham:

Our office has been asked to respond to comments of the Archaeology Branch of SHPD on the above-referenced applications as set out in your letter dated April 14, 2014. Your letter raised two questions regarding the request for grading and stockpiling permits from the County of Hawaii for the Thirty Meter Telescope ("TMT") Project within the Mauna Kea Science Reserve ("MKSR"): (1) whether the National Science Foundation’s ("NSF") funding for "Planning a Partnership Model for a Giant Segmented Mirror Telescope" pursuant to Cooperative Agreement AST-1241529 triggers NHPA Section 106 consultation, and (2) whether the Kahu Kū Mauna Council has been consulted on the significance and treatment of "find spots" impacted by the TMT Project.

As to the first, it is our understanding that the Historic Preservation Officer for NSF has already directly advised your staff of the agency’s determination that the Cooperative Agreement does not create an undertaking requiring consultation pursuant to Section 106. As further described below, the Kahu Kū Mauna Council has been consulted on its policies regarding "find stops" within the MKSR and the treatment of the sole find spot (2005.08) impacted by the TMT Project.
While I previously explained to your staff that the NSF grant was limited to planning partnership models for a giant telescope and has no association with either TMT Project activities or the MKSR site, I forwarded your concerns to NSF's Assistant General Counsel, Caroline Blanco, who also serves as NSF's Federal Historic Preservation Officer. Ms. Blanco sent your office an email on NSF's position including an explanation of its determination that CA AST-1251529 is not an "undertaking" as defined by the National Historic Preservation Act requiring Section 106 consultation. Please find attached a copy of the email message sent by NSF's Federal Historic Preservation Officer on April 29, 2014 to your staff archaeologist, Mr. Sean Naleimalie, in SHPD's Hilo office.

As to the second, the Kahu Kū Mauna Council met on May 12, 2014 to consider the significance and treatment of any "find spots" impacted by the TMT Project pursuant to the Council's policies on construction of new cultural features. A discussion with Mr. Naleimaile and Stephanie Nagata, Director of the Office Maunakea Management determined that only one (FS 2005.08) of the three find spots identified in your April 14, 2014 letter will be impacted by the TMT Project. The other two find spots are not close to the Project site and will not be impacted by any Project activities. FS 2005.08 was first observed during the 2005 inventory survey of the astronomy precinct and was not observed during an earlier survey of this same area in 1982. According to the AIS report, FS 2005.08 is not an historic property but a modern structure consisting of two single uprights.

Following a review of this matter during its May 12, 2014 meeting, members of the Kahu Kū Mauna Council reaffirmed its policy to support DLNR's conservation district regulations (HAR § 13-209-4) prohibiting the erection on any structures that remain more than 30 days without a permit. As described in the attached letter dated May 14, 2014, the Kahu Kū Mauna Council has determined that there is no responsibility to maintain this find spot as no permit has been issued for its erection. Relocating the site or data recovery should not be required as mitigation since the find spot is not an historic property under HRS Chapter 6E.

You have also requested that Site 21449 be located on the grading plans for the permit application. Controlled subsurface testing of the Site 21449 in consultation with SHPD subsequent to the submission of the AIS report found no evidence of historic origin. It was determined to be the result of natural processes and not man-made.

We believe that this resolves all of the issues raised in your April 14, 2014 letter to Engineering Partners. We understand that your comments on the permit applications for the TMT Project have been adequately addressed.
Very Truly Yours,
WATANABE ING LLP

By
J. Douglas Ing

Enclosures
cc: Engineering Partners (attn: Mr. Yen Wen Fang)
Office of Mauna Kea Management (attn: Ms. Stephanie Nagata, Director)
DLNR - State Historic Preservation Division (attn: Mr. Alan S. Downer, Administrator)
National Science Foundation (attn: Ms. Caroline M. Blanco, Asst. Gen. Counsel - Environment)
County of Hawaii, Department of Public Works (attn: Engineering Division)
FYI – Given the time difference, I decided to send an email to Sean Naleimaile rather than try to connect by phone. I will let you know if there is a response to my email.

Best,

Caroline

CAROLINE M. BLANCO

Greetings – In light of some recent correspondence that has come to my attention, I would like to clarify some apparent confusion regarding the role of the National Science Foundation (NSF) with regard to Cooperative Agreement AST1241529. On March 15, 2013, NSF issued a 5-year award and entered into a cooperative agreement (AST 1241529) with Thirty Meter Telescope (TMT) Observatory Corporation for “Planning a Partnership Model for a Giant Segmented Mirror Telescope.” NSF’s engagement with TMT through this Cooperative Agreement is strictly limited to providing funds solely for planning activities. The primary deliverable of this award is the development of a partnership model for NSF to review and consider. NSF does not have any involvement with TMT Project activities at or associated with the site of the proposed telescope in Hawaii as a result of this Cooperative Agreement. Moreover, the Cooperative Agreement expressly prohibits the use of award funds “for pre-construction design and development, construction, operations, or to support reviews such as Cost, Readiness, Conceptual-, Preliminary-, Final-Design.” Likewise, there is no other arrangement outside of this Cooperative Agreement that provides for any involvement with TMT Project activities at or associated with the site of the proposed telescope.

Importantly, the language of the Cooperative Agreement expressly states that this Cooperative Agreement shall have no bearing on future commitments of NSF: “[this Cooperative Agreement] does not obligate the NSF to future funding for the preconstruction, construction, or operations phases of the TMT Observatory.” Further, NSF made clear in the Cooperative Agreement that any future “involvement of NSF with the TMT Project subsequent to this CA [Cooperative Agreement] depends on the outcome of this planning award, among other factors.” Accordingly, if NSF were to consider, at some point in the future, becoming involved with the TMT Project, NSF would determine, among other things, what level of environmental compliance, including compliance with Section 106 of the National Historic Preservation Act, would be appropriate before making a decision regarding whether or not to become involved with the TMT Project. At this stage, however, the only activity that is being funded by NSF with regard to the TMT Project is planning and, thus, it is NSF’s position that the Cooperative Agreement does not create an undertaking that would require further consultation under Section 106 of the National Historic Preservation Act.

I hope that this clarifies NSF’s position on this issue. If you would like to discuss this further or would like additional information, please do not hesitate to contact me directly.

Many thanks and best regards,

Caroline M. Blanco

CAROLINE M. BLANCO
ASSISTANT GENERAL COUNSEL
NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD, SUITE 1265
ARLINGTON, VA 22230
703.292.4592 (TELEPHONE)
703.292.9041 (FAX)
CBLANCO@NSF.GOV (E-MAIL)
May 14, 2014

Mr. Yen Wen Fang
Engineering Partners
455 E. Lani'kaua Street
Hilo, Hawai'i 96720

Subject: Kahu Kū Mauna Consultation on Disposition of Find Spot 2005.08

Dear Mr. Fang:

At its regular monthly meeting on May 12, 2014, the Kahu Kū Mauna Council considered the significance and treatment of the find spots identified in the State Historic Preservation Division's (SHPD) April 14, 2014 letter to you. The Council determined that “find spot” 2005.08 listed in that letter would be impacted by construction activities for the Thirty Meter Telescope (TMT) as shown on the attached plan. The result of a separate discussion with SHPD was a determination that the other two find spots (2005.06 and 2005.07) are too far away and will not be impacted by TMT construction.

FS 2005.08 was first identified during the Archaeological Inventory Survey (AIS) for the Astronomy Precinct in 2005. This feature, consisting of two single upright stones was not seen during surveys of this same area during the early 1980's. Although it is not considered an historic property, this modern feature was also described in the EIS for the TMT project which provided for consultation with Kahu Kū Mauna on the appropriate treatment and disposition of this modern feature, in particular as it relates to management action CR-9 of the Comprehensive Management Plan for the University’s managed lands on Maunakea.

The Council felt strongly the need to maintain the integrity of the mountain and reaffirmed its current position to support and follow DLNR's regulatory condition for treating land uses. Specifically HAR §13-209-4 the erection of structures for longer than thirty (30) days within the State Conservation District requires a DLNR permit.

While the CMP calls for developing a policy (CR-9) for the culturally appropriateness of building ahu or the stacking of rock, the Council determined that CR-9 did not apply to FS 2005.08 as the uprights were not considered a stack of rocks. Kahu Kū Mauna believed that CR-7 applies instead, in which case the Council’s policy is that the construction of new cultural features requires a permit pursuant to DLNR Conservation District Rules. In addition, any non-historic cultural feature requires the party who erected it to maintain the site.
The Council is also aware of the provisions of HRS 6E which governs historic preservation. Modern sites are not historic properties and, therefore, the University and the land owner are not obligated to maintain, relocate or data recover FS 2005.08 as there has been no permit issued by DLNR allowing the feature to remain.

On behalf of Kahu Kū Mauna Council, thank you for the opportunity to consult and comment on this matter.

Sincerely,

Stephanie Nagata
Director

Attachment

c: Historic Preservation Division
June 25, 2014

Caroline M. Blanco
Assistant General Counsel
National Science Foundation
4201 Wilson Boulevard, Suite 1265
Arlington, VA 22230

Ref: NSF Cooperative Agreement with Thirty Meter Telescope (TMT)
NSF Award 0443999
Mauna Kea, Hawaii

Dear Ms. Blanco:

The Advisory Council on Historic Preservation (ACHP) has received your response to our letter of June 4, 2014, regarding the National Science Foundation’s (NSF’s) funding of a cooperative agreement (NSF Award 0443999) with the Thirty-Meter Telescope (TMT) Project and its compliance with Section 106 of the National Historic Preservation Act (NHPA) [16 U.S.C. § 470f] and its implementing regulations, “Protection of Historic Properties” (36 C.F.R. Part 800 (2004)). NSF has concluded, based on 36 C.F.R. § 800.3(a), that the activities supported by this cooperative agreement are not activities that have the potential to cause effects on historic properties. As such, NSF has concluded that it has no further review obligations under Section 106. Further, it is NSF’s conclusion that the NSF funding of this Cooperative Agreement does not convert the TMT Project into an undertaking for the purposes of Section 106. The ACHP does not find NSF’s conclusions to be unreasonable in this instance for the reasons outlined in this letter.

According to the information you provided, the activities being funded are limited to governance planning focused on development of a partnership model for the TMT Observatory. The partnership model will include: a US astronomy community science plan, an integrated science and education plan, proposals for US groups to collaborate in TMT science instruments, a US operations plan, and a US TMT data management plan. The partnership model will be focused on the TMT, but is intended to serve as a model for other similar projects at other locations in the future. You have clarified that the funding made available by NSF is not for construction or planning related to construction. You also note that there is express language in the Cooperative Agreement stating that the use of award funds "for pre-construction design and development operations, or to support reviews such as Cost, Readiness, or Conceptual-, Preliminary-, Final-Design" is prohibited.

As we understand, NSF may consider joining the TMT partnership in the future, and may consider future requests for assistance related to the construction of the facility. However, you acknowledge the language in the Cooperative Agreement which expressly states that the Cooperative Agreement shall have no bearing on future commitments of NSF and that the Cooperative Agreement “does not obligate the NSF to future funding for the preconstruction, construction, or operations phases of the TMT Observatory.”
Based on the information you have provided, the ACHP does not find NSF’s position on this undertaking to be unreasonable since the federal assistance it is providing does not make the larger TMT project an activity subject to review under Section 106. Nevertheless, there does appear to be some expectation that NSF may, in the future, receive and approve applications for support related to construction of the facility. We therefore recommend that NSF consider consulting with the project proponents early on so that any required Section 106 review related to the construction and operation of the TMT facility on Mauna Kea can be carried out when a full range of alternatives are still available for review. In addition, NSF should take measures to avoid the potential for the applicant to trigger Section 110(k) of the NHPA (16 U.S.C. § 470h-2(k)) by initiating any type of construction activities that may result in adverse effects to historic properties with the intention of requesting federal assistance or authorization at subsequent stages of project implementation. As you know, Section 110(k) prohibits a federal agency from granting a loan, loan guarantee, permit, license, or other assistance to an applicant who, with intent to avoid Section 106 of the NHPA, has intentionally significantly adversely affected an historic property to which the grant would relate, or having legal power to prevent it, has allowed such significant adverse effect to occur. Since the NSF is uniquely situated to monitor the ongoing activities related to the TMT Project, we urge you to inform the TMT Partnership that its actions should avoid compromising NSF’s and other federal agencies’ ability to meet the intent and spirit of Section 106.

In closing, pursuant to 36 C.F.R. § 800.3(a), the federal agency is responsible for making the determination of whether a federal action relates to an undertaking that has the potential to cause effects to historic properties and is thus subject to Section 106 review. We see no basis for objecting to NSF’s conclusion, but think that it would be prudent to involve the TMT Partnership in discussions related to historic preservation at this time. The ACHP has provided these advisory comments regarding NSF’s determination in accordance with 36 CFR § 800.2(b)(2). Should you have any questions or wish to discuss this matter further, please contact John T. Eddins, PhD, at 202-517-0211, or by e-mail at jeddins@achp.gov.

Sincerely,

Charlene Dwin Vaughn, AICP
Assistant Director
Federal Permitting, Licensing, and Assistance Section
Office of Federal Agency Programs
MINUTES FOR THE
MEETING OF THE
BOARD OF LAND OF NATURAL RESOURCES

DATE: FRIDAY, JUNE 27, 2014
TIME: 9:00 A.M.
PLACE: KALANIMOKU BUILDING
LAND BOARD CONFERENCE ROOM 132
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

Chairperson William Aila called the meeting of the Board of Land and Natural Resources to order at 9:02 a.m. The following were in attendance:

MEMBERS
William J. Aila, Jr.
Reed Kishinami
Thomas Oi

Robert Pacheco
James Gomes
Wesley Furtado

STAFF
Julie China-Deputy AG
Kevin Moore-LAND
Maria Carnavale-PMNM

Sam Lemmo-OCCL
Alan Downer-SHPD
Dickey Lee-ENG

OTHER
Ross Smith/ DOT-AIR
Rocky Kaluhiwa/ K-3
Brenda Asuncion/ K-3
Peter Hamasaki/ D-18
Mark Roy/ D-11
Noboru Oishi/ D-4
Chancellor Don Straney/ D-19
Sterling Wong/ D-19
Kealoha Pisciotta/ D-19
Jim Hayes/ D-19
Pono Kealoha/ D-19
Kaanohi Kaleikini/ D-19
Maoni/ D-19
Tim Lui-Kwan/D-19
Kapuakeli‘ikoa Kamai/D-19
Beverley Amaral/ D-2
HECO Rep/ D-15

Luka Mossman/ K-3
Jerry Kaluhiwa/ K-3
Dan Purcell/K-3,D-10,D-4,D-19,K-2
Paul Mancini/ D-10
Jeri Oishi/ D-4
David Kopper/ D-5
E. Kalani Flores/ D-19
Deborah J. Ward/ D-19
Dianne K. Hoapili/ D-19
Kimmer Bighorse/ D-19
Amelia Gora/ D-19
Shelly Muneoka/ D-19
Candice Fujikane/ D-19
Laulani Teale/ D-19
Stephanie Nagata/ D-19
Kelly Gleason/ F-1
Chair Aila acknowledged and commended Member Pacheco for his service as the Hawaii Island Board Member. Chair also acknowledged Wesley Furtado as the newest Land Board Member.

Item A-2 Approval of April 25, 2014 Minutes

Unanimously approved as submitted (Pacheco, Kishinami)

Item M-1 Amendment No. 3 to Concession Agreement No. DOT-A-09-0002, to Extend Lease Term Under Provisions of Act 46, DFS Group, L.P., Retail Concession, Honolulu International Airport Tax Map Key (1) 1-1-003: Portion of 1.

Item M-2 Issuance of a Revocable Permit, Hawai’i Island Air, Inc. DBA Island Air, For the Purposes of Passenger Check-In Counters and Office Space for Airline Operations, Honolulu International Airport, Tax Map Key: (1) 1-1-003: Portion of 208.

Item M-3 Issuance of a Revocable Permit for Aircraft Parking, Cardinal Partners, LLC, Honolulu International Airport, Tax Map Key: (1) 1-1-076: Portion of 23.

Item M-4 Issuance of a Revocable Permit for Commercial Helicopter Operations, Alexair, Inc., Kahului Airport, Tax Map Key: (2) 3-8-001: Portion of 19.

Item M-5 Issuance of a Revocable Permit for Commercial Helicopter Operations, Aris, Inc., Kahului Airport, Tax Map Key: (2) 3-8-001: Portion of 19.

Item M-6 Issuance of a Revocable Permit for Office Space, DAL Global Services, LLC, Kahului Airport, Tax Map Key: (2) 3-8-001: Portion of 19.

Item M-7 Issuance of a Revocable Permit for Aircraft Parking, Guardian Flight, Inc., Moloka‘i Airport, Tax Map Key: (2) 5-2-004: Portion of 8.

Item M-8 Issuance of a Revocable Permit for Storage Space, U.S. General Services Administration for Transportation Security Administration, Hilo International Airport, Tax Map Key: (3) 2-1-012: Portion of 90.

Item M-9 Issuance of a Revocable Permit for Office Space, US General Services Administration/TSA, Lihu‘e Airport, Tax Map Key: (4) 3-5-001: Portion of 135.

Ross Smith representing the Department of Transportation Airports Division (DOT-AIR) went through items M-1 through M-9 and had no changes.
Member Gomes asked what the form was to find out how much their lease would be from the state. Smith explained in this case DOT is negotiating it based upon the revenues that are anticipated to generate.

**Unanimously approved as submitted (Pacheco, Gomes)**

**Item K-3 Conservation District Use Application (CDUA) ST-3703 for a Statewide Programmatic General Permit and Programmatic Agreement for the repair, restoration, maintenance, and operation of traditional fishpond systems in Hawai‘i by the Department of Land and Natural Resources, Office of Conservation and Coastal Lands.**

*Written testimony was submitted by Grayson “Buddy” Keala, Kevin K.J. Chang, Leimana DaMate, and John N. Kittinger, Ph.D.*

Sam Lemmo, Administrator for the Office of Conservation and Coastal Lands (OCCL) presented item K-3. Its item supports a statewide programmatic general permit and programmatic agreement for the repair, restoration, maintenance and operation of traditional fishpond systems in Hawaii. OCCL is the applicant and will affect all traditional Hawaiian fishponds in the state of Hawaii that occur within the conservation district. The intent would be to provide cultural practitioners with a single application and permit processed by OCCL which encompasses about 5 different permits. This does not address the leasing issue, only the regulatory process. Lemmo gave detailed background on the structure and process.

Member Pacheco asked if these projects would be eligible for direct leases. Lemmo responded that if they are a 501-C3 then they qualify.

Member Gomes asked what would happen if someone had to go through private property to get to the fishpond. Lemmo explained that if the fishpond is owned by the owner, then there would need to be an agreement with the private land owner. If the pond is public, then you would have to have an agreement. They are making this process as friendly as possible, while maintaining the responsibilities to protect the cultural and environmental resources of the state. Lemmo added that OCCL has been working on this application for almost a year.

Member Furtado asked how many fishponds the department was willing to restore under state jurisdiction. Lemmo said there are about 400 fishponds under the state, and feel like this program will create incentive for practitioners who haven’t shown an interest in this, to maybe show an interest in this. OCCL hopes to see about 20 projects in the next year.

Luka Mossman, Fisheries Outreach Coordinator for Conservation International testified in support, as this will ease the burdens of the fishpond practitioners.

Rocky Kaluhiwa po’o for the Island of Oahu testified on behalf of the Aha Moku Advisory Committee (AMAC) in support. Kaluhiwa read testimony submitted by Leimana DaMate, Executive Director for AMAC.
Jerry Kaluhiwa, Rocky’s husband and cultural practitioner advised the Board to pick practitioners that are qualified and selected by the kupuna.

Member Gomes asked about where the monies from the fishponds would go. R. Kaluhiwa explained that the money from the fish sold goes back into that fishpond.

Brenda Asuncion with Kua’aina Ulu Auamo affirmed that they are committed to supporting practitioners along with this effort. Asuncion stood by the written testimony that was submitted.

Dan Purcell asked who would consume this fish and if any would be sold. Chair Aila explained that there are existing commercial fishponds, what is done with the fish is up to the land owner/applicant, it needs to be spelled out in the application.

Member Gomes commended Lemmo and staff for their work in this application and supports this projects. Member Pacheco seconded, he also supports.

Unanimously approved as submitted (Gomes, Pacheco)

Item D-12 Status of the Lawsuit filed by Plaintiffs Malama Kahakai and Dana Naone Hall v. 3900 WA Associates, LLC, dba The Four Seasons Resort Maui at Wailea, The Board of Land and Natural Resources, State of Hawai‘i, et al., Civil No. 13-1-0219(2) filed in the Circuit Court of the Second Circuit, State of Hawai‘i (Maui County).

The Board may hold a discussion in Executive Session pursuant to Section 92-5(a)(4), Hawai‘i Revised Statutes, in order to consult with its attorney on questions and issues pertaining to the Board’s powers, duties, privileges, immunities and liabilities.

Kevin Moore representing Land Division (LAND) reviewed the item explaining that this was just to report the status of the lawsuit. Deputy Attorney General Donna Kalama was present.

Member Gomes made a motion to go into Executive Session pursuant to Section 92-5(a)(4), Hawai‘i Revised Statutes, in order to consult with its attorney on questions and issues pertaining to the Board’s powers, duties, privileges, immunities and liabilities. Member Pacheco seconded.

Non-action item/ Non decision making.

9:48AM EXECUTIVE SESSION
10:11AM RECONVENE

Feedlot site at Campbell Industrial Park, Honouliuli, ‘Ewa, O‘ahu, Hawai‘i, Tax Map Key: (1) 9-1-031:001. The purpose of the amendment is to extend the benchmark deadline for compliance with Hawai‘i Revised Statutes Chapter 343, Environmental Assessments that is set forth in the Amended and Restated Development Agreement.

Moore presented item D-18 explaining that as of the meeting of April 11, 2014 the department worked with the AGs to get the development agreement drafted and signed, in the process of circulating that, the developer requested additional time to complete the environmental assessment and instead of the fixed date (August 1, 2014), to change that to after the effective date of the development agreement. Land Division has no objection to that especially since the developer made a payment.

Peter Hamasaki representing McCorriston et al. testified that he was in support.

Unanimously approved as submitted (Gomes, Kishinami)

Item D-10 Grant of 55-Year Term, Non-Exclusive Easement to Matthew H. and Shawnee M. Schweitzer for Seawall and Stairway Encroachment Purposes; After-the-Fact Authorization to Issue Immediate Right-of-Entry Permit for Emergency Seawall Work; Authorize Issuance of Right-of-Entry Permit to Repair Seawall, ‘Alaeola, Lāhainā, Maui, Tax Map Key: (2) 4-3-015: Seaward of 001.

Written testimony was submitted by Paul R. Webber, PE.

Moore briefed the Board on item D-10 and explained that staff’s recommendation is to grant the easement and approve the after-the-fact emergency right of entry and issue a right of entry to allow construction to go forward.

Paul Mancini, representing the Schweitzer family, thanked the Board and staff for the emergency permit.

Member Gomes said he went to site and saw the emergency repairs, and was curious as to how they were going to cure those repairs.

Mancini handed out a report with the repair designs prepared by a Mr. Webber.

Member Gomes asked about the beam holding up the wall. He asked if a footing would be built. Mancini read the narrative, which noted that reinforcing bars would be installed, forms would be placed on the footings and held in place while the concrete is pumped up the yard into it. Member Gomes said he would like to know how this is going to be implemented without damaging anything. There are stairs, but there is no way he can get into the water through those stairs, if he doesn’t get down deep enough, that water will erode them again. Mancini said he would make arrangements for Member Gomes to speak with Webber.
Dan Purcell testified by asking what kind of follow up would be done about the issues that Member Gomes brought up. Moore said that complaints about the shoreline are bought to the department by the public, but if the Board requests an onsite inspection, one can be done for this project. Member Gomes said he would like that.

Unanimously approved as amended (Gomes, Pacheco)

The Board amended the recommendation section to require the applicant submit plans for the repair of the seawall to the Office of Conservation and Coastal Lands, and have its engineer and contractor consult with OCCL on the repair prior to commencement of construction.

Item D-11 Amend Prior Board Action of August 12, 2011, Item D-2, Grant of Term, Non-Exclusive Easement to Association Of Unit Owners (AOUO) of Hale Kai Condominium for Seawall / Revetment Purposes; Amendment is for the Inclusion of an Additional 1,287 Square Foot Encroachment Area, Honokōwai, Lāhainā, Maui, Tax Map Key: (2) 4-4-001: Seaward of 042.

Moore noted that the requested action is to amend prior Board approval to increase the area of encroachment and charge the applicant accordingly based the appraisal that was done on the encroachment in 2011.

Mark Roy resenting Hale Kai thanked staff. Hale Kai has been working with staff and the AGs office. Due to the age of the property, repairs needed to be done and there was a requirement to do an updated shoreline survey. When Hale Kai did that, it was determined that the shoreline shifted further mauka, which is the cause of the additional square footage. They are in agreement and would like to move forward. The owners recognize there will be maintenance requirements and are prepared to go through the right process when that time comes.

Unanimously approved as submitted (Gomes, Furtado)

Item D-4 Lessee’s Request for Early Termination of General Lease No. S-3836, NoJer Enterprises, Inc., Lessee, Waiākea, South Hilo, Hawai‘i, Tax Map Key: (3) 2-2-048:001.

Moore reviewed item D-4 explaining that the lessee is asking for early termination, staff is asking that a phase I site assessment is done as part of that agreement.

Member Gomes questioned the sold date under the remarks column of the staff submittal. Moore apologized and stated that the date should read June 16, 1964 not June 126, 1964. Member Gomes then asked if the applicant approached the department and said they couldn’t afford the lease. He also asked if there anyone else interested in leasing this property. Moore said that it’s up to the interested parties to take the assignment of a lease.

Jeri Oishi, one half of NoJer Enterprises stated that her husband Noboru is the other half. They bought the property in 1998 and over the last 10 years, business has not been robust. They
believe the re-assessment that had just been done had been exaggerated. With a retiring workforce they found it unsustainable. Recently, the Oishi’s approached another business man in the area and asked him to take over their customers and their last two remaining employees. The employees now work for him and he has not taken over any part of their business. Member Gomes asked Mrs. Oishi if she still wanted to be in business if the rent was reduced to an affordable amount. She responded that their plan was to continue for the last 5 years of the 55 year lease, but they feel it’s time to close. They plan on selling their plants for whatever they can get. At this point, they don’t want to continue with the lease because their employees are already gone.

Member Oi asked if the main reason for opting out of the lease is the increase in rent. Mrs. Oishi said yes.

Chair Aila asked Moore for the reasoning was behind the increased rent. Moore said that was a difficult question and explained that the appraisal issue is specialized and that property values factor in. Moore did point out that the lessee is entitled to an arbitration reopening, but has decided not to do so.

Member Pacheco commented that arbitration is expensive, and felt like the department should’ve tried to work with the tenant to keep them for the last five years. Member Gomes agreed with Pacheco.

Noboru Oishi, Ms. Oishi’s husband asked that the Board consider allowing a condition permitting the Oishi’s to sell their greenhouses. Member Pacheco stated that is part of the recommendation.

Dan Purcell testified that staff ought to be prepared to answer questions. He also commented on the configuration of the meeting.

Chair Aila responded that the appraisal process is handled by professional standards, so staff is unable to answer those questions, because that is something that is out of the purview. The law only allows the department to do the appraisal, not to explain why the appraisal needs to be done.

**Unanimously approved as submitted (Pacheco, Gomes)**

**Item D-15 Grant of Perpetual, Non-Exclusive Easement for Utility Purposes to Hawaiian Electric Company, Inc.; Issuance of Immediate Construction and Management Right of Entry, Honolulu, O‘ahu, Tax Map Key (1) 2-1-015: portions of 009 & 030.**

Moore conveyed item D-15 and noted that the decision is gratis because this is a government agency.

A representative from Hawaiian Electric (HECO) testified supporting the project.

**Unanimously approved as submitted (Pacheco, Gomes)**
Denial of Requests for Contested Case by (1) Kalani Flores, (2) Paul Neves, and (3) Hanalei Fergerstrom re: (a) Board Action of November 8, 2013, Item D-5, No Action on Mutual Cancellation of General Lease No. S-4191 to the University of Hawai‘i (UH) for the Mauna Kea Science Reserve and Issuance of New Direct Lease to UH for Mauna Kea Science Reserve Purposes; Mutual Cancellation of General Lease No. S-5529 to UH for the Hale Pohaku Mid-Level Facilities and Issuance of New Direct Lease to UH for Hale Pohaku Mid-Level Facilities Purposes; Extension, Amendment and Restatement of Grant of Term Easement S-4697 to UH to Extend the Easement Term by Approximately 45 Years and Update the Easement Instrument with Current Provisions Approved by the Department of the Attorney General; and (b) Board Action of December 13, 2013, Item D-15, Deferring Action on Resubmittal: Mutual Cancellation of General Lease No. S-4191 to the University of Hawai‘i (UH) for the Mauna Kea Science Reserve and Issuance of New Direct Lease to UH for Mauna Kea Science Reserve Purposes; Mutual Cancellation of General Lease No. S-5529 to UH for the Hale Pohaku Mid-Level Facilities and Issuance of New Direct Lease to UH for Hale Pohaku Mid-Level Facilities Purposes; Extension, Amendment and Restatement of Grant of Term Easement S-4697 to UH to Extend the Easement Term by Approximately 45 Years and Update the Easement Instrument with Current Provisions Approved by the Department of the Attorney General, Ka‘ūhe, Hāmākua, Island of Hawai‘i, Tax Map Keys: 3rd/4-4-015:01 por., 09 & 12.

Written testimony was submitted by Koa Luke and David Kauila Kopper.

Moore presented item D-5 explaining that the first two requesters are represented by the Native Hawaiian Legal Corporation (NHLC). After receiving the petitions requesting a contested case, the department referred these requests to the AG office for assistance. The department was then informed by the AGs that these persons are not entitled to a contested case on these items by statute, rule or due process. The department accepts the AGs determination, and staff recommendation is to deny the petitions for these individuals.

David Kopper, attorney with NHCL representing petitioner Flores and petitioner Neves. Kopper cautioned the Board that native Hawaiian cultural Practitioners have constitutional rights for contested case hearing for government approvals regarding lands that could affect traditional and cultural practices. The staff submittal does not contest the petitioner’s right as cultural practitioners. The two issues are the ripeness, and whether or not under Sharma, these practitioners are entitled to a contested case hearing as a matter of law. To address the ripeness issue, Kopper referred to Kilikila O Haleakala, explaining that the Supreme Court said that a Contested Case must be made before decision making.
Member Pacheco made a motion to go into Executive Session pursuant to Section 92-5(a)(4), Hawai‘i Revised Statutes, in order to consult with its attorney on questions and issues pertaining to the Board’s powers, duties, privileges, immunities and liabilities. Member Gomes seconded.

10:53AM EXECUTIVE SECESSION
11:10AM RECONVENE

Chair Aila called for more public testimony. No one came forward, so Chair Aila closed public testimony.

Member Pacheco explained that he did have concerns with the staff recommendation, he then made a motion to approve the recommendation but amending A, B and C to include deny petition without prejudice so that the applicants can bring the petition back when the item is brought back to the Board if they so choose. Member Gomes seconded.

The Board amended the staff recommendation to provide that the Petitioners’ requests for contested case are denied “without prejudice.”

Unanimously approved as amended (Pacheco, Gomes)

Item D-19 Resubmittal: Consent to Sublease under General Lease No. S-4191 to the University of Hawai‘i, Lessee, to TMT International Observatory LLC, Sublessee, Ka‘ohe, Hāmākua, Island of Hawai‘i, Tax Map Key: (3) 4-4-015: 009 por.; and Decision-Making on Requests for Contested Case Hearing by Kalani Flores and Dan Purcell on Board Action of June 13, 2014, Item D-8 in Opposition to the Request for Consent to Sublease under General Lease No. S-4191 to the University of Hawai‘i, Lessee, to TMT International Observatory LLC, Sublessee, Ka‘ohe, Hāmākua, Island of Hawaii, Tax Map Key: (3) 4-4-015: 009 por.

Dianne K. Hoapili, E. Kalani Flores, Sterling Wong, Deborah J. Ward, Chris Peterson and the Hawaii Astronomical Society Board Members & Membership and Charlene Dwin Vaughn, AIC.

Moore reviewed item D-19 reminding everyone that at the meeting of June 13, 2014 the Board raised 3 questions and issues dealing with the sublease rent, questions about the advisory council and Historic Preservation, review of sublease issues, and whether HRS 171-36 prohibits UH from entering into this sublease. On the afternoon of June 25, 2014 UH delivered its response letter to the department. The department has provided a copy of the letter upon request to members of the public. The letter states that the sublease rent is substantially in compliance with the CDUP requirement, that The Advisory Council on Historic Preservation has determined that the project has no federal funds and therefore does not constitute a Federal undertaking, thus Section 106 is not triggered, and it takes the position that HRS 171 does not prohibit the sublease.

Another item covered by this submittal is the requests for contested case hearings that were made at the June 13, 2014 made by Kalani Flores and Dan Purcell; however no written petitions were received 10 days after the Board meeting as required by administrative rules. Moore indicated that those cases can be denied due to lack of follow up.

Deputy Attorney General (AG) Julie China recommended that the contested case requests be denied for “failure to follow up with a written request,” as required by the rules.

UH Hilo Chancellor Straney commended Moore for summarizing the content of the letter UH provided and was available to answer any questions.

Chair Aila pointed out that in the response an analysis was provided of similar situations for other telescopes around the world.

E. Kalani Flores made a request for a contested case hearing for this item D-19 because it is a resubmittal, and because it was previously deferred. He also submitted his petition for a contested case hearing. In regards to the contested case hearing, the testimony provided on item D-5 is relevant for this sublease, and shows why a contested case hearing should be approved.

Flores then submitted his written testimony pertaining to the D-19 sublease. He explained that this testimony was basically a follow up from the testimony from June 13, 2014 BLNR meeting. Flores summarized his testimony highlighting key points 1) the BLNR and DLNR have not fulfilled their statutory responsibilities to protect the interests, lands, resources and rights of the public, beneficiaries and Native Hawaiians associated with Mauna Kea by relying primarily upon the submittals and testimony of UH regarding this item; 2) Various terms and conditions of the proposed sublease are in violation of Hawaii Revised Statues as well as constitute a breach of the State’s high fiduciary duties to the public lands trust; 3) The BLNR has failed to determine the fair market value of the proposed lease rent; 4) Sections 9 (a) (b)(c) of the proposed sublease are in violation of HRS 171-36 (a)(1); 5) Various terms and conditions of the proposed sublease remove the oversight of the lessor pertaining to significant provisions and relinquishes it to the sublessor; 6) This sublease should not be approved until an independent Ka Pa’akai analysis has been completed; 7) This proposed sublease should not be approved until a final ruling regarding
the CDUP has been rendered; 8) This proposed sublease should not be approved until section 106 and consultation with Native Hawaiians regarding the TMT has been completed; 9) A sublease should not be issued for a project that extends beyond the life of the existing master lease that terminates in 2033; 10) This sublease should be in compliance with Act 132; 11) This proposes sublease should not be approved based upon other written comments and testimony previously submitted and presented by Flores at the 6/13/2014 BLNR meeting; 12) Further construction should not be allowed until the terms and conditions of the sublease are in compliance with federal and state laws; 13) The submittal by Straney includes several inaccuracies and misleading statements.

Sterling Wong public policy manager with the Office of Hawaiian Affairs (OHA) testified along with their outside council, Ms. Broder. Wong distributed his written testimony, then highlighted key points. The fiduciary responsibility of the state is their main concern. He noted that all testimony OHA has previously submitted has been attached to the testimony submitted today. Wong wanted to be clear that OHA’s Board did pass a resolution in July 2009 in support of TMT on Mauna Kea. OHA also has a 30 year responsibility advocating that the state meet its fiduciary responsibility to the public lands trust. Wong explained that OHA asks that the BLNR delay decision making on this sublease until it receives adequate information and there has been adequate time to review that information. OHA would like more time to review the response letter from UH. Their concern is still the rental structure calculation for the sublease.

OHA’s outside counsel added that a persuasive case has not been made by UH to justify the amount of rent being charged to meet the standard of substantial rent.

Member Pacheco commented that the department has never done appraisals on subleases. He said that since UH is not making money off of the operating cost, how does OHA suggest the department to take that into consideration.

Counsel said its difficult to determine what is substantial rent because of the uniqueness of the property, so more information is needed to make a determination. Another important missing piece is the cost of the management plan. What impact will billion dollar contract will have?

Deborah J. Ward is one of six petitioners who have challenged the BLNR approval of the TMT CDUP because UH has failed to demonstrate compliance with the eight criteria set out in the Administrative Rules and failed to comply with due process. Ward submitted her written testimony in opposition and read it before the Board.

Kealoha Pisciotta, a litigant, practitioner and President of Mauna Kea Anaina Hou testified on behalf of herself, Paul Neves and Clarence Ching in opposition to this project. Pisciotta does not believe Sharma falls into place in this case. She expressed her concern that this meeting wasn’t held on Hawaii Island. Pisciotta referenced all of their previous testimony and contested case findings and facts. She asked to re-request another contested case hearing if this one was to be denied. Pisciotta said that at the last meeting it was their understanding that this was deferred, so there should have been no clock on petitions if the item was deferred. She indicated that she requested a contested case at the last meeting but was not listed in the title as of the requestors. Piciotta reiterated that if this is the final decision, she wanted to contest it. She then expressed
her concern with the rent, and asked to amend the statement made that UH does not make money, because its money that’s generated on ceded lands. Pisciotta clarified certain points in a letter submitted by the Advisory Council of Historic preservation.

Dianne K. Hoapili read her written testimony in opposition addressing the fact that the decision is discriminatory and has no respect for the culture.

Jim Hayes, an environmental planner, former Chairperson for the Sierra Club on Oahu who previously worked for the TMT prior to the environmental statement. He spoke about his perspective of the project and some things that he has heard from the community. Hayes supports this project.

12:26PM RECESS
12:45PM RECONVENE

Kimmer Bighorse, a veteran, who said her Navajo ancestors are the founding fathers of this Country presented her testimony in opposition, for the aina based on spirituality, indigenous spirituality, loss of religion, and spirituality that is fading. After her oral testimony, Bighorse chanted and asked that the song guides the Board with their decision.

Chair Aila announced that the Board would be taking up an oral arguments case at 2pm and asked everyone to please limit their testimony and stay on the agenda item topic.

Pono Kealoha a Hawaiian National and kanaka maoli testified that Mauna Kea is sacred to him, his culture and his future generations. He challenged the Board on making any type of decision until a treaty of annexation can be provided and asked that the Board have nothing else to do with this item until then.

Amelia Gora, an heir to King Kamehameha told the Board to cease and desist and listen to the sacred piko, because there can be war crimes charged against many the Board members.

Kaanohi Kaleikini testified as a state recognized descendant to Kaohe. She encouraged the Board not to release Mauna Kea lands because it will damage numerous cultural sites. Kaleikini stated that the contested case hearings need to be heard.

Shelly Muneoka began her testimony opposing TMT by reading an excerpt from an oli that puts Mauna Kea in a sacred generation. Muneoka read the testimony she submitted that directly addressed the responses put forth by UH Hilo to the questions posed at the June 13, 2014 BLNR meeting.

Moani a state recognized descendant to Kaohe testified that she does not approve of this sublease because this is a sacred mountain and lots iwi kupuna will be affected.

Candice Fujikane an English professor at UH Manoa and KAHEA Board member testified urging the Board not to consent to the sublease. The TMT will be an industrial complex that cannot in anyway be consistent with the conservation district use compliance. Fujikane presented
photos so that we could visually see what the consequences would be if this is approved. She questioned how the TMT is able to begin construction and drilling even before TMT has a sublease.

Member Gomes asked if there really was construction. Fujikane said yes, under the permit, but not without an actual lease.

Tim Lui-Kwan, representing UH Hilo explained that many of the issues raised today were issues in the CDUP which was issued last year. He asked the Board to ask any questions to any issues that were raised TMT has a grant of construction entry that was approved by OCCL. However, there is no construction occurring on TMT. In August 2013, geotechnical boring was done.

Dan Purcell said he was disappointed by comments from other members of the public. He asked to take Flores’ statements as his own comments in regards to the contested case, Purcell said Flores’ spoke them perfectly. Purcell asked for consistency in filing contested cases.

Chair Aila explained that the reason Purcell didn’t get a contested case was because he didn’t follow through with a written request within 10 days of the oral request. Purcell said he didn’t follow through with one today and it’s on the agenda for denial.

AG China clarified that it’s because it’s on the agenda again and if you had timely submitted a written petition, it was going to be addressed today. Purcell understood, but said it was still confusing. He reserved his right to a contested case hearing on this item. Chair Aila reminded him to follow up in writing in 10 days.

Laulani Teale testified as Public Heath Practitioner focused on Native Hawaiian Health. She addressed the health impacts the TMT has on the people protecting sacred places or cultural rights. She believes there will be serious health impacts because the destruction of sacred places can kill people. Teal asked the Board to consider this aspect in what they determine.

Kapuakeli‘ikoa Kamai testified in disbelief of the failure of the state, staff and Boards. Kamai stated that this is environmental injustice; we need to preserve the aina for the future generations. She also said that the decisions that involve other islands need to be heard on those islands so the people affected can attend the meeting.

Chair Aila closed public testimony.

Member Pacheco said he had questions so he made a motion to go into Executive Session pursuant to Section 92-5(a) (4), Hawai‘i Revised Statutes, in order to consult with its attorney on questions and issues pertaining to the Board’s powers, duties, privileges, immunities and liabilities. Member Gomes seconded.

1:47PM EXECUTIVE SECESSION
2:28PM RECONVENE
Member Pacheco made it clear that a lot of issues brought up in testimony are an issue that dealt with the substance of the CDUP and that is already a legal document. The CDUP is not on the agenda is not what the Board is discussing. There were issues brought up about the 106 process, that’s the federal process, not something that the Board needs to instigate. The Board is here to discuss the nature of the sublease. If that needs to go forward, then it will go forward. Member Pacheco does have questions about the substantial rent, and what that exactly means. He asked the appraiser to come up. Member Pacheco indicated that there is no requirement for the Board to have any kind of appraisal for a sublease.

Member Pacheco asked the appraiser about the appraisal process. James Hollstrom the appraiser for UH Hilo explained that this unique asset doesn’t have an economic benefit, and he cannot speak to the value of the aina (land). Trying to come up with an estimate of a market value would be hard, because there is no market. It’s preservation zoned land, there is no economic use. They made the observation that the amount of rent per unit or in total is greater than almost anything that currently exists for any state or private lease.

Member Pacheco asked Stephanie Nagata with the office of Mauna Kea Management what her opinion is on whether this sublease will contribute to the management of the mountain. Nagata explained that TMT’s contribution will be very significant. Right now they are looking at 2.2 million dollars to manage the mountain, TMT will cover 50% of that.

Member Pacheco did have a concern from the Native Hawaiian Legal Corp about the quickness of this turnover response from UH.

Chair Aila told Member Pacheco that at the close of the June 13, 2014 BLNR meeting the question was asked about the quickest this could come back to the Board, Chair made everyone aware that the soonest this item could be back on the agenda would be the next Land Board meeting. UH Hilo had to do research to answer the questions that were brought up. They delivered their response on June 25, 2014 and we posted that and made it available as soon as technologically possible. Yes it was short, but the response was made available as quick as possible.

Member Pacheco then commented on the concept of the language of the sublease. He said that language is about that sublease being able to be carried forward if a new master lease is brought forward. Not that it requires things of the master lease. The sublease is subservient to the new master lease. Chair Aila added that will be part of a separate sublease action after an EIS is completed.

Member Pacheco added that this Board does have the authority authorize to issue subleases.

Member Pacheco made a motion to approve the recommendation, consenting to the sublease but that the consent is stayed until the administrative process is done. Member Kishinami seconded.

OHA made a request for a contested case.

**Unanimously approved as amended (Pacheco, Kishinami)**

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The Board approved the consent to sublease, but stayed the effectiveness of the consent until administrative proceedings on any contested case requests are concluded. No action was taken on the two contested case requests made by Kalani Flores and Dan Purcell.

2:44PM RECESS
3:38PM RECONVENE

Item I-1 Request Approval to Authorize the Chairperson to Execute and Sign the Curatorship Agreement Between the Board of Land and Natural Resources and Ho’opakele Heiau Regarding the State Inventory of Historic Places Heiau Site #50-10-35-18695, Waiākea Ahupua’a, District of South Hilo, Island of Hawai‘i.

Alan Downer Administrator for the State Historic Preservation Division (SHPD) asked for the approval of item I-1.

Member Gomes asked what happened between 1932 and 1983, if anyone claimed the heiau. Downer said no, the name now, is the name of the people who do work on the heiau. It has no name and no one has claimed it. Downer said that this group has been doing work on this hieau for the last 4 years.

Unanimously approved as submitted (Pacheco, Gomes)

Item D-2 Rescind Prior Board Action of March 27, 2009, Item D-4, Consent to Assignment of General Lease No. S-5435, Lei Mamo Kaapana Aken, Assignor, to Jake Kaawaloa, Assignee, Kīkala-Keokea, Puna, Hawai‘i, Tax Map Key: (3) 1-2-043:035. And

Consent to Assign General Lease No. S-5435, Lei Mamo Kaapana Aken, Assignor, to Beverly Keonaona Amaral, Assignee, Lot 35, Kalapana Section, Kīkala-Keokea, Puna, Hawai‘i, Tax Map Key: (3) 1-2-043:035.

Moore reviewed item D-2. Beverley Amaral was present and asked the Board to approve the lease.

Unanimously approved as submitted (Pacheco, Gomes)

Item D-7 Issuance of a Right-of-Entry Permit to the United States Department of Agriculture (USDA) Forest Service in conjunction with the Research Corporation of the University of Hawai‘i (RCUH), for the Forest Inventory and Analysis Program at Honomā‘ele and Ka‘elekū, Hāna, Maui, Tax Map Key: (2) 1-3-003: Por. of 017.

Member Gomes asked how long the quarry has been used for the County of Maui. Moore said that Maui staff had just indicated this quarrying activity had been going on for some time. The
County is still on the property and is not exempt for an EA. Moore said he will check with Maui staff about the amount of time the County of Maui has been on this property and would follow up with Member Gomes.

Unanimously approved as submitted (Gomes, Kishinami)

Item D-1  Reinstate General Lease No. S-5563, Stephen Sico, Lessee, Portion of Lot 173, Kapa'a Homesteads, 3rd Series, Kapa'a, Kawaihau, Kauai'i, Tax Map Key: (4) 4-6-008:001.

Item D-3  Authorize a One-Year Holdover of General Lease No. 3165, Roderick Q. Hickman and Gloria L. Colden-Hickman, Lessee, to be Immediately Followed by the Issuance of a Month-to-Month Revocable Permit and Issuance of a Bill of Sale Transferring All Improvements on the Property to the Lessee, Ocean View Lease Lots, Wai'akea, South Hilo, Hawai'i, Tax Map Key: (3) 2-1-007:031.

Item D-6  Cancellation of Revocable Permit S-7711 Richard E. Souza and Donna Lee Souza with Issuance of New Month-to-Month Revocable Permit to Richard E. and Donna Lee Souza, for Pasture Purposes, Waiohinu, Ka'ū, Hawai'i, Tax Map Key: (3) 9-5-005: portion 003.

Item D-8  Issuance of Right-of-Entry Permit to Beach Games Spectacular, Inc., for a Team Building Event at Wailea Beach, Honua'ula, Wailea, Maui, Tax Map Key: (2) 2-1-008: Seaward of 109.

Item D-9  Consent to Lease of Lands under Governor's Executive Order No. 2358 to Lae 'Ula O Kai, a Hawai'i Nonprofit Corporation, Kanahā Beach Park, Kahului, Wailuku, Maui, Hawai'i, Tax Map Key: (2) 3-8-001: Por. of 119.

Item D-13  Grant of Term, Non-Exclusive Easement to Makai Ranch, LLC for Encroachment Structure Purposes; Assess Administrative Cost of $500, Kahuku, Koʻolaupoa, Oʻahu, Tax Map Key: (1) 5-6-003: Seaward of 010.

Item D-14  Amend Prior Board Action of April 12, 2013, Item D-12 by Authorizing the issuance of Immediate Right-of-Entry Permit for Access Purposes; Grant of Two (2) Perpetual, Non-Exclusive Easements to Clara Matthews, Sonny P. Lucas, and Debbie May Silva-Lucas for Access Purposes, Kunawai, Honolulu, Oʻahu, Tax Map Key: (1) 1-7-036: adjacent to 014 and 015.

Item D-16  Consent to Assign General Lease No. S-4891, Alfred K. Fountain, Assignor, to Heine Fountain, Assignee, Maunalaha, Honolulu, Oʻahu, TMK: (1) 2-5-024:030.
Item D-17  Consent to Warranty Deed Regarding the Transfer of Non-Exclusive Easement S-5202; Marlene E. Ress, the Assignor; to Lisa Gouw Iwata, Trustee of the Lisa Gouw Revocable Living Trust Agreement dated May 8, 1997, as amended and completely restated on May 23, 2006, and John Allen Wong, Trustee of the John Allen Wong Revocable Trust dated November 24, 1990 as amended and completely restated on March 14, 1998; the Assignees; Ka'alaea, Ko'olaupoko O'ahu, Tax Map Key: (1) 4-7-016:seaward of 061.

No changes to items D-1, D-3, D-6, D-8, D-9, D-13, D-14 D-16 or D-17.

Unanimously approved as submitted (Pacheco, Gomes)

Item F-1  Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Conservation and Management Permit to Dr. Kelly Gleason, National Oceanic and Atmospheric Administration, Papahānaumokuākea Marine National Monument, for Access to State Waters to Conduct Maritime Heritage Activities. Request Approval of Declaration of Exemption to Chapter 343, HRS Environmental Compliance Requirements for the Project.

Maria Carnavale, State Co-Manager for Papahānaumokuākea Marine National Monument (PMNM) had no changes to items F-1 through F-3.

Member Gomes asked for more detail on the “black coral species”. Kelly Gleason explained that she was not the technical expert on that, but according to Daniel Wagner this is a new species, and he is not aware of this species on the main Hawaiian Islands. Carnavale said she would follow up with Member Gomes after she contacts Wagner.

Member Pacheco asked Gleason what the status was on the two brothers. Gleason said the latest is that they finished their documentary film last fall, and PBS picked it up. She is also currently working on a nomination to the National Register of Historic Places for that site. The film is about 25 minutes; she also offered to give a presentation to the Board members in the future.

Member Pacheco asked Gleason to briefly tell the Board members the significance of the two brothers. Gleason explained that the Two Brothers is a Nantucket Whaling ship. The Captain of the Two Brothers was a man named George Pollard, who was caption of the whaling ship Essex prior to the Two Brothers. The Essex was stoved by a whale, which inspired Herman Melville to write Moby Dick. Captain Pollard survived that experience with a few of his crewman, made his way back to Nantucket and decided to head out on the Two Brothers 30 days later. His quote was “lighting doesn’t strike twice,” but he was just an unlucky man.

Item F-2  Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Research Permit to Dr. Megan Donahue, Hawai'i Institute of Marine Biology, University of Hawai'i, for Access to
State Waters to Conduct Bioerosion Study Activities. Request Approval of Declaration of Exemption to Chapter 343, HRS Environmental Compliance Requirements for the Project.

Item F-3 Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Research Permit to Dr. Megan Donahue, Hawai‘i Institute of Marine Biology, University of Hawai‘i, for Access to State Waters to Conduct *Pocillopora meandrina* (POME) Community Characterization Activities. Request Approval of Declaration of Exemption to Chapter 343, HRS Environmental Compliance Requirements for the Project.

No Changes to items F-1, F-2 or F-3.

**Unanimously approved as submitted (Pacheco, Kishinami)**

**Item K-2** Appointment and Selection of a Hearing Officer to Conduct All Hearings for a Contested Case (KA 14-02) Regarding Unauthorized Construction and Transient Vacation Rentals in the Conservation District, Located at Hanalei, Kaua‘i, Tax Map Key (4) 5-4-002: 032.

Written testimony was submitted by Harold Bronstein.

Lemmo explained that this is asking the BLNR to select a hearing officer to run a contested case hearing in the Laney alleged violation and to delegate to the chair for selecting a hearing officer. This is a procedural request. The defendant has indicated in writing that they have no objections to the procedure.

Dan Purcell asked why there needs to be a hearing officer and would the hearing be open to the public.

Chair Aila indicated the hearing officer makes recommendations to the BLNR, the BLNR decides to take the recommendations or ask for further advice.

Member Pacheco further explained that a contested case hearing gets a hearings officer appointed to them, usually an attorney and they act as the judge and hear the arguments.

AG Julie China added that the public can sit in on these hearings, they just cannot testify. It’s like going to court.

Purcell asked how he would find out about the hearing. Chair Aila told him to send in a request and once the hearing officer is appointed, then the department will have the hearings officer contact him.
Item K-1    Conservation District Use Application (CDUA) HA-3700 Regarding the State
Department of Transportation (DOT) Māmalahoa Highway Repair Project,
Located in the Kaʻū District, Island of Hawaiʻi, on Tax Map Keys: (3) 9-5-
016:006, 022, 025 and 026.

No changes to items K-1 or K-2.

Unanimously approved as submitted items K-1 and K-2 (Pacheco, Gomes)

Item L-1    Declare Project Exempt From Requirements of Chapter 343, HRS, and Title
11, Chapter 200, Hawaiʻi Administrative Rules for Job No. J00CB01B,
Rainbow Falls ADA Barrier Removal Project, Hilo, Hawaiʻi.

Item L-2    Declare Project Exempt From Requirements of Chapter 343, HRS, and Title
11, Chapter 200, Hawaiʻi Administrative Rules for Job No. J00CB01B,
Wailoa Small Boat Harbor ADA Barrier Removal Project, Hilo, Hawaiʻi.

Item L-3    Appointment of John McHugh and Certification of Elections of Alan
Gottlieb and Peter Gibson to Serve as Directors of the West Oʻahu Soil and
Water Conservation District.

Item L-4    Appointment of Jill Suga to Serve as a Director of the East Kauai Soil and
Water Conservation District.

Dickey Lee representing the Engineering Division (ENG) had no changes to items L-1 through
L-4.

Unanimously approved as submitted items (Pacheco, Gomes)
There being no further business, Chairman William Aila adjourned the meeting at 5:21 pm. Recording(s) of the meeting and all written testimonies submitted at the meeting are filed in the Chairperson’s Office and are available for review. Certain items on the agenda were taken out of sequence to accommodate applicants or interested parties present.

Respectfully submitted,

Kuʻulei Moses
Land Board Secretary

Approved for submittal:

William J. Aila, Jr.
Chairperson
Department of Land and Natural Resources
The Economic Impact of Astronomy in Hawai'i

August 28, 2014
The Economic Impact of Astronomy in Hawai’i

AUGUST 28, 2014

Prepared by:

University of Hawai’i Economic Research Organization (UHERO)

UHERO Principal Investigators: Dr. Kimberly Burnett (Associate Specialist), Dr. Inna Cintina (Assistant Specialist), and Dr. Christopher Wada (Research Economist)

This research was supported by Mauna Kea Observatories
The astronomy sector in Hawaii generates economic activity through its purchases from local businesses, its payment to its employees, and spending by students and visitors. In collaboration with the Institute for Astronomy, a survey was designed to obtain information from astronomy related entities about in-state expenditures. The collected survey data was used to estimate the astronomy sector’s total economic activity in each of Hawaii’s counties for the calendar year 2012. Following a standard Input-Output approach, we define economic impact to be the direct, indirect, and induced economic activities generated by the astronomy sector’s expenditures in the state economy, taking into account inter-county feedback and spillover effects.

Local astronomy related expenditures in calendar year 2012 were $58.43 million, $25.80 million, $1.28 million, and $2.58 million in Hawaii, Honolulu, Kauai, and Maui counties respectively. Total astronomy related spending in the state was $88.09 million. Including indirect and induced benefits and adjusting for inter-county feedback and spillover effects, the astronomy sector had a total impact of $167.86 million statewide. The largest impact was found to be in Hawaii County ($91.48 million), followed by Honolulu County ($68.43 million). Impacts were found to be relatively small in Maui County ($5.34 million) and Kauai County ($2.61 million). In addition to contributing to output, astronomy activities generated $52.26 million in earnings, $8.15 million in state taxes, and 1,394 jobs statewide.
Astronomy Activities by County

The State of Hawaii has one of the largest astronomy sectors in the United States, with world class observatories attracting scientists, research funds and visitors to the islands. The Institute for Astronomy (IfA) was founded at the University of Hawaii (UH) in 1967 to manage the Haleakala Observatory on Maui and to guide the development of the Mauna Kea Observatories on Hawaii Island, as well as to carry out its own program of fundamental research. It has a total staff of 250, including 55 faculty members. The IfA has an annual budget comprising approximately $10.5 million in funds allocated by the University and $22 million in external funds (mostly federal grants and contracts). There are several University of Hawaii departments with research programs and degrees in astronomy, and five public facilities open to visitors on Oahu and Hawaii Island (Bishop Museum Planetarium, Aerospace Lab and Planetarium at Windward Community College, Mauna Kea Observatory Visitor Information Station, 'Imiloa Astronomy Center of Hawai'i, and Onizuka Space Center).

Astronomy has been identified as an emerging industry in Hawaii. In 2007, the astronomy and space science sector accounted for 885 jobs, with an average salary of $70,951. In addition, astronomy activity creates employment for hundreds of people in related industries, purchases goods and services from local businesses, and invests in capital improvements. Finally, the research and education components contribute to Hawaii through investment in human capital and the spillovers of knowledge important in a budding technology and innovation community. The objective of this study is to quantify the economic impact of astronomy to the state of Hawaii. Using survey data collected from the IfA, UH Manoa, UH Hilo, and other astronomy-related entities in Hawaii, we conducted an input-output analysis to estimate astronomy’s contribution to local business sales, employee earnings, tax revenues, and number of jobs throughout the State.

In order to accurately quantify the economic impact of astronomy, the input-output framework requires information about expenditures for all astronomy-related activities throughout the State. The scope of astronomy includes mountaintop observatory activities, astronomy research including instrument development and assessment, graduate and undergraduate astronomy programs, astronomy spin-off companies, bookstore operations, visitor operations, and the 'Imiloa Astronomy Center of Hawai'i.

Hawaii County

Currently, UH Hilo offers the only undergraduate astronomy major in the state of Hawaii and tops the nation in the number of undergraduate astronomy degrees awarded per year (44 students were declared astronomy majors in Fall 2012). The program emphasizes training in observational astronomy, physics, mathematics, and computer science. Astronomy majors get hands-on experience by participating in research that makes use of the University Park of Science and Technology and the Hubble Space Telescope. Students also benefit from the astronomy department’s numerous international collaborations, including the All-sky Survey High Resolution Air


2 Of the 35 departments where the bachelor’s degree was the highest astronomy degree offered, only five averaged five or more degrees annually from 2008-2010. UH Hilo was at the top of that list with an annual average of 10 degrees per year (http://www.aip.org/statistics/trends/reports/astro2010.pdf).
Shower (ASHRA) cosmic ray detection program, the Panoramic Survey Telescope and Rapid Response System (PanSTARRS) asteroid detection system, the Pacific International Space Center for Exploration Systems (PISCES) that focuses on sustainable human habitats for the Moon and Mars, and the Taiwan-American Occultation Survey (TAOS) that studies the outer solar system.

The summit of Mauna Kea is an ideal location for ground-based astronomical research because of its dark skies, low humidity, clean air, good weather, and proximity to the equator. The Mauna Kea Observatories (MKO) are an independent collection of roughly one dozen astronomical research facilities, including the UH 2.2-m telescope, the NASA 3.0-m Infrared Telescope Facility, the Canada-France-Hawaii 3.6-m Telescope, the United Kingdom 3.8-m Telescope, the W.M. Keck Observatory 10-m Telescopes, the Subaru 9.3-m Telescope, the Gemini Northern 9.1-m Telescope, the Caltech Submillimeter 10.4-m Telescope, the James Clerk Maxwell 15-m Telescope, the Submillimeter Array 8x6-m Telescope, the 25-m Very Long Baseline Array Antenna, and the planned $1.4 billion Thirty Meter Telescope spearheaded by the University of California system, California Institute of Technology, and Association of Canadian Universities for Research in Astronomy in partnership with China, India and Japan. The MKO is located in the 525-acre Astronomy Precinct within the 11,288-acre Mauna Kea Science Reserve, which is overseen by the Office of Mauna Kea Management (OMKM). OMKM was established in 2000 as part of a master plan to provide responsible stewardship of Mauna Kea, including protecting cultural, natural and scientific resources, monitoring public access, and decommissioning astronomical facilities. Under the direction of OMKM, the Mauna Kea observatories, commercial tour operators, and the activities of the visiting public to promote safety and prevent harm to the resources. Mauna Kea Observatories Support Services (MKSS) operates and maintains mid-level food and lodging facilities at Hale Pohaku, maintains the summit access road, provides administrative services for the weather center and communications network, and operates the Onizuka Center for International Astronomy Visitor Information Station, which is located at the 2,800 m level and is open 365 days a year.

A number of foreign countries conduct research at MKO including Canada, France, the United Kingdom, Japan, Argentina, Australia, Brazil, Chile, Taiwan, Korea, and soon China and India. The University shares in the scientific use of all of the telescopes, except the VLBA, at the level of 10-15% of the observing time. This use is available to anyone within the University system who has a valid proposal; the observing time is awarded on a competitive basis. The observatory base facilities are located at lower elevations such as Waimea and Hilo, where hundreds of employees contribute to the local economy. The research facilities also participate in outreach activities such as field trips, stargazing programs, classroom visits and science nights at libraries.

While most astronomy facilities focus on generating research and providing community outreach from a purely scientific standpoint, the ʻImiloa Astronomy Center of Hawaii was designed specifically to promote the integration of modern astronomical science and the Hawaiian culture. Open since 2006, the $28 million, 42,000-square-foot exhibition and planetarium complex is located in the University of Hawaii’s Science and Technology Park. Since opening,
‘Imiloa has served thousands of students in a number of educational programs including field trips, family workshops, afterschool programs, other extra-curricular activities, robotic tournaments, and overnight sleepover events.

The observatories typically either develop their instruments in-house or outsource them to out-of-state companies or labs. Some, however, contribute to the local economy by requesting services from astronomy spinoff companies in Hawaii. Mauna Kea Infrared (MKIR), LLC has been building custom hardware since 1985. Their 3,500-square-foot facility in Hilo is equipped with instrument design, assembly, and testing areas. MKIR’s biggest project to date was a $4 million coronagraphic camera for the Gemini South 8-m Telescope in Chile.

Honolulu County

While not a suitable location for observatories, Honolulu County does house a large number of the State’s astronomy researchers. The Institute for Astronomy (IfA) headquarters, located at UH Manoa, includes a library, labs, a machine shop for building instruments, computing facilities, and remote observing facilities. With a staff of 81 PhDs from 26 different countries, IfA is one of the largest university astronomy programs in the world. IfA has an annual budget of roughly $32 million ($22 million of which comes from federal grants and contracts) and a total staff of 250, including 55 faculty members. IfA also has offices and laboratories on Maui and Hawaii Island, as well as observatories on the summits of Mauna Kea and Haleakala.

IfA shares responsibility for the UH Manoa graduate astronomy program with the University’s Department of Physics & Astronomy. In Fall 2012, the program had 45 students working for MS or PhD degrees. In addition to teaching and advising graduate level research, IfA provides research opportunities to undergraduate students. Beginning in 2015, IfA will offer undergraduate degree programs in astronomy and astrophysics. The UH Manoa College of Engineering also engages in some space-related activities, including the Small Satellite Program, which was established in 2001. Sponsored by NASA’s Educational Launch of Nanosatellites Program, 30 engineering students have spent the past three years designing and building a cube satellite, dubbed Hooponopono 2 or H2, to calibrate and monitor US Department of Defense radar stations that track objects in space.

Like MKIR in Hawaii County, GL Scientific, Inc. in Honolulu designs, manufactures, and services precision scientific instruments and custom components, many of which are used for astronomy research. Customers include Gemini Observatory, Canada-France-Hawaii Telescope Corporation, W.M. Keck Observatory, University of California, and California Institute of Technology.

Maui County

The IfA operates the Advanced Technology Research Center located in Pukalani, on the slopes of Haleakala. The Maui branch of IfA houses over $3 million in advanced optical instrumentation and test equipment. Other ATRC assets include a welding shop and full machine shop with over $2 million of fabrication instruments.

The Haleakala Observatory (HO), located above the tropical inversion layer at the summit of Haleakala, has been managed by IfA for over four decades. HO has partnerships with the National Science Foundation, NASA, the Pan-STARRS consortium, Space Telescope Science Institute,
Tohoku University and the Air Force, and hosts over half a dozen telescopes. HO’s location is favorable for a variety of purposes, which makes it a very desirable destination for unique and cutting edge research. For example, the Mees Solar Observatory and Solar-C are used specifically for solar observation, whereas the TLRS-4 Laser Ranging System measures distances to the Moon and artificial Earth satellites. The Faulkes Telescope provides free access to robotic telescopes and a fully supported education program to encourage teachers and students to engage in hands-on research-based science education.

Most recently, the PS1 and PS2 telescopes were completed for the Pan-STARRS wide-field survey program. Among other things, the Pan-STARRS telescopes will search for large asteroids long before possible impact with Earth. The planned Asteroid Terrestrial-Impact Last Alert System (ATLAS) will search the sky in a closer and wider region to help identify smaller asteroids that hit Earth much more frequently. Funding from NASA will provide $5 million over five years to a UH Manoa team for the development of ATLAS. The Haleakala Observatory is also the site for the 4-m Advanced Technology Solar Telescope (recently officially named the Daniel K. Inouye Solar Telescope), currently under construction.

With the many facilities dedicated to space surveillance atop Haleakala, Maui has hosted the Advanced Maui Optical and Space Surveillance Technologies Conference – the premiere space surveillance conference in the nation – every year since 2001. The focus of the conference is space situational awareness, i.e. keeping track of man-made space junk and asteroids that could damage or destroy commercial and government satellites. The conference attracts top names in the aerospace industry and aerospace research.

Methodology and Data

The astronomy sector generates economic activity in the community through local business sales, employee earnings, tax revenues, and job creation. We used data on labor earnings and astronomy-related expenditures for three major spending categories -- astronomy operations, students and visitors -- to calculate the total local expenditures by industry for each county. Expenditure types were classified using the North American Industry Classification System (NAICS) industry descriptions. The total amount of economic activity generated in each county (Hawaii, Honolulu, Maui, and Kauai) was then estimated using the 2007 inter-county input-output (I-O) model of Hawaii’s economy. 4

Operation expenditures for astronomy related entities

In collaboration with the IfA, a survey was designed to obtain information from astronomy related entities about in-state expenditures for the calendar year 2012 (see Appendix A). Expenditure categories included salaries and wages, rent on facilities and equipment, capital purchases, supplies, information services, utilities, professional services, repair and maintenance, and construction. Data was collected from mountain-top observatories on Mauna Kea and Haleakala, other astronomy research facilities, Mauna Kea Observatories Support Services (MKSS), Office of Mauna Kea Management (OMKM), the UH

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3 The Air Force activities are not included in this impact study.

4 An I-O model accounts for all sales and purchases made by firms in each sector of the economy, thus creating a comprehensive picture of the interdependence among industries in the economy.
Manoa graduate astronomy program, the UH Hilo undergraduate astronomy program, the 'Imiloa Astronomy Center of Hawaii, astronomy spin-off companies in Hawaii, and the Visitor Information Station at Hale Pohaku. Collected expenditure data was organized by county and by spending category, each of which corresponds to one of 20 industries. Individual responses were then aggregated for each industry-county combination.

To best calculate the economic impacts, one must convert the in-state retail level expenditure data collected from the survey into producer level expenditures by industry categories. This conversion must be done since all transactions in the DBEDT I-O model are valued at producer prices. Therefore, the economic multipliers that were used to estimate economic impacts are based on producer level rather than retail level data. Producer price expenditures equal retail price expenditures less retail, wholesale, and transportation margins.\(^5\)

### Student expenditures

There are three astronomy degree programs in the state of Hawaii: the UH Manoa MS and PhD programs and the UH Hilo undergraduate program. Fall 2012 enrollment data for each of the programs was obtained from the UH System Institutional Research and Analysis Office Data Portal.\(^6\) The number of students from each county, 45 and 44 for Honolulu and Hawaii respectively, was then multiplied by average spending by category – “graduate student on Oahu” for PhD students and “undergraduate student on all neighbor islands” for undergraduate students – to calculate total student expenditures in each of the 20 NAICS-classified industries.\(^7\)

### Visitor expenditures

Ideally visitor expenditure calculations would include data on tourist visitors who spent a portion of their vacation participating in astronomy related activities. However, identifying the proportion of total vacation spending attributed only to astronomy activities would be very difficult, given that most visitors do not come to Hawaii specifically to visit observatories or other astronomy facilities. Instead, visitor expenditures were based on visitors who come to Hawaii specifically to work at astronomy facilities. The final values and corresponding impacts can therefore be viewed as a lower bound for total visitor expenditures on astronomy related activities in Hawaii.

Using data on the number of visitors and average duration of stay collected by the IfA, we calculated total visitor spending by multiplying the total number of person-days in each county by the corresponding 2012 visitor average personal daily expenditures in that county.\(^8\) Because we are interested in the economic impacts to Hawaii specifically, total expenditures were adjusted in each county for out-of-state imports (15.5% for all counties) and within-state imports (1.0% for Honolulu, 13.9% for Hawaii, 9.3% for Maui, and 17.8% for Kauai). Within-state imports for each county were redistributed across 20 industries in that county using fixed visitor expenditure (VE) shares that can be calculated from the 2007 Hawaii Inter-County I-O Transactions table.\(^9\)

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6 https://www.hawaii.edu/institutionalresearch/home.action
7 Average spending numbers were obtained from a survey conducted as part of “The Contribution of the University of Hawaii at Manoa to Hawaii’s Economy in 2012,” University of Hawaii Economic Research Organization, January 2013.
8 Table 83 in “2012 Annual Visitor Research Report,” Hawaii Tourism Authority, August 2013.
9 Transaction table is part of the “2007 Hawaii Inter-County I-O Study,” Department of Business, Economic Development, and Tourism, May 2012 and can be downloaded at
Labor earnings and personal consumption expenditures

The survey on astronomy related in-state expenditures included specific questions on total salaries and wages, employee benefits, retirement contributions, and FICA taxes. Using this information, net labor earnings were calculated for each county as the sum of wages, salaries, and benefits, less FICA taxes. Total labor earnings in each county were then adjusted for out-of-state imports (14.6% for all counties) and within-state imports (4.4% for Honolulu, 13.8% for Hawaii, 16.5% for Maui, and 22.3% for Kauai). Because a substantial portion of labor earnings are injected back into the economy in the form of household purchases of goods and services, within-state imports for each county were redistributed across 20 industries in that county using fixed personal consumption expenditure (PCE) shares that can be calculated from the 2007 Hawaii Inter-County I-O Transactions table. 10

Total in-state expenditures on astronomy

Total local expenditures by county were calculated as the sum of operations, student, visitor, and personal consumption expenditures, adjusted for out-of-state and in-state imports. The breakdown of the total local expenditures by county is reported in Figure 1. IfA survey data was reported by industry and data from other sources was distributed via fixed industry shares as described above. Therefore, each of the $88.09 million spent locally were assigned to one of 20 industries. Table 1 shows that nearly one fifth of the total local expenditures occurred in the real estate and rental sector, 13% occurred in the retail sector, and 11% occurred in each of the utilities and health services sectors. The resulting 1×80 local expenditure vector that captures all combinations of the 20 industries and 4 counties was used for calculation of the economic impacts. More details on these calculations are provided in Appendix B.

Economic impact calculations

Type-II inter-county total requirement tables11 were used to calculate economic impacts for each county in terms of output, earnings, taxes, and jobs. Each 80×80 requirement table was multiplied by the corresponding local expenditures in county-industry, resulting in four 80×80 matrixes. For a given impact category (e.g. output), total impact for county X was calculated by summing across all rows corresponding to that county (20 rows and 80 columns), i.e. summing over all industries. Total impact for industry Y was calculated by summing all elements for industry Y (4 rows and 80 columns), i.e. over all counties.

11 A total requirements table is a matrix of coefficients showing the sum of direct and indirect purchases required to produce one dollar of output, one dollar of earnings, one dollar of taxes, or one job.

Figure 1 - Share of Local Expenditures by County
The inter-county type II “multipliers” capture the direct, indirect, and induced effects per dollar of spending in each of the 20 sectors of Hawaii’s economy.\textsuperscript{12} While more computationally intensive than a state-level model, the advantage of using an inter-county model is that it accounts for both flows of goods and services within each county and between counties, and it can therefore capture spillover and feedback effects. When a new economic activity in Hawaii County, for example, increases an industry’s final demand and the produced output in that county, new flows of goods and services are required from other counties (in this case, Honolulu, Kauai, and Maui), resulting in increased output in those counties as well – a spillover effect. The increased production in those counties might, in turn, create new demand for goods and services produced in Hawaii County (for example, via purchase of inputs). This boost in Hawaii County’s economic activity is in addition to the initial change in output, and is therefore considered a feedback effect.

### Astronomy’s Impact on Hawaii’s Economy

In calendar year 2012, astronomy related local expenditures totaled $88.09 million. Together with additional indirect and induced benefits from these activities, astronomy had a total im-

\textsuperscript{12} To illustrate the relationship between “direct,” “indirect,” and “induced” effects, consider the following example: I spend $10 at a local grocery store; the “direct effect” of my expenditure on business sales in the economy is the $10 received by the grocery store. In turn, the grocery store purchases $5 worth of goods from its wholesaler. The additional sale in the economy by the wholesaler to the grocery store is an “indirect” effect of my grocery purchase. Both the grocery store and the wholesaler pay their employees, and with their pay the employees purchase goods and services in the economy. These are the “induced” effects. Similarly, the grocer and wholesaler pay rent, interest on loans, and take home profits; those incomes are eventually spent in the economy as well. Type II multipliers capture the “multiplier,” or sometimes referred to as the “ripple,” effects of any initial spending.
The economic impact of astronomy-related local expenditures was significant, with a total impact of $167.86 million on Hawaii’s economy. Table 2 shows that the $88.09 million in expenditures generated $52.26 million of employee earnings, $8.15 million in state tax revenues and 1,394 jobs.

Nearly 70% of local spending occurred in Hawaii County. The $58.43 million of expenditures attributed to astronomy activities in Hawaii County alone generated $91.48 million in local business sales (or 55% of the total impact on the business sales), $27.98 million in employee earnings (or 54% of the total effect), $4.00 million in state tax revenues (50% of the total effect), and over 800 jobs or 60% of the total effect (Table 2).

Table 3 reports the breakdown of the initial local spending and the overall impacts on the state of Hawaii by industry. Most of the astronomy activity spending occurred in the real estate and rentals industry (17.84%), the retail trade sector (13.48%), and the health services sector (11.05%). The impact this spending had to the state was not proportional to the spending, due to structural differences in the way each sector allocates spending throughout the state and four counties. For example, while expenditures to the retail sector was significant at over 13% of total astronomy activity spending, the impact to total output to the state was less than 10%, versus a sector such as other manufacturing which saw just over 4% of total spending but had an output impact to the state of almost 9%. The immediate nature of retail spending, in many cases, is that most of the funds received go directly out of state to the original seller. Spending to the manufacturing sector, on the other hand, may go largely towards paying for the produced good in Hawaii and/or may generate larger indirect and induced effects.

To properly assess the impact of astronomy activities in Hawaii, it was essential to focus on “local” expenditures and exclude payments to out-of-state vendors. Because many of the calculations detailed in the study are based on reported local expenditures from survey participants, the accuracy of the estimated impact depends largely on whether participants were able to successfully distinguish local and out-of-state expenditures. The estimated impact also depends on how expenditures are disaggregated across industries, since the output of the I-O model is sensitive to where inputs are coming from.

Table 2. Economic Impacts of Astronomy-Related Local Expenditures by County

<table>
<thead>
<tr>
<th>County</th>
<th>Local expenditures (millions of 2012 $)</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Output (millions of 2012 $)</td>
</tr>
<tr>
<td>Hawaii County</td>
<td>58.53</td>
<td>91.48</td>
</tr>
<tr>
<td>Honolulu County</td>
<td>25.80</td>
<td>68.43</td>
</tr>
<tr>
<td>Kauai County</td>
<td>1.28</td>
<td>2.61</td>
</tr>
<tr>
<td>Maui County</td>
<td>2.58</td>
<td>5.34</td>
</tr>
<tr>
<td>TOTAL</td>
<td><strong>88.09</strong></td>
<td><strong>167.86</strong></td>
</tr>
<tr>
<td>Industry</td>
<td>Local expenditures (%)</td>
<td>Output</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Agriculture</td>
<td>0.70</td>
<td>0.77</td>
</tr>
<tr>
<td>Mining and construction</td>
<td>1.05</td>
<td>1.61</td>
</tr>
<tr>
<td>Food processing</td>
<td>1.63</td>
<td>1.31</td>
</tr>
<tr>
<td>Other manufacturing</td>
<td>4.37</td>
<td>8.94</td>
</tr>
<tr>
<td>Transportation</td>
<td>3.27</td>
<td>3.15</td>
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<tr>
<td>Information</td>
<td>2.75</td>
<td>3.08</td>
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<tr>
<td>Utilities</td>
<td>10.85</td>
<td>8.01</td>
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<td>Wholesale trade</td>
<td>5.27</td>
<td>4.28</td>
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<tr>
<td>Retail trade</td>
<td>13.48</td>
<td>9.88</td>
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<td>Finance and insurance</td>
<td>3.52</td>
<td>4.75</td>
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<td>Real estate and rentals</td>
<td>17.84</td>
<td>19.91</td>
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<tr>
<td>Professional services</td>
<td>5.09</td>
<td>4.99</td>
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<td>Business services</td>
<td>1.24</td>
<td>3.69</td>
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<td>Educational services</td>
<td>2.03</td>
<td>1.50</td>
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<td>Health services</td>
<td>11.05</td>
<td>9.43</td>
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<tr>
<td>Arts and entertainment</td>
<td>1.25</td>
<td>0.94</td>
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<tr>
<td>Accommodation</td>
<td>5.13</td>
<td>3.16</td>
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<tr>
<td>Eating and drinking</td>
<td>2.44</td>
<td>2.66</td>
</tr>
<tr>
<td>Other services</td>
<td>4.50</td>
<td>4.68</td>
</tr>
<tr>
<td>Government</td>
<td>2.54</td>
<td>3.26</td>
</tr>
</tbody>
</table>
Astronomy: A Sizable Economic Sector in Hawaii

Figure 2 shows the astronomy sector’s contribution to Hawaii’s economy compared with other similar sized sectors throughout the state. In 2012, astronomy’s output was roughly equal to half of the output estimated for the agriculture, forestry, fishing, and hunting sector; one third the size of the output from the arts, entertainment, and recreation sector; and nearly one fourth of the output attributed to either the educational services or the management of companies and enterprises sector.

Figure 3 illustrates that the total impact of astronomy to the state ($167.86 million) is nearly twice the size of the impact estimated for the Natural Energy Laboratory Hawaii Authority Tenants ($87.7 million)\(^{13}\), and larger than the cumulative impact of the UH system on Maui ($85.16 million) and Kauai ($61.53 million) counties.\(^{14}\) It is also approximately one third the size of the UH system’s impact on Hawaii County. The astronomy sector is a significant contributor to Hawaii’s economy, and will likely to continue to be one in the foreseeable future, given the continued interest in ongoing and planned astronomy related projects throughout the state.

14 “The Economic Impact of the University of Hawaii System,” University of Hawaii Economic Research Organization, April 2013.
AUGUST 28, 2014 - PAGE 14
ECONOMIC IMPACT OF ASTRONOMY IN HAWAII
UHERO

Appendix A: Expenditure Survey

Category

Description and examples *

Organization name: ____________________________________
Name of contact: _______________________________________
Phone: _______________________________________________
Email: ________________________________________________

Salaries and
wages

Equipment

Retirement
contributions
FICA taxes
Rent

Employee benefits

Salaries and wages paid to employees,
including other taxable payments such as high
altitude allowances, merit awards, etc.
Do not include fringe.
Fringe benefit payments, expenditures for
business and employee insurance coverage,
employee benefit programs and services.
Do not include FICA.
State of Hawai‘i Employees' Retiremen t
System (ERS), TIAA-CREF, etc.
Federal Insurance Contributions Act
E xpenditures for rental of facilities, equipment,
vessels, cars, etc.
Expenditures for capital purchases - durable
goods, equipment, motor vehicles, furniture,
construction materials, metals and minerals
(except petroleum), laboratory equipment,
scientific instruments, etc.; include raw and
intermediate materials and supplies used in
production of astronomy related equipment
Office supplies, consumables, minor equipment
Internet, telecommunications, media services
Electricity, gas, wate r
Expenditures for services such as payroll and
accounting; computer support; research;
consulting; engineering, architectural

Supplies
Information
Utilities
Professional
services

Total calendar year 2012
expenditures
(to the nearest 1,000 $)

Hawaii

Maui

Kauai

% of total calendar year 2012 expenditures by county**
Honolulu

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<table>
<thead>
<tr>
<th>Category</th>
<th>Description and examples</th>
<th>(nearest 1,000 $)</th>
<th>Honolulu</th>
<th>Maui</th>
<th>Kauai</th>
<th>Hawaii</th>
<th>% of total calendar year 2012 expenditures by county**</th>
<th>Total calendar year 2012 expenditures</th>
<th>% of total calendar year 2012 expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial &amp; insurance services</td>
<td>Investment management services, expenditures for interest on loans or leasing arrangements</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>Expenditures to transport materials and equipment via air, water, truck, rail, etc.; include warehousing and storage en route</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repair &amp; Maintenance</td>
<td>Equipment and machinery repairs and maintenance; Observatory and other building repair and maintenance; Safety inspections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>Heavy &amp; civil engineering construction; Construction costs incurred for observatory and other buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td>Expenditures for airfare, lodging, meals &amp; incidentals paid on behalf of employees and others such as event participants, invited guests, etc.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Please describe*

**Honolulu, Hawaii**

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Please report the number of FTE employees in each category, by county.

<table>
<thead>
<tr>
<th>FTE Category</th>
<th>Examples</th>
<th>Support</th>
<th>Academic</th>
<th>Technical Support</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maui</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Kona</td>
<td></td>
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</tr>
<tr>
<td>Oahu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note that you can make more than one entry in this table if you wish. If the actual dollar amount spent in each county is not available, please estimate the percentage.

For Mauna Kea Observatories, do not include Mauna Kea Observatories Support Services Payments. These will be handled separately.

*Please note that you can make more than one entry in this category. Please provide a description/explanation along with each entry.
Appendix B: Economic Impact Calculations

We use data on labor earnings and astronomy-related expenditures for three major spending categories - students, astronomy operations, and visitors - to calculate the total local expenditures by industry for each county. The economic impact of astronomy in each county is then determined using the 2007 Inter-County Type II multipliers for output, earnings, state taxes, and jobs. This appendix provides a detailed explanation of the computations undertaken to arrive at our final impact estimates.

Student expenditures

Fall 2012 enrollment data for the UH Manoa PhD program and the UH Hilo undergraduate program was obtained from the UH System Institutional Research and Analysis Office Data Portal. The number of students from each county was then multiplied by average spending by category – “graduate student on Oahu” for PhD students and “undergraduate student on all neighbor islands” for undergraduate students – to calculate total student expenditures in each industry ($m=1, \ldots, 20$).

For example, student expenditures in county $i$ in industry $m$ were calculated as

\[
\text{(student exp)}_{i,m} = [\text{(\# graduate students)}_i \times \text{(avg spending for grad student in county } i \text{ in industry } m)]
\]

\[+
\text{[\text{(\# undergraduate students)}_i \times \text{(avg spending for undergrad student in county } i \text{ in industry } m)]} \quad (B1)
\]

Operation expenditures for astronomy related entities

In-state expenditure data collected from astronomy related entities was organized by county ($i$) and by spending category, each of which corresponds to one of 20 industries. $k=1,\ldots,18$ individual responses were then aggregated for each county-industry combination. So for county-industry combination $i$-$m$, total operation expenditures are given by

\[
\text{(op exp)}_{i,m} = \sum_{k=1}^{18} \text{[(operations expenditures)}_{i,m,k} \]
\]

Since all transactions in the DBEDT I-O model are valued at producer prices, we converted the collected retail level data into producer level expenditures by industry categories according to the following formula:

\[
\text{producer price exp} = \text{retail price exp} - \text{retail margin} - \text{wholesale margin} - \text{transport margin} \quad (B3)
\]

Visitor expenditures

Visitor expenditures were based on visitors who come to Hawaii specifically to work at astronomy facilities. The final values and corresponding impacts can therefore be viewed as a lower bound for total visitor expenditures on astronomy related activities in Hawaii. Total visitor-spending in county $i$ is
calculated as follows:

\[
(gross \ visitor \ exp)_i = (# \ person-days)_i \times (2012 \ visitor \ personal \ daily \ expenditures)_i \tag{B4}
\]

Because we are interested in the economic impacts to Hawaii specifically, total expenditures were adjusted in each county for out-of-state imports (15.5% for all counties) and within-state imports (1.0% for Honolulu, 13.9% for Hawaii, 9.3% for Maui, and 17.8% for Kauai). Then within-state imports for each county were redistributed across 20 industries in that county using fixed visitor expenditure (VE) shares that can be calculated from the 2007 Hawaii Inter-County I-O Transactions table. The transactions table records transactions between Hawaii’s industries, final-payments sectors, and final-demand sectors. The table keeps track of industry sales, final consumers, and intermediate goods sold to local industries for use in producing the finished goods. The sum of a row is the total output or total sales of an industry.

Then for county-industry combination \(i-m\), in-state visitor spending is

\[
(visitor \ exp)_{i,m} = [(gross \ visitor \ exp)_i \times (1 – 0.155 - \alpha_i)] \times VE_{i,m} \tag{B5}
\]

where \(\alpha_i\) is the percentage of expenditures attributed to within-state imports in county \(i\) and \(VE_{i,m}\) is a share of industry \(m\) in visitor expenditures in county \(i\).

**Labor earnings and personal consumption expenditures**

The survey on astronomy related in-state expenditures (Appendix A) included specific questions on total salaries and wages, employee benefits, retirement contributions, and FICA taxes. Using this information, net labor earnings for all \(k\) respondents were calculated for each county \(i\) as

\[
(net \ labor \ earnings)_i = (wages + salaries + benefits)_i - (FICA \ taxes)_i \tag{B6}
\]

Total labor earnings in each county were then adjusted for out-of-state imports (14.6% for all counties) and within-state imports (4.4% for Honolulu, 13.8% for Hawaii, 16.5% for Maui, and 22.3% for Kauai). Within-state imports for each county were redistributed across 20 industries in that county using fixed personal consumption expenditure (PCE) shares. Analogous to (B5), for county-industry combination \(i-m\), in-state labor earnings are

\[
(labor)_{i,m} = [(net \ labor \ earnings)_i \times (1 – 0.146 - \beta_i)] \times PCE_{i,m} \tag{B7}
\]

where \(\beta_i\) is the percentage of labor earnings attributed to within-state inputs in county \(i\) and

\[15 \text{ Ibid 9} \]
\[16 \text{ Ibid 9} \]
$PCEim$ is a share of industry $m$ in personal consumption expenditures in county $i$.

**Total in-state expenditures on astronomy**

Total local expenditures by industry-county were calculated as the sum of student, operations, visitor, and personal consumption expenditures, adjusted for out-of-state and in-state imports. The resulting $1 \times 80$ local expenditure vector captures all combinations of the 20 industries and 4 counties. Each element of the vector is calculated as follows:

$$(\text{total exp})_{i,m} = (\text{student exp})_{i,m} + (\text{op exp})_{i,m} + (\text{visitor exp})_{i,m} + (\text{labor})_{i,m}$$

**(B8)**

**Economic impacts of local astronomy expenditures**

Type-II inter-county total requirement tables were used to calculate economic impacts for each county in terms of output, earnings, taxes, and jobs. The direct requirement tables are derived from the transactions tables, and represent the amount of inputs purchased directly to produce one dollar of output. Total requirement tables represent the sum of direct and indirect purchases required to produce a dollar of output. Each $80 \times 80$ requirement table (one for output, one for earnings, one for taxes, and one for jobs) was multiplied by the corresponding local expenditures in each county-industry, resulting in four $80 \times 80$ matrixes. For a given impact category (e.g. output), total impact for county $i$ was calculated by summing across all rows corresponding to that county (20 rows and 80 columns). The 20 rows correspond to the 20 industries in the county, and the 80 columns correspond to the inter-county effects (4 counties $\times$ 20 industries). Total impact for industry $m$ was calculated by summing all elements for industry $m$ (4 rows and 80 columns). The 4 rows correspond to the 4 counties, and the 80 columns again correspond to the inter-county effects.

To illustrate the methodology, the example matrix below illustrates calculated impacts for a 3 county - 3 industry model. C-$i$ denotes county $i$ where $i = 1, \ldots , 3$ and IND-$j$ denotes industry $j$, where $j = 1, \ldots , 3$. Each cell shows the relationship between two counties and two industries. For example, C1C1-11 corresponds to the within county (C1) within-industry (IND1) relationship; C1C1-12 corresponds to the within county (C1) across-industry relationship (between IND1 and IND2); C2C1-11 corresponds to the across county but within-industry relationship; and so on.

IO tables allow one to identify the breakdown of each industry’s output multiplier by county-industry combination. Focusing on C1, the IND1 output multiplier will consist of C1C1-11, C1C1-21, C1C1-31, C2C1-11, … where transactions within IND1 in C1 (i.e. C1C1-11) will contribute the largest share to the total IND1 output multiplier in C1. Although $X1$ was initially spent only in C1, the impact effect goes beyond IND1 in C1 due to the linkage between industries within the county and industries across counties, thus having an effect on IND2 and IND3 in C1, as well as IND 1, IND2, and IND3 in C2 and C3.

The impacts are calculated by multiplying the corresponding local expenditures in a county-industry by the Type II inter-county total requirement table. This means that $X1$ of local expenditures in

17 Ibid 11
county C1 in IND1 is multiplied by components of the output multiplier for IND1 in C1; $X2 of local C1, and so on. The resulting matrix will contain output impacts for all county-industry combinations associated with all local expenditures.

The row C1, IND1 will contain impacts on IND1 in C1 associated with all local expenditures $X1, $X2, etc. spent across all industries in all counties (i.e., $X1 in IND1 in C1; $X2 in IND2 in C1; $X3 in IND3 in C1; $X4 in IND1 in C2; so on); the row C2, IND1 will contain impacts on IND1 in C2 associated with all local expenditures across all industries and all counties; etc. So to obtain the total impact on IND1 one has to sum impacts in IND1 across the counties (i.e., sum of shaded rows).

Matrix for output impacts

<table>
<thead>
<tr>
<th></th>
<th>C - 1</th>
<th>C - 1</th>
<th>C - 1</th>
<th>C - 2</th>
<th>C - 2</th>
<th>C - 2</th>
<th>C - 2</th>
<th>C - 3</th>
<th>C - 3</th>
<th>C - 3</th>
<th>C - 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IND 1</strong></td>
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<td></td>
</tr>
<tr>
<td>C - 1, IND 1</td>
<td>C1C1-11</td>
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<td></td>
<td>C1C1-21</td>
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<td>C1C1-31</td>
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<td>C - 1, IND 2</td>
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<td>C1C1-12</td>
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<td></td>
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</tr>
<tr>
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<td>C1C1-32</td>
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</tr>
<tr>
<td><strong>IND 2</strong></td>
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<td></td>
<td>C2C1-11</td>
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<tr>
<td>C - 2, IND 2</td>
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<tr>
<td>C - 2, IND 3</td>
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<td><strong>IND 3</strong></td>
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<tr>
<td>C - 3, IND 2</td>
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<tr>
<td>C - 3, IND 3</td>
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</tr>
</tbody>
</table>

Local exp       | C1, IND1 | C1, IND2 | C1, IND3 | C2, IND1 | ... |
Local exp $     | X1       | X2       | X3       | X4       | ... |
Urging De-escalation of Tension and Non-violent Solutions on Maunakea

WHEREAS, the Board of Regents believes and acknowledges that Maunakea holds a special and important place in the history, culture, and hearts of the peoples of Native Hawaiian ancestry and all of Hawai‘i; and

WHEREAS, meeting after meeting, testifiers have come to the Regents urging Kapu Aloha be exercised by all parties; and

WHEREAS, the conflict at Maunakea involves people on all sides of the issue who must make individual judgments of right and wrong; and

WHEREAS, each side shares in this personal responsibility to do what it can do to prevent violence which may cause injury or harm to others; and

WHEREAS, the Board of Regents desires to ensure that the University of Hawai‘i and all of its units acknowledge their collective responsibility to work in the spirit of aloha; and

WHEREAS, when one faculty member recently made hurtful statements regarding Kamehameha Schools, in the spirit of reconciliation, University President David Lassner disavowed and apologized for those statements, as did the professor, and Kamehameha Schools acknowledged the apology; and

WHEREAS, the Board of Regents wishes to take this opportunity to call for all sides to similarly work toward a peaceful resolution and work together in the spirit of aloha.

NOW, THEREFORE, BE IT RESOLVED that the University of Hawai‘i administration under the leadership of President David Lassner is encouraged to pursue good faith efforts to de-escalate tensions regarding Maunakea, including exploring again the use of ho'oponopono, and to pursue non-violent solutions to the conflict on Maunakea; and

BE IT FURTHER RESOLVED that University leadership continue to explore ways to learn from what is happening today to become a stronger community of learners, teachers, and scholars, with a shared commitment to civility and respect for one another.

Adopted by the Board of Regents
University of Hawai‘i
______________, 2019
Item VII.
Executive Session
Personnel Matters
Legal Matters

ITEM TO BE DISCUSSED IN EXECUTIVE SESSION