UNIVERSITY OF HAWAI'I AT HILO

UH Hilo Administration
Office of the Chancellor

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

August 7, 2006

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Dear Ms. Salmonson,

Subject: Finding of No Significant Impact (FONSI) for the University of Hawaii 24-inch Telescope Observatory Renovation, TMK (3) 4-4-15: 09, Mauna Kea, Hamakua District, Island of Hawaii, State of Hawaii.

The University of Hawai'i at Hilo (UH Hilo) has reviewed the comments received during the 30-day public comment period which began on April 8, 2006. UH Hilo has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the next available *Environmental Notice*.

We have enclosed a completed OEQC Publication Form and four copies of the final EA. Please call Dr. William Heacox at (808) 974-7382 if you have any questions.

Sincerely,

Rose Tseng
Chancellor

Enclosures

cc: Dr. William Heacox

200 W. Kawili Street, Hilo, Hawai'i 96720-4091
Telephone: (808) 974-7444, Facsimile: (808) 974-7622, www.uhh.hawaii.edu
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FINAL ENVIRONMENTAL ASSESSMENT

UNIVERSITY OF HAWAIʻI

24-INCH TELESCOPE OBSERVATORY RENOVATION

Mauna Kea Science Reserve, Hāmākua, Hawaiʻi, Hawaiʻi

University of Hawaiʻi at Hilo

National Science Foundation

August 2006

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FACILITIES PLANNING
UH HILO

FINAL ENVIRONMENTAL ASSESSMENT

UNIVERSITY OF HAWAI'I 24-INCH TELESCOPE OBSERVATORY RENOVATION

Mauna Kea Science Reserve, Hāmākua, Hawai'i, Hawai'i

University of Hawai'i at Hilo

National Science Foundation

August 2006

Approved For Publication:

Dr. Rose Y. Tseng
Chancellor
University of Hawaii at Hilo

AUG 9 2006
Date

Incorporating by reference the Final EA and concurring with the Finding of No Significant Impact:

Dr. G. Wayne Van Citters
Division Director, Division of Astronomical Sciences
National Science Foundation

8/2/06
Date

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COVER SHEET

Proposed Action The National Science Foundation (NSF) proposes to fund the proposal of the University of Hawai‘i at Hilo (UHH) to replace an existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope. UHH further proposes to renovate the existing observatory building using State funds. The Observatory is located within the Astronomy Precinct at the Mauna Kea Science Reserve (MKSR), Hāmākua, island of Hawai‘i, State of Hawai‘i.

Type of Document Environmental Assessment

Lead Agency	State: UHH Dept. of Physics and Astronomy	Federal: NSF
For Further Information	Dr. William D. Heacox	Dr. Julian Christou
	200 West Kawili Street	4201 Wilson Boulevard
	Hilo, Hawai‘i 96720-4091	Arlington, VA 22230
	Telephone: (808) 974-7382	Telephone: (703) 292-7324

Summary This Environmental Assessment (EA) was prepared in compliance with Chapter 343, Hawai‘i Revised Statutes; Title 11, Section 200, Hawai‘i Administrative Rules (HAR); the National Environmental Policy Act (NEPA) of 1969 (42 United States Code §4321, et seq.), as implemented by the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); and the NSF regulations governing compliance with NEPA, 45 CFR Part 640 and NSF’s Grant Policy Manual of July 2005. NSF is the lead Federal agency and UHH is the lead State agency.

NSF proposes to fund UHH’s proposal to replace an existing 24-inch telescope with a new 36-inch telescope and, using State funds, UHH proposes to replace/upgrade the existing dome, siding, interior wall panels, associated interior power and communication wiring, and doors utilizing the same foundation and footprint and install controls to make the facility remotely operable from the UHH campus (“Proposed Action”). No new excavation would be needed: existing utility conduits would be adequate for both power and communication needs. The Proposed Action would occur within the observatory footprint and an adjacent renovation lay-down area immediately north and south of the observatory (“Project Site”). The facility is owned by the University of Hawaii (UH) and managed by the UH Manoa’s Institute for Astronomy. After the completion of the Proposed Action, the observatory management responsibility would be transferred to UHH.

The renovated facility would be used to train undergraduate students in observatory operations and to conduct research projects with undergraduate student participation, either as assistants or in support of theses and other undergraduate student projects. The action is needed because: (1) the facility is inadequate for the needs of the UHH, principally because the facilities have reached the end of their useful lifetime; and (2) in fulfillment of NSF’s mission to support education and fundamental research in astronomy and to ensure that the U.S. maintains leadership in scientific discovery. Alternatives to the Proposed Action include: (1) Telescope Replacement Without Building Renovation and (2) No Action. Other alternatives considered, but eliminated from further evaluation, included demolition and renovation of the site to its pre-observatory condition, leasing other observatory space within MKSR, and relocation/construction of new facilities within the Astronomy Precinct.

The Proposed Action would not result in significant adverse impacts to the following resource areas: land use compatibility, cultural resources, visual environment, traffic, infrastructure, flood hazard, ground and surface water resources, topography, geology, soils, biological resources (including threatened, endangered or otherwise protected species), climate and air quality, noise, and the socio-economic environment.

The National Historic Preservation Act (NHPA) and NEPA processes were run concurrently and public comments were invited. Based on a careful review and analysis, and in accordance with Section 106 of the NHPA, NSF has determined that the Proposed Action would result in “no historic property affected.” NSF has sought concurrence with this determination with the State Historic Preservation Division (SHPD), Office of Hawaiian Affairs (OHA), Kahu Ku Mauna, the Royal Order of Kamehameha I, and Mauna Kea Anaina Hou. SHPD has indicated its concurrence with this determination. OHA, Kahu Ku Mauna, and Mauna Kea Anaina Hou have provided comments. No response was received from the Royal Order of Kamehameha I.

The Proposed Action would not create environmental health and safety risks that may disproportionately affect children and minority or disadvantaged populations. When considered with other past, present, and reasonably foreseeable future actions, the Proposed Action and alternatives would not result in any significant adverse cumulative impacts.

Based on the environmental analysis and a review of NEPA and the significance criteria specified in Section 11-200-12, HAR, NSF and UHH find that the Proposed Action would not have a significant impact on human health or the environment and a Finding of No Significant Impact is warranted.

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APPENDICES

A Cooperating Agency Agreement between the University of Hawai‘i at Hilo and the National Science Foundation.

B National Historic Preservation Act, Section 106 Correspondence

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
BLNR	Board of Land and Natural Resources
CAA	Clean Air Act
CFR	Code of Federal Regulations
CFHT	Canada, France, Hawai‘i Telescope
CSO	California Technical Institute Submillimeter Telescope Observatory
CWA	Clean Water Act
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Area
CEQ	Council on Environmental Quality
DHHL	Department of Hawaiian Home Lands
DBEDT	Department of Business, Economic Development, and Tourism
DLNR	Department of Land and Natural Resources
DOH	Department of Health
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
FTE	Full Time Equivalent
F	Fahrenheit
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Hawai‘i Administrative Rules
HRS	Hawai‘i Revised Statutes
IfA	Institute for Astronomy
IR	Infrared
IRTF	Infrared Telescope Facility
JCMT	James Clerk Maxwell Telescope
kV	kilovolt (s)
kVA	kilovolt-ampere (s)
KW	kilowatt (s)
LUPAG	Land Use Policy Allocation Guide
m	meter(s)
MKSR	Mauna Kea Science Reserve
MKVIS	Mauna Kea Visitor Information Station
NAAQS	National Ambient Air Quality Standards
NAR	Natural Area Reserve
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register for Historic Places
NSF	National Science Foundation
OEQC	Office of Environmental Quality Control
OHA	Office of Hawaiian Affairs
sf	square foot (feet)
SHPD	State Historic Preservation Division
SHPO	State Historic Preservation Office
SMA	Shoreline Management Area
SOH	State of Hawai‘i
TMK	Tax Map Key
UH	University of Hawai‘i
UHH	University of Hawai‘i at Hilo

ACRONYMS AND ABBREVIATIONS (Continued)

UHM	University of Hawai‘i at Manoa
UKIRT	United Kingdom Infrared Telescope
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture

EXECUTIVE SUMMARY

Project Name:	University of Hawai‘i 24-inch (0.6 meter) Telescope Observatory Renovation
Proposed Action:	The National Science Foundation (NSF) proposes to fund the proposal of the University of Hawai‘i at Hilo (UHH) to replace an existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope. UHH further proposes to renovate the existing observatory building using State funds.
Location:	Astronomy Precinct, Mauna Kea Science Reserve, Hāmākua, island of Hawai‘i, State of Hawai‘i
Applicant:	University of Hawai‘i at Hilo Department of Physics and Astronomy
Lead State Agency (Approving Authority):	University of Hawai‘i at Hilo
Contact Information:	Dr. William Heacox University of Hawai‘i at Hilo Department of Physics and Astronomy 200 West Kawili Street Hilo, HI 96720-4091 Telephone: (808) 974-7382 heacox@hawaii.edu
Lead Federal Agency	National Science Foundation
Contact Information:	Dr. Julian Christou 4201 Wilson Boulevard Arlington, VA 22230 Telephone: (703) 292-7324 j.christo@nsf.gov
Action Required:	Compliance with Chapter 343, Hawai‘i Revised Statutes and the National Environmental Policy Act, 42 USC §4321 et seq
National Environmental Policy Act “Trigger”	Use of Federal funds
Chapter 343, Hawai‘i Revised Statutes “Triggers”:	Use of State lands and funds and use of Conservation District land
Alternatives Considered:	(1) Telescope Replacement Without Building Renovation; and (2) No Action
Project Area:	The building footprint is approximately 420 square feet and the adjacent renovation lay-down area is approximately 20,000 square feet.
Tax Map Key Parcels:	(3) 4-4-015: 009
Landowner:	State of Hawai‘i
Existing Uses:	Astronomy research and undergraduate astronomy instruction
Proposed Uses:	Undergraduate astronomy instruction and educational research
State Land Use District:	Conservation District (Resource Subzone)

County of Hawai‘i General Plan Land Use Allocation Guide Map:	Conservation
County of Hawai‘i Plan Designation:	Conservation
County of Hawai‘i Zoning:	Conservation
Special Designations:	None
Determination:	Finding of No Significant Impact

This Environmental Assessment (EA) is prepared in compliance with Chapter 343, Hawai‘i Revised Statutes (HRS); Title 11, Section 200, Hawai‘i Administrative Rules (HAR), the National Environmental Policy Act (NEPA) of 1969 (42 United States Code §4321 et seq.), as implemented by the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); and the National Science Foundation (NSF) regulations governing compliance with NEPA (45 CFR Part 640) and NSF’s Grant Policy Manual of July 2005. University of Hawai‘i at Hilo (UHH) and NSF have established a cooperating agency relationship (see Appendix A) in accordance with 40 CFR §1501.6 and §11-200-225, HAR. This EA analyzes and documents potential environmental consequences associated with the Proposed Action and foreseeable reasonable alternatives.

Project objectives are to: (1) provide UHH with a modern optical telescope observatory which would meet the Department of Physics and Astronomy’s instructional and educational research needs for their undergraduate astronomy program and to provide community outreach to local high school science students; and (2) fulfill NSF’s mission to support education and fundamental research in astronomy and to ensure that the U.S. maintains leadership in scientific discovery by providing adequate education and research opportunities to U.S. astronomy students.

Proposed Action. NSF proposes to fund UHH’s proposal to replace an existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope. UHH further proposes to renovate the existing observatory building using State funds. The Proposed Action would occur at the 420 square foot (sf) University of Hawai‘i (UH) 24-inch Telescope Observatory and a proposed renovation lay-down area comprised of less than 20,000 sf immediately north and south of the observatory building (“Project Site”). The MKSR is located at the summit of Mauna Kea volcano on ceded lands and is part of Tax Map Key 4-4-015:009. The observatory and optical telescope are owned by UH and managed by the University of Hawai‘i at Manoa Institute for Astronomy. After the completion of the Proposed Action, the observatory and telescope would be managed by UHH.

Purpose and Need. The purpose of the action is to: (1) provide updated and modern facilities in support of the UHH’s undergraduate educational astronomy program and astronomy outreach programs to local high schools and (2) to partially fulfill NSF’s mission to support education and fundamental research in astronomy and to maintain U.S. leadership in scientific discovery. In addition, the Proposed Action would provide adequate operational facilities that meet the observatory’s unique mission requirements for undergraduate astronomy instruction and education in the State of Hawai‘i and improve operational efficiency for the UHH Department of Physics and Astronomy. The new 36-inch telescope would be used both to train undergraduate students in observatory operations and to conduct research projects with undergraduate student participation, either as assistants or in support of theses and other undergraduate student projects. It would also be used to support astronomy outreach programs in local high schools. When fully instrumented, the observatory would be capable of conducting observations in all areas of modern observational astronomy, and of wide-field imaging surveys for extrasolar

planets, supernovae, and other survey targets. The new educational observatory would be the world's only at a modern, major observatory site and would constitute an astronomy educational resource of unprecedented value to undergraduate students and faculty.

The action is needed to: (1) replace the existing 24-inch telescope which is inadequate for the needs of the UHH Department of Physics and Astronomy, principally because it has reached the end of its useful lifetime; and (2) help fulfill NSF's mission to support astronomy education in research and to maintain U.S. leadership in astronomy by providing adequate education and research facilities to U.S. astronomy students. The telescope has been used for over 30 years as a testbed for instruments designed for much larger telescopes, so its gearing is badly worn and the telescope no longer performs mechanically at a level suitable for instructional use. In addition, it was designed prior to the computer era and cannot easily be retrofitted for remote operation, an essential feature for routine educational use. Replacement parts are no longer available from the manufacturer. The building housing the 24-inch telescope is similarly obsolete with fiberglass wall cladding that is deteriorating and a dome that is in marginal mechanical condition; neither the walls nor the dome are insulated against dust and water infiltration.

Alternatives. Alternatives considered include (1) Telescope Replacement Without Building Renovation and (2) No Action. Other alternatives considered, but eliminated from further evaluation, include demolition and restoration of the site to pre-observatory conditions, leasing other observatory space at MKSR, and relocation/construction of new facilities within the Astronomy Precinct.

Environmental Consequences. Environmental consequences of the Proposed Action and Telescope Replacement Without Building Renovation alternative are expected to be limited to the local and/or regional setting. There should be minor benefits at the island-wide level due to the beneficial economic effects associated with renovation and a modest increase in operational period employment levels (two additional staff) and increased opportunities for State of Hawai'i and island of Hawai'i undergraduates to gain academic and practical experience in astronomical research. Impacts evaluated included short-term, long-term and cumulative impacts. The environmental impacts associated with the Proposed Action are temporary and not significant, or can be minimized through the application of appropriate design and engineering methods.

The Proposed Action would not result in significant adverse impacts to the following resource areas: land use compatibility, cultural resources, visual environment, traffic, infrastructure, flood hazard, ground and surface water resources, topography, geology, soils, biological resources, climate and air quality, noise, and the socio-economic environment.

The National Historic Preservation Act (NHPA) and NEPA processes were run concurrently and public comments were invited. Based on a careful review and analysis, and in accordance with Section 106 of the NHPA, NSF has determined that the Proposed Action would result in "no historic property affected." NSF sought concurrence with this determination with the State Historic Preservation Division (SHPD), Office of Hawaiian Affairs (OHA), Kahu Ku Mauna, the Royal Order of Kamehameha I, and Mauna Kea Anaina Hou. SHPD has indicated its concurrence with this determination. OHA, Kahu Ku Mauna, and Mauna Kea Anaina Hou provided comments. No response was received from the Royal Order of Kamehameha I. Correspondence related to the Section 106 consultation process is provided in Appendix B.

A previous environmental impact statement for the MKSR Master Plan (UH 1999), including the UH 24-inch Telescope Observatory site, incorporated a cultural impact assessment, which was completed in accordance with the *Guidelines for Assessing Cultural Impacts* issued by the State of Hawai'i Office of Environmental Quality Control. That cultural assessment indicates that the Proposed Action would not impact cultural features, practices and beliefs at the Project Site.

The Proposed Action would not create environmental health and safety risks that may disproportionately affect children and minority or disadvantaged population. When considered with other past, present, and reasonably foreseeable future actions, the Proposed Action would not result in any significant adverse cumulative impacts.

Based on the environmental analysis and a review of NEPA and the significance criteria specified in Section 11-200-12, HAR, NSF and UHH find that the action would not have a significant impact on human health or the environment and a Finding of No Significant Impact is warranted.

1 PURPOSE OF AND NEED FOR ACTION

This chapter presents a summary of the Proposed Action, a discussion of its purpose and need, and a regulatory overview. In addition, Table 1, at the end of the Chapter, provides a list of potential permits, approvals, and consultation for the project.

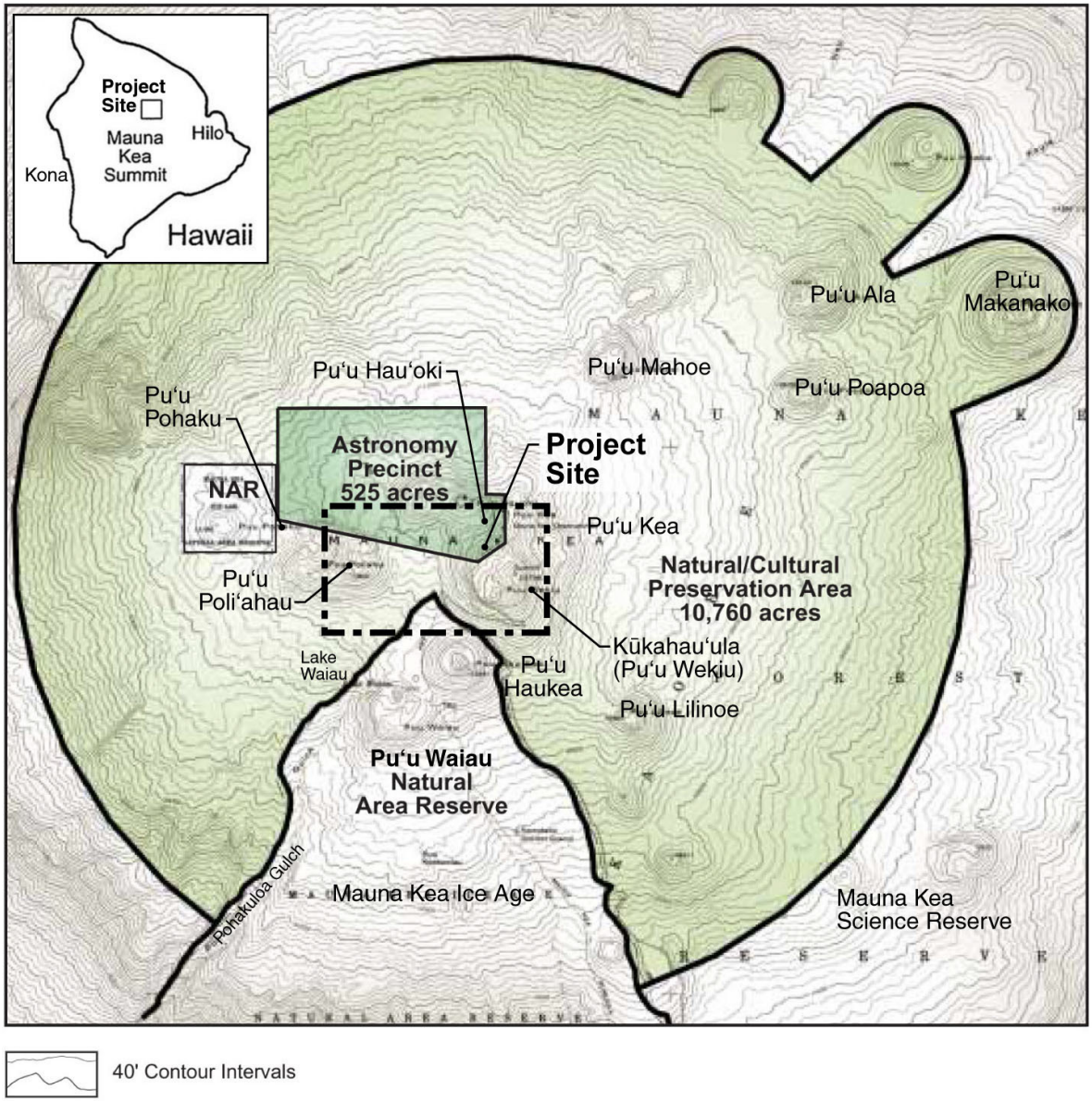
1.1 SUMMARY OF PROPOSED ACTION

NSF proposes to fund UHH's proposal to replace an existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope. Using State funds, UHH further proposes to renovate the existing observatory building, which is located within the "Astronomy Precinct" at the Mauna Kea Science Reserve (MKSR), Hāmākua District, island of Hawai'i, State of Hawai'i ("Proposed Action"; see Figure 1, Location Map). The Proposed Action would occur at the 420 square foot (sf) University of Hawai'i (UH) 24-inch Telescope Observatory and a proposed renovation lay-down area of approximately 20,000 sf immediately north and south of the building ("Project Site"; see Figure 2, Project Site). The MKSR is located at the summit of Mauna Kea volcano on ceded lands and is part of Tax Map Key 4-4-015:009. The observatory and optical telescope are owned by UH and managed by the University of Hawai'i at Manoa (UHM) Institute for Astronomy (IfA). After the completion of the Proposed Action, the observatory and telescope would be managed by UHH.

1.2 PURPOSE AND NEED

The purpose of the action is to: (1) provide updated and modern facilities in support of the UHH's undergraduate educational astronomy program, to provide job training for local students for careers in the astronomy community, and to provide astronomy outreach programs to the community, including local high school science students; and (2) help fulfill NSF's mission to support education and fundamental research in astronomy and to maintain U.S. leadership in scientific discovery. Adequate operational facilities are needed to meet UHH's unique mission requirements for undergraduate astronomy instruction and education in the State of Hawai'i and to improve the operational efficiency for the UHH Department of Physics and Astronomy. A modern optical telescope is required both to train undergraduate students in observatory operations and to conduct research projects with undergraduate student participation, either as assistants or in support of theses and other undergraduate student projects. It would also be used to support astronomy outreach programs in local high schools. A fully instrumented observatory, capable of conducting observations in all areas of modern observational astronomy, and of wide-field imaging surveys for extrasolar planets, supernovae, and other survey targets, is required to meet the instructional training requirements for the UHH astronomy program, to provide job training for careers in astronomy, and to meet the community outreach needs of the astronomy program. A new instructional observatory situated at the existing location of the UH 24-inch Telescope Observatory would provide the UHH undergraduate astronomy program with an educational facility of exceptional value for training local students for careers in astronomy and jobs in Mauna Kea observatories.

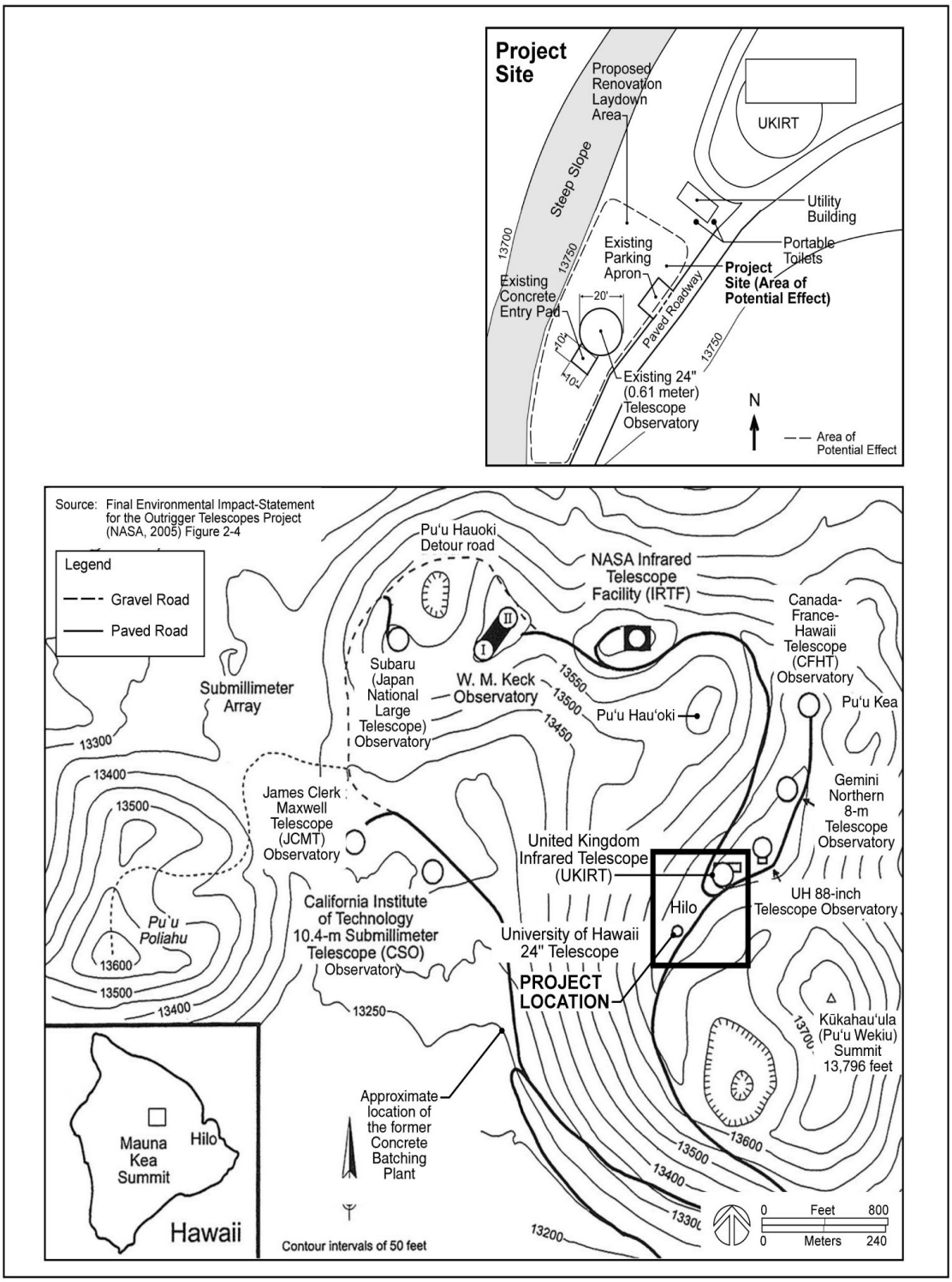
The action is needed to: (1) replace the existing 24-inch telescope which is inadequate for the needs of the UHH Department of Physics and Astronomy, principally because it has reached the end of its useful lifetime; and (2) help fulfill NSF's mission to support astronomy education in



Source: MKSR Master Plan, Fig IX-13

Location Map **Figure 1**

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii



Project Site **Figure 2**

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii

research and to maintain U.S. leadership in astronomy by providing adequate education and research facilities to U.S. astronomy students. The telescope has been used for over 30 years as a testbed for instruments designed for much larger telescopes, so its gearing is badly worn and the telescope no longer performs mechanically at a level suitable for instructional use. In addition, it was designed prior to the computer era and cannot easily be retrofitted for remote operation, an essential feature for routine educational use. Replacement parts are no longer available from the manufacturer. The building housing the 24-inch telescope is similarly obsolete with fiberglass wall cladding that is deteriorating and a dome that is in marginal mechanical condition; neither the walls nor the dome are insulated against dust and water infiltration.

1.3 PROJECT OBJECTIVES

The objectives of this project are to: (1) provide UHH with a modern optical telescope observatory which would meet the UHH Department of Physics and Astronomy's instructional and educational research needs for their undergraduate astronomy program, to provide job training opportunities for astronomy related careers to local residents, and to provide outreach to the community, including local high school science students; and (2) partially fulfill NSF's mission to support education and fundamental research in astronomy and to ensure that the U.S. maintains leadership in scientific discovery by providing adequate education and research opportunities to U.S. astronomy students ("Project Objectives").

1.4 REGULATORY OVERVIEW

This Environmental Assessment (EA) analyzes the potential impacts of the Proposed Action and reasonable alternatives and is intended to provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) pursuant to both Chapter 343, Hawai‘i Revised Statutes (HRS) (State Environmental Impact Statement Law) and the National Environmental Policy Act (NEPA).

The following is a discussion of the major Federal and State regulatory and permitting requirements that apply to the replacement and renovation activities under the Proposed Action.

1.4.1 Chapter 343, Hawai‘i Revised Statutes

This EA is prepared in compliance with Chapter 343, HRS; and Title 11, Section 200 (§11-200), Hawai‘i Administrative Rules (HAR) because it involves improvements to State lands (i.e., improvements to the UH 24-inch Telescope Observatory) and takes place in a State Conservation District. The purpose of Chapter 343, HRS is to establish a system of environmental review to ensure that environmental concerns are given appropriate consideration in decision-making along with economic and technical considerations.

This EA was prepared in accordance with Chapter 343, HRS and Section 11-200, HAR to provide sufficient evidence and analysis for determining whether to prepare an EIS or to issue a Negative Declaration/FONSI under Chapter 343, HRS.

1.4.2 National Environmental Policy Act

Because of the Federal funding, the potential environmental effects of the Proposed Action must be assessed in accordance with NEPA (42 U.S.C. §4321 et seq.), as implemented by the Council

on Environmental Quality regulations (40 CFR Parts 1500-1508) and NSF's NEPA regulations (45 CFR Part 640). This EA is being prepared in compliance with these standards.

1.4.3 Chapter 6E, Hawai‘i Revised Statutes Historic Preservation

The Hawai‘i State Constitution recognizes the value of conserving and developing the historic and cultural property within the State for the public good. Under Chapter 6E HRS (Chapter 6E), the State recognizes that the historic and cultural assets are among its most important assets and the rapid social and economic developments of contemporary society threaten to destroy the remaining vestiges of this heritage. Chapter 6E recognizes that it is in the public interest to engage in a comprehensive program of historic preservation at all levels of government to promote the use and conservation of such property for the education, inspiration, pleasure, and enrichment of its citizens. Before any agency or officer of the State or its political subdivisions commences any project which may affect historic property, aviation artifact, or a burial site, the agency or officer shall provide the State Historic Preservation Division (SHPD) an opportunity for review of the effect of the proposed project on the historic properties, aviation artifacts, or burial sites, consistent with Section 6E-43. Under Chapter 6E, HRS, land disturbing activities cannot be commenced until the SHPD has given its written concurrence. In this case, because UHH, a State agency, would renovate the UH 24-inch Telescope Observatory located on State lands, the Chapter 6E process is applicable to the Proposed Action.

1.4.4 Section 106, National Historic Preservation Act

Federal funding of the Proposed Action also invokes the National Historic Preservation Act of 1966 (NHPA) (as amended) (16 USC §470). NHPA recognized the nation's historic heritage and established a national policy for the preservation of historic properties as well as the National Register for Historic Places (NRHP). Section 106 of the NHPA requires Federal agencies like NSF to take into account the effects of Federal undertakings on historic properties and affords the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings. The proposed grant funds in this case make the Proposed Action qualify as a "federal undertaking." The Section 106 process guides NSF in the identification and evaluation of historic properties, assists in determining the effect of the undertaking on such properties, and facilitates the resolution of any adverse effects in consultation with consulting parties.

1.4.5 Coastal Zone Management Act

The purpose of the Coastal Zone Management Act (CZMA) of 1972, as amended (16 USC §145 et seq.) is to encourage coastal states to manage and conserve coastal areas as a unique, irreplaceable resource. Hawai‘i's Coastal Zone Management Program (Chapter 205-A, Hawai‘i Revised Statutes) implements the CZMA in the State of Hawai‘i. State agencies are required to comply with the objectives and policies of the Hawai‘i Program (§205-A 5(a), HRS). In this case, UHH, a State agency, must comply with the Hawai‘i's CZM Program.

1.4.6 Endangered Species Act

The Endangered Species Act (ESA) (16 USC §1531 *et seq*.) establishes a process for identifying and listing species. It requires all Federal and State agencies to carry out programs for the conservation of federally listed endangered and threatened plants and wildlife, and prohibits actions by Federal and State agencies that may adversely affect endangered or threatened

species, or critical habitat. Section 7 of the ESA requires Federal agencies to consult with the federal wildlife management agencies on actions that may jeopardize species or habitat.

1.4.7 State Conservation District Rules

The State Conservation District Rules (Chapter 13-5 HAR) regulate land use in the State Conservation District in which the Project Site is located. UHH will be required to secure a Conservation District Use Permit from the State's Board of Land and Natural Resources (BLNR) to implement the Proposed Action.

1.4.8 Environmental Permits and Required Approvals

Table 1 is a listing of Federal and State environmental permits, approvals and consultations that may be required for the Proposed Action and alternatives.

Table 1: List of Potential Permits, Approvals and Consultations

Permit/Approval/Consultation	Agency
Federal	
NEPA FONSI or Notice of Intent (NOI) to prepare an EIS	NSF
Section 106, NHPA consultation	SHPD, Office of Hawaiian Affairs (OHA), Kahu Ku Mauna, Royal Order of Kamehameha I, and Mauna Kea Anaina Hou
State of Hawai‘i	
Chapter 343, HRS Environmental Review and Determination (FONSI or EIS)	UHH
Conservation District Use Permit (Departmental)	DLNR
Chapter 6E, HRS Historic Preservation	SHPD
Project Consultation	Office of Mauna Kea Management (OMKM), Mauna Kea Management Board and associated councils
Renovation Plan Approval	UH President or Board of Regents
County of Hawai‘i	
Building Permits	Building Division

2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter presents a discussion of the Proposed Action, alternatives and a summary of effects. The alternatives described below represent a range of reasonable alternatives. The Proposed Action and the alternatives are analyzed in terms of how well they meet the Project Objectives, as described in Chapter 1.

2.1 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The following alternatives were analyzed:

- Proposed Action
- Telescope Replacement Without Building Renovations
- No Action

Each alternative is described below. A comparison of the environmental impacts of the Proposed Action and the alternatives carried through the analysis (i.e., the Telescope Replacement Without Building Renovation Alternative and the No Action Alternative) is presented in Table 2 at the end of this chapter.

2.1.1 Proposed Action

Utilizing Federal NSF grant funds, UHH proposes to replace an existing 24-inch telescope with a new 36-inch telescope and, using State funds, renovate an existing 37 year old, 420 sf observatory building located at the Project Site (Figure 1, Location Map, and Figure 2, Project Site). UHH proposes to replace/upgrade the existing dome, siding, interior wall panels, associated interior power and communication wiring, and doors utilizing the same foundation and footprint and install controls to make the facility remotely operable from the UHH campus ("Proposed Action"). UHH has received NSF funding to purchase a new, state-of-the-art 36-inch optical telescope for use in undergraduate instruction and educational research.

Under the Proposed Action, the existing dome, siding, interior wall panels, associated interior power and communication wiring, and double doors would be removed from the observatory building and replaced with new components with funds provided by the State of Hawaii. An additional door would be added to the north side of the observatory building (see Figure 3, Observatory Floor Plans, and Figure 4, Observatory Building Section). The renovated observatory building would be made weatherproof and would protect against water and dust infiltration. The Proposed Action would increase the dome height up to 12 inches. The proposed renovation and replacement would take approximately 14 to 18 weeks to complete, including a 2 week foul weather contingency. The cost of the renovation is less than $500,000.

When completed, the renovated observatory and new optical telescope would be the world's only educational observatory at a modern, major observatory site (Mauna Kea). The facility would mostly be operated remotely with occasional on-site visitors. Upon completion of renovations, the new UH 36-inch Telescope Observatory would employ one full time observatory technician assisted by the observatory director, a full time equivalent (FTE) UHH astronomy faculty member. Currently, the combined service staff for the existing UH 24-inch Telescope Observatory and the existing UH 88-inch Telescope Observatory consists of 7 people, of which only a small fraction of their time is used to service the UH 24-inch Telescope. Under the Proposed Action, this

arrangement would change; all maintenance of the facility would be performed by UHH personnel.

Under the Proposed Action, the telescope observatory would be operated as a field laboratory by the UHH Physics & Astronomy Department, largely in support of UHH astronomy educational programs and school/community outreach programs. The telescope would be operated and maintained by existing UHH staff, which would be augmented for this purpose. An operations budget has been committed to the project by the UHH administration. A dedicated 4 wheel-drive vehicle would be purchased for maintenance and operations by the facility. A remote operations center, machine shop, and instrumentation shop would be provided in the new Science & Technology building on the UHH campus; adequate high-speed optical fiber bandwidth exists between the observatory complex and the UHH campus. The operations center would be used to operate the observatory during most nighttime observing.

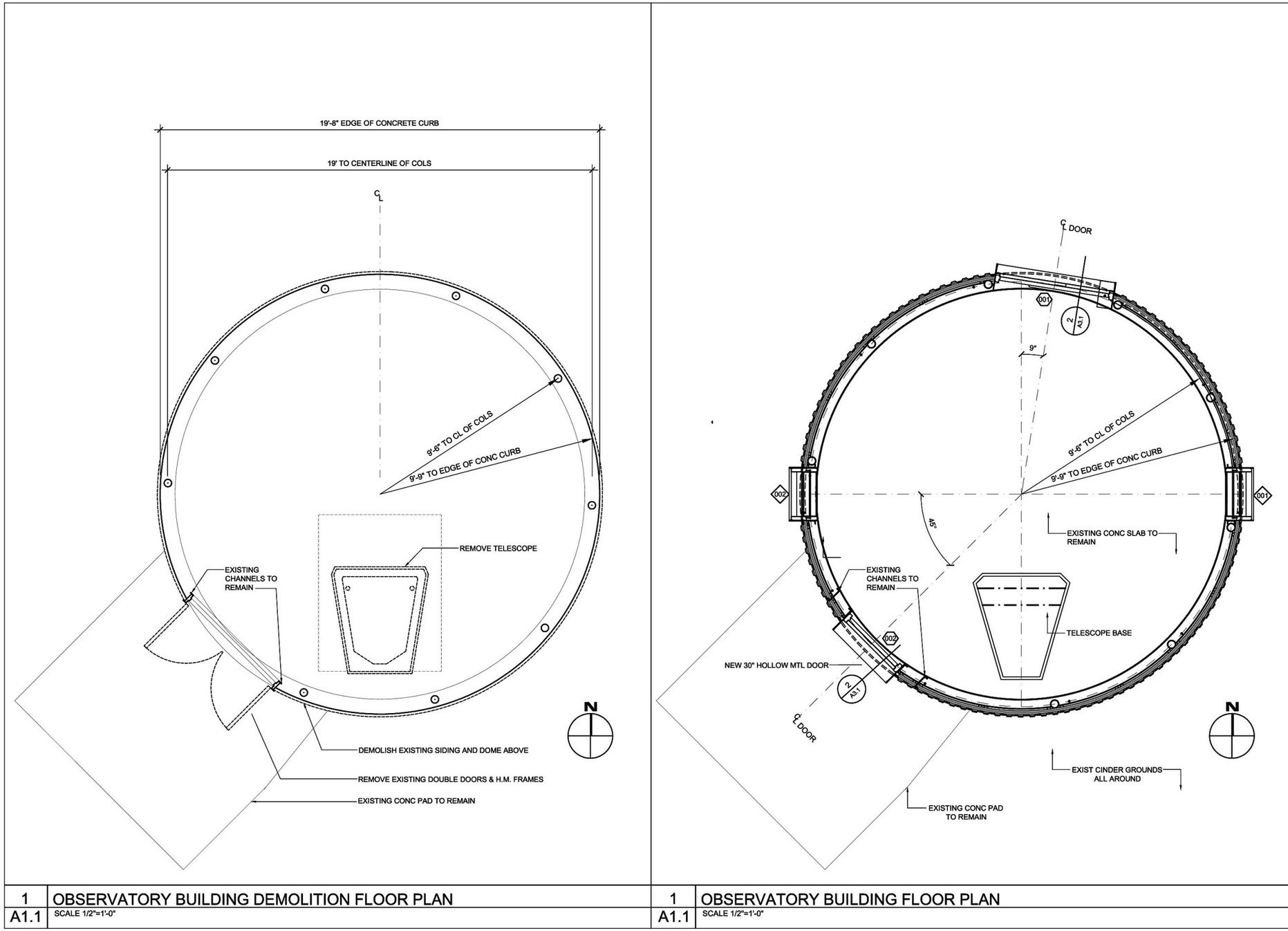
Daily operations would be similar to those of existing observatories in the MKSR: the telescope and associated instruments would be used to observe astronomical objects during most nights of suitable weather, and the facility would be maintained during daylight hours as required, expected to be about one time per week. The facility would occasionally used during daylight hours for observatory operations and maintenance training of UHH students. Most nighttime observing would be remotely controlled from the operations center on the UHH campus, with no one at the observatory site. Occasional nighttime observing sessions may be conducted at the site for student training; these would usually be during the first half of the night only, and would be relatively infrequent (about 1 night per month).

Specific operations of the facility, in order of most to least frequent, would largely be in terms of:

- Scheduled nighttime astronomical observations as a laboratory component of UHH astronomy courses, mostly remotely controlled;
- Nighttime observations in support of research programs conducted by UHH students for senior theses and independent research projects, most remotely controlled.;
- Sponsored research by UHH astronomy faculty, usually student assistants or co-investigators, mostly remotely controlled;
- Training of UHH students seeking employment in Mauna Kea observatories, in modern astronomical telescopes, instruments, and observatory management, mostly on-site;
- Outreach to local high school science classes in the forms of mentored observations and science fair projects, entirely remotely controlled;
- Research observations in collaboration with other universities, usually employing UHH student assistants, mostly remotely controlled; and
- Occasional nighttime observations in support of community outreach programs, entirely remotely controlled.

2.1.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative restricts the action to just the replacement of the 24-inch telescope. In this alternative, the observatory building would remain in its existing condition and the building would not be made weatherproof or be made protective against water and dust infiltration. Building maintenance and repairs would continue as currently programmed. Under this alternative, the new 36-inch telescope would not be completely remotely operable as the existing observatory dome is manually operated and would require someone at the observatory building to open and close the dome for each use of the telescope. Failure to renovate the building would increase operating costs by requiring more

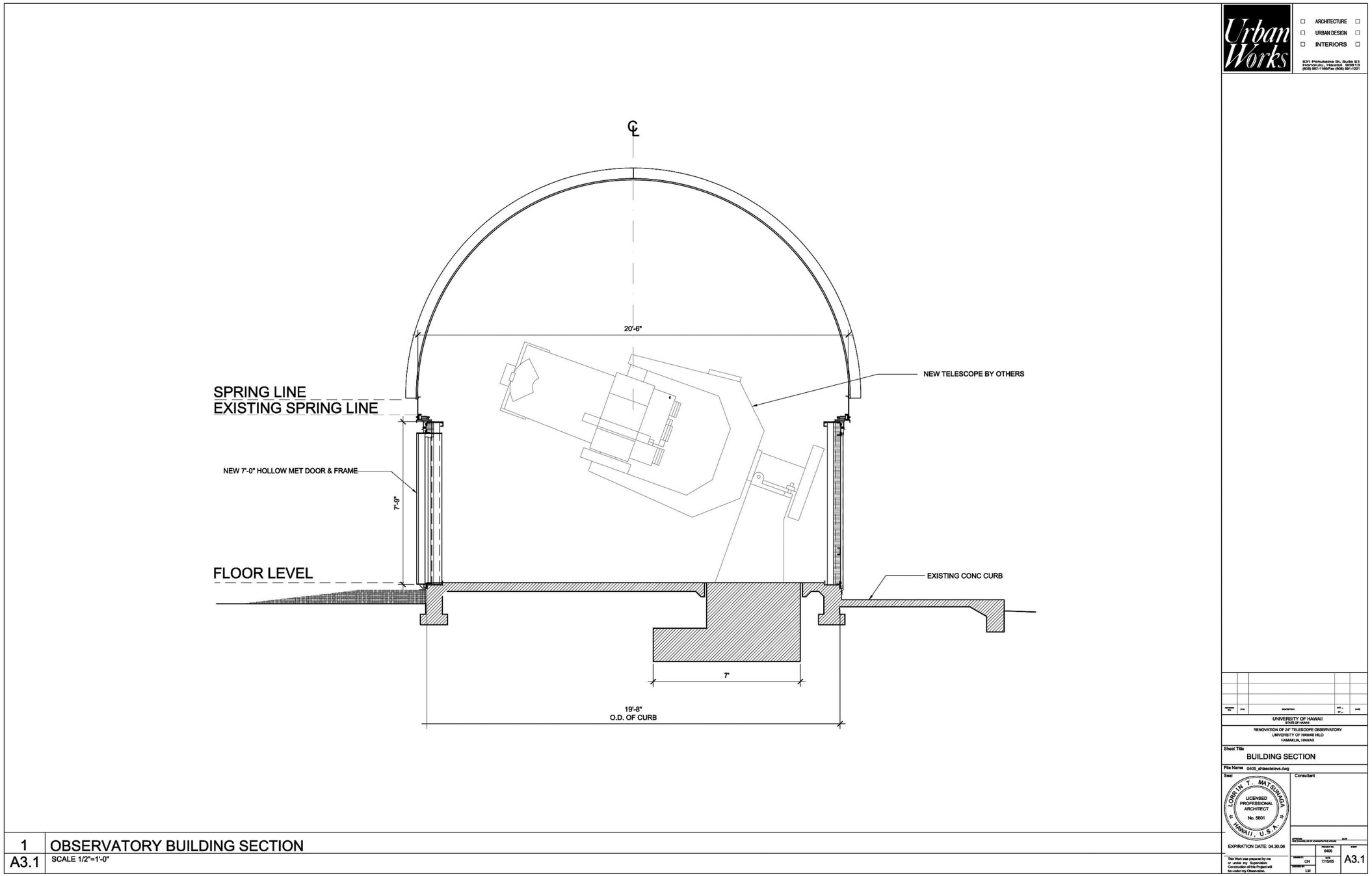


Source:
Urban Works 2005

Observatory Building Floor Plans

Figure 3

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii



Source:
Urban Works 2005

Observatory Building Section **Figure 4**

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii

frequent maintenance, including mirror re-aluminizations; decrease instrument performance efficiency due to anticipated dust and water damage to the optical surfaces and machinery components. Because of these limitations, the Telescope Replacement Without Building Renovation Alternative is logistically difficult and is considerably less desirable than the Proposed Action. However, the cost for this alternative would be less than the Proposed Action since the cost for the building renovations would not be included. Notwithstanding the shortcomings discussed above, the Telescope Replacement Without Building Renovation Alternative was considered viable and was included in the analysis of environmental effects because it would utilize the new 36-inch telescope; however, this alternative would not provide the complete remote operation capability to meet the project objectives and the instructional needs of UHH.

2.1.3 No Action Alternative

The No Action Alternative preserves the status quo, and assumes that the UH 24-inch Telescope Observatory would continue to operate with out-dated equipment. Under this alternative the utilization of the telescope would be expected to decrease as the technology becomes obsolete. Currently, the observatory is used by researchers during 40 percent of the nights and used once a month by UHH faculty and undergraduate students for instructional purposes. The cost for housing the students, staff, and researchers to access the site is approximately $125 per night per person with an average stay of 3 nights. Under the No Action Alternative, the quality of life for students, staff, and researchers utilizing the observatory would continue to degrade. This alternative would seriously limit UHH's ability to offer realistic training to students seeking careers in astronomy. The No Action Alternative would not provide the facilities necessary to meet the UHH Department of Physics and Astronomy's goal for increased community outreach since the observatory and telescope would still be manually operated and visitation to the observatory is not open to the general public. The No Action Alternative would not achieve the Project Objectives defined in Chapter 1 but was carried through the analysis as a benchmark to compare the magnitude of environmental effects of the alternatives, including the Proposed Action.

2.1.4 Alternatives Considered But Eliminated From Further Evaluation Demolition and Site Restoration

This alternative is supported by participants in previous environmental reviews of observatory projects at Mauna Kea. Strong sentiments have been expressed to remove the observatories from the mountain and restore it to its pre-contact condition. Under this alternative, the existing UH 24-inch Telescope Observatory would be demolished and the site restored to its original condition. Complete restoration would essentially be impossible due to grading (flattening of the ridgeline during road and observatory construction) and subsequent compaction of the site. This alternative would not enhance the UHH undergraduate astronomy program, would not provide job training for local residents for careers in the astronomy community, and would not provide outreach to the community including high school science students. Because this alternative did not meet the project objectives, it was not considered a viable alternative and was eliminated from further consideration.

Leasing. This alternative involves leasing observatory time from existing MKSR observatories. About 30 to 40 nights per semester would be needed, at a minimum, to realize the UHH astronomy program's academic needs. No time is available on current MKSR telescopes. All the

telescopes are heavily oversubscribed for research purposes only, typically by a factor of 3 or 4. Diverting significant amounts of current telescope time to educational purposes would detrimentally affect research at one of the world's premiere research facilities. Since large (as opposed to small) telescope access is not needed for educational purposes, this would be a mis-allocation of scarce resources.

Relocation/New Construction at the MKSR. This alternative involves the construction of a 2- to 3-meter telescope observatory on the site of the existing UH 24-inch Telescope Observatory and a new facility to be used by UHH at the existing "Utility Building" north of the Project Site (see Figure 2, Project Site), in accordance with the Mauna Kea Science Reserve Master Plan (hereinafter known as the "Master Plan"; UH, 2000). Proposed improvements would include: 1) demolition of existing structures, pavements and utilities; 2) construction of a new building to house a new 2-to 3-m optical telescope at the Project Site and a new building to house a new 1-m optical telescope at the Utility Building site; 3) installation of a 2-to 3-m optical telescope at the Project Site and installation of a 1-m optical telescope at the Utility Building site; and 4) installation of electrical and communication systems, potable water systems, and wastewater systems at both locations. The Astronomy Precinct is a culturally and biologically sensitive environment. Ground disturbance at the Project Site and the Utility Building site could present new important issues pertaining to cultural and natural resources at the summit. Therefore, this alternative is not considered a viable alterative and has been eliminated from further consideration.

2.2 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES

Table 2 summarizes the environmental effects of the Proposed Action and the reasonable alternatives. The information in the table is summarized from Chapter 4, Environmental Consequences. Because the Demolition/Site Restoration Alternative, Leasing Alternative, and the Relocation/New Construction Alternative do not meet the project's objectives, they are not discussed further in the EA.

Table 2: Summary of Environmental Effects of the Proposed Action and Alternatives

Resource Issue	Proposed Action	Replacement Without Renovation	No-Action
Land Use Compatibility	Under the Proposed Action the telescope observatory would be used primarily for instruction and educational research of undergraduates enrolled in the astronomy program of the UHH Department of Physics and Astronomy. Currently the facility is used primarily for research and to a lesser extent by UHH for undergraduate instruction for the astronomy program. The land use under the Proposed Action is compatible with the surrounding land uses within the Astronomy Precinct.	Same as Proposed Action.	No impact.
Cultural Resources	Historic Properties: The Proposed Action would not involve ground disturbing activities, changes in the landscape or access to the Project Site. Exterior renovations would be made to the observatory building, including a potential increase in the overall dome height of up to 12 inches which would not adversely affect important view planes. A significant decrease in required on-site support due to remote operations capability would be achieved. Proposed construction activities would be short in duration (14-18 weeks) and would follow best management practices to minimize disturbance to cultural practitioners. Based on a careful review and analysis, and in accordance with Section 106 of the NHPA, NSF has determined that the Proposed Action would result in “no historic property affected”. The NEPA and Section 106 process were run concurrently and public comments were invited. NSF has sought concurrence with this determination from SHPD, OHA, Kahu Ku Mauna, the Royal Order of Kamehameha I, and Mauna Kea Anaina Hou. SHPD, OHA, Kahu Ku Mauna have provided comments and SHPD has indicated its concurred with the determination.	Modest decrease of current level of on-site support due to remote telescope aiming capability would decrease the overall cumulative impact of development in the sacred summit area.	Retains manual operation of the telescope and dome requiring more trips and on-site support than either the Proposed Action or Replacement Without Renovation Alternative, which contributes to the overall cumulative impact of development in the summit area.

Resource Issue	Proposed Action	Replacement Without Renovation	No-Action
Cultural Resources (Continued)	Mauna Kea Anaina Hou expressed that the group has never signed a Memorandum of Agreement (MOA) pursuant to Section 106 NHPA relating to previous development of Mauna Kea. No response was received from the Royal Order of Kamehameha I. Correspondence related to the Section 106 consultation process is provided in Appendix B. Chapter 343, HRS – Cultural Resources: The presence of shrines and monuments in the summit region of Mauna Kea indicates that certain religious observances or worship services have been conducted there. Contemporary religious practitioners who continue to pay homage to the deities enshrined in their early forms on Mauna Kea and to the ‘uhane (spirits) of their ancestors whom they believe also reside or visit the sacred grounds. The Proposed Action would not impact the current abilities and rights of contemporary religious practitioners to access the area around the Project Site.		
Visual Environment	Replacement of the dome and renovation of the observatory exterior would improve the visual environment.	The continued degradation of the existing observatory building and dome would negatively impact the visual environment.	Same as the Replacement Without Renovation alternative.
Traffic	Short-term renovation period negative impacts associated with project-related vehicles. Decreased traffic volumes on regional and summit roadways during the operational period due to remote operation capability and improved building insulation.	Similar to the Proposed Action. Traffic volumes on regional and summit roadways during the operational period would be higher than the Proposed Action. Although the telescope would be remotely aimed and operated, on-site personnel (and associated vehicle trips) would still be required to open and close the dome for each use of the telescope. Increased frequency of maintenance visits resulting from poor building insulation.	Continued need for on-site support to aim the telescope and open and close the dome. Increased frequency of maintenance visits resulting from poor building insulation.

Resource Issue	Proposed Action	Replacement Without Renovation	No-Action
Infrastructure	No change in infrastructure outside of the building footprint would be required. Replacement of the building's outdated electrical and communications systems would be required but would have no impact outside of the observatory building.	Same as the Proposed Action.	No impact.
Topography, Geology, Soils, Flood Hazard, Ground/Surface Water Resources	No impact to the topography, geology, soils, flood hazard, groundwater and/or surface water resources under the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.
Biological Resources (Flora and Fauna)	No effect on the Wēkiu bug (*Nysius wekiuicola*), a candidate for listing under the Endangered Species Act or other protected biological resources. Although present at the summit, the Wēkiu is not found within the Project Site which has been disturbed and does not offer the loose packing of cinder material required for the bug's habitat	Same as the Proposed Action.	Same as the Proposed Action.
Air Quality and Noise	Local renovation period air quality and noise disturbance. Remote operational capability would reduce need for on-site support and associated vehicle trips, reducing air quality and noise impacts.	Limited remote operation capability would result in a modest reduction in air quality and noise impacts.	No change from current level of air quality and noise impact.
Hazardous and Regulated Materials	No significant impact. Any hazardous and regulated materials encountered would be handled in accordance with applicable regulations.	Same as Proposed Action.	Same as the Proposed Action.
Socio-Economic	Positive benefit for UHH astronomy program students and staff with beneficial employment enhancement via career training to the community during the operational period. Minor beneficial island-wide effects associated with renovation-period employment opportunities and associated government tax revenues. Insignificant increases in indirect/induced spending and impact to local businesses during the operational period. No impact to children and minority/ disadvantaged populations.	Similar to the Proposed Action. The UHH astronomy program would be improved; however, observatory building would still require on-site personnel for each use of the telescope. Renovation-period employment would be less.	The existing manual operation of the telescope would severely restrict the ability to conduct high school outreach programs and would limit UHH's ability to support an undergraduate astronomy program.

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3 AFFECTED ENVIRONMENT

This chapter describes the environmental setting of the Project Site and the environmental resources within the area of potential effect.

3.1 OVERVIEW

The Project Site is located at the current site of the UH 24-inch Telescope Observatory. The observatory sits on the southeastern side of the 528-acre Astronomy Precinct within the 11,288-acre MKSR located at the summit of Mauna Kea, Hāmākua, island of Hawai‘i, State of Hawai‘i (Figure 1, Location Map). It is located 40 miles northwest of the town of Hilo and 26 miles southeast of the town of Waimea. The Project Site is approximately 6 miles northwest of the Hale Pōhaku and the Mauna Kea Visitor Information Station. It can be reached from Route 200 – the narrow and winding Saddle Road, so named because it runs between the two major volcanic mountains, Mauna Loa and Mauna Kea, at an elevation of 6,600 feet. The Mauna Kea Access Road intersects the Saddle Road at Mile 28 and winds its way up the slopes of Mauna Kea (IfA 2005).

3.2 LAND USE COMPATIBILITY

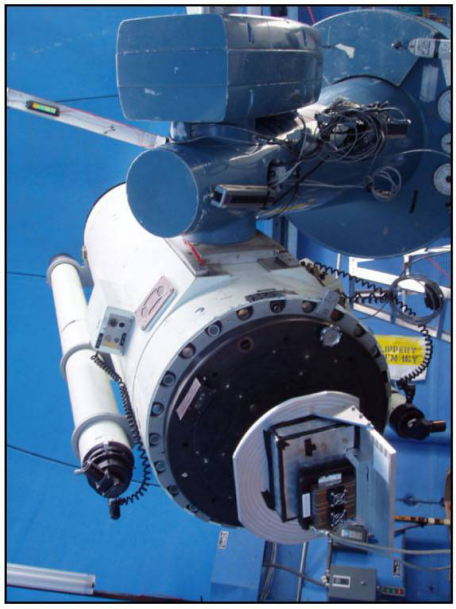
The Project Site is located on the southeast edge of the Astronomy Precinct on a ridgeline within the cluster of three cinder cones: Pu‘u Hau‘oki, Pu‘u Kea, and Pu‘u Wēkiu (see Figure 1, Location Map). The Project Site consists of an approximately 20,000 sf area, encompassing the proposed renovation lay-down area, the observatory building, which contains a 24-inch optical telescope and associated equipment, and a 10-foot by 10-foot concrete entrance pad (see Figure 2, Project Site). The proposed lay-down area is on the unpaved, graded area, commonly used by summit tourists and visitors for parking, located immediately north and south of the observatory building. Currently, the telescope observatory is primarily used for research and is used approximately once a month for instructional purposes by UHH faculty for their undergraduate astronomy program. Figure 5 presents four photographs of the existing UH 24-inch Telescope Observatory and environs at the time of the October 17, 2005 site visit.

North of the proposed renovation lay-down area are two portable toilets and a small, one-story cinderblock building referred to as the “Utility Building” which is also used by observatory workers as a warming area and lunch shed (Figure 2, Project Site). Other uses in the vicinity include access roadways and astronomy observatories to the northeast and northwest and access roads to the south. Northeast of the Project Site are the United Kingdom Infrared Telescope (UKIRT) Observatory, the UH 88-inch Telescope Observatory, the Gemini Northern 8-m Telescope Observatory (the Gemini), and the Canada-France Hawai‘i Telescope (CFHT) Observatory (see Figure 2, Project Site, and Figure 6, Aerial Photograph of Summit Telescopes). North and west of the UH 24-inch Telescope Observatory are the California Institute of Technology 10.4-m Submillimeter Telescope Observatory (CSO), the James Clerk Maxwell Telescope (JCMT), the Subaru Observatory (Japan National Large Telescope), the W.M. Keck Observatory, the NASA Infrared Telescope Facility (IRTF), and the Submillimeter Array (see Figure 2, Project Site, and Figure 6, Aerial Photograph of Summit Telescopes). The Mauna Kea Ice Age Natural Area Reserve (NAR) is located within the summit area approximately 6,000 feet south of the Project

View from UKIRT Observatory facing southwest towards the Project Site. Note the utility building on the right.

View towards the north facing the UH 24-inch Telescope Observatory in the foreground. UKIRT Observatory in the middle and UH 88-inch Telescope Observatory in the background.

Southwest elevation of 24-inch UH Telescope Observatory



Existing 24-inch Telescope

Figure 5

Photographs of the Project Site and Environs

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii

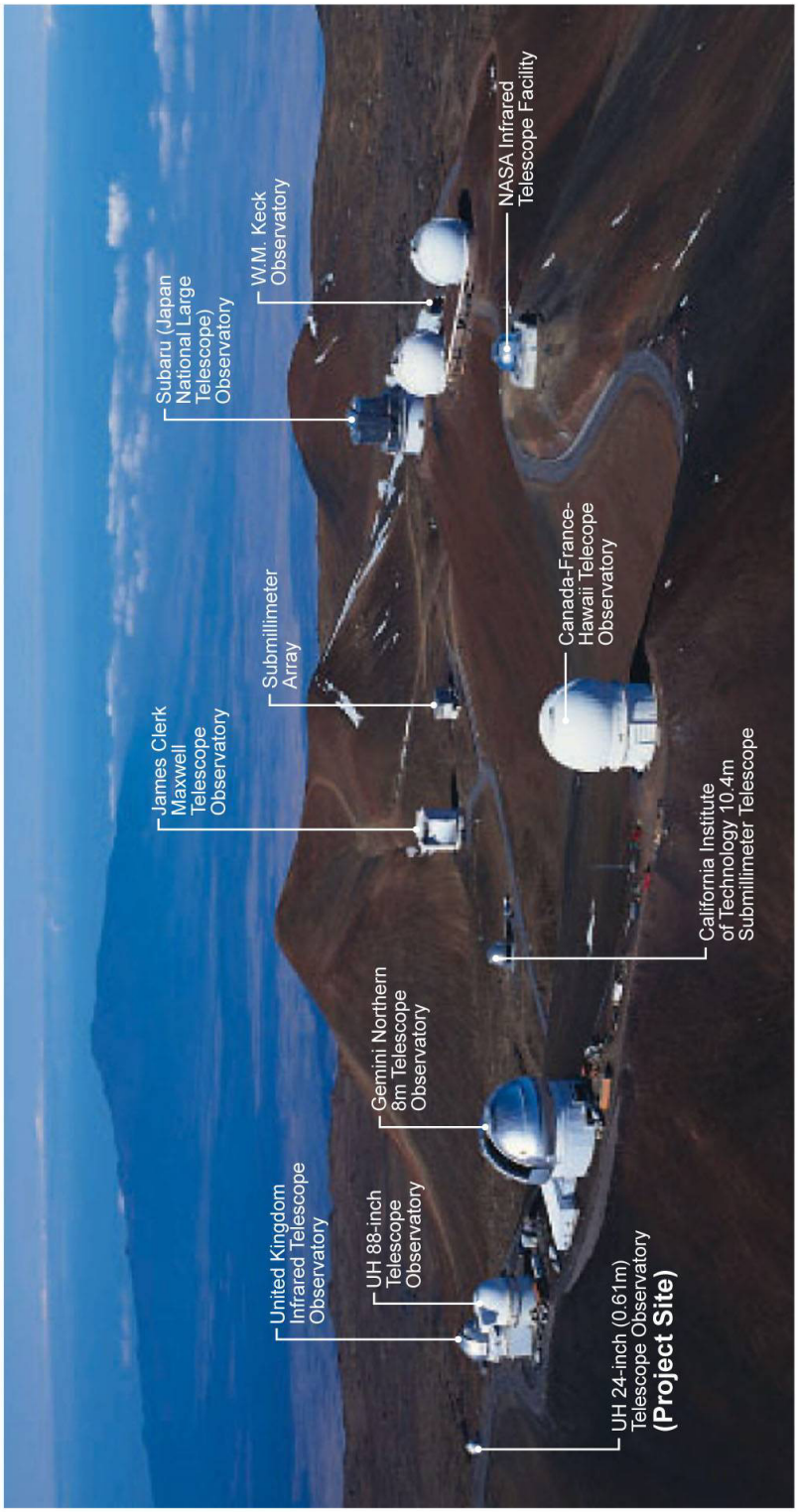


Figure 6

Aerial Photograph of Summit Telescopes (View from the East)

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii

Site (see Figure 1, Location Map). A former concrete batching plant is located approximately 1,500 feet southwest from the Project Site (Figure 2, Project Site).

Recreational activities in the MKSR include sightseeing, skiing, snow play, and hiking. The most popular ski runs are the Poi Bowl located east of the CSO and the King Kamehameha run (an area east of the summit). Hiking is most popular in the NAR and along existing roadways. Visitors come to the summit for sightseeing in commercial vehicles, personally owned vehicles, and rental vehicles.

Lands surrounding the Project Site consist of the MKSR which is leased by the UH from the State of Hawaiʻi for use as a scientific complex and is located in the State Conservation District (Resource subzone, see Figure 7, Hawaiʻi County Conservation District Subzones). The Astronomy Precinct is centered near the middle of the summit plateau while the remainder of the MKSR serves as a buffer area (see Figure 1, Location Map). The MKSR is composed of those lands above approximately the 12,000-foot elevation, excluding the parcels that make up the Mauna Kea Ice Age NAR (UH 1999). Support facilities for science activities are provided at Hale Pōhaku, located approximately 6 miles south of the Astronomy Precinct (see Figure 1, Location Map).

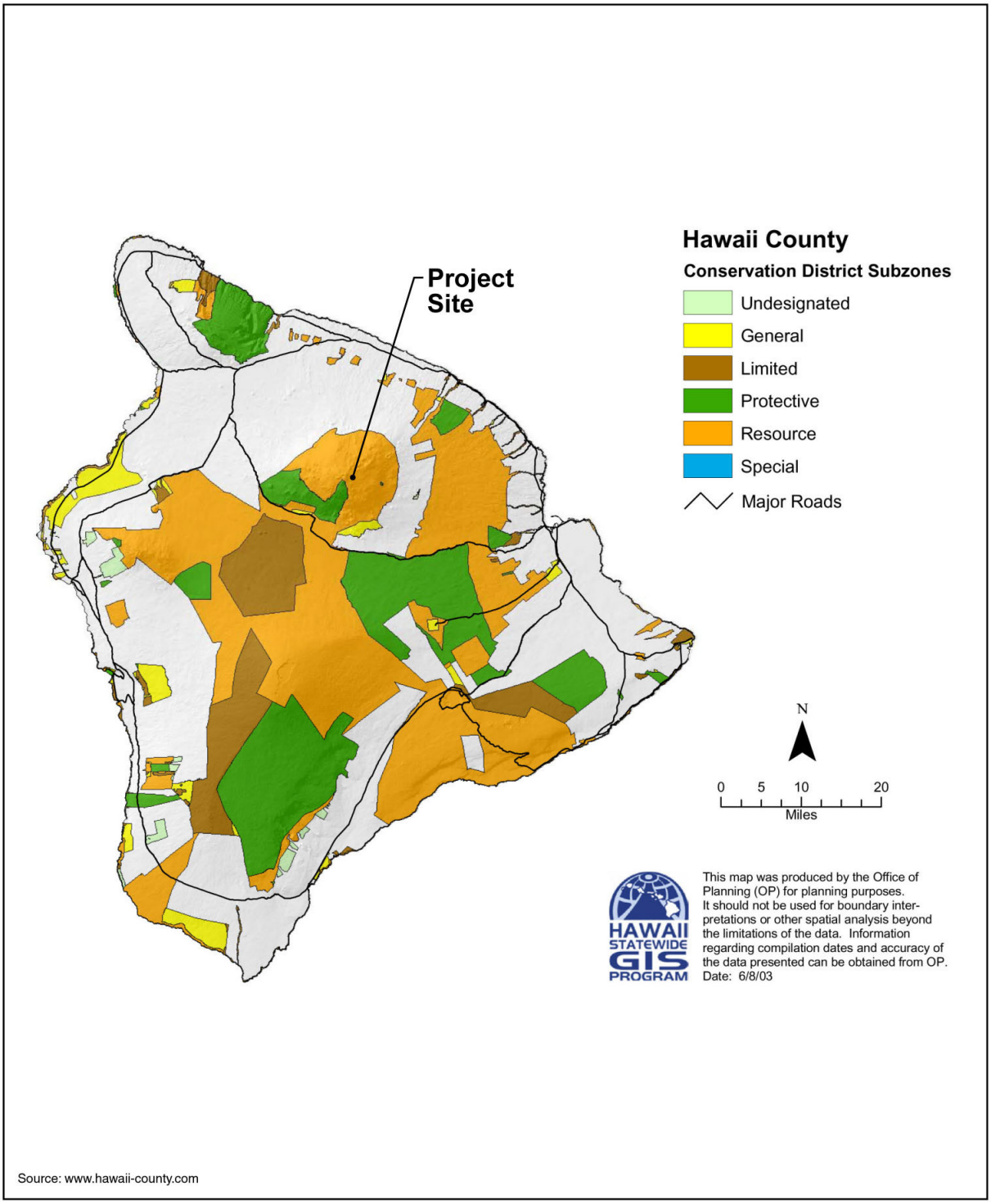
3.3 CULTURAL RESOURCES

The following is a summary of the cultural resources for the Project Site determined from previous surveys and assessments detailed in the Final EIS (FEIS) for the MKSR Master Plan (UH 1999) and the FEIS Outrigger Project (National Aeronautics and Space Administration [NASA] 2005). This information is considered to be current and applicable to the Project Site. The NHPA process and the NEPA process for this project were run concurrently and public comments were invited.

3.3.1 Historic Properties

Cultural resources, as defined by the NHPA, include both historic properties and cultural values or traditional cultural practices. Historic properties are defined by the NHPA as any prehistoric or historic districts, sites, buildings, structures, or objects, significant in American history, architecture, archaeology, engineering, or culture that are included in, or eligible for inclusion on, the NRHP. Historic properties include archaeological sites, historic buildings and structures, historic districts, and other evidence of human activity, as well as artifacts, remains, and records related to and located within such properties. Historic properties also include places of traditional religious and cultural importance to an Indian tribe or a Native Hawaiian organization. These traditional cultural properties are places associated with the practices and beliefs of a living community, are rooted in its history, and are important in maintaining the continuing cultural identity of the community. Historic properties are protected under Chapter 6E HRS, Section 11 of the State Constitution, and the NHPA.

Cultural values or traditional cultural practices reflect the beliefs of particular ethnic or cultural groups. These values and practices are identified in ethnographic studies and other personal accounts. The American Indian Religious Freedom Act of 1978 makes it Federal policy to protect and preserve the rights of indigenous groups, including Native Hawaiians, to practice their



Hawaii County Conservation District Subzones **Figure 7**

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii

traditional religion, access sites, and to conduct ceremonial and traditional rites. Cultural values and traditional cultural practices are further described in Section 3.2.2 of this EA.

The UH 24-inch Telescope Observatory building does not have exceptional importance or meet the NRHP eligibility criteria for historic significance (UH 1999). The UH 24-inch Telescope Observatory was constructed in 1968 as part of the initial development of the MKSR. In 1968, the BLNR recognized the importance of Mauna Kea for astronomy observations and leased 11,288 acres of land that comprises the MKSR to the UH for a 65 year period. The 37-year old observatory building is not considered an historic architectural resource. Historic properties that are located in the vicinity of the Project Site include an historic district, a national historic landmark (NHL), archaeological sites, historic buildings, and traditional cultural places (see Figure 8, Archaeological Sites, and Figure 9, Cultural Landscape). The historic district, NHL, archaeological sites, and historic buildings are discussed in the following paragraphs. Traditional cultural places are discussed in Section 3.2.2.

Historic District

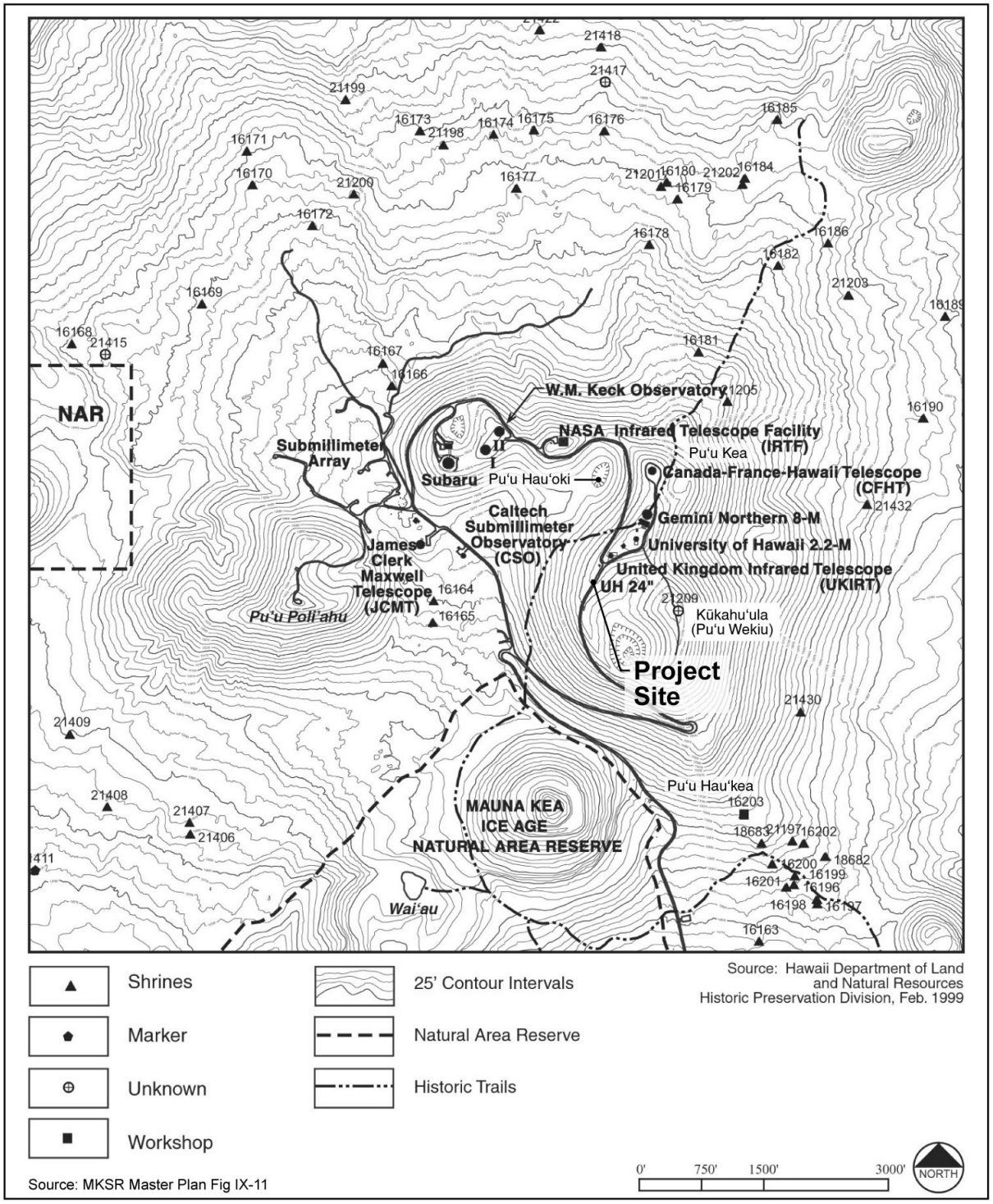
The location of the Project Site lies within the cluster of three cinder cones: Puʻu Hauʻoki, Puʻu Kea, and Puʻu Wēkiu that form the summit of Mauna Kea (see Figure 9, Cultural Landscape). SHPD Archaeologists have concluded this cluster of cones is an historic property that probably bore the name of Kūkahauʻula (NASA 2005). Their conclusion is based on evidence that at least a part of the summit cluster was named for Kūkahauʻula, a figure who appears in legends about Mauna Kea as an ʻaumakua (family deity) of fishermen. Furthermore, the SHPD has stated it intends to propose the summit region of Mauna Kea for inclusion on the NRHP as an historic district, because “it encompasses a sufficient concentration of historic properties (i.e. shrines, burials and culturally significant landscape features) that are historically, culturally, and visually linked within the context of their setting and environment” (See Figure 8, Archaeological Sites, and Figure 10, Cultural Landscape; UH 1999; NASA 2005).

National Historic Landmark

The Mauna Kea Adze Quarry, the largest pre-industrial quarry in the world, used by Hawaiians before Contact to obtain basalt for stone artifacts, is located approximately 6,000 feet south of the Project Site. It is listed as a NHL by the National Park Service under National Register No. 66000285 (UH 1999) (See Figure 8, Archaeological Sites; UH 1999) and is located within the Mauna Kea Ice Age NAR.

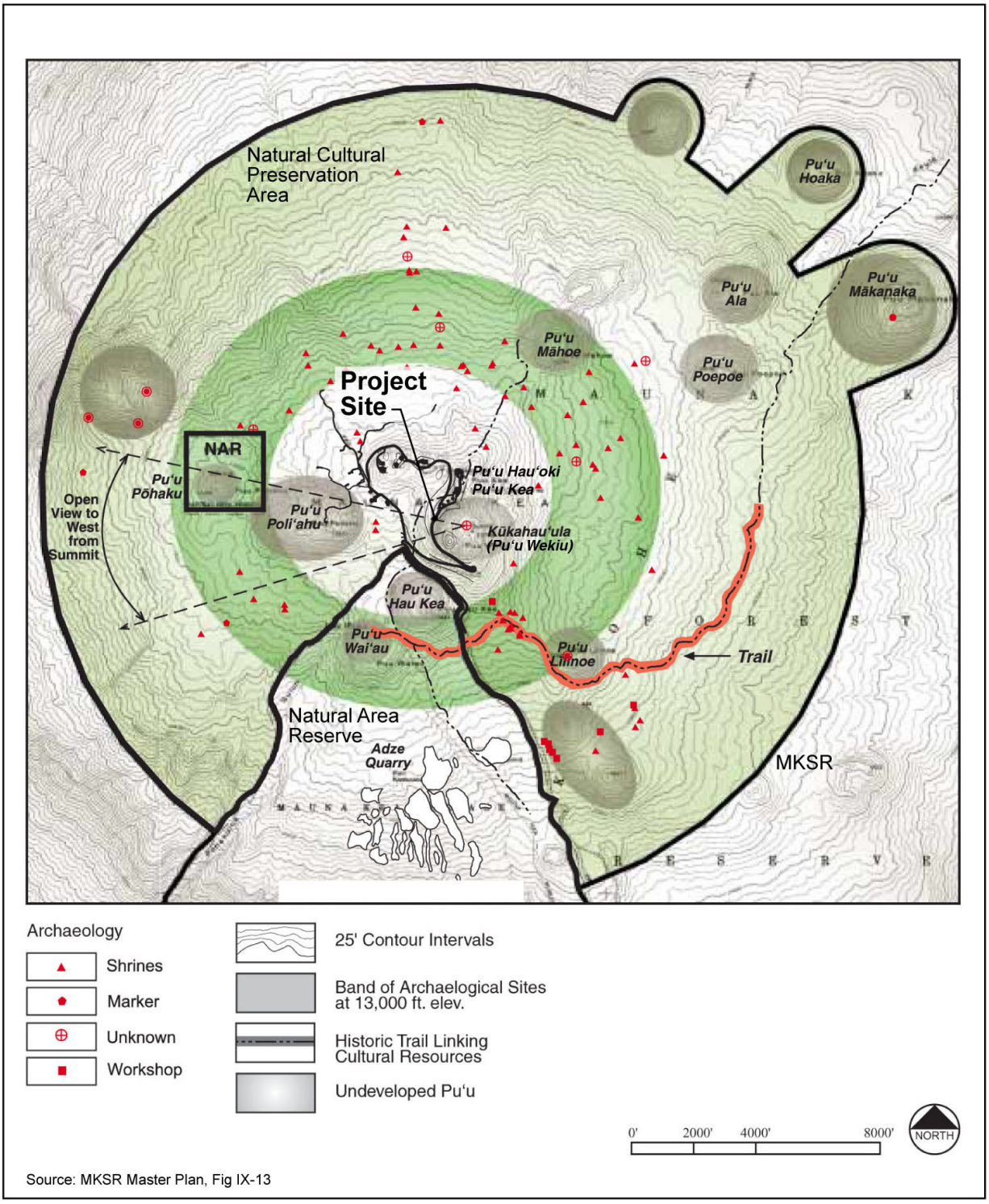
Archaeological Sites

Over the past 20 years, archaeologists have surveyed approximately 27 percent or 3,000 acres of the MKSR. Surveys to date have identified 93 archaeological sites within the MKSR; however, no individual archaeological sites have been identified within the Project Site (see Figure 8, Archaeological Sites). Seventy-six of the sites are shrines, 4 are adze-manufacturing workshops with shrines, and 3 are stone piles that serve as markers. One burial site and 4 possible burial sites (marked by cairns) have also been identified outside the Project Site, but within the MKSR. Five sites are of unknown function (See Figure 8, Archaeological Sites, and Figure 9, Cultural Landscape; UH 1999). The SHPD is in the process of preparing a Historic Preservation



Archaeology Sites Map **Figure 8**

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii



Source: MKSR Master Plan, Fig IX-13

Cultural Landscape Map **Figure 9**

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii

Management Plan for Mauna Kea. As part of this plan, archaeologists have inventoried and summarized the known archaeological sites that provide a wealth of knowledge of past use of the mountain. No archaeological sites have been found at the Project Site (See Figure 8, Archaeological Sites, and Figure 9, Cultural Landscapes; UH 1999).

Historic Buildings

There are no historic buildings at the Project Site (UH 1999). The stone cabins within Hale Pōhaku, approximately 6 miles south of the MKSR, are more than 50 years old and the SHPD considers these two buildings to be historic properties (UH 1999).

3.3.2 Chapter 343, Hawai‘i Revised Statutes – Cultural Resources

Cultural resources, as used in Chapter 343, HRS, include the “practices and beliefs of a particular cultural or ethnic group or groups” (Office of Environmental Quality Control [OEQC] 1997). The types of cultural practices and beliefs to be assessed may include “subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs” (OEQC 1997), and may also include traditional cultural properties or other historic sites that support such beliefs and practices.

Places of Traditional Cultural Significance

Documentary archival research and oral history interviews with kupuna familiar with the mountain and cultural practitioners have identified several traditional cultural places that may be eligible for the NRHP on Mauna Kea (NASA 2005). The mountain is a traditional cultural property, but there are also particular landscape features on the mountain that hold individual traditional importance within Hawaiian culture. Three places that have been identified by the SHPD as traditional cultural properties are: (1) Kūkahau‘ula (Site 21438); (2) Pu‘u Līlīnoe (Site 21439); and (3) Wai‘au (Site 21440). Other traditional places that may qualify include: (1) Pu‘u Poli‘ahu; (2) Pu‘u Mākanaka and Kaupō; (3) Kūka‘iau-‘Umiko Trail; and (4) Mauna Kea-Humu‘ula Trail (see Figure 8, Archaeological Sites, and Figure 9, Cultural Landscape; NASA 2005). An important view plane to the west from the Pu‘u Wēkiu summit is also shown on Figure 9.

Cultural Practices and Beliefs

Cultural values and traditional cultural practices include intangible resources that are important to culture. Contemporary cultural practices relate to current beliefs or practices. Traditional cultural practices on Mauna Kea are associated with resource locations (e.g., stone, water, and hunting), trails, individual topographic features, burial locations, and cultural landscapes (NASA 2005).

According to the 2005 FEIS for the Outrigger Project (NASA 2005), in Native Hawaiian society, cultural and religious practices and observations are inseparably intertwined; the good favor of the gods (na akua) is sought before every endeavor, from the very mundane tasks to the most fearsome ventures. Na akua were believed to dwell in earthly forms such as the pu‘u on Mauna Kea and the waters spouting from the earth or running in the streams. In addition, Native Hawaiians deified their family ancestors as na‘aumakua which took the form of animals such as sharks, owls, hawks, and many others. These ancestors were asked to support and assist in the coming effort from planting taro to waging war.

Furthermore, Native Hawaiians also delineated the inland areas of the islands according to the right, or restriction, of access by the maka‘anaina, or commoner, and the presence of the deities. Thus, wao kanaka is an inland area of lower elevation where the maka‘anaina can inhabit or move about freely. Wao kele is the upland forested area into which the maka‘anaina can enter for the purpose of gathering materials for their daily lives. Above the wao kele is the wao akua, also called the wao ke akua, which is believed be inhabited by na akua; here the maka‘anaina hesitate to enter, and only did so with prayer and great respect. The wao akua is generally the desert region above the tree line or wao kele, and is believed to be inhabited by na akua; hence, the name. Some cultural practitioners believe that only persons of the ‘ali‘i (chiefly) class and the highest priests or kahuna nui were permitted to enter the wao akua. An area inhabited by na akua may also be called pō. The summit of Mauna Kea from about the 9,000-foot level is considered wao akua, a sacred region, with kapu, or restriction in what may be done on the land (NASA 2005).

The presence of shrines and monuments in the summit region of Mauna Kea indicates that certain religious observances or worship services have been conducted there. However, there is no written record or description of those ceremonies solely because the Hawaiian language was unwritten up until the arrival of American missionaries (mid 1800’s). Notwithstanding, all things of importance at earlier times were handed down generation after generation through oral history. Although a great deal was lost over time, a great deal continues to be used and practiced by cultural practitioners of today (see Section 6.1 letter from Kahu Ku Mauna).

Contemporary religious practitioners who continue to pay homage to the deities enshrined in their early forms on Mauna Kea and to the ‘uhane or spirits of their ancestors whom they believe also reside or visit the sacred grounds. Those contemporary practitioners consider themselves na koa, or warriors, whose enduring task is to protect the mountain from unwarranted intrusion, particularly under the present circumstances. They ardently believe that Mauna Kea is inhabited by akua or ‘uhane and that the development on the summit is an invasion by ordinary man into the sacred realm. The practitioners find that the presence of the observatories on the summit, and the noise emanating from them and created by vehicular traffic, is destructive of the silence and spiritual ambience that is necessary to their proper religious observances. Additionally, the observatories obscure their view of certain stars, thus interfering with the practitioners’ proper alignment with the stars for worship, and preventing an unobstructed 360-degree view of the summit region and the neighboring mountains (NASA 2005).

Each pu‘u, at the summit and at the lower elevations, has a cultural and spiritual significance; most are named for the akua, whose forms are represented by the pu‘u, stars, and other formations of nature. Moreover, they do not stand-alone; they each have a relationship to the other pu‘u that is meaningful to the practitioners. By orienting their worship with the alignment of the pu‘u the practitioners are able to determine whether they are in a spot that is propitious for worshipping na akua and seeking their assistance. The presence of the observatories, and the removal of the top of pu‘u interferes with the practitioners’ ability to achieve that correct orientation (NASA 2005).

In addition, some of the religious practitioners have concerns regarding the use of septic systems on the mountain. They are concerned that the septic systems have caused the green coloration of Lake Wai‘au’s water, thus interfering with the practitioner’s ability to see the reflection of the

stars on the water (NASA 2005). However, historical accounts have indicated that the green coloration of the lake was present prior to the construction of astronomy facilities at the summit (see Section 6.2 letter from OMKM). Recent research on the lake's water quality and isotope studies indicate that the lake water is derived from precipitation and snow melt originating in the lake's vicinity (NASA 2005).

According to the 2005 FEIS for the Outrigger Project (NASA 2005), the practitioners, and many other families in the community, continue to carry the umbilical cords (piko) of their newborn children to the summit for concealment. This is a deeply spiritual activity, and the piko may be concealed anywhere on the summit. Only the families, who mark the site by alignment of physical features, including the pu‘u and other geographic characteristics as well as the stars, know the location of the piko. Thus the ability to achieve orientation through the alignment of the pu‘u is critical. In keeping with this tradition, each family considers itself as caretaker of a sector on the mountain in the vicinity of the piko location.

According to the FEIS for the Outrigger Project, many families erect family shrines (‘ahu) and others visit the adze quarry to engage in their cultural and religious rituals (NASA 2005). The practitioners consider their observances as being in place of those ceremonies lost in antiquity. They are "adaptations" of present day practices to allow them to worship na akua and na ‘aumakua in proper fashion and with proper reverence. One of those adaptations is the spiritual observance of the winter solstice begun in 1998. The practitioners interviewed deemed it proper, as part of the protest against the development of the summit, to observe the solstice, much as they believe their ancestors observed the passage of the seasons. The event is observed by gathering at Pu‘u Huluhulu at a lower elevation of the mountain and proceeding on foot up to the summit with chants and prayers. During their first observance the practitioners erected a lele or altar on the summit (NASA 2005).

Cultural practitioners assert that a cumulative impact assessment must include consideration of the developments' impact on the whole mountain, "from the bottom up," not merely the impact on the top. These practitioners stress that their right to access the mountain is of fundamental importance. It is an absolute requirement for their cultural and religious observances. Although they know of no denials of access at the present time, they are fearful that such will come in the future (NASA 2005).

3.4 VISUAL ENVIRONMENT

The summit plateau cinder cones characterize the visual environment at the Project Site. The topography of the mountain blocks the view of the telescopes, including the UH 24-inch Telescope Observatory, from the access road approaching the summit; however, the Mauna Kea astronomical facilities are visible from within the immediate summit area. Existing facilities are also evident to varying extents from Hilo, Honoka‘a, and Waimea. Because of its small size and the surrounding topography, the UH 24-inch Telescope Observatory is not visible from Hilo, Honoka‘a, or Waimea.

3.5 TRAFFIC

The drive from Hilo or Waimea to the upper elevations of Mauna Kea takes approximately 1 to 1.5 hours. Access to the summit is from Saddle Road (Route 200) to Pu‘u Huluhulu, and from

there along a 6-mile long, 20-foot wide paved portion of the Mauna Kea Access Road to Hale Pōhaku, located at an elevation of 9,200 feet, and then along an unpaved portion of the Mauna Kea Access Road for approximately 4.5 miles. The road is then paved again at an elevation of 11,800 feet msl to the Project Site at an elevation of 13,603 feet msl (NASA 2005).

Although it is recommended that visitors use a four-wheel drive vehicle to go beyond Hale Pōhaku, no measures are taken to prevent two-wheel drive vehicles from using the summit road. Hazards encountered during travel to and from the summit include brake failures on the steep summit road and weather-related accidents. On average, there are about three incidents each year that require a vehicle to be towed. Drivers occasionally decide to take their vehicles off designated roadways. This results in increased personal risk as well as risks to archaeological sites, arthropod and flora habitat, and to the serenity of the natural landscape (NASA 2005).

Table 3 summarizes the estimated number of vehicle trips to the summit and to the Project Site per year.

Table 3: Estimated Number of Vehicle Trips

Mauna Kea Summit		
Roadway Users	**Purpose**	**Number of Trips per Year***
Observatory Personnel	Astronomy-Related	14,066
Commercial Operators	Commercial Use	4,371
Others including cultural practitioners, tourists, recreational users, local traffic	Other	12,852
	Total	31,389 (2,616 per month average)
UH 24-Inch Telescope Observatory (Project Site)		
Roadway Users	**Purpose**	**Number of Trips per Year****
UH 88-inch Telescope Observatory Service Personnel	Maintain the UH 24-inch Telescope	156
Researchers	Utilize the UH 24-inch Telescope	146
UHH Astronomy Program Faculty and Students	Astronomy Instruction	12
	Total	304 (26 per month average)

* see DEA comment letter from OMKM in Section 6.2

** personal communication with Dr. William Heacox, 2006

3.6 UTILITIES

3.6.1 Potable Water

Water supply for Hale Pōhaku and the summit is trucked from Hilo in a 5,000 gallon capacity tanker truck and stored in two 40,000-gallon water tanks located at Hale Pōhaku. Currently, 25,000 gallons of water are trucked to the Hale Pōhaku each week. An additional 15,000 gallons of water each week are trucked to the summit to supply all the various facilities. Most facilities at the summit have their own on-site water storage and distribution system. However, the UH 24-

inch Telescope Observatory (the Project Site) does not have a potable water supply. There is no water storage or water service at the Project Site. All potable water is either brought on site or obtained from the UH 88-inch Telescope Observatory.

3.6.2 Wastewater

The UH 24-Inch Telescope Observatory does not have a wastewater disposal system. Visitors to the observatory utilize the public portable toilets located north of the observatory (Figure 2, Project Site). All of the other observatories at MKSR largely operate their own wastewater collection system to collect and treat domestic wastewater, which is ultimately disposed of into the subsurface cinder. No plan exists to replace these individual systems with a common sanitary sewer (NASA 2005). No wash water is generated at the UH 24-inch Telescope Observatory; all telescope mirror cleaning is done off site at the UH 88-inch Telescope Observatory (personal communication, Dr. William Heacox, 2005).

3.6.3 Electrical

A 59-kilovolt (kV) overhead transmission line to the Hale Pōhaku substation provides electrical power to the Mauna Kea summit. This substation consists of two 3,000-kilovolt-ampere (kVA) transformers with a total capacity of 6,000 kVA. From the substation, there is an underground 12.47 kV dual loop feed system that loops around the Mauna Kea summit. The monthly average power consumption at the substation is 1,045,000-kilowatt (kW)-hours. The existing peak demand load at the substation is approximately 2,230 kW. This peak is approximately half of the capacity at the substation (NASA 2005).

The existing UH 24-inch Telescope Observatory underground electrical service provided by the Hawai‘i Electric Light Company has a 1,000 kW capacity. The 24-inch facility draws its power from the UH 88-inch Telescope Observatory building and is not separately metered. The peak load is estimated to be 5 kW and the capacity is estimated to be 10 kW (personal communication, Dr. William Heacox, 2006).

3.6.4 Communication

The communications system serving the MKSR observatories was upgraded between 1996 and 1998, including the installation of an underground fiber optic communications system. This system provides data flow between the summit and base facilities in Waimea and Hilo. Remote observing from outside Hawai‘i via the Internet is also possible with the improved communications link (NASA 2005). The existing UH 24-inch Telescope Observatory is connected via underground conduit to this fiber optic backbone.

3.6.5 Solid Waste

Solid waste at the Project Site consists of municipal solid waste – also known as trash. Trash includes waste paper products, spent containers, and limited amounts of waste food. All trash generated at the Project Site is removed by the trash generators and properly disposed of off-site.

3.6.6 Drainage

The Project Site consists of graded native cinder sand and gravel as well as introduced cinder gravel, excluding the foundation of the observatory building and the parking apron, which are paved with impervious concrete and asphaltic concrete, respectively. Surface water drainage at

the Project Site is through infiltration into the subsurface soil with limited surface runoff. Runoff from paved surfaces at the summit is directed to lined channels, which conduct the water to collection basins and/or dry wells. This allows runoff to percolate into the subsurface and thereby prevent surface erosion (UH 1999).

3.6.7 Emergency Services and Fire Suppression

An emergency preparedness and medical evacuation plan has been prepared by Mauna Kea Support Services. This plan covers and applies to all observatories on the summit of Mauna Kea. The plan is updated as required and distributed to all facilities (NASA 2005).

As noted in the FEIS for Keck Outrigger Project (NASA 2005), Mauna Kea is an isolated work site. As such, it is many miles from the nearest professional Emergency Medical Service (EMS). Therefore, the responsibility and primary source of first aid assistance are the employees at each observatory facility. There are no emergency medical facilities on the summit or at Hale Pōhaku. The plan recommends that each facility maintain a stock of emergency first aid supplies and that all employees have current first aid training and experience using the equipment available to them. In addition, the plan recommends that some staff members undergo emergency medical technician training and that each facility should establish regular first aid drills, test emergency and safety equipment, and test-drive the emergency evacuation vehicle. The emergency evacuation vehicle is available if facility vehicles are inadequate and an accident victim needs to be transported to an EMS location or must meet an EMS vehicle. This emergency vehicle is located at the CSO for use by all observatories. The purpose of this vehicle is to provide a means of transporting an injured person down the mountain to an ambulance or helicopter at Saddle Road or Hale Pōhaku. The vehicle is equipped with first aid supplies and a cellular phone. EMS is available from both the Hawai‘i County Fire Department and the Pōhakuloa Training Area. Pōhakuloa is closer to Mauna Kea and can respond more quickly than the Hawai‘i County Fire Department. EMS personnel from the County and Pōhakuloa Training Center can be dispatched either by ambulance or helicopter. The nearest hospital is Hilo General Hospital (NASA 2005).

The fire suppression equipment at the UH 24-inch Telescope Observatory consists of widely available hand-held fire extinguishers. The hand-held fire extinguishers consist of carbon dioxide and dry chemical types.

3.7 FLOOD HAZARD

A Federal Emergency Management Agency Flood Insurance Rate Map does not exist for the MKSR or the summit area of Mauna Kea. The Project Site is located at a relatively flat area at 13,603 feet msl elevation and is bordered on the east and west by steep ravines. Due to the low precipitation rates at the summit of Mauna Kea (~6 inches per year), the occurrence of ephemeral (short term or transitory) surface water at the summit is limited to winter storms and/or rapid snowmelts there. These infrequent runoff occurrences have cut small channels and gullies that connect with larger gulches further down the mountain slope. Given the grade of the Project Site and the limited precipitation, flooding, even during the heaviest rainfall event or snow melt, has not been observed in the past 37 years of the observatory’s use and is not expected to occur in the future.

3.8 GROUND AND SURFACE WATER RESOURCES

As detailed in the FEIS for the Outrigger Project, shallow groundwater exists in Mauna Kea's flanks and is evidenced by modest springs and seeps. Perched on glacial drift deposits, the most prominent of these are springs located on the west side of Pōhakuloa Gulch on the mountain's south flank. The spring water is believed to be recent, meaning that it is not from the melting ancient subsurface ice or permafrost, and is identical to rainfall at the summit. Water discharged at the springs originates as rainfall on and near the summit. It percolates downward to a perching layer and then moves conformably down slope on this relatively impermeable layer to ultimately discharge at the ground surface as a spring or seep (NASA 2005).

Deep groundwater beneath Mauna Kea occurs in high-level aquifers. An aquifer is an underground layer of water-bearing permeable rock, or permeable mixtures of unconsolidated materials such as gravels, sand, silt, or clay. Some groundwater aquifers are in fractured rock (carbonate rock, basalt, or sandstone). The high-level aquifer that exists beneath Mauna Kea occurs in vertical intrusive structures called dikes. Groundwater measurements at wells nearest to the summit range from 1,510 feet msl to the west at Waikiʻi to 950 to 1,000 feet msl to the east towards Hilo (21.4 to 21.8 miles away). Groundwater levels in the area between these wells and the summit of Mauna Kea are expected to step up incrementally toward the summit; however, the depth to the groundwater at the summit of Mauna Kea will not be conclusively known until an actual boring/well is advanced to a depth that intercepts groundwater. (NASA 2005).

Among the many natural features found on Mauna Kea, the small alpine lake, Waiʻau, is unique and revered. It is a nearly circular pond, 300 feet in diameter, situated on the summit platform of Mauna Kea at an altitude of approximately 13,020 feet approximately one mile southwest of the Project Site. It is the highest lake within the boundaries of the Pacific Ocean basin and one of the highest lakes in the United States. The southern rim of the depression containing the lake is a low segment of a cinder cone, Puʻu Waiʻau, on which rests a moraine of the largest period of glaciation. The water of the lake, a maximum of 10 feet deep, is derived entirely from precipitation and runoff from the edges of the basin (UH 1999). The green coloration of the lake is discussed in Section 3.3.2 (pages 3-10 and 3-11).

3.9 GEOLOGY, SOILS AND TOPOGRAPHY

Mauna Kea is a 400,000-year-old dormant shield volcano in its post-shield stage. Its last eruption was 4,500 years ago and its oldest exposed lavas are 250,000 years old. Mauna Kea rises 30,000 feet from the ocean floor with its highest point, the summit Kūkahauʻula (also known as Puʻu Wēkiu), at 13,796 feet in elevation. The topography at the Project Site is gently sloping to the southeast with a steep downward slope located west of the observatory. The dome of the volcano is 30 miles across and is punctuated with cinder cones of various sizes and shapes along the rift zones that descend from the summit. Slopes in the area vary from flat plateaus to close to vertical slopes on the cinder cones. Kūkahauʻula (also known as Puʻu Wēkiu), the summit cinder cone, rises several hundred feet above the surrounding lava plateau. Both the inner and outer slopes of this cone average about 28 degrees (UH 1999).

The mountain's past volcanic activity was characterized by explosive eruptions that produced widespread ash deposits. The pattern of the Mauna Kea cinder cones indicates that the volcano was built over rifts extending eastward, southward, and westward. The volcanics of Mauna Kea

are divided into two series. The older Hāmākua series is comprised chiefly of primitive olivine basalts and forms the major part of the mountain. The overlying Laupahoehoe volcanic series is predominantly andesine andesites and forms a thin veneer over the upper part of the mountain. The Laupahoehoe series is the thickest at the Mauna Kea summit where it has filled in the summit caldera. Many short lava flows and bulk cinder cones characterize the Laupahoehoe series (UH 1999).

The eruptions that formed the cinder cones and lava flows underlying the Astronomy Precinct all occurred more than 40,000 years ago. The chance for future eruptions in the summit area appears to be slight. Future eruptions are likely to be similar to those of Mauna Kea's recent past (last 10,000 years) and would be marked by the formation of high cinder cones and sluggish lava flows that will mostly impact the lower flanks of the volcano. Eruptions of this type will almost certainly be preceded by substantial premonitory activity, which will likely give years of advance warning. No seismic activity associated with the volcano has been detected beneath Mauna Kea. The earthquakes that will accompany any future eruption of Mauna Kea will doubtless cause significant ground shaking on all parts of Mauna Kea and might be expected to cause substantial damage to astronomical facilities at the summit (UH 1999).

During the Pleistocene epoch, an ice cap covered approximately 28 square miles over the summit area of Mauna Kea. Several of the mountain's cinder cones peaked through the ice cap which had an average thickness of 200 feet and a maximum thickness of 350 feet in places. Within the limits of the glacier, which reached down to the 11,000 and even the 10,500-foot elevation, many areas were scraped bare of ash and cinder. During this period, volcanic eruptions continued to take place beneath the ice cap, forming a large lake of lava. This lava cooled without crystallizing, creating a uniquely dense rock that was moved and crushed under the weight of the glacier. Many years later, this rock was sought after by Hawaiians who used it to craft adzes (UH 1999).

The MKSR is characterized by its rugged landscape, alternating between massive andesite lava flows and large cinder cones of volcanic ash, loose cinder, and other interbedded volcanic material. Cinder cones are generally loose, unstable, and highly porous. The andesite lava flows consist of dense rock with numerous pits, fissures, small caves, overhangs, and deeply shaded pockets and crevices.

The United States Department of Agriculture (USDA 1973) classifies soil types at the summit of Mauna Kea as cinder land and very stony land. Cinder land is a miscellaneous land type consisting of bedded cinders, pumice, and ash. These materials are black, red, yellow, brown, or variegated. The particles have jagged edges and a glass appearance and show little or no evidence of soil development. Cinder land commonly supports some grass, but it is not good pastureland because of its loose consistency and poor trafficability. This land is a source of materials for surfacing roads (USDA, 1973).

Very stony land is a miscellaneous land type consisting of very shallow soil material and a high proportion of 'a'a lava outcrops. The dominant slope is between 10 and 15 percent. Between the lava outcrops and in the cracks of lava, the soil material extends to a depth of 5 to 20 inches. The erosion hazard is slight. This land is used for pasture and watershed and for wildlife habitat (USDA, 1973).

3.10 BIOLOGICAL RESOURCES

The following is a summary of biological resource information gathered for the Project Site from the FEIS for the MKSR Master Plan (UH 1999) and the FEIS for the Outrigger Project (NASA 2005). This information is believed to be current, accurate, and representative of the Project Site.

For the purposes of discussion, Mauna Kea has been divided into four areas based upon elevation: (1) "Summit Area Cinder Cones"; (2) "Area Below the Summit Area Cinder Cones"; (3) "Silversword/Alpine Shrub Zone"; and (4) the "Mamane Subalpine Forest Zone". The "Summit Area Cinder Cones" consists of Puʻu Wēkiu, Puʻu Kea, and Puʻu Hauʻoki and extends from the true summit of the mountain on Puʻu Wēkiu at about 13,796 feet down to approximately 13,400 feet. The second area is the "Area Below the Summit Area Cinder Cones" beginning at the base of the summit cinder cones at about 13,400 feet (4,084 m) and extending down to about 11,700 feet, which is the lower known limit of Wēkiu bug habitat. The third area is the "Silversword/Alpine Shrub Zone" extending from 11,700 feet to about 9,200 feet. The fourth area is the "Mamane Subalpine Forest Zone" extending from about 9,200 feet to the Saddle Road at about 6,578 feet (UH 1999).

The Project Site is located in the Summit Area Cinder Cones. This area encompasses approximately 452 acres and is known as Kūkahauʻula (Puʻu Wēkiu, Puʻu Kea, and Puʻu Hauʻoki). It receives almost no rainfall (less than 6 inches per year). Most precipitation falls as snow that sometimes accumulates on the Summit Area Cinder Cones. Temperatures can drop to below freezing at night and can reach up to 50° Fahrenheit (F) during the day. Solar radiation is extreme, and evaporation rates are high. The harsh conditions of the Summit Area Cinder Cones limit the composition of the resident floral and faunal communities found in the Project Site (UH 1999).

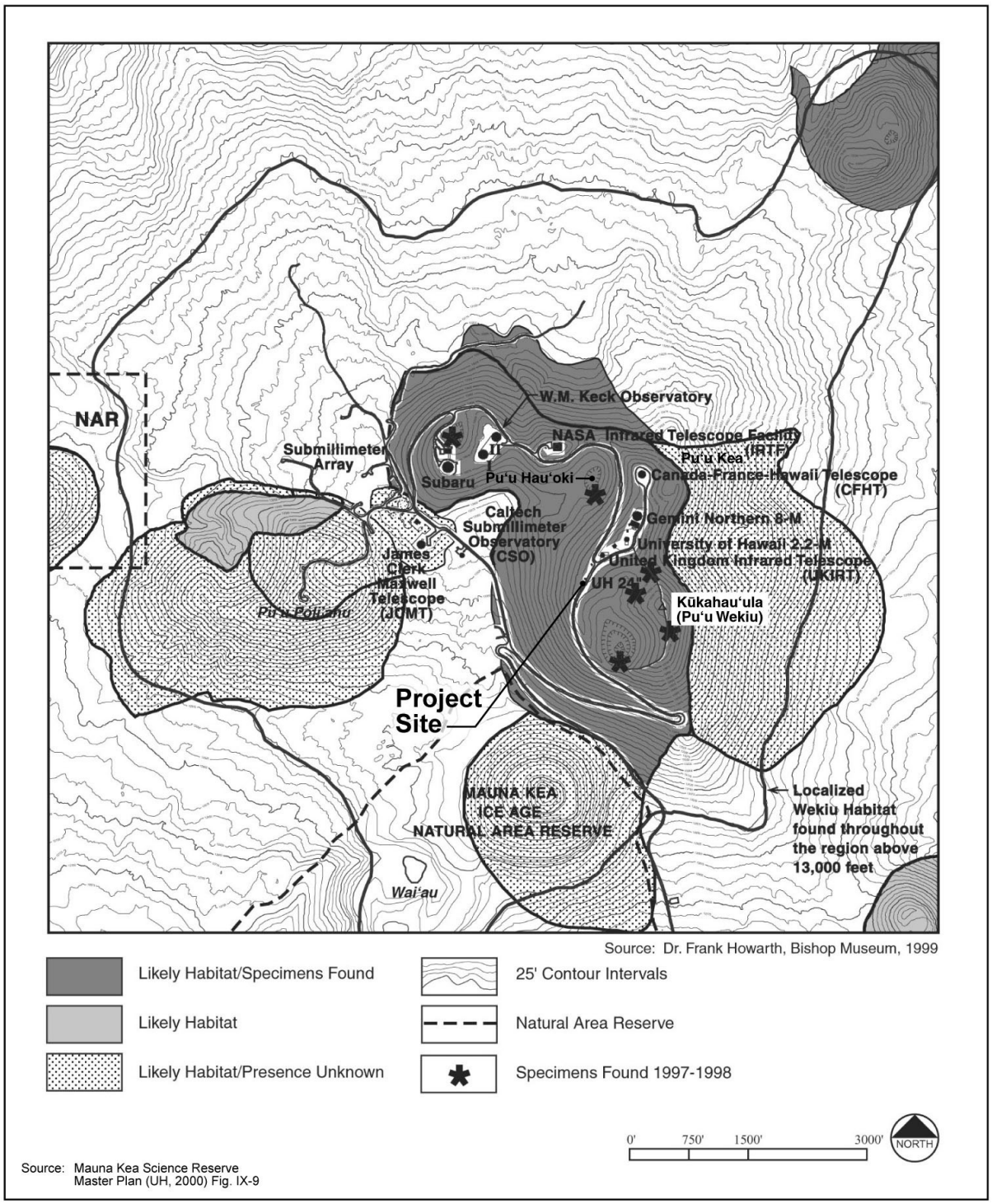
3.10.1 Flora

No flora, including Federally protected, threatened and endangered species, are known to be present within the Project Site (UH 1999; NASA 2005). Plants are present at lower elevations on the mountain. The extreme temperatures and very dry conditions of the cinder cones, including limited precipitation, porous cinder substrates, and high winds, have apparently prevented establishment of even very hardy plants. Lichens occur in low abundance on the Summit Area Cinder Cones, and only the most common lichen species occur there. The principal lichen habitats are in the blocky ʻaʻa flows in the area defined as Below the Summit Area Cones.

3.10.2 Fauna

No Federally protected, threatened or endangered fauna are known to be present within the Project Site (UH 1999; NASA 2005). The only resident animal species found on the Summit Area Cinder Cones are arthropods (UH 1999; NASA 2005). The loose packing of the cinder makes numerous spaces that provide shelter for resident arthropods from adverse weather conditions, intense solar radiation, freezing temperatures, and predators.

Daily upslope winds carry insects, spores, seeds, and organic debris to the summit from surrounding forests. This Aeolian (windborne) debris collects in the lee of summit cones and is a major food source of the resident arthropods. The resident arthropods have evolved distinctive



Potential Wēkiu Habitat **Figure 10**

Renovation of 24" Telescope Observatory
University of Hawai'i, Hilo, Hāmākua, Hawaii

adaptations in order to exploit the resources and live in this habitat. Eleven species indigenous to Hawai‘i are thought to be residents within the Summit Area Cinder Cones: (1) Wēkiu bugs (*Nysius wekiuicla*); (2) lycosid spiders (*Lycosa sp*.); (3) sheetweb spiders (*Erigone sp*. A1 and B1); (4) another sheetweb spider (Family Linyphiidae: species unknown); (5) a mite (Family Anystidae: species unknown); (6) another mite (Family Eupodidae: species unknown); (7 and 8) springtails (Family Entomobryidaae: 2 unknown species); (9) another springtail (Class Collembola, family and species unknown), and (10) a centipede (*Lithobius* sp.).

One of the arthropods found on Mauna Kea above 11,700 feet, the Wēkiu bug (*Nysius wekiuicola*), is a candidate for listing under the ESA (NASA 2005). Surveys completed in 1997 and 1999 show that Wēkiu Bug habitat exists in the vicinity of the Project Site; however, it is not found at the Project Site which has been disturbed and does not offer the loose packing of cinder material required for the bug’s habitat (UH 1999; NASA 2005). According to Bishop Museum entomologists, there have been no new Wēkiu bug surveys in the vicinity of the Project Site and a single map of all currently known populations is not currently available (personal communication Mr. David Preston and Dr. Ronald Englund 2006).

3.11 CLIMATE AND AIR QUALITY

The upper slopes and summit of Mauna Kea are located above the temperature inversion layer, which varies between 4,921 to 9,843 feet depending on weather systems and season, providing a climate for these areas that is best described as a dry, cold tundra-like environment. Average monthly temperatures at the MKSR range from 23° to 56° F. Winds are predominantly from the west/northwest during the day and from the east/northeast at nigh at about 10 to 15 miles per hour. During severe winter storms, winds can exceed 100 miles per hour on exposed summit areas, such as the top of cinder cones. For the years 1969 to 1977, the annual average precipitation at the MKSR observatory sites is 6 inches (NASA 2005).

The State of Hawai‘i, DOH monitors air quality on the island of Hawai‘i. The air in Hawai‘i is relatively clean and low in pollutants. Based on air quality data collected and published by DOH, Hawai‘i complies with the standards of the Clean Air Act of 1970, as well as the National Ambient Air Quality Standards and the State Ambient Air Quality Standards for carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, particulate matter, and lead. The State of Hawai‘i is recognized as an attainment area. Although the air quality at the MKSR has not been sampled or monitored, its geographic and meteorological isolation produces excellent air quality. The summit of Mauna Kea is well above the altitude of temperature inversions for the area. Air pollutants generated below the inversion layer (smog, smoke, dust, salt spray, etc.) generally do not affect air quality at the summit of Mauna Kea (NASA 2005).

Locally generated atmospheric pollutants at the summit are primarily emissions from the combustion engines and fugitive dust from construction activities and unpaved surfaces. Winds at the summit area aid in the dispersion of air pollutants generated by summit activity (NASA 2005).

3.12 HAZARDOUS AND REGULATED MATERIALS

There are no known hazardous/regulated material release or disposal sites at the Project Site. Lead-based paint is not present on the painted surfaces at the Project Site (personal communication, Dr. William Heacox, 2005). Asbestos containing materials are not present at the Project Site (personal communication, Dr. William Heacox, 2005). No hazardous or regulated materials are currently stored or used at the Project Site (personal communication, Dr. William Heacox, 2005).

3.13 NOISE

Background noise levels at the summit of Mauna Kea consist primarily of sounds associated with the wind and vehicular noise. The summit of Mauna Kea normally has a low ambient noise level. Existing facility operations generate very low noise levels. The summit population is small and transient. Visitors to the summit include observatory employees, researchers, recreational users, tourists, and local traffic (deliveries) which are not considered noise-sensitive receptors. Cultural practitioners have indicated that noise associated with the operations of the MKSR Observatories adversely effects the spiritual ambience necessary for their religious observances (NASA 2005).

3.14 SOCIO-ECONOMIC

Astronomy is an important industry in Hawai‘i and in particular on the island of Hawai‘i because Mauna Kea offers world-renown observing (viewing) conditions. The State and County have protected these conditions through the management of the summit of Mauna Kea and land use changes on the island of Hawai‘i (urban lighting) that could affect astronomical observations (NASA 2005).

Astronomers and scientific organizations throughout the world have responded by investing in summit observatories. In addition, UH has developed an undergraduate astronomy program in Hilo and a graduate program in Manoa with the ability to create scientific instruments for astronomical observations (NASA 2005).

Over three quarters of the population of the State of Hawai‘i is composed of non-white residents. Persons self-designated as Asian, Native Hawaiian or Other Pacific Islander, or multiracial (primarily Asian and Native Hawaiian) comprised approximately 67 percent of the total resident population (NASA 2005). The non-minority (white) population in both Hilo and Waimea declined between 1990 and 2000, that decline was off-set by growth in the minority (non-white) populations (NASA 2005). For Hawai‘i County, approximately 60 percent of the resident population is self-designated as Asian, Native Hawaiian or Other Pacific Islander, or multiracial.

The area around the MKSR is relatively unpopulated. Less than 10,000 residents live within approximately 25 miles of the MKSR. The population centers of Hilo and Waimea have both experienced an overall increase in population between 1990 and 2000. Waimea’s population grew by 18 percent while Hilo’s population grew by 8 percent (NASA 2005). The average visitor census for the County of Hawai‘i increased during the 1980’s and 1990’s. The County of Hawai‘i has attracted an increasing share of the State’s visitors. In comparison with 1999, visitor days for the island of Hawai‘i declined by 3.7 percent in 2000 due to lower domestic and international arrivals. The average daily visitor census in 2000 was 21,831, approximately 4 percent less than the corresponding visitor census for 1999.

The summit of Mauna Kea and the Astronomy Precinct has a transient population consisting of observatory staff and visiting scientists. There are no permanent residents at the summit. The observatories at the MKSR employ approximately 487 people (NASA 2005); however, most work at remote operation centers in Waimea and Hilo and at other locations. Hale Pōhaku is visited by 100 or more visitors daily. Summit tours are increasing in number; tourism on Mauna Kea is a large part of a trend towards active tourism on the island of Hawai‘i (NASA 2005). The average de facto population of the summit is approximately 125 during the daytime and less than 20 at night (personal communication, Dr. William Heacox, 2005).

The average employed civilian labor force in the County of Hawai‘i numbered 65,450 in 2000, an increase of 2,100 over the previous year. The County’s average unemployment percentage declined from 8.7 percent in 1999 to 6.7 percent in 2000. The State of Hawai‘i’s average unemployment rate declined from 5.6 percent in 1999 to 4.3 percent in 2000. The unemployment rate for the County of Hawai‘i remains larger than that for the State of Hawai‘i as a whole. The closing of sugar plantation in Hāmākua, North Hilo, and Kau Districts contributed to the larger unemployment rate for the County of Hawai‘i. Median household income in the County in 1997 was estimated to be $34,557, which is approximately $9,000 less than the median income for the State as a whole (NASA 2005).

From the construction of new astronomy facilities, to the employment of trained technicians, to the purchases made by visiting scientists, the astronomy industry has contributed substantially to the island of Hawai‘i’s economy. All of the telescopes on Mauna Kea have been built with funds coming from outside the State of Hawai‘i. Typically, a minimum of one third of the funds for construction and more than 80 percent of the operating funds are spent in Hawai‘i.

Jobs associated with the observatories include astronomers, engineers, and engineering technicians, software programmers, equipment technicians, managers, clerks, and custodial personnel. Currently, the majority of technical and scientific employees associated with the observatories, of which there are about 300, are brought in from out-of-state; while nearly all of the clerical, custodial, and mid-management positions are hired locally. The technical and scientific positions are mostly highly paid. A typical entry-level technician position is paid approximately $50,000 which is very high by local standards. Salaries of employees at the observatories range from mid-$20,000 to almost $150,000 (NASA 2005).

Total economic activity (direct, indirect, and induced) as a result of Mauna Kea observatories is estimated at $130.9 million annually for the County and $141.7 million annually for the State of Hawai‘i. Direct employment and expenditures associated with the operation of telescopes in the Astronomy Precinct represent approximately $61.1 million for the County and $63 million for the State annually. Indirect economic expenditures occur when astronomy-related firms purchase goods and services from other firms. There are also induced expenditures by the astronomy workforce, which are spent in the local community. Construction costs for all facilities built total approximately $826 million (converted to 1998 dollars). Roughly one fourth of the $826 million (converted to 1998 dollars), or over $200 million was spent in the County of Hawai‘i (NASA 2005).

All jobs generated by observatory purchases from other firms and spending by the direct and indirect workforce results in about 750 jobs on the island of Hawai‘i with a total payroll of about $45 million. State-wide employment consists of about 820 jobs, generating a total payroll of approximately $50 million (UH 1999).

The capital cost of the UH Hilo 24-inch Telescope Observatory was approximately $300,000 when it was built in 1968. Its annual operating budget, which is shared with the UH 88-inch Telescope Observatory, is $1.2 million. Jointly, the two observatory telescopes currently employ 7 County of Hawai‘i-based personnel (NASA 2005).

4 ENVIRONMENTAL CONSEQUENCES

4.1 OVERVIEW

This chapter evaluates the potential environmental consequences associated with the Proposed Action, the Telescope Replacement Without Building Renovation Alternative, and the No Action Alternative. The probable direct, indirect, short-term, long-term and cumulative impacts of the Proposed Action and alternatives on relevant environmental resources are discussed.

Environmental consequences of the Proposed Action and Telescope Replacement Without Building Renovation Alternative are expected to be limited to the local and/or regional setting. The UHH undergraduate astronomy program is expected to grow significantly with concomitant improvements in training opportunities for local students as a result of the Proposed Action. There should be some minor benefits at the island-wide level due to the beneficial economic effects associated with the renovation and/or telescope replacement activities and an insignificant increase in operational period employment levels.

4.2 LAND USE COMPATIBILITY

4.2.1 Proposed Action

Under the Proposed Action the telescope observatory would be used primarily for instruction and educational research of undergraduates enrolled in the astronomy program of the UHH Department of Physics and Astronomy. Currently the facility is used primarily for research and to a lesser extent by UHH for undergraduate instruction for the astronomy program. The land use under the Proposed Action is compatible with the surrounding land uses within the Astronomy Precinct. The Proposed Action would replace the existing 24-inch optical telescope with a 36-inch optical telescope and renovate the observatory building to make it weatherproof to prevent moisture and dust infiltration. The general land use would not change.

The renovation phase activities would occur at the observatory and in the renovation lay-down area located north and south of the building (see Figure 2, Project Site). The Proposed Action would minimally impact vehicle parking in the vicinity of the Project Site during the renovation phase. In addition, during the renovation phase, the former concrete batching plant site located approximately 1,500 feet southwest of the Project Site may be utilized to store heavy equipment. Also, the coudé and generator rooms at the nearby UH 88-inch Telescope Observatory may be used to store some renovation materials. This could minimize the attractive nuisance associated with heavy equipment and building materials stored at the site, and provide protection for equipment and materials from the high winds at the summit.

The intensity of land use would decrease during the operational phase since the observatory and telescope would be largely remotely operated and on-site use would decrease. The existing use of the Project Site for astronomy observatory functions would not change during the operational phase; however, under the Proposed Action, the facility would be primarily used for undergraduate education of students in the UHH astronomy program and, via remote operation, by local high school science students. The operational phase activities associated with the Proposed Action would be primarily instructional and educational research, and would be

conducted wholly within the UH 24-inch Telescope Observatory or the remote operation center at the UHH campus.

4.2.2 Telescope Replacement Without Building Renovation Alternative

The impact of the Telescope Replacement Without Building Renovation Alternative would be similar to the Proposed Action with a few exceptions. Under this alternative the construction lay-down area would be decreased and duration of its use would be shortened. During the operational phase, the intensity of land use would be greater than the Proposed Action because the observatory and telescope would not be completely remotely operated and someone would be required to be at the observatory to open and close the dome for each use. This, in turn, would impact the optimization of the observatory as an instructional instrument and lessen its utilization for outreach to local high school science students.

4.2.3 No Action Alternative

The No Action Alternative preserves the status quo. The new 36-inch telescope would not replace the existing 24-inch telescope and no building renovations would occur, thereby resulting in no impact to land use compatibility. The facility would continue to be used for astronomy observatory functions, which is consistent with the land uses in the vicinity. There would be no impact to the land use compatibility under the No Action Alternative.

4.3 CULTURAL RESOURCES

4.3.1 Historic Properties

For the purposes of this analysis, significant historic resources are those properties listed or eligible for listing in the NRHP. As defined in the implementing regulations for Section 106 of the NHPA, impacts of an undertaking on significant cultural resources are considered adverse if they "diminish the integrity of the property's location, design setting, materials, workmanship, feeling, or association" (36 CFR § 800.5 [a][(1]). Examples of adverse effects include, but are not limited to, the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from, or alteration of the character of, the property's setting when that character contributes to the property's qualification for listing on the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property, or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property (36 CFR § 800.5[a][2]).

Proposed Action

The Proposed Action would not directly or indirectly impact a historic building as the UH 24-inch Telescope Observatory building is not deemed eligible for inclusion in the NRHP. The Proposed Action (replacement of the telescope and renovation of the building) would not further destroy, damage, or alter the summit area which is recognized eligible for inclusion on the NRHP as "it encompasses a sufficient concentration of historic properties (shrines, burials, and culturally significant landscape features) that are historically, culturally, and visually linked within the context of their setting and environment (NASA 2005). The Proposed Action would not involve any ground disturbing activities, changes in the landscape, or access to the Project Site. Under

the Proposed Action, exterior renovation would be made to the observatory building, including a potential increase in overall dome height of up to 12 inches which would not adversely affect important view planes. Under the Proposed Action, the renovation activities would be short in duration (14 to 18 weeks) and would follow best management practices to minimize disturbance to cultural practitioners. Under the Proposed Action, during the post-renovation (operational) period, a significant decrease in required on-site support due to remote operations capability would be achieved having a beneficial impact on existing noise and traffic that might interfere with use of the mountain as a cultural resource.

The NHPA and NEPA processes were run concurrently and public comments were invited. Based on a careful review and analysis, an in accordance with Chapter 6E HRS and Section 106 of the NHPA, NSF has determined that the Proposed Action would result in “no historic property affected.” NSF has sought concurrence with this determination with the SHPD, OHA, Kahu Ku Mauna, the Royal Order of Kamehameha I, and Mauna Kea Anaina Hou. SHPD has indicated its concurrence with this determination. OHA, Kahu Ku Mauna, and Mauna Kea Anaina Hou have provided comments. Mauna Kea Anaina Hou has expressed that the group has never signed a Memorandum of Agreement (MOA) pursuant to Section 106 NHPA relating to previous development of Mauna Kea (see Section 6.2 letter from Mauna Kea Anaina Hou). No response was received from the Royal Order of Kamehameha I. Correspondence related to the Section 106 consultation process is provided in Appendix B.

Although the probability is very low, in the event that cultural resources are encountered as part of the Proposed Action, all work will cease and Mauna Kea Rangers and SHPD personnel will be notified. No direct or indirect historic property impacts are anticipated under the Proposed Action.

Telescope Replacement Without Building Renovation Alternative

The impact of the Telescope Replacement Without Building Renovation Alternative would be similar to the Proposed Action with a few exceptions. There would be no building renovations under this alternative and therefore no change in the dome height and no change to view planes. The renovation period would be shorter under this alternative. Under this alternative, the telescope would be remotely operable; however, on-site support would still be required to open and close the dome. The modest decrease in on-site support due to remote telescope aiming capability would result in a modest decrease in the overall cumulative impact of development in the sacred summit area.

No Action Alternative

The No Action Alternative preserves the status quo. It retains manual operation of the telescope and dome, requiring more trips and on-site support than either the Proposed Action or Replacement Without Renovation Alternative, which contributes to the overall cumulative impact of development in the summit area..

4.3.2 Chapter 343, Hawai‘i Revised Statutes - Cultural Resources

Sacred sites. Most of the archaeological resources identified within the MKSR fall into three categories: shrines, adze quarrying and manufacturing localities, and burial sites. No archaeological sites have been identified at the Project Site. Nonetheless, no area at or near the summit is assumed to be devoid of archaeological resources. This is true even for the Project

Site where land was previous leveled and developed to construct the existing UH 24-inch Telescope Observatory.

Proposed Action

The Proposed Action would have no significant direct or indirect impact on the MKSR archaeological sites. The Proposed Action would involve the replacement of the 24-inch optical telescope with the new 36-inch optical telescope and building renovations. The building renovations at the observatory would be located away from the access points to these sites and would not impede the traffic leading to or from these sites. Proposed renovation activities would be short in duration (14-18 weeks) and would follow best management practices to minimize disturbance to cultural practitioners. As for visual impact of the Project Site, under the Proposed Action, the proposed renovations to the facility would be limited to modifications to the interior and exterior of the building, including the construction of a new doorway and the replacement of an existing doorway as well as modifications to the interior electrical/communications system. The Proposed Action would possibly increase the dome height by up to 12 inches. The renovations would not significantly affect views from any where within the MKSR or outlying areas.

Telescope Replacement Without Building Renovation Alternative

The impact of the Telescope Replacement Without Building Renovation Alternative would be similar to the Proposed Action with a few exceptions. There would be no building renovations under this alternative and therefore no view plane impacts. The renovation period would be shorter under this alternative.

No Action Alternative

The No Action Alternative preserves the status quo. The new 36-inch telescope would not replace the existing 24-inch telescope and no building renovations would occur, thereby resulting in no impact to sacred sites.

Trails. The Proposed Action and alternatives would not directly or indirectly impact any historic or designated hiking trails.

Beliefs. Cultural values and traditional cultural practices include intangible resources that are important to culture. Contemporary cultural practices relate to current beliefs or practices relate to current beliefs or practices. Traditional cultural practices on Mauna Kea are associated with resource locations (e.g., stone, water, and hunting), trails, individual topographic features, burial locations, and cultural landscapes.

The presence of shrines and monuments in the summit region of Mauna Kea indicates that certain religious observances or worship services have been conducted there. Contemporary religious practitioners who continue to pay homage to the deities enshrined in their early forms on Mauna Kea and to the ‘uhane or spirits of their ancestors whom they believe also reside or visit the sacred grounds. Those contemporary practitioners consider themselves na koa, or warriors, whose enduring task is to protect the mountain from unwarranted intrusion, particularly under the present circumstances.

Proposed Action

The Proposed Action would not directly or indirectly impact the current abilities and rights of contemporary religious practitioners at MKSR or the Project Site. Proposed renovation activities would be short in duration (14-18 weeks) and would follow best management practices to minimize disturbance to cultural practitioners. No modifications would be made to the landscape or access to MKSR or the Project Site under the Proposed Action. Under the Proposed Action, exterior and interior renovations would be made at the UH 24-inch Telescope Observatory (e.g., replacement of telescope, dome and siding, addition of a doorway and modifications to an existing doorway); however, these modifications would not significantly modify current view planes at or across the site. The Proposed Action would not impact the view plane from Pu‘u Wēkiu to the west (Figure 9).

Telescope Replacement Without Building Renovation Alternative

The impact of the Telescope Replacement Without Building Renovation Alternative would be similar to the Proposed Action with a few exceptions. There would be no building renovations under this alternative and therefore no view plane impacts. The renovation period would be shorter under this alternative.

No Action Alternative

The No Action Alternative preserves the status quo. The new 36-inch telescope would not replace the existing 24-inch telescope and no building renovations would occur, thereby resulting in no impact to cultural beliefs.

4.4 VISUAL ENVIRONMENT

4.4.1 Proposed Action

Exterior renovations under the Proposed Action include the replacement of the dome and siding, construction of a new doorway and the modification of an existing doorway. No ground-disturbing activities and no new construction would occur at the Project Site as a result of the Proposed Action. Although the Project Site is isolated, its location the within the MKSR makes it visible from nearby sacred sites and trails within the Mauna Kea summit area. The UH 24-inch Telescope Observatory is a relatively small and familiar landscape feature. The Proposed Action would possibly increase the dome height by up to 12 inches. The new dome and siding would be painted the same titanium white color as the existing dome and siding. The Proposed Action would not change the diameter, or general footprint. The replacement of the dome and renovation of the observatory building exterior would improve the visual environment.

4.4.2 Telescope Replacement Without Building Renovation Alternative

The impact of the Telescope Replacement Without Building Renovation Alternative would be similar to the Proposed Action with one exception. The physical environment would be negatively impacted as the exterior of the existing building continues to deteriorate over time.

4.4.3 No Action Alternative

The No Action Alternative preserves the status quo. The new 36-inch telescope would not replace the existing 24-inch telescope and no building renovations would occur. As a result, the

physical environment would be negatively impacted as the exterior of the existing building continues to deteriorate over time.

4.5 TRAFFIC

4.5.1 Proposed Action

During the renovation phase, the Proposed Action would have minor short-term, direct and indirect impacts on the Saddle Road and access road to MKSR and in the vicinity of the Project Site as project-related vehicles, equipment, and personnel access the Project Site. Transporting project equipment and materials to and from the Project Site during non-peak traffic hours would minimize these impacts. During the renovation period, the removal of the existing telescope and building components and the delivery of the new telescope and building components would not exceed weight, height, or size restrictions for the roadways and, therefore, a permit would not be required by the Department of Transportation.

During the operational period, the Proposed Action would have a beneficial impact on peak hour traffic volumes along the Saddle Road and the MKSR access road, because building improvements would result in fewer maintenance visits and the remote operation capabilities for the telescope and observatory would allow for fewer visits to the Project Site. Projected trips associated with the Proposed Action are summarized in Table 4. Total average monthly trip are projected at 8, approximately one third the number of trips associated with the no action alternative.

Table 4: Operational Phase Traffic: Proposed Action

Roadway Users	Purpose	Number of Trips per Year*
UHH Faculty and Students	Astronomy Instruction	36
UHH Technicians	Maintenance	52
	Total	88 (8 trips per month)

* personal communication with Dr. William Heacox

4.5.2 Telescope Replacement Without Building Renovation Alternative

During the renovation phase, the Telescope Replacement Without Building Renovation Alternative would have similar but reduced impacts as the Proposed Action due to the reduced scope of renovation work. However, during the operational period, this alternative would have a less desirable impact on traffic volumes along the Saddle Road in the summit area. Although the telescope would be remotely aimed and operated, on-site personnel (and associated vehicle trips) would still be required to open and close the dome fore each use of the telescope; therefore, operational period trip would be about 90 percent of the number of the trips associated with the No Action alternative (Table 5). Without the building renovations contemplated in the Proposed Action, the new telescope would be exposed to higher moisture and dust levels which would ultimately shorten its life span and increase the amount of onsite maintenance activity and increased vehicle trips needed to keep it operational.

Table 5: Operational Phase Traffic: Telescope Replacement w/out Building Renovation

Roadway Users	Purpose	Number of Trips per Year*
UHH Faculty and Students	Astronomy Instruction	36
Open and Close Dome	Astronomy Instruction	80
UHH Technicians	Maintenance	156
	Total	276 (23 trips per month)

* personal communication with Dr. William Heacox

4.5.3 No Action Alternative

The No Action Alternative would not reduce existing traffic levels associated with operating the existing facility. In addition, without building renovations which create a weather proof and dust free environment to house the new 36-inch telescope, maintenance requirements and upkeep for the existing telescope are likely to be higher than those of the Proposed Action and the Telescope Replacement Without Building Renovation Alternative. Without the building renovations, the telescope would be exposed to high moisture and dust levels which will ultimately shorten its life span and increase the amount of onsite maintenance activity and increased vehicle trips needed to keep it operational.

4.6 UTILITIES

4.6.1 Potable Water

Proposed Action

The Proposed Action would not impact delivery of potable water service to the existing UH 24-inch Telescope Observatory facility. Currently, there is no potable water service or storage at the Project Site. No change in potable water demand or consumption is anticipated as a result of the Proposed Action. Currently, potable water is brought to the Project Site by on-site visitors using or working at the Project Site.

Telescope Replacement Without Building Renovation Alternative

The impact of the Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action.

No Action Alternative

The No Action Alternative preserves the status quo. The No Action Alternative would be the same as the Proposed Action.

4.6.2 Wastewater

Proposed Action

The Proposed Action would not impact wastewater service to the existing UH 24-inch Telescope Observatory. Treatment and disposal of the wastewater generated by the Proposed Action would be via the existing portable toilet facilities that serve the UH 24-inch Telescope Observatory facility. The Contractor will be required to provide and maintain portable toilet facilities for

renovation workers. No other wastewater sources would exist at the Project Site as result of the Proposed Action. The remote use of the facility would decrease wastewater generated by facility users.

Telescope Replacement Without Building Renovation Alternative

The impact of the Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action with one exception. Although the telescope replacement would allow for remote operation of the telescope, on-site personnel would be required to open and close the dome which lead to only a slight decrease of wastewater generated by facility users..

No Action Alternative

The No Action Alternative preserves the status quo. The No Action Alternative would not impact the generation of wastewater at the Project Site.

4.6.3 Electrical

Proposed Action

The Proposed Action would not impact delivery of electrical service to MKSR customers or the existing UH 24-inch Telescope Observatory. The installation of the new equipment could lower the energy demands to the electrical system through use of power saving devices. Electrical power for the Proposed Action would be provided by the existing electrical system infrastructure.

Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action

No Action Alternative

The No Action Alternative preserves the status quo. The No Action Alternative would not impact the electrical service or use at the Project Site.

4.6.4 Communications

Proposed Action

The Proposed Action would not significantly impact communications services at the Project Site. Communications services for the Proposed Action would be provided by the existing communication system infrastructure.

Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action.

No Action Alternative

The No Action Alternative preserves the status quo. The No Action Alternative would not impact the communications services at the Project Site.

4.6.5 Solid Waste

Proposed Action

The renovation period of the Proposed Action would result in a minor increase in the island-wide generation and disposal of solid waste. The decrease of on-site use of the observatory as a result of the Proposed Action would result in a decrease in solid waste generated at the facility due to its remote operation capability.

Telescope Replacement Without Building Renovation Alternative

The renovation period of the Telescope Replacement Without Building Renovation Alternative would produce much less solid waste as there would be no waste generated by the demolition of the building structure. In the operation period, due to the need for on site staff to operate the dome, there would continue to be a smaller decrease in solid waste compared to the Proposed Action.

No Action Alternative

The No Action Alternative preserves the status quo. There would be no renovation period solid waste generated and there would be no change in the existing modest amount of solid waste generated by on site staff.

4.6.6 Drainage

Proposed Action

The Proposed Action would not alter the extent of impervious surfaces. The existing surface runoff characteristics within the vicinity of the Project Site would not be changed as a result of the Proposed Action.

Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action.

No Action Alternative

The No Action Alternative preserves the status quo and would be the same as the Proposed Action.

4.6.7 Emergency Services and Fire Suppression

Proposed Action

The Proposed Action would marginally reduce the demand for emergency services and fire suppression since fewer on-site visits would be required to utilize the facility.

Telescope Replacement Without Building Renovation Alternative

Under the Telescope Replacement Without Building Renovation Alternative the existing emergency services and fire suppression demand would not change significantly as some on-site support would be required to open and close the dome.

No Action Alternative

The No Action Alternative preserves the status quo. There would be no impact to the emergency services and fire suppression demand at the Project Site as a result of the No Action Alternative.

4.7 FLOOD HAZARD

4.7.1 Proposed Action

The Proposed Action would not impact existing flood hazard conditions since the existing topography and regional geomorphology would not be altered at the Project Site or surroundings.

4.7.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action.

4.7.3 No Action Alternative

The No Action Alternative preserves the status quo and would be the same as the Proposed Action. There would be no impact to the flood hazard at the Project Site as a result of the No Action Alternative.

4.8 GROUNDWATER AND SURFACE WATER RESOURCES

4.8.1 Proposed Action

The Proposed Action would not impact existing groundwater and surface water resources at the Project Site or surroundings.

4.8.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action.

4.8.3 No Action Alternative

The No Action Alternative preserves the status quo and would be the same as the Proposed Action.

4.9 GEOLOGY, SOILS AND TOPOGRAPHY

4.9.1 Proposed Action

The Proposed Action would not impact existing soil or topographic conditions at the Project Site or surroundings. No earth moving or grading is required under the Proposed Action.

4.9.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action.

4.9.3 No Action Alternative

The No Action Alternative preserves the status quo and would be the same as the Proposed Action.

4.10 BIOLOGICAL RESOURCES

4.10.1 Proposed Action

The Proposed Action would have no effect on threatened, endangered or candidate listed flora or fauna protected by Federal and State regulations. None have been observed at the Project Site, and no unique habitat resources important to native or protected flora or fauna are found at the Project Site. Habitat for the Wēkiu Bug, a candidate for listing under ESA, exists in the vicinity of the Project Site; however, the Project Site is not considered Wēkiu Bug habitat or potential habitat as past ground disturbance and the use of fill material at the Project Site and along the roadway do not provide the loose cinder material necessary for the Wēkiu Bug habitat (UH 1999; NASA 2005). Under the Proposed Action the potential impact to biological resources surrounding the Project Site would be further minimized through education of site visitors including contractors, students, faculty, staff, researchers and others about protecting the environmental resources of the summit. A qualified inspector would be retained to inspect all renovation materials and heavy equipment for introduced arthropods and insects prior to mobilization to the Project Site.

4.10.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action.

4.10.3 No Action Alternative

The No Action Alternative preserves the status quo and would be the same as the Proposed Action.

4.11 CLIMATE AND AIR QUALITY

4.11.1 Proposed Action

The Proposed Action would not have a significant direct or indirect impact on the climate at or around the Project Site. Air quality standards are established by both the EPA and by the DOH. The State of Hawai‘i is in “attainment” for all criteria air pollutants. The Proposed Action would not generate any new emissions. In addition, the Proposed Action would result in a modest reduction of vehicle trips reducing air quality impacts. However, fugitive dust may be generated during the renovation and replacement activities of the Proposed Action. Best management plans will be implemented to mitigate fugitive dust.

4.11.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action with one exception. The renovation activities would consist only of the telescope replacement and would have a shorter duration than the Proposed Action.

4.11.3 No Action Alternative

The No Action Alternative preserves the status quo and would be the same as the Proposed Action.

4.12 HAZARDOUS AND REGULATED MATERIALS

4.12.1 Proposed Action

The Proposed Action would not impact hazardous and regulated materials. No hazardous or regulated materials are currently stored, used, or disposed of at the Project Site and any hazardous and regulated materials encountered would be handled in accordance with applicable regulations.

4.12.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be the same as the Proposed Action.

4.12.3 No Action Alternative

The No Action Alternative preserves the status quo and would be the same as the Proposed Action.

4.13 NOISE

4.13.1 Proposed Action

The Proposed Action would result in a short-term increase in noise levels as a result of the renovation and telescope replacement activities. Under the Proposed Action reduced vehicle trips associated with remote operational capability would result in a modest reduction of noise in the summit area and at the Project Site.

4.13.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would be similar to the No Action alternative. The noise associated with renovation period activities (telescope replacement) would be of much shorter duration. In addition, although the telescope would be remotely operable, on-site personnel would still be required to open and close the dome which would require vehicle activity in the vicinity of the site. Due to the age of the facility, increased vehicle activity associated with building maintenance could be expected.

4.13.3 No Action Alternative

The No Action Alternative preserves the status quo. There would be no renovation period noise and there would be no decrease in the operation period vehicle traffic. Due to the age of the facility, increased vehicle activity associated with building maintenance could be expected.

4.14 SOCIO-ECONOMIC

4.14.1 Proposed Action

The Proposed Action would have a long-term social benefit for UHH students, faculty, and staff currently utilizing the observatory that has exceeded its practical life and no longer meets operational requirements. Furthermore, the Proposed Action would improve operational capabilities in support of UHH's Department of Physics and Astronomy for community outreach. The Department of Physics and Astronomy is likely to grow as a result of the Proposed Action in

terms of the number of students, quality and scope of academic programs, and extramural funding (particularly Federal funding; NSF and NASA). If adequately funded for operations, the UHH Department of Physics and Astronomy would be the premier undergraduate astronomy program in the world. The Proposed Action would result in an increased ability to train local students for careers in astronomy and jobs in MKSR observatories in support of NSF's mission of supporting scientific education and research and maintaining U.S. leadership in scientific discovery. It would enhance the Department's prospects for obtaining additional grants from Federal agencies to support such training; and would allow the Department to expand its services to local high schools by provision of opportunities to use the telescope remotely to support astronomy education in science classes.

The Proposed Action would result in short- and long-term direct, indirect and induced minor beneficial impacts to population, employment, income and commerce. Building renovation costs are estimated to be less than $500,000. Short-term employment levels would increase during the renovation and replacement activities phase, resulting in minor positive economic benefits related to the increased employment levels and localized economic benefits for local businesses and services due to the increased number of project-related workers in the area. Currently, there are no employees assigned specifically to the UH 24-inch Telescope Observatory; the UH 88-inch and UH 24-inch Telescope Observatories are jointly serviced by 7 service staff members. This arrangement would change under the Proposed Action.

During the operational phase, the facility would gain 2 employees and be operated by the UHH Department of Physics and Astronomy. Initial full-time staffing would consist of 1 astronomer and 1 technician. The telescope would be operated at night by observatory staff and by additional department faculty members, often with the assistance of students. Student assistants and experienced faculty would assist from time-to-time with routine observatory maintenance. One 4-wheel drive (4WD) vehicle would be available 24 hours a day, 7 days a week for support of operations; one other 4WD pool vehicle may be used from time to time as needed. The initial operating budget, exclusive of salaries, would be about $50,000 per year. The modest increase in employment would generate a small increase in direct spending, which in turn would generate further economic activity. No significant impacts to the existing socio-economic environment at the local and regional level are expected since the Proposed Action essentially entails enhancement of an existing activity already within the region.

4.14.2 Telescope Replacement Without Building Renovation Alternative

The Telescope Replacement Without Building Renovation Alternative would result in similar socio-economic impacts as the Proposed Action with some notable exceptions. The renovation-period employment levels would be slightly less than those of the Proposed Action as only the telescope replacement would occur. Operational-period employment levels would be the same as the Proposed Action and result in no significant impacts to the existing socio-economic environment on the local and regional level since the replacement of the telescope essentially entails enhancement of the existing activity. This alternative would not allow for the remote operation of the telescope which is an essential function of an instructional telescope and, therefore, would not meet the needs for the students, faculty, staff of the UHH Physics and Astronomy Department. In addition, without building renovations which create a weather proof and dust free environment to house the new 36-inch telescope, the maintenance requirements

and upkeep for the new telescope are likely to be higher than those of the Proposed Action. Without the building renovations, the telescope would be exposed to high moisture and dust levels which will ultimately shorten its life span.

4.14.3 No Action Alternative

The No Action Alternative would adversely impact the existing socio-economic environment. This alternative would forego the short-term benefit of creating temporary renovation/replacement period employment and the long-term benefit of improving quality of life for UHH students, faculty, and staff now utilizing the observatory that does not meet operational requirements. In the long term, the No Action Alternative would result in an underutilization of the observatory facility that is one of the world's most desirable optical astronomy telescope locations. Furthermore, the No Action Alternative would not allow for any substantial community outreach to high school science students since remote operation of the telescope would not be possible and they would not be allowed on-site for health reasons as young people are more susceptible to altitude sickness and for that reason, the UHH does not recommend that students of school age visit the summit.

4.15 CONSISTENCY WITH THE OBJECTIVES OF FEDERAL, STATE AND COUNTY LAND USE POLICIES, PLANS AND CONTROLS

This section provides an overview of the Proposed Action's consistency with relevant sections of major Federal, State and County land use policies, plans and controls. A listing of required environmental permits and approvals is included in Chapter 1.

4.15.1 Federal Plans and Controls

Other than environmental laws and regulations reviewed in Chapter 1 and discussed in other sections of this EA, the Federal government has no direct jurisdiction over the Project Site or other property within the boundaries of the MKSR.

National Environmental Policy Act

NEPA (42 USC §4321 et seq.), as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508) and NSF's "Compliance with the National Environmental Policy Act" (45 CFR Part 640) establishes a system of environmental review to ensure that environmental concerns are given appropriate consideration in Federal decision making along with economic and technical considerations. Compliance with NEPA is required for any program or project that proposes one or more of eight land uses or administrative acts, including use of Federal lands or funds other than for feasibility studies or the purchase of raw land. Because the Proposed Action involves the use of Federal funds, the project is subject to review under NEPA and approval by the NSF (lead Federal agency). This EA was prepared to comply with the requirements of 42 USC §4321 et seq.

Section 11-200-225, HAR provides that when an action is subject to NEPA and Chapter 343, HRS requirements, Federal and State agencies are required to cooperate to the fullest extent possible to reduce duplication of the requirements. This cooperation, to the fullest extent possible, must include joint environmental documents, concurrent public review, and concurrent processing. As such, this document will provide documentation for both the NEPA and Chapter 343, HRS environmental review process.

As noted, NSF and UHH have established a cooperating agency relationship (see Appendix A) and are jointly processing this EA.

4.15.2 State of Hawai‘i Policies, Plans and Controls

1. Hawai‘i State Constitution

Article XI Section 1: For the benefit for future generations, the State and its political subdivisions shall conserve and protect Hawai‘i’s natural beauty and all natural resources, including land, water, air minerals, and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation of self sufficiency.

Relationship to the Proposed Action – Natural beauty and natural resources are conserved and protected under the Proposed Action and alternatives.

Article XII, Section 7 of the Hawaii State Constitution: The State affirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaa tenants who are descendents of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the rights of the State to regulate such rights.

Relationship to the Proposed Action – Customary and traditional rights exercised for subsistence, cultural, and/or religious purposes are not affected under the Proposed Action and alternatives.

Article XI, Section 9 of the Hawaii State Constitution: Each person has the right to a clean and healthful environment, as defined by laws relating to environmental quality, including control of pollution and conservation, protection, and enhancement of natural resources.

Relationship to the Proposed Action – The Proposed Action and alternatives would provide a clean and health environment including control of pollution and conservation, protection, and enhancement of natural resources.

2. Hawai‘i State Plan

The Hawai‘i State Plan, established through the State’s legislative process, represents public consensus regarding expectations for Hawai‘i’s future. Chapter 226, HRS, as amended, describes the purpose of the State Plan as follows:

> “[it] shall serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State of Hawai‘i; provide the basis for determining priorities and allocating limited resources, such as public funds, services, manpower, land, energy, water, and other resources; improve coordination of state and county plans, policies, programs, projects, and regulatory activities; and establish a system for plan formation and program coordination to provide for an integration of all major state and county activities.” (Chapter 226-1, HRS; Findings and Purpose).

It is the goal of the Hawai‘i State Plan to achieve:

1. A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai‘i’s present and future generations.

2. A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
3. Physical, social, and economic well-being for individuals and families in Hawai‘i, that nourishes a sense of community responsibility, or caring, and of participation in community lifestyle.

The objectives and the policies of the State Plan that are relevant to the Proposed Action and alternatives include the following:

Section 226-6 Objectives and Policies for the Economy – In General.

Planning for the State’s economy in general shall be directed toward achievement of the following objectives:

(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai‘i’s people.

(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.

To achieve the general economic objectives, it shall be the policy of this State to:

(2) Expand Hawai‘i’s national and international marketing, communications, and organizational ties, to increase the state’s capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.

(3) Promote Hawai‘i as an attractive market for environmentally and socially sound investment activities that benefit Hawai‘i’s people.

(15)Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.

Section 226-8 Objectives and Policies for the Economy – Visitor Industry

(4) Planning for the State’s visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawai‘i’s economy.

(b) To achieve the visitor industry objective, it shall be the policy of this State to:

(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai‘i’s cultures and values.

Section 226-10 Objectives and Policies for Economy – Potential Growth Activities.

(a) Planning for the State’s economy with regard to potential growth activities shall be directed towards achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawai‘i’s economic base.

(b) To achieve the potential growth activity objective, it shall be the policy of this State to:

(5) Expand Hawai‘i’s capacity to attract and service international programs and activities that generate employment for Hawai‘i’s people.

(6) Enhance and promote Hawai‘i’s role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.

Section 226-12 Physical Environment – Scenic, Natural Beauty, and Historic Resources

(a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multicultural/historical resources.

(b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:

(1) Promote the preservation and restoration of significant natural and historic resources.

(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.

Section 226-21 Objectives and Policies for Socio-Cultural Advancement – Education.

(a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.

(b) To achieve education objective, it shall be the policy of this State to:

(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.

(9) Support research programs and activities that enhance the education programs of the State.

Relationship to the Proposed Action – The development of the MKSR Astronomy District since the late 1960s has diversified the State's economic base, by providing a stable, clean, high-tech industry. Mauna Kea is internationally known as the premier location for astronomy in the Northern hemisphere. The Proposed action will produce economic benefits that are detailed in Sections 3.14 and 4.14 of this document.

3. Hawai'i State Plan: Functional Plans

The State Functional Plans are plans that set forth the policies, statewide guidelines, and priorities within a specific field of activity. Functional plans have been developed for agriculture, conservation lands, education, employment, energy, health, higher education, historic preservation, housing, human services, recreation, tourism, transportation, and water resources development.

The State Functional Plans have been reviewed and those that have direct relevance to the Proposed Plan are presented here.

Recreational Functional Plan (1991)

Issues Area II. Mauka, Urban, and Other Recreation Opportunities

Objective II-A: Plan, develop, and promote recreational activities and facilities in mauka and other areas to provide a wide range of alternatives.

Policy II-A (1): Plan and develop facilities and areas that feature the natural and historic/cultural resources of Hawai'i. Develop interpretive programs for these areas.

Issues Area IV. Resource Conservation Management

Objective IV-A: Promote a conservation ethic in the use of Hawai‘i’s recreational resources.

Policy IV-A (1): Emphasize an educational approach, in coordination with enforcement efforts, to promote environmental awareness.

Relationship of the Proposed Action: Just a short drive from the island’s coasts, Mauna Kea’s upper slopes provide the opportunity to ski, snowboard, and play. The mountain is popular for hiking and sightseeing. The mountain’s lower slopes are used for hunting. The Proposed Action would not impact existing recreational activities on the mountain.

Conservation Lands Functional Plan (1991)

The objective of the State Conservation Lands Functional Plan is to provide for a management program allowing for judicious use of the State’s natural resources balanced with the need to protect these resources to varying degrees.

Objective IA: Establishment of databases for inventories of existing lands and resources.

Objective IB: Establishment of criteria for management of land and natural resources.

Objective IIA: Establishment of plans for natural resources and land management.

Objective IIB: Protection of fragile or rare natural resources.

Objective II C: Enhancement of natural resources.

Objective IID: Appropriate development of natural resources.

Objective IIF: Increase enforcement of land and natural resource use laws and regulations.

Objective IIIA: Expansion and promotion of a public conservation ethic through education.

Relationship of the Proposed Action – The Conservation Lands Functional Plan does not specifically refer to the MKSR which lies within the State Conservation District. The Proposed Action is consistent with the Conservation Lands Functional Plan as it does not propose any new development on the summit and does not impact natural resources in the area.

Higher Education Functional Plan (1987 Draft)

The State Higher Educational Functional Plan is “intended to serve as a guide to the objectives and policies pursued by the post-secondary education community in meeting its many responsibilities.”

Objective A: Maintain a number and variety of postsecondary education institutions sufficient to provide the diverse range of programs required to satisfy individual and societal needs and interests.

Policy A (2): Focus increased attention on the role higher education plays in supporting the economic development of the State.

Objective B: Attain the highest level of quality, commensurate with its mission and objectives, of each education, research, and public service program offered in Hawai‘i by an institution of higher education.

Policy B (2): Maintain and strengthen the position of the University of Hawai‘i as a leading national and international research center.

Policy B (3): Identify for program enrichment and emphasis those programs considered important in terms of State needs and emphases, those programs for which special advantages in Hawai‘i provide an opportunity for national or

international prominence, and those programs which have already achieved such prominence.

Relationship of the Proposed Action – The UH IfA is internationally known for its astronomical research. The IfA is able to recruit world class talent and conduct superior research because the UH, through its agreements with the individual telescopes located on Mauna Kea, has access to some of the world's finest viewing instruments. The redevelopment of the UH 24-inch Telescope Observatory into a 36-inch telescope observatory with state-of-the-art equipment which would allow the telescope observatory to be remotely operated would significantly enhance the undergraduate astronomy program at the UHH. The implementation of the Proposed Action would allow the UHH Department of Physics and Astronomy to provide training to local students for potential positions in the astronomy community.

4. State Land Use Districts

All lands in the State of Hawai'i have been classified in one of four land use districts by the State Land Use Commission, pursuant to HRS, Chapter 205, and Chapter 15-15, HAR. The four land use districts are: (1) Conservation; (2) Agricultural; (3) Urban; and (4) Rural. The conservation district is the most restrictive of the four land use classifications authorized under Hawaii's Land Use Law, Hawaii Revised Statutes ("HRS") Chapter 205. Conservation districts are defined to include: areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous and endemic plants, fish and wildlife, including those which are threatened or endangered; preventing floods and soil erosion; forestry; open space and areas whose existing openness, natural condition or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept. HRS § 205-2(e).

As shown in Figure 9, the Proposed Action is within the State Conservation District. Astronomy instructional and educational research observatories are permitted uses within the State Conservation District (Chapter 13-5-24 HAR). The UHH is preparing a CDUA for the Proposed Action.

5. State Conservation District Rules

Pursuant to Chapter 205, HRS, the State Land Use Commission has established the boundaries for four State Land Use Districts throughout the State: Urban, Rural, Agriculture, and Conservation. The MKSR and the Project Site lies within the State Conservation District.

The DLNR administers public lands in the Conservation District pursuant to HRS Ch. 183C. That chapter makes the following statement of public policy: "…the legislature finds that lands within the State land use conservation district contain important natural resources essential to the preservation of the State's fragile natural ecosystems and the sustainability of the State's water supply. It is therefore, the intent of the legislature to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare."

DLNR is responsible for the regulation of land uses within the Conservation District in which the Proposed Action lies. It has established four types of resources subzones (general, resource, limited, protective), within the Conservation District based on their resource characteristics, and adopted regulations identifying permitted uses and permitting requirements. The MKSR, including the Project Site, is contained entirely in the Resource subzone (Figure 7). The objective of this Resource Subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.

According to the Conservation District Rules (Chapter 13-5 HAR) the Resource subzone encompasses:

- Lands necessary for providing future parkland and lands presently used for national, State, County, or private parks.
- Lands suitable for outdoor recreational uses such as hunting, fishing, hiking, camping, and picnicking.
- Offshore islands of the State of Hawai‘i, unless placed in a protected (P) or Limited (L) subzone.
- Lands and State marine waters seawater of the upper reaches of the wash of waves, usually evidenced by the edge of vegetation or by the debris left by the wash of waves on shore to the extent of the State’s jurisdiction, unless placed in a P or L subzone.
- Permitted land uses include astronomy facilities (Section 13-5-24, HAR).

In evaluating the merits of a proposed land use, the DLNR shall apply certain criteria. Those criteria directly related to the MKSR include:

1. **The proposed land use is consistent with the purpose of the conservation district.**

   Discussion: Astronomy instructional and educational research observatories are permitted uses within the State Conservation District (§13-5-24, HAR). An after-the-fact Conservation District Use Application (CDUA) was prepared by UH in 1977 for the MKSR. Demolition, removal or alteration of existing structures and equipment in a protective subzone require a Department Permit (§13-5-22). UHH is preparing a CDUA for the Proposed Action.

2. **The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur.**

   Discussion: Astronomy facilities under an approved management plan are considered a permitted use in the Resource Subzone (§13-5-24, HAR).

3. **The proposed land use complies with provisions and guidelines contained in Chapter 205A, HRS, entitled “Coastal Zone Management,” where applicable.**

   Discussion: The Proposed Action (renovation of an existing facility) complies with provisions and guidelines of Chapter 205-A, HRS (consistency with CZM objectives and policies).

4. **The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.**

   Discussion: The Proposed Action (renovation of existing facility utilizing the same building foundation and footprint) would not cause adverse impact to existing natural resources within the surrounding area, community or region.

5. **The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.**

Discussion: The Proposed Action is compatible with locality and surroundings, appropriate to the physical conditions and capabilities of the Project Site. The Proposed Action would be consistent with the OMKM design guidelines concerning the siting, heights, coloration, and character of redeveloped facilities in a manner that is appropriate to the unique physical environment of Mauna Kea.

6. **The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, which would be preserved and improved upon, whichever is applicable.**

   Discussion: The Proposed Action would not impact the existing physical and environmental aspects of the land in the Astronomy Precinct.

7. **The proposed land use will not be materially detrimental to the public health, safety, and welfare.**

   Discussion: The Proposed Action, the renovation of an existing telescope observatory, would not be impact the public health and safety of the community. The Proposed Action will support UHH's undergraduate astronomy program and astronomy outreach programs to local school which will benefit the welfare of Hawai'i's citizens.

6. Hawai'i Coastal Zone Management Area Program

The Hawai'i Coastal Zone Management Program (HCZMP) (Chapter 205-A, HRS) applies to all State agencies. The Proposed Action would not have reasonably foreseeable direct or indirect short term or long term effects on any coastal use or resources in the State's coastal zone. Objectives and policies of the HCZMP are described in Chapter 205-A (2) HRS, Part I. The project's conformance with relevant objectives of the HCZMP is reviewed below:

Recreational Resources

Objective: Provide coastal recreation opportunities accessible to the public.

Relationship to the Proposed Action - The Proposed Action is in an upland site. Access to recreational resources in the Mauna Kea summit area would not be affected by the Proposed Action or alternatives.

Historic Resources

Objective: Protect, preserve, and where, desirable, restore those natural manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture. Historic Resources Policies: (A) Identify and analyze significant archaeological resources; and (B) Maximize information retention through preservation of remains and artifacts or salvage operations.

Relationship to the Proposed Action – The SHPD has surveyed all known archaeological features in the MKSR. Using Global Positioning System (GPS) technology, the State has been able to accurately locate these features and has incorporated them into a Geographic Information System (GIS). This database is maintained by the SHPD and has been utilized along with the other data to determine the boundaries of the proposed Natural and Cultural Preservation Area and to determine appropriate locations for proposed new facilities. The Project Site is not located on any known archaeological feature. No ground disturbance would occur as a result of the Proposed Action. The Proposed Action would be consistent the "Historic Resources" objective of the CZM Law. UHH and NSF have determined the Proposed Action would result in "no historic

properties affected" in accordance with Section 106 of the NHPA (see correspondence in Appendix B).

Scenic and Open Space Resources

Objective: Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open space resources.

Relationship to the Proposed Action – The Proposed Action would not significantly impact scenic viewplanes. The footprint of the observatory building would not change as a result of the Proposed Action and the height of the building would possibly increase by up to 12-inches. The observatory building is the smallest of the Mauna Kea observatories. Due to the topography of the summit area and its location in a relatively low lying area, the observatory is not visible from areas below the summit.

Coastal Ecosystems

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Relationship to the Proposed Action – No ground disturbance and no change in storm water runoff would occur as a result of the Proposed Action and the alternatives. The Proposed Action and the alternatives would maintain the existing drainage pattern at the Project Site. No adverse impacts to stream water quality are anticipated.

Economic Uses

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Relationship to the Proposed Action – The astronomy observatories at Mauna Kea are important contributors to the economy of Hawai'i County and to the State of Hawai'i. The Proposed Action and the Replacement Without Renovation alternative would enhance the UHH astronomy program and provide job training for careers in the astronomy community for local people, including jobs at the Mauna Kea observatories.

Coastal Hazards

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Relationship to the Proposed Action – The Project Site is not in an identified flood hazard area. It is located in a dry area receiving approximately 6 inches of precipitation a year and is located at the summit of the highest peak in the Hawaiian Islands. The Project Site is over 25 miles from the coast and not within a tsunami inundation zone.

Managing Development

Objective: Improve the development and review process, communication and public participation in the management of coastal resources and hazards.

Public Participation

Objective: Stimulate public awareness, education, and participation in coastal management.

Relationship to the Proposed Action – Pre-consultation assessment during preparation of the Draft EA included a wide range of government agencies, community organizations, and interested individuals (see Sections 6.1 and 6.2). A notice announcing availability of the Draft EA was published in the March 23, 2006 edition of OEQC's Environmental Notice.

Beach Protection

Objective: Protect beaches for public use and recreation.

Relationship to the Proposed Action – The Project Site is in an upland location, far removed from any coastal beaches.

Marine Resources

Objective: Implement the State's ocean resources management plan.

Relationship to the Proposed Action – The Project Site is in an upland location, far removed from the marine environment.

7. Chapter 343, Hawai'i Revised Statutes.

Chapter 343, HRS, the State of Hawai'i Environmental Impact Statement Law, establishes a system of environmental review to ensure that environmental concerns are given appropriate consideration in decision making along with economic and technical considerations. Compliance with Chapter 343, HRS is required for any program or project that proposes one or more of eight land uses or administrative acts, including use of State or County lands or funds other than for feasibility studies or the purchase of raw land. Because the Proposed Action involves improvements to State facility and takes place in the Conservation District, the project is subject to review under Chapter 343, HRS and approval by the UHH (approving agency). This EA was prepared to comply with the requirements of Chapter 343, HRS and Chapter11-200, HAR.

Section 11-200-225, HAR provides that when an action is subject to NEPA and Chapter 343, HRS requirements, Federal and State agencies are required to cooperate to the fullest extent possible to reduce duplication of the requirements (UHH/NSF cooperating agreement presented in Appendix A). This cooperation, to the fullest extent possible, must include joint environmental documents, concurrent public review, and concurrent processing. As such, this document will provide documentation for both the NEPA and Chapter 343, HRS environmental review process. A review of the consistency of the Proposed Action with significance criteria specified in §11-200-12, HAR is provided in Chapter 5.

4.15.3 County of Hawai'i Plans and Policies

1. County of Hawai'i General Plan

The Hawai'i County General Plan ("General Plan") establishes the long-range goals and policies, which guide comprehensive development and appropriate uses of land resources. The General Plan contains goals, policies, and standards under in several categories that are relevant to Mauna Kea. Categories include economic, environmental quality, historic sites, natural beauty, natural resources and shoreline, recreation, and land use. This section addresses the consistency of the Master Plan for the MKSR with relevant policies of the County.

Economic

Goals: Economic development and improvement shall be in balance with the physical and social environments of the island of Hawai‘i.

Policies: The County of Hawai‘i shall continue to encourage the expansion of the research and development industry by working with and supporting the university, private sector, and other agencies' programs developed to aid the County of Hawai‘i.

The County shall promote a distinctive identify for the island of Hawai‘i to enable government, business and travel industries to promote the County of Hawai‘i as an entity separate and unique within the State of Hawai‘i.

Relationship of the Proposed Actions – The State's astronomy industry, and specifically the complex on Mauna Kea, is one of Hawai‘i's best-known industries in the international community. The Proposed Action is consistent with the economic goals and policies of the General Plan. The Proposed Action would be operated by an educational, non-profit entity, the UHH.

Historic Sites

Goals: Protect and enhance the sites, buildings and objects of significant historical and cultural importance to Hawai‘i. Access to significant historic sites, buildings and objects of public interest should be made available.

Policies: Signs explaining historic sites, buildings, and objects shall be in keeping with the character of the area or the cultural aspects of the feature.

Relationship of the Proposed Action – The known archaeological sites within MKSR have been mapped and described by the SHPD. The Proposed Action is not on or near existing archaeological features. The Mauna Kea Rangers on the mountain educate visitors and residents about the proper treatment of significant cultural features.

Natural Beauty

Goals: Protect scenic vistas and view planes from becoming obstructed. Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

Policies: Increase public pedestrian access opportunities to scenic places and vistas.

Relationship of the Proposed Action – The Proposed Action and the resulting renovated observatory building would not be visible from the surrounding towns of Honoka‘a, Hilo, and Waimea. The summit access road is open to the public. UH holds a non-exclusive easement from DLNR for the section of roadway between Hale Pohaku and the summit. Vehicular traffic is restricted to paved and unpaved roadways. UH has the authority to close the road at Hale Pohaku or further above, to vehicular traffic, only if weather creates unsafe conditions. There are no restrictions for foot traffic within the UH-managed lands, including the Hale Pohaku area, and the science reserve. The Kuka'iau-'Umiko trail is said to come from the northeast toward the summit and appears on older maps. Access to the area where the trail is said to traverse is available, as long as the road is open. Access to the trail from makai is via DLNR (forest reserve) and makai ranch lands. The same is true for the Humu‘ula trail, which also comes from makai out of DLNR-managed lands, through the Mauna Kea Ice Age NAR (see Section 6.2 letter from OMKM). Pedestrian access on the mountain would not be restricted in any way by the Proposed Action or the alternatives.

2. Land Use Policy Allocation Guide Map

The lands of the MKSR are all outside the jurisdiction of the County of Hawai‘i. The County’s Land Use Policy Allocation Guide (LUPAG) map designates the entire area of Mauna Kea as conservation. The County’s Facilities Map does not designate any County public facilities in the area of Mauna Kea.

3. Zoning

Land use regulatory authority of lands within the Conservation District is vested with the DLNR. The Mauna Kea summit area, including the Project Site, is not zoned by Hawai‘i County.

4.15.4 Mauna Kea Science Reserve Master Plan

The Master Plan and the FEIS for the Master Plan were prepared by UH in 2000 and 1999, respectively. These documents were used as references in the preparation of this EA. The Master Plan was prepared to provide the policy framework for the responsible stewardship and use of UH-managed lands on Mauna Kea through the year 2020 and supersedes the 1983 MKSR Complex Development Plan. The Master Plan made an effort to address comments and recommendations from a 1998 Legislative Auditor’s report on the management of Mauna Kea. The Master Plan is intended to integrate future use of the mountain for education, research, culture, and recreation with a deeper awareness of the natural and cultural resources of the mountain and the significance of Mauna Kea.

The Master Plan provides the framework for the implementation of educational outreach to the native Hawaiian community at primary, secondary, and post-secondary levels. Under the Master Plan, a new management structure was recommended that included the appointment, by the UH Chancellor, of a single point of contact for the MKSR to provide comprehensive management authority located in Hilo and on the mountain –OMKM. It was recommended that OMKM coordinate interagency issues and be a conduit to the community. The Master Plan also recommended that the UH appoint a Mauna Kea Management Board (MKMB) to provide the community with direct voice into the management of the mountain.

The Master Plan also recommended management policy guidelines be further developed and created a Physical Planning Guide. The Physical Planning Guide consists of four components: natural resources, culture, education and research, and recreation. Under the Master Plan, 95% of the MKSR was reserved as a Natural and Cultural Preservation Area. The remaining land area was reserved for the Astronomy Precinct which is subject to architectural, environmental, and cultural controls. The redevelopment of the Project Site was included in the Master Plan.

The Master Plan called for a 2-to 3-meter telescope observatory on the site of the existing UH 24-inch Telescope Observatory and a new 1-m Telescope Observatory facility for UHH at the existing “Utility Building” north of the Project Site (see Figure 2, Project Site). The Proposed Action is consistent with the Master Plan with the following exceptions. A 36-inch telescope will be installed at the Project Site rather than the 2-to 3-m telescope indicated in the Master Plan. Plans for the 1-m telescope observatory have been cancelled. The Proposed Action would be more environmentally sensitive than the Master Plan because no ground disturbance would result and it would decrease the number of planned telescopes in the MKSR.

4.16 CUMULATIVE IMPACTS

Cumulative impacts are effects on the environment that result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of what entity undertakes such actions. The cumulative impact analysis considered reasonable future actions (summarized in Table 6) within the reasonable geographic boundaries for each potentially affected resource. The cumulative impact analysis prepared for the Outrigger Project FEIS (NASA 2005) was used as a baseline to evaluate potential impacts of the Proposed Action. Land use compatibility, utilities/infrastructure, flood hazard, ground and surface water resources, geology, soils, topography, climate and air quality, and noise are not discussed in this section as those environmental factors were not identified as having potential direct, indirect, or cumulative adverse impacts. Resources with potential for cumulative impact include cultural resources, visual resources, roads and traffic, and socio-economics and demographics.

Table 6: Existing and Proposed Observatories at MKSR

Observatory (Aperture Diameter)	Proposed Master Plan Action
UH 24-inch (0.6 m)	Redevelop: 2 – 3 m*
UH 88-inch (2.2 m)	Redevelop: 4-12 m
CFHT (3.6m)	Redevelop: 4-12+ m
UKIRT (3.8 m)	Redevelop: 4-12+ m
IRTF (3.0 m)	Redevelop: 4-12+ m
CSO (10 m)	Remain as-is
JCMT (15 m)	Remain as-is
Very Long Baseline Array (VLBA) (25 m)	Remain as-is
W.M. Keck Observatory (Keck I & II) (10)	Add 4-6 1.8 m Outrigger Telescopes
Gemini Telescope (8 m)	Remain as-is
Subaru Telescope (8 m)	Remain as is
Submillimeter Array (SMA) (12 6-m Antennas)	Add 12 Antennas
New: UH 36-inch Telescope	New site, 0.9 m (Instructional)**
New: Conventional Optical/IR	New site, 4-12+ m
New: Next Generation Large Telescope	New site, 25+ m

*The redevelopment of the existing UH 24-inch Telescope Observatory into a larger 2 to 3 m telescope observatory at an adjacent site was subsequently dismissed after the approval of the Master Plan. The changes to the Master Plan pertaining to the siting of the 36-inch (0.9 m) telescope at the Project Site are documented in a Memorandum of Agreement between IfA and UHH (personal communication, Dr. William Heacox, 2006).

** The "New UHH 1 m Instructional Telescope" location was moved from a "new" site, as described in the 2000 Master Plan, to the redevelopment of the existing UH 24-inch Telescope Observatory after the approval of the Master Plan. The changes to the Master Plan pertaining to the siting of the 36-inch (0.9 m) telescope at the Project Site are documented in a Memorandum of Agreement between IfA and UHH (personal communication, Dr. William Heacox, 2006).

4.16.1 Cultural Resources

The reasonable geographic boundaries for cultural resources consist of the Astronomy Precinct of the MKSR where the Project Site is located. Many believe that any new development activity on the summit of Mauna Kea, regardless of how insignificant or how major in scope, coupled with all internal and external activities of the 12 astronomy facilities on the mountain, adds to a cumulative impact that is disturbing to the serenity, significance, and spiritual ambience of this sacred region as wao akua to the Hawaiian people.

The Proposed Action does not involve ground disturbing activities and would not affect archaeological or architectural resources. Other redevelopment/development projects listed in Table 6 involve ground disturbing activities. Large setbacks have been established between the three archaeological sites within the Astronomy Precinct to prevent planned astronomy facilities from impacting these sites. With the planned growth in the number of summit facilities, there is the potential for an increase in the number of visitors using foot trails in the MKSR. With greater access to archaeological sites, this could result in some secondary impacts resulting from possible disturbance to shrines and other site types. Monitoring by Mauna Kea Rangers and educational programs at the MKVIS are expected to help offset this potential cumulative impact to archaeological resources.

Cultural resources would be preserved on Mauna Kea through multiple measures proposed in the Master Plan, including the preservation of culturally important landforms and inter-relationships between shrines and landforms. The Master Plan takes several measures to preserve and enhance the cultural setting of the summit region. Siting of new facilities would avoid impacts to culturally significant landforms and design of new and recycled facilities that would blend with the surroundings. In the case of the summit ridge, the visual impact of the recycled facilities would be less intrusive than the view of existing facilities into this area.

The Astronomy Precinct area is the area most affected by previous development, however, it contains the fewest archaeological sites, and there are no undeveloped pu‘u in this part of the summit. The cumulative effect of restricting the zone of development is a significant benefit to cultural resources through the designation of over 95 percent of the MKSR into a Natural and Cultural Preserve Area, consisting of over 10,760 acres. All of the undeveloped pu‘u in the MKSR would be protected from future disturbance. An unimpeded view channel from the summit to the west would be retained (Figure 9). The Master Plan reinforces the existing resources of the NAR, with its culturally important places of Wai‘au and Keanakakoi adze quarry and the band of shrines occurring at the 13,000-foot elevation.

In terms of management impact to cultural resources, the Master Plan brings Hawaiian cultural interests to the forefront of an on-going management effort for the resources of the mountain. The mountain’s cultural resources would be protected, along with access rights for cultural practitioners. The plan protects and enhances these resources for the betterment of generations to follow.

4.16.2 Visual Resources

Views of the summit of Mauna Kea from locations at the summit and off-mountain locations would be affected by the proposed redevelopment and development projects detailed in the Master Plan (see Table 6). The plan for physical development limits redevelopment and new facilities to the Astronomy Precinct, which is the area of least potential visual impact. The most desirable locations for new observatories – the tops of undeveloped pu‘u such as Poli‘ahu and Līlīnoe – will not be affected by astronomy development (see Table 6 and Figure 8). The view of the summit from Hilo would be preserved, with no new facilities extending down the slope to the east of the summit ridge. An unimpeded view channel from the summit to the west would be retained (Figure 9).

In the case of the redeveloped or “recycled” facilities at the summit ridge, including the Proposed Action, the visual impact could actually be less intrusive than the existing facilities on the ridge. There would be a long-term cumulative effect resulting from the view of new facilities on the northern slope of the mountain from the down-slope communities. Design measures and careful siting would be applied to minimize the potential visual impact of these facilities. The Proposed Action and alternatives are not visible from off-summit locations and would have no significant cumulative impact on the visual environment at the summit.

4.16.3 Roads and Traffic

The Summit Road and the Saddle Road define the reasonable geographic boundaries for roads and traffic. No significant cumulative impacts on roads and traffic are expected as a result of the Proposed Action and the proposed redevelopment and development projects listed in Table 6 (NASA 2005). The number of trips required by staff and students as a result of the Proposed Action and, to a lesser extent, the Telescope Replacement without Building Renovation alternative would decrease, as the facility would be largely remotely operated. A slight increase in the number of trips by staff, researchers, and visitors would occur as a result of the other redevelopment and development projects listed in Table 6 which would be slightly offset by a decrease in the number of trips to the Project Site under the Proposed Action.

4.16.4 Socio-Economics/Demographics

The Island of Hawaiʻi and to a lesser extent, the State of Hawaiʻi, define the reasonable geographic boundaries for cumulative socio-economics/demographics effects. The Proposed Action and the Master Plan actions would have a positive long-term cumulative effect to the economy of the State of Hawaiʻi and County of Hawaiʻi. The Proposed Action would include an increase of two positions and is expected to positively impact the UHH Physics and Astronomy undergraduate program as well as boost the community outreach of the department.

Astronomy-related employment currently totals nearly 400 direct positions. Direct, indirect, and induced employment associated with Mauna Kea operations in the year 2020 is expected to total 850 to 1,000 positions statewide. Direct and indirect revenues to the State and County would be increased by $12 million to $16 million per year (NASA 2005).

Aside from the direct and indirect economic benefits, the observatories are becoming more involved in community building activities, with high school internships offered by Keck and Gemini observatories. Under the Proposed Action, the UHH astronomy program would be greatly expanded and would offer students the opportunity to prepare for careers in astronomy at UHH. The trend toward observatory involvement in community-building enterprises is anticipated to expand with time.

4.17 COMPLIANCE WITH EXECUTIVE ORDERS

As a Federal agency, NSF is required to comply with Presidential Executive Orders (EO). Relevant EO’s are summarized below.

Executive Order 12898, Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 (February 11, 1994) requires Federal agencies to identify and address the potential for disproportionately high and adverse human health or environmental effects of

their actions on minority and low-income populations. Additionally, EO 12898 requires that access to public information and meaningful opportunities for public involvement by minorities and low-income populations be provided during project planning and development.

Over three quarters of the population of the State of Hawai‘i is composed of non-white residents. Persons self-designated as Asian, Native Hawaiian or Other Pacific Islander, or multiracial (primarily Asian and Native Hawaiian) comprised approximately 67 percent of the total resident population (NASA 2005). For Hawai‘i County, approximately 60 percent of the resident population is self-designated as Asian, Native Hawaiian or Other Pacific Islander, or multiracial. The area around the MKSR is relatively unpopulated. Less than 10,000 residents live within 40 kilometers of the MKSR. The population centers of Hilo and Waimea have both experience an overall increase in population between 1990 and 2000. Waimea's population grew by 18 percent while Hilo's population grew by 8 percent (NASA 2005). The non-minority (white) population in both Hilo and Waimea declined between 1990 and 2000, that decline was off-set by growth in the minority (non-white) populations (NASA 2005).

Short-term renovation related impacts to the surrounding communities are possible under the Proposed Action, however, there are no known significant or adverse environmental impacts, including human health, economic or social effects resulting from the Proposed Action or alternatives that could disproportionately affect minority or low-income communities. The Proposed Action and alternatives would maintain economic activity within the MKSR and nearby communities. The Proposed Action could provide employment training to local minorities for work at MKSR. Under the No Action Alternative, there would be no renovation activities, and no impact on minority and low-income populations.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. EO 13045 (April 21, 1997) requires Federal agencies to make children's health a high priority. To the extent permitted by law and appropriate and consistent with its mission, each Federal agency:

- Shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and
- Shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

The Proposed Action and alternatives would not pose any environmental health and safety risks that may disproportionately affect the general public, including children. Because of the high altitude at the Project Site, there is an underlying danger to all persons visiting the summit that may affect children and the elderly disproportionately. Symptoms of mountain sickness or altitude sickness vary from person to person but may include: sever headaches, nausea, vomiting, breathing difficulties, coughing, blue lips or fingernails, disorientation, dizziness, dehydration, and extreme drowsiness that may lead to coma. Under the Proposed Action and alternatives access would be afforded by the Summit Road, which is patrolled by Mauna Kea Rangers. Children unaccompanied by an adult would be unlikely to visit the Project Site.

Executive Order 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition. EO 13101 (September 14, 1998) is intended to improve the Federal government's use of recycled products and environmentally preferable products and services. It

states that pollution that cannot be prevented should be recycled and pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should only be conducted as a last resort.

The Proposed Action and Telescope Replacement Without Building Renovation Alternative would incorporate efficient waste handling provisions for recycling waste products. The renovation debris would be recycled to the maximum extent possible, and the remaining renovation debris would be disposed in a local landfill to be determined by the renovation contractor. Under the No Action Alternative, there would be no new construction; therefore, there would be no impact on the use of recycled products and environmentally preferable products and services. There is no reuse potential for the 24-inch telescope as a functioning telescope; however, it may be used for display at the UHH campus.

Executive Order 13123, Greening the Government Through Efficient Energy Management. EO 13123 (June 3,1999) requires the Federal government to improve its energy management for the purpose of saving taxpayer dollars and reduce emissions that contribute to air pollution and global climate change. Federal agencies are required to reduce greenhouse gas emissions; reduce energy consumption per square foot of facility; strive to expand use of renewable energy; reduce the use of petroleum within its facilities; and reduce water consumption.

Efficient energy management for the Proposed Action would be incorporated through energy efficient building design and construction and operation. Sustainable design features that would be considered for potential inclusion in renovated facility include the use of efficient equipment lighting and the use of high reflective roofing. Under the alternatives, there would be no new construction or renovation; therefore, there would be no impact on the existing energy management practices.

4.18 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

The Proposed Action and Telescope Replacement Without Building Renovation Alternative would not increase energy requirements. It is reasonable to conclude that the renovated facility would be more energy efficient than the unimproved existing facility since the renovated facility would comply with current energy efficiency standards and policies.

4.19 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

This section lists the trade-offs between short- and long-term gains and losses due to the Proposed Action. “Short-term” refers to the renovation period; “long-term” refers to the operational period.

- Short-term loss due to air quality and noise impacts during renovation;
- Short-term gains to the local economy resulting from renovation activity and direct/indirect spending;
- Long-term decrease in traffic volumes associated with the facility as a result of remote controlled operation;
- Long-term improvement to the visual environment of the observatory building by replacing the aging exterior siding and dome;
- Long-term productivity and efficiency gains through providing adequate facilities that increase operational efficiency;

- Long-term improvement in community outreach to local high school science students and the community as a whole from use of the remotely operated new 36-inch optical telescope;
- Long-term gain of improved morale and quality of life for UHH Astronomy and Physics Department personnel and students working in improved facilities that meet operational requirement;
- Long-term indirect and induced economic benefits resulting from increased enrollment in the UHH Astronomy and Physics Department;
- Long-term operational gains in instructional and research capabilities of the UHH Department of Physics and Astronomy staff and students.

4.20 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Resources that are committed irreversibly or irretrievably are those that cannot be recovered if the proposed project is implemented. The Proposed Action and the Telescope Replacement Without Building Renovation Alternative would irreversibly and irretrievably commit two types of resources: (1) general development costs including fiscal resources, labor, fuels, energy, and construction equipment and materials and (2) operational phase resources such as electricity, water and materials. The No Action Alternative would require operational and maintenance costs through the life of the facility, although resources used during the operational phase would not increase over existing levels.

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5 COMPLIANCE WITH CHAPTER 343, HAWAI'I REVISED STATUTES

This EA has been written to comply with Chapter 343, HRS and Chapter 11-200, HAR, in addition to other requirements identified in Section 1.4. This section is included to meet the requirements of Chapter 343, HRS and Chapter 11-200, HAR.

5.1 DETERMINATION

Based on the information and analysis presented in this document, the Proposed Action is not expected to result in a significant impact on the environment. The Proposed Action will not have a significant short-term, long-term or cumulative adverse impact on the environment; therefore, preparation of an Environmental Impact Statement will not be required. In accordance with NEPA and Chapter 343, HRS and Chapter 11-200, HAR, NSF and UHH have determined that a FONSI will be issued for the Proposed Action.

5.2 FINDINGS AND REASONS SUPPORTING THE DETERMINATION

In determining whether an action may have a significant impact on the environment, the applicant or agency must consider all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. The FONSI was based on review and analysis of the significance criteria specified in Section 11-200-12, HAR. A discussion of each of the criteria and findings are presented below.

1. Involves an irrevocable commitment or loss of or destruction of natural or cultural resources

The Project Site encompasses lands that have been previously disturbed and developed for an astronomy observatory. Previous flora and fauna surveys have determined no presence of Federal or State-protected endangered, threatened or candidate species that could be jeopardized by the Proposed Action (see Sections 3.10 and 4.10). No significant archaeological or architectural resources would be impacted by the Proposed Action or alternatives. The Project Site is located at the summit of Mauna Kea, a NRHP eligible site; however, the Proposed Action (i.e., replacement of the existing telescope and renovation of the existing observatory building) and alternatives would not further impact traditional cultural property (the summit) or cultural practices. The Proposed Action would not involve ground disturbing activities, changes in the landscape or access to the Project Site. Exterior renovations would be made to the observatory building, including a potential increase in the overall dome height of up to 12 inches which would not adversely affect important view planes. A significant decrease in required on-site support due to remote operations capability would be achieved. Proposed construction activities would be short in duration (14-18 weeks) and would follow best management practices to minimize disturbance to cultural practitioners.

The NHPA and NEPA processes were run concurrently and public comments were invited. Based on a careful review and analysis, an in accordance with Chapter 6E HRS and Section 106 of the NHPA, NSF has determined that the Proposed Action would result in "no historic property affected." NSF has sought concurrence with this determination with the SHPD, OHA, Kahu Ku Mauna, the Royal Order of Kamehameha I, and Mauna Kea Anaina Hou. SHPD has indicated its

concurrence with this determination. OHA, Kahu Ku Mauna, and Mauna Kea Anaina Hou have provided comments. Mauna Kea Anaina Hou has expressed that the group has never signed a MOA pursuant to Section 106 NHPA relating to previous development of Mauna Kea (see Section 6.2 letter from Mauna Kea Anaina Hou). No response was received from the Royal Order of Kamehameha I. Correspondence related to the Section 106 consultation process is provided in Appendix B.

Renovation of existing facilities would not adversely impact scenic views (see Sections 3.4. and 4.4.1). The existing siting would be utilized and would maintain the overall visual quality of the existing view planes. The observatory dome would remain visible from the Mauna Kea summit area. The proposed renovation would appear below the envelope of the existing astronomy facilities and would not be visible from Hilo, Honoka‘a, or Waimea.

2. Curtails the range of beneficial uses of the environment

The Proposed Action would revitalize an aging but important State-owned observatory resulting in the positive long-term benefits associated with upgrading and renovating a previously developed facility. Renovation and operation of the facility would be handled in accordance with Federal and State regulations, thereby minimizing potential impacts to the Conservation lands at and around the Project Site (see Section 4.15.2).

3. Conflicts with the State’s long-term environmental policies or goals and guidelines as expressed in Chapter 343, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders

The Proposed Action is consistent with the State’s long-term environmental policies, and the policies and guidelines specified in Chapter 343, HRS, EOs, and Court Decisions, as demonstrated by the discussion in this chapter and Section 4.15.

4. Substantially affects the economic welfare, social welfare, and cultural practices of the community or State

The Proposed Action would renovate an existing State-owned astronomy observatory within the Astronomy Precinct, thereby maintaining existing jobs and associated economic benefits within the region. Temporary, short-term direct and indirect economic benefits would result from renovation-related jobs and activity, including positive benefits for nearby retail and food establishments due to the increased number of renovation workers in the area. The increased employment level (approximately 2 new jobs for local civilian workers) would result in minor long-term direct, indirect and induced economic benefits to the local and island economy. There would be no increase demand for public facilities and services (see Sections 3.5, 3.6, 4.5, and 4.6 3).

The Proposed Action would not adversely affect the social welfare or cultural practices of the community or State, or create environmental health and safety risks that may disproportionately affect children and minority or disadvantaged population (see Sections 4.15.2, 4.16.4 and 4.17). As discussed in Sections 3.3 and 4.3, the Proposed Action would not impact cultural resources or practices. The density and intensity of land use would not change and the proposed use is compatible with the surrounding uses (see Sections 3.2. and 4.2).

5. Substantially affects public health

Activities associated with the Proposed Action are non-industrial, education-related activities that would not pose any public health hazards (see Sections 3.2, 4.2, and 4.17).

6. Involves substantial secondary impacts, such as population changes or effects on public facilities

The Proposed Action would result in insignificant island-wide population growth resulting from the minor increase in staffing (2 new jobs). The Proposed Action would not result in significant increased traffic on public roadways and intersections near UHH and peak hour levels of service are projected to remain at acceptable levels for urban areas.

7. Involves a substantial degradation of environmental quality

The Proposed Action is a renovation project. It would not degrade environmental quality at the Project Site or the summit. Long-term impacts to air and water quality, noise levels, and natural resources would be insignificant. The use of standard construction and erosion control best management practices would minimize the anticipated renovation-related short-term impacts (i.e., noise, air quality, water quality, and traffic). Design and renovation of the facility and interior utility upgrades would be designed and constructed in accordance with Federal and State regulations.

8. Is individually limited and cumulatively has considerable effect upon the environment or involves a commitment for larger actions

Analysis of possible cumulative impacts resulting from the Proposed Action did not identify any resource area that would experience significant adverse cumulative impacts.

9. Substantially affects a rare, threatened, or endangered species, or its habitat

No threatened, endangered or candidate listed bird, mammal or plant species protected by Federal or State regulations would be impacted by the Proposed Action or alternatives. The action would have no effect on the Wēkiu bug (*Nysius wekiuicola*), a candidate for listing under the Endangered Species Act or other protected biological resources. Although present at the summit, the Wēkiu is not found within the Project Site which has been disturbed and does not offer the loose packing of cinder material required for the bug's habitat(see Sections 3.10 and 4.10).

10. Detrimentally affects air or water quality or ambient noise levels

The Proposed Action would not substantially affect air or water quality or ambient noise levels. The use of best management practices would minimize renovation-related impacts, and the project would comply with applicable Federal, State and local regulations and standards. There would be no replacement of permeable surfaces with impervious and, therefore, drainage improvements would not be necessary (see Section 4.6.6). Ground or surface water quality, aquifer recharge potential, and air quality would not be significantly impacted (see Sections 3.6.1, 3.8, 3.13, 4.6, 4.8., and 4.13). Ambient noise levels would remain the same or be reduced because of the reduction of on-site visits; ambient noise levels will remain within permissible sound levels allowable under Federal and State standards (see Section 4.13).

11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters

The Proposed Action is not located within an environmentally sensitive area. The Project Site is located in an upland area unlikely to be affected by flooding. No jurisdictional navigable waters of the U.S. as defined by the Clean Water Act are present within the Project Site (see Sections 3.7, 3.8, 4.7, and 4.8). Soils within the Project Site are suitable for the planned renovation, and no special foundation preparation would be needed (see Sections 3.9 and 4.9).

12. Substantially affects scenic vistas and view planes identified in County or State plans or studies or

The Proposed Action would not obstruct or affect scenic vistas and viewplanes identified in County or State plans or studies. The project would renovate an existing facility and improve the overall visual environment within the Project Site and surrounding area. As described in Section 4.4, the building profile will remain below the envelope of the existing astronomy facilities and well below the view planes visible from the summit of Mauna Kea.

13. Requires substantial energy consumption

The Proposed Action would provide a renovation to an existing facility. Energy requirements would include resources required for construction and operation. Energy consumption during the operational phase would be expected to be slightly less than the existing energy consumption due to the installation of new energy-saving devices. Although renovation activities would consume energy resources, the project would include sustainable design features in compliance with Federal EOs and policies (see Sections 4.17 and 4.18).

6 AGENCIES, ORGANIZATIONS, AND INDIVIDUALS CONSULTED

This chapter describes the Federal, State, and local agencies, utility companies, community and other organizations, elected officials, and individuals were consulted in the preparation of this EA.

6.1 CHAPTER 343, HRS PRE-ASSESSMENT CONSULTATION

The following agencies and organizations were contacted during the pre-assessment consultation phase of the Draft EA in accordance with Chapter 343, HRS requirements. Parties who responded to the pre-assessment consultation are identified by an asterisk (*). The pre-assessment consultation letter, written comments received in response to the pre-assessment consultation and subsequent response letters addressing those comments are presented on the following pages.

Federal

Department of the Army, Pōhakuloa Training Center
*Department of the Army, Army Corps of Engineers
United States (U.S.) Department of Agriculture
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of the Interior, Forest Service
U.S. Department of the Interior, U.S. Geological Survey
U.S. Environmental Protection Agency – Region IX

State of Hawai‘i

*Office of Environmental Quality Control
Office of Mauna Kea Management
University of Hawai‘i Institute for Astronomy
Department of Land and Natural Resources Board of Land and Natural Resources
Department of Land and Natural Resources, Historic Preservation Division
Department of Hawaiian Homelands
*Office of Hawaiian Affairs
Department of Business, Economic Development, Tourism, Coastal Zone Management
Department of Business, Economic Development, Tourism, Office of Planning
Department of Health, Environmental Management Division
Department of Health, Environmental Planning
Department of Defense, Office of Director of Defense
*Department of Transportation
*Department of Accounting and General Services
University of Hawai‘i-Environmental Center

Hawai‘i County

*Hawai‘i County, Planning Department
Hawai‘i County, County Council
Hawai‘i County Department of Research and Development
Hawai‘i County Department of Water Supply
*Hawai‘i County, Fire Department
*Hawai‘i County Civil Defense Agency
*Hawai‘i County, Police Department

Hawai‘i County (Continued)

Hawai‘i County Department of Public Works

Utility Companies

Hawaiian Telecom
Hawai‘i Electric Light Company

Community and Other Organizations

*Kahu Ku Mauna
Mauna Kea Anaina Hou
Sierra Club, Hawai‘i Chapter
Hawai‘i Audubon Society
Hawai‘i’s Thousand Friends
Life of the Land

Elected Officials

*U.S. Senator – Mr. Daniel Akaka
U.S. Senator – Mr. Daniel Inouye
U.S. Representative – Mr. Ed Case
*State Senator – Ms. Lorraine R. Inouye
State Representative – Mr. Dwight Y. Takamine
Hawai‘i County, Office of the Mayor- Mr. Harry Kim
County Council Member – Dr. Fred C. Holschuh, M.D.

Individuals That May Be Affected

Mr. David Kawika Lovell
*Mr. Anthony Ako Anjo & Ms. Valerie Luhiau Anjo
Mr. Kepa Maly and Ms. Kamakaonaona Pomroy-Maly
Ms. Anakura Melemai
Mr. John F. Villesvik
Reverend Tuck Wah K. Lee
*Mr. Genesis Lee Loy
Ms. Elizabeth G.L. Loy
Ms. Hanna Wahinemaikai o Ka‘ahumanu Keli‘iulanui Naniole O Kalama Kane Reeves
Ms. Ululani T. Evangelista
Ms. Eleanor K Ahuna
Ms. Carole Nervig
Ms. Connie Erger
*Mr. Edward G. Stevens
Toby Hazel
*Ms. Deborah Ward
Mrs. Alexa Russell
Mr. George Russell

November 18, 2005

To: Distribution

Subject: Pre-Assessment Consultation for the University of Hawai'i at Hilo Mauna Kea Science Reserve Telescope Observatory Renovation, Hāmākua, Hawai'i, State of Hawai'i Draft Environmental Assessment Pre-Assessment Consultation

Dear Sir or Madam,

The University of Hawai'i at Hilo (UHH) proposes to replace an existing 24-inch optical telescope with a new 36-inch optical telescope and renovate an existing 37-year old observatory building located at the summit of Mauna Kea. The project site is located within the Astronomy Precinct of the Mauna Kea Science Reserve (MKSR) on the island of Hawai'i, State of Hawai'i and consists of less than one-half acre. Pursuant to the National Environmental Protection Act of 1969 and Chapter 343, Hawai'i Revised Statutes, the UHH has contracted our firm to prepare an environmental assessment (EA) to evaluate the potential effects of the proposed action and the possible alternatives, including the installation of a new 36-inch telescope without renovating the observatory building and the no action alternative.

This pre-assessment consultation is intended to ensure that interested parties are notified of the forthcoming Draft EA, and that all relevant environmental, economic and technical issues and concerns are identified and addressed. A brief description of the project and general information regarding the contents of the EA are enclosed for your consideration. Should you have any written comments, we invite you to submit them by December 5, 2005 to the following address:

Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, HI 96813
ATTN: Martha Spengler

Thank you for your interest in this project. If you would like to receive a copy of the Draft EA and participate in the environmental review process, or if you have any questions or concerns, please contact Martha Spengler, project planner, at 545-2055 or via e-mail at mspengler@hhf.com.

Aloha,

Thomas A. Fee, AICP
Principal

Attachments

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH
National Science Foundation

Pacific Guardian Center • 733 Bishop Street, Suite 2590 • Honolulu, Hawai'i 96813
Tel. 808.545.2055 • Fax 808.545.2050 • www.hhf.com • e-mail: info@hhf.com

Distribution:
Accepting Authority: University of Hawai'i at Hilo
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U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of the Interior, Forest Service
U.S. Department of the Interior, U.S. Geological Survey
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Office of Mauna Kea Management
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Utility Companies
Hawaiian Telecom
Hawai'i Electric Light Company
Citizens Groups That May Be Affected
*Mr. David Kawika Lovell, Royal Order of Kamehameha I
*Ms. Margery Zeigler, Conservation Council for Hawaii
* Ms. Cha Smith, KAHEA: The Hawaiian-Environmental Alliance
Mauna Kea Anaina Hou
Sierra Club, Hawai'i Chapter
Hawai'i Audubon Society
Hawai'i's Thousand Friends
Life of the Land
Elected Officials:
U.S. Senator – Mr. Daniel Akaka
U.S. Senator – Mr. Daniel Inouye
U.S. Representative – Mr. Ed Case
State Senator – Ms. Lorraine R. Inouye
State Representative – Mr. Dwight Y. Takamine
Hawai'i County, Office of the Mayor- Mr. Harry Kim
County Council Member – Dr. Fred C. Holschuh, M.D.
Individuals That May Be Affected
Mr. Anthony Ako Anjo & Ms. Valerie Luhiau Anjo
Mr. Kepa Maly and Ms. Kamakaonaona Pomroy-Maly
Ms. Anakura Melemai
Mr. John F. Villesvik
Reverend Tuck Wah K. Lee
*Mr. Genesis Lee Loy
*Ms. Elizabeth G. Lee Loy
Ms. Hanna Wahinemaikai o Ka'ahumanu Keli'iulanui Naniole O Kalama Kane Reeves
Ms. Ululani T. Evangelista
Ms. Eleanor K Ahuna
Ms. Carole Nervig
Ms. Connie Erger
Mr. Edward G. Stevens
Toby Hazel
Ms. Deborah Ward
Mrs. Alexa Russell
Mr. George Russell

***- distribution list revised on 12/14/05**

GENERAL INFORMATION

Applicant:	University of Hawai'i at Hilo Department of Physics and Astronomy 200 West Kawili Street Hilo, HI 96720 Dr. William Heacox
EA Preparer:	Helber Hastert & Fee, Planners 733 Bishop Street, Suite 2590 Honolulu, HI 96813 (808) 545-2055 Tom Fee / Martha Spengler
Accepting Authority:	University of Hawai'i at Hilo
Proposed Action:	The University of Hawai'i at Hilo proposes to replace an existing 24-inch (0.61-meter [m]) telescope with a 36-inch (1 m) telescope and renovate an existing observatory building located in the Astronomy Precinct within the Mauna Kea Science Reserve (MKSR), Hāmākua, Hawai'i, State of Hawai'i.
National Environmental Protection Act of 1969 "Trigger":	Use of federal funds (e.g. National Science Foundation grant monies)
Chapter 343, Hawai'i Revised Statutes "Trigger":	Use of State and Conservation District Lands (e.g., Mauna Kea Science Reserve)
Location:	Hāmākua, Island of Hawai'i, State of Hawai'i
Tax Map Keys:	4-4-15:09
Project Site:	Less than one-half acre within State-owned MKSR Astronomy District
Landowner:	State of Hawai'i
Existing Land Uses:	Conservation, Astronomy District, Optical Telescope Observatory for Educational and Research purposes.
State Land Use District:	Conservation
Other Land Use Approvals:	Conservation District Use Application
Hawai'i County Zoning:	Conservation

University of Hawai'i at Hilo Mauna Kea Science Reserve Observatory
Environmental Assessment
Pre-Assessment Consultation
November 18, 2005
Page 2 of 3

Project Summary

The 24-inch University of Hawai'i at Manoa (UHM) Mauna Kea Science Reserve (MKSR) Telescope Observatory is located approximately 40 miles northwest of Hilo and 26 miles southeast of Waimea, at the summit of Mauna Kea within the Astronomy Precinct of the MKSR. Comprised of Tax Map Key parcel 4-4-15: 09, the observatory occupies less than one-half acre of land. As shown on the attached map, surrounding land uses consist of other observatories and conservation land.

The Proposed Action proposes replacement of the existing the UHM 24-inch (0.61 meter [m]) research telescope with a modern instructional telescope and renovation of the existing approximately 312-square foot observatory building to provide updated and modern facilities in support of the University of Hawai'i at Hilo's (UHH's) educational astronomy program and astronomy outreach programs to local high schools. The UHH has received funding from the National Science Foundation (NSF) for the purchase and installation of a new 36-inch (0.9 m) telescope within the MKSR for the use of faculty and students of UHH. The new telescope would replace UHM's existing 24-inch (0.61 m) optical research telescope, which has been in operation for more than 30 years and has reached the end of its useful life. When installed in early 2007, the telescope would be remotely controllable from a control room near sea level, on the UHH campus. Existing siding, interior wall panels, associated power and communication wiring, and double doors would be removed from the observatory building and replaced with new components. An additional door would be added to the observatory building. Alternatives to be considered would be replacement of the 24-inch telescope with the new 36-inch telescope with no renovations to the observatory building and no action.

Environmental Assessment Scope

The environmental assessment (EA) is being prepared pursuant to National Environmental Protection Act of 1969 (NEPA) and Chapter 343, Hawai'i Revised Statutes (HRS) to evaluate the potential effects of the proposed action and the possible alternatives. The EA will be organized to address potential direct, indirect, and cumulative impacts associated with the Proposed Action. A NEPA EA is required because Federal funds (NSF monies) are being used for the Proposed Action. A Chapter 343, HRS EA is required for the project's proposed use of state and Conservation District lands (i.e., the site is located within the State of Hawai'i's MKSR within the State Conservation District).

Potential Impacts

Potential impacts associated with Proposed Action include but are not limited to those related to noise, air and water quality, drainage, archaeological, cultural and historic resources, soils, flora and fauna, utilities, visual resources, traffic, and socio-economic impacts. The Proposed Action is consistent with current land use policies and land use proposed by the MKSR Master Plan (University of Hawai'i, 1999). No additional construction would occur as a result of the Proposed Action.

Technical studies were undertaken as part of the Mauna Kea Master Plan (University of Hawai'i, 1999) that anticipated the eventual demolition of the UH 24-inch telescope and observatory and its replacement with a larger telescope. The following is a list of technical studies that were conducted as part of the preparation of the MKSR Master Plan to analyze potential impacts of

plan recommendations, which included the project site. The analyses and findings of these studies will be summarized in the Draft EA.

Technical Studies

- Astronomy Research Development Plan (UH Institute for Astronomy, 1999)
- Economic Impact of Mauna Kea Observatories, Hawai'i County, State of Hawai'i (SMS Research and Marketing, Inc., 1999)
- An Arthropod Assessment with Selected Areas of the Mauna Kea Science Reserve – Final Report (Howarth, Brenner, Preston, 1999).
- Mauna Kea Science Reserve and Hale Pohaku Complex Development Plan Update: Oral History and Consultation Study, and Archival Literature Research. Ahupua'a of Ka'ohe (Hāmākua District) and Humu'ula (Hilo District), Island of Hawai'i (Maly, 1999)
- Management Components of the Historic Preservation Plan for Mauna Kea – Outline and Review Draft (State Historic Preservation Division, 1999).
- Mauna Kea Science Reserve Complex Development Plan Update – Roadway and Utilities Report (Sam O. Hirota, 1999)
- Botanical Resources, Mauna Kea Summit (Char, 1999)
- Mauna Kea Science Reserve Site Descriptions (McCoy, 1999)
- Cultural Impact Assessment Study: Native Hawaiian Cultural Practices, Features, and Beliefs Associated with the University of Hawai'i Mauna Kea Science Reserve Master Plan Project Area (PHRI, Inc., August 1999).

UNIVERSITY OF HAWAI'I AT MĀNOA
Institute for Astronomy
Office of the Director

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HELBER, HASTERT & FEE PLANNERS

November 23, 2005

Helber, Hastert & Fee, Planners
Attn: Martha Spengler
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Ms. Spengler:

Re: Pre-Assessment Consultation for UH Hilo Observatory Renovation

Thank you for your pre-assessment consultation letter concerning the UH Hilo instructional telescope on Mauna Kea. As you know, this project involves the renovation and refurbishment of a telescope facility previously operated by the Institute for Astronomy. If there is useful information that we might be able to provide about the existing facility or about astronomy on Mauna Kea in general, please do not hesitate to contact us.

Our only suggestion at this time is that the Environmental Assessment (EA) contain a description of the operational aspects of the new facility, including the size of the staff and budget needed to maintain it, and the extent to which the telescope will be operated remotely.

We would be pleased to receive a copy of the draft EA.

Sincerely,

Robert A. McLaren
Associate Director

2680 Woodlawn Drive, Honolulu, Hawai'i 96822
An Equal Opportunity/Affirmative Action Institution

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Robert A. McLaren
Associate Director
Office of Director, Institute for Astronomy
University of Hawaii at Manoa
2680 Woodlawn Drive
Honolulu, HI 96822

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. McLaren,

Thank you for your letter dated 23 November 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are addressed in the draft Environmental Assessment document which will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

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HELBER, HASTERT & FEE PLANNERS

November 28, 2005

Mr. Thomas Fee
Helber, Hastert & Fee Planners
733 Bishop St, Suite 2590
Honolulu, HI 96813
Attn: Martha Spengler

Subject: Draft Environmental Assessment Pre-Assessment Consultation
University of Hawaii-Hilo Mauna Kea Science Telescope
Observatory Renovation

Dear. Mr. Fee,

We have received your letter dated November 18, 2005 on the Renovation for the University of Hawaii-Hilo Mauna Kea Science Reserve Telescope Observatory.

We have no comments to offer at this time, but will reserve further comments when the documents are submitted. Thank you for the opportunity to review your request and should you have any questions, please feel free to call our office at 586-4185.

Sincerely,

Genevieve Salmonson
Director

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Ms. Genevieve Salmonson
Director, State of Hawaii Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Ms. Salmonson,

Thank you for your letter dated 28 November 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted. The draft Environmental Assessment document will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Harry Kim
Mayor

Christopher J. Yuen
Director

Roy R. Takemoto
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720
Phone (808) 961-8288 • Fax (808) 961-8742

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November 29, 2005

Ms. Martha Spengler
Helber, Hastert & Fee Planners
733 Bishop Street, Ste. 2590
Honolulu, HI 96813

Dear Ms. Spengler:

Subject: Pre-Environmental Assessment (EA) Consultation for the University of Hawai`i at Hilo Mauna Kea Science Reserve Telescope Observatory Renovation
Hāmākua District, Hawai`i
TMK: (3) 4-4-015:009

Thank you for your letter dated November 18, 2005 requesting our comments on the proposed replacement of an existing 24-inch optical telescope with a new 36-inch optical telescope and renovation of an existing 37-year old observatory building located at the summit of Mauna Kea.

We have the following comments to offer:

1. The subject-parcel is designated Conservation by the State Land Use Commission. In the Conservation District, there is no County zoning per se. Therefore, the Department of Land and Natural Resources has jurisdiction over any use which occurs on this parcel.

2. According to the County General Plan's Land Use Pattern Allocation Guide Map, the subject parcel is designated Conservation.

3. The County General Plan describes Mauna Kea as an example of a "distinctive and identifiable landform" of "extraordinary natural beauty that shall be protected" (Section 7.4 Standards). Please include in the Draft EA details regarding the anticipated visual impacts of the proposed project on views of Mauna Kea.

4. The subject parcel is not located within the County's Special Management Area.

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5. The "Mauna Kea – Umikoa" historic trail is shown on TMK: (3) 4-4-015 to be located on the subject parcel. We recommend that the Draft EA address the location and condition of the trail in relation to the proposed project; any protection measures that may be necessary; and how public use of the trail will be managed.

6. Please provide our office with a copy of the Draft Environmental Assessment for our review.

If you have questions, please contact Deborah Chang at 961-8288, extension 254.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

DLC:cd
P:\public\WPWIN60\Deborah\Letters\EAConsultMaunaKeaTelObservRenovation.doc

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Christopher Yuen, Planning Director
County of Hawaii, Planning Department
Aupuni Center, 101 Pauahi Street, Suite 3
Hilo, HI 96720

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Yuen,

Thank you for your letter dated 29 November 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted and are addressed in the draft Environmental Assessment document which will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document. With regard to historic trails (comment #5) in the vicinity of the Project Site, they are referenced and their locations are depicted in Figure 7 in the cultural resources section of Chapter 3 (Affected Environment) in the draft Environmental Assessment document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

LINDA LINGLE
GOVERNOR

RUSS K. SAITO
COMPTROLLER

KATHERINE H. THOMAS
DEPUTY COMPTROLLER

(P)128

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

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NOV 29 2005

Ms. Martha Spengler
Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Spengler

Subject: Pre-Assessment Consultation for the University of Hawaii at Hilo
Mauna Kea Science Reserve Telescope Observatory Renovation,
Hamakua, Hawaii, State of Hawaii

Thank you for the opportunity to review the information regarding the subject project. This project does not impact any of the Department of Accounting and General Services' projects or existing facilities and we have no comments to offer.

If there are any questions regarding the above, please have your staff call Mr. David DePonte of the Planning Branch at 586-0492.

Sincerely,

ERNEST Y. W. LAU
Public Works Administrator

DD:jp
c: Ms. Genevieve Salmonson, OEQC

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Ernest Y. W. Lau, Public Works Administrator
State of Hawaii Department of Accounting and General Services
P.O. Box 119
Honolulu, HI 96810

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Lau,

Thank you for your letter dated 29 November 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted. The draft Environmental Assessment document will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

PHONE (808) 594-1888

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

FAX (808) 594-1865

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November 29, 2005

Thomas A. Fee, AICP
Principal
Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, HI 96813

ATTN: Martha Spengler

RE: Pre-Environmental Assessment Consultation for the University of Hawai 'i at Hilo Mauna Kea Science Reserve Telescope Observatory Renovation, Hāmākua, Hawai'i; TMK: 4-4-015:009

Dear Thomas Fee,

The Office of Hawaiian Affairs (OHA) is in receipt of your November 18, 2005, request for comments on the above project, which would include replacing an existing 24-inch optical telescope with a new 36-inch optical telescope, and renovating an existing 37-year-old building on the summit of Mauna Kea, within the Astronomy Precinct of the Mauna Kea Science Reserve. OHA offers the following comments.

We request that you also contact, if you have not already, our Hilo and Kona Community Resource Coordinators (addresses below), who can best advise you with whom else you should consult. Mauna Kea is a sacred site that holds strong cultural, traditional and religious significance to the Hawaiian people. The Hawaiian people should therefore be consulted, and their feelings for the land should be respected.

Please note that the Astronomy Precinct sits on ceded lands, and should be afforded the respect that deserves. Ceded lands are public lands, held in trust, and OHA has a fiduciary duty to our beneficiaries – all Hawaiians, to assure that these lands are used and treated properly.

OHA appreciates that this latest project on the summit will be replacing existing equipment, thereby not adding to the construction footprints on the summit. We look forward to the opportunity to review, and comment upon, the forthcoming Draft Environmental Assessment, and the supplemental traditional practices assessment and cultural resource evaluation.

Thank you for the opportunity to comment at this time. If you have any further questions or concerns please contact Heidi Guth at (808) 594-1962 or e-mail her at heidig@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

CC: Ruby McDonald
Community Resource Coordinator
OHA – Kona Office
75-5706 Hanama Place, Suite 107
Kailua-Kona, HI 96740

Gladys Brigham
Interim Community Resource Coordinator
OHA – Hilo Office
162 A Baker Ave.
Hilo, HI 96720-4869

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Clyde W. Namuo, Administrator
State of Hawaii Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, HI 96813

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Namuo,

Thank you for your letter dated 29 November 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted and are addressed in the draft Environmental Assessment document which will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document. As requested, we have contacted Ms. Ruby Mac Donald, Kona Community Resource Coordinator for the Office of Hawaiian Affairs, and Ms. Gladys Brigham, Interim Hilo Community Resource Coordinator. In addition, we have been in contact with Ms. Lukela Ruddle, Hilo Community Resource Coordinator for the Office of Hawaiian Affairs.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Desmond K. Wery
Deputy Fire Chief

County of Hawai'i
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November 30, 2005

Attention: Martha Spengler
Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

RE: **Pre-Assessment Consultation for the University of Hawaii at Hilo Mauna Kea Science Reserve Telescope Observatory Renovation, Hamakua, Hawaii, State of Hawaii Draft Environmental Assessment Pre-Assessment Consultation**

We have no comments to offer at this time in reference to the above-mentioned Pre-Environmental Assessment Consultation.

DARRYL OLIVEIRA
Fire Chief

DO:lpc

Hawai'i County is an Equal Opportunity Provider and Employer.

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Darryl Oliveira
Fire Chief, County of Hawaii Fire Department
25 Aupuni Street, Suite 103
Hilo, HI 96720

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i**

Dear Mr. Oliviera,

Thank you for your letter dated 30 November 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted. The draft Environmental Assessment document will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

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PLANNERS

Dec 1, 2005
510 Anuwae Rd
Hilo, Hi 96720

Dear Sir:

My name is Mr. Genesis Lee Loy. I was identified in your distribution list as Mr Genesis Lee Loy... quite sloppy... as sloppy reporting.

The Citizen Groups of Mauna Kea Anaina Hou, The Royal Order of Kamehameha, Sierra Club Hawaii Chapter have objected to further expansion atop our sacred mountain. We have asked that dismantling of facilities be forthcoming once their useful new has been expanded.

I was instrumental in providing telecommunications for the UHH original telescope atop Mauna Kea. It was a challenging effort and a proud accomplishment at that. And here forty years later in my life it is with dismay I view the expansion, and pollution, and total disregard for our mountain by visitors there.

Yours truly,
Genesis Lee Loy,
Member Royal Order Kamehameha
Native of Hawaii

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Genesis Lee Loy
Member, Royal Order of Kamehameha, Mohu O Hawaii
510 Auwae Road
Hilo, HI 96720

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation**
Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Lee Loy,

Thank you for your letter dated 1 December 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted and are addressed in the draft Environmental Assessment document which will be distributed in late January or early February 2006. As requested in your phone call to our office on 8 December 2005, we will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Harry Kim
Mayor

County of Hawaii
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-8869

Lawrence K. Mahuna
Police Chief

Harry S. Kubojiri
Deputy Police Chief

RECEIVED
DEC 15 2005
HELBER, HASTERT & FEE PLANNERS

December 1, 2005

Helber Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Attention: Martha Spengler

Subject: Pre-Assessment Consultation for the University of Hawaii at Hilo Mauna Kea Science Reserve Telescope Observatory Renovation, Hamakua, Hawaii, State of Hawaii Draft Environmental Assessment Pre-Assessment Consultation

Staff has neither comments nor concerns regarding this notification of draft environmental assessment.

It will not be necessary for us to receive a copy of the Draft EA.

Thank you for allowing us the opportunity to comment.

James M. Day
JAMES M. DAY
ASSISTANT POLICE CHIEF
AREA I OPERATIONS

LW/lli

"Hawai'i County is an Equal Opportunity Provider and Employer"

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. James M. Day
Assistant Police Chief, Area 1 Operations
County of Hawaii Police Department
349 Kapiolani Street
Hilo, HI 96720-3998

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Day,

Thank you for your letter dated 1 December 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted. At your request we will not send you a copy of the draft or final Environmental Assessment documents.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Scanned 12-6-05

LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
BARRY FUKUNAGA
BRENNON T. MORICKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.1974

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

December 1, 2005

RECEIVED
DEC - 6
HELBER, HASTERT & FEE PLANNERS

Ms. Martha Spengler
Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Spengler:

Subject: University of Hawaii Hilo Mauna Kea Science Reserve Telescope Observatory Renovation – Draft Environmental Assessment Pre-Assessment Consultation

Thank you for your transmittal requesting our review on the subject project.

The proposed replacement of an existing telescope with a new one and renovation of the old observatory are not expected to have an impact on any of our State transportation facilities.

However, the project contractor should contact our Highways Division Hawaii District Office to discuss the need for an Oversize and Overweight Vehicles Permit to cover any transport of large observatory equipment.

We appreciate the opportunity to provide our comments.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Rodney K. Haraga
Director of Transportation,
State of Hawaii, Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i**

Dear Mr. Haraga,

Thank you for your letter dated 1 December 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted and are addressed in the draft Environmental Assessment document which will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Scanned 12-6-05

Harry Kim
Mayor

Troy M. Kindred
Administrator

Lanny T. Nakano
Assistant Administrator

County of Hawaii
CIVIL DEFENSE AGENCY
920 Ululani Street • Hilo, Hawai'i 96720-3958
(808) 935-0031 • Fax (808) 935-6460

RECEIVED
DEC - 6 2005
HELBER, HASTERT & FEE PLANNERS

December 2, 2005

Helbeer, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, Hawai'i 96813

ATTN: Martha Spengler

SUBJECT: Pre-Assessment Consultation for the University of Hawai'i at Hilo
Mauna Kea Science Reserve Telescope Observatory Renovation,
Hamakua, Hawai'I, State of Hawai'i
Draft Environmental Assessment Pre-Assessment Consultation

Thank you for the opportunity to submit comments to your proposed project.

We have no objections to this proposal since it is a replacement of an older instrument.

If you have any questions, please call Neil Gyotoku or me at 935-0031.

Sincerely,

Lanny T. Nakano
Acting Civil Defense Administrator

Hawai'i County is an equal opportunity provider and employer

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Lanny T. Nakano
Acting Civil Defense Administrator
County of Hawaii, Civil Defense Agency
920 Ululani Street
Hilo, HI 96720-3958

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Nakano,

Thank you for your letter dated 2 December 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted. The draft Environmental Assessment document will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

~LWF0001

Draft EA for UHH Mauna Kea Telesope Observatory Renovation

Martha Spengler

Page 1 of 1

From: Kenneth Best [k.best@capitol.hawaii.gov]
Sent: Tuesday, December 06,200510:52 AM
To: Martha Spengler
Subject: Draft EA for UHH Mauna Kea Telesope Observatory Renovation

Martha,

Following up on the letter of November 18 from Helber Hastert & Fee Planners concerning the environmental assessment on the UHH Mauna Kea Telescope Observatory renovation, please send when available a copy of the Draft EA to Senator Lorraine R. Inouye at the State Capitol, Room 201, Honolulu, HI 96813. Thank you for your cooperation.

Ken Best
Committee Clerk for Senator Lorraine R. Inouye Tel. (808) 586-6782

12/6/2005

file:///C|/DOCUME~1/MSPENG~1/LOCALS~1/Temp/~LWF0001.htm [12/6/2005 1:10:19 PM]

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Kenneth Best,
Committee Clerk for Senator Lorraine R. Inouye
State Capitol Room 201
Honolulu, HI 96813

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation**
Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Best,

Thank you for your email message dated 6 December 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. The draft Environmental Assessment document will be distributed in late January or early February 2006. As requested, we will ensure that Senator Inouye receives a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

Regulatory Branch

December 16, 2005

RECEIVED
DEC 21 2005
HELBER, HASTERT & FEE PLANNERS

File Number POH-2005-627

Helber, Hastert & Fee Planners
Attn: Martha Spengler
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96814

Dear Ms. Spengler:

This responds to your pre-assessment consultation notice dated November 18, 2005 concerning preparation of a Draft Environmental Assessment (DEA) for proposed 24-inch telescope replacement and building renovation at the University of Hawaii Mauna Kea Science Reserve (MKSR) Telescope Observatory, Island of Hawaii. We have reviewed the materials submitted with respect to the Corps' authority to issue Department of the Army (DA) permits pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344).

Based on the information you provided, the project site consists entirely of uplands and the proposed activity will not involve the discharge of dredged or fill material into waters of the United States, including adjacent wetlands; therefore, a DA permit is not required.

Should you have questions concerning this determination, please contact Mr. Galloway via e-mail (*peter.c.galloway@usace.army.mil*), by telephone at 438-8416, or by fax at 438-4060. Written inquiries should cite the file number above and be sent to: Regulatory Branch (CEPOH-EC-R/P. Galloway); U.S. Army Engineer District, Honolulu; Building 230; Fort Shafter, Hawaii 96858-5440.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. George P. Young, P.E.
Chief, Regulatory Branch
Department of the Army, U.S. Army Engineer District Honolulu
Ft. Shafter, HI 96858-5440

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Young,

Thank you for your letter dated 16 December 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted and are addressed in the draft Environmental Assessment document which will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Ms. Deborah Ward
P.O. Box 918
Kurtistown, HI 96760

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Ms. Ward,

Thank you for taking the time to speak with Ms. Martha Spengler on the phone on 23 December 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. In the list below and based on the telephone conversation, Ms. Spengler has summarized your comments pertaining to the project. We hope that the list is complete and accurate. Your comments are addressed below. The draft Environmental Assessment document will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

1. Will there be ground disturbance? Answer: No.
2. Will there be a change in view planes? Answer: No.
3. Will there be an increased generation of noise? Answer: No change in noise during operational phase; increase in noise during renovation phase.
4. Is there any mercury used in the observatory? Answer: No.
5. How will the mirror cleaning effluent be handled? Answer: Mirror cleaning would be done off-site at the UH 88-inch Telescope Observatory.
6. How will waste water be disposed? Answer: There would be no wastewater generated at the Project Site.
7. Will there be any military application for the observatory? Answer: No.
8. Will anyone be patenting the work from the telescope? Answer: No
9. Has the decommissioning option been considered as an alternative? Answer: Yes, it was considered as an alternative but dismissed because it does not meet the project objectives.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

OFFICE OF HAWAIIAN AFFAIRS
162-A BAKER STREET
HILO, HAWAII 96720

RECEIVED
JAN - 3 2006
HELBER, HASTERT & FEE PLANNERS

December 27, 2005

Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Spengler, I apologize for the delay. A letter was sent to Mr. Charles Wilson regarding the Komohana Project and one should have gone to you as well. Here is the information regarding Marianne Maigret at the Historic Preservation Division in Kona. Her address is 74-383 Kealakehe Parkway, Kailua, Kona, Hawaii, 96740. Her telephone number is 327-3690. I have forwarded your letter to her. If you have any questions or concerns please feel free to call me. Again, I apologize for the delay.

Sincerely,

LUKELA RUDDLE
COMMUNITY RESOURCE COORDINATOR

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Ms. Lukela Ruddle
Community Resource Coordinator
Office of Hawaiian Affairs
162-A Baker Street
Hilo, Hawaii 96720

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Ms. Ruddle,

Thank you for your letter dated 27 December 2005 in response to our pre-assessment consultation letter concerning the above-referenced project. Your comments are noted. In addition, we have made inquiries to Ms. Mary Anne Maigret at the State Historic Preservation Division in Kona as well Mr. David Brown of the State Historic Preservation Division, Archaeology Branch Chief. The draft Environmental Assessment document will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Helber Hastert & Fee
Planners, Inc.

18 January 2006

Mr. Anthony Ching Ako
P.O. Box 310
Kapa'au, HI 96755

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Ching Ako,

Thank you for providing your advice to Ms. Martha Spengler on the phone on 3 January 2006 in response to our pre-assessment consultation letter concerning the above-referenced project. In the list below and based on the telephone conversation, Ms. Spengler summarized your concerns pertaining to the project. We hope that they are complete and accurate. Your concerns regarding development on the mountain are addressed in the cultural resources section of Chapter 3 of the draft Environmental Assessment document which will be distributed in late January or early February 2006. We will ensure that you receive a copy of the document.

1. Mr. Ching Ako is in strong opposition to the project and indicated that he would like to receive another copy of the early consultation letter and any other documents/materials pertaining to the project. He may be reached at P.O. Box 310, Kapa'au, HI 96755. Mr. Ching Ako indicated that the majority of Hawaiians do not support any development on the mountain, including this project, and would like to have the mountain restored to its original condition.
2. Mr. Ching Ako stated that he does not recognize the government of the United States, the State of Hawaii, or the University of Hawaii. He indicated that they are illegal governments.
3. Mr. Ching Ako indicated that the University of Hawaii was the biggest problem facing Mauna Kea. He indicated that the observatories on Mauna Kea desecrate the sacred mountain and the University of Hawaii has shown no respect to his ancestors by building at the mountain and allowing others to build there. He said that in the 1950s there were no developments on the mountain. He said that former Governor John Burns was responsible for the desecration on the mountain by promoting astronomy observatories. He said that the observatories served no purpose in that they do not help care for the Earth and its people.
4. Mr. Ching Ako stated that in the past he had participated in public meetings regarding projects at Mauna Kea and had been disappointed by the outcome. He indicated that he had contacted Mr. Karl Pilcher of NASA in Washington D.C. and was disappointed by his determination to continue with the construction of the Keck Outrigger Telescopes on the mountain. Mr. Ching Ako stated that he did not know why Hawaiians were not used to plan these projects (on the mountain).

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center,

Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

DANIEL K. AKAKA
HAWAII

WASHINGTON OFFICE:
141 HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510
TELEPHONE: (202) 224-6361

HONOLULU OFFICE:
3106 PRINCE JONAH KUHIO
KALANIANAOLE FEDERAL BUILDING
P.O. BOX 50144
HONOLULU, HI 96850
TELEPHONE: (808) 522-8970

United States Senate
WASHINGTON, DC 20510–1103

COMMITTEES:
ARMED SERVICES
ENERGY AND NATURAL RESOURCES
HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS
INDIAN AFFAIRS
VETERANS' AFFAIRS

RECEIVED
FEB – 6 2006
HELBER, HASTERT & FEE PLANNERS

January 31, 2006

Mr. Thomas A. Fee
Pacific Guardian Center
733 Bishop Street, #2590
Honolulu, HI 96813

Dear Mr. Fee:

Thank you for contacting me regarding the pre-assessment consultation for the proposed renovation of the University of Hawaii at Hilo (UHH) Mauna Kea Science Reserve Telescope Observatory.

I appreciate your apprising me of the process preceding a Draft Environmental Assessment for the observatory renovation project. As a strong supporter of the National Environmental Protection Act (NEPA) and proponent of furthering human knowledge, I am pleased to see this action to improve the UHH's observatory. Mahalo again for contacting me.

Aloha pumehana,

Daniel K. Akaka

DANIEL K. AKAKA
U.S. Senator

PRINTED ON RECYCLED PAPER

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Senator Daniel K. Akaka
U.S. Senator – State of Hawai'i
141 Hart Senate Office Building
Washington DC 2051

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Senator Akaka,

Thank you for your dated 31 January 2006 in response to our pre-assessment consultation letter concerning the above-referenced project. I apologize for the delay in responding to your letter. Your comments are noted. The draft Environmental Assessment document was distributed in April 2006 and your office received a copy. When completed, a copy of the Final Environmental Assessment document will also be sent to your office.

Should you have any questions regarding this project, please contact Ms. Martha Spengler at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

6.2 CHAPTER 343, HRS DRAFT EA CONSULTATION

The following agencies and organizations received copies of the Draft EA. In addition, a notice of availability was placed in the April 8, 2006 edition of the Office of Environmental Quality Control's Environmental Notice (see attached copy). Responding parties are identified by an asterisk (*). Correspondence is presented on the following pages.

Federal

Department of the Army:
- Pōhakuloa Training Center
- Army Corps of Engineers

United States (U.S.) Department of Agriculture
U.S. Department of the Interior:
- Fish and Wildlife Service
- Forest Service
- U.S. Geological Survey

U.S. Environmental Protection Agency – Region IX

State of Hawai'i

*Office of Environmental Quality Control
*Office of Mauna Kea Management
*University of Hawai'i Institute for Astronomy
Department of Land and Natural Resources:
- *Office of Conservation and Coastal Lands
- *Historic Preservation Division

Department of Hawaiian Homelands
*Office of Hawaiian Affairs
Department of Business, Economic Development, Tourism:
- Coastal Zone Management
- Office of Planning

Department of Health:
- Environmental Management Division
- Environmental Planning

*Department of Defense, Office of Director of Defense
*Department of Transportation
Department of Accounting and General Services
University of Hawai'i-Environmental Center

Hawai'i County

*Planning Department
County Council
Department of Research and Development
*Department of Water Supply
*Fire Department
Civil Defense Agency
Police Department
Department of Public Works

Utility Companies

Hawaiian Telecom
Hawai‘i Electric Light Company

Community and Other Organizations

*Kahu Ku Mauna
*Mauna Kea Anaina Hou
*Sierra Club, Hawai‘i Chapter
Hawai‘i Audubon Society
Hawai‘i’s Thousand Friends
Life of the Land
Royal Order of Kamehameha I

Elected Officials

U.S. Senator – Mr. Daniel Akaka
U.S. Senator – Mr. Daniel Inouye
U.S. Representative – Mr. Ed Case
State Senator – Ms. Lorraine R. Inouye
State Representative – Mr. Dwight Y. Takamine
Hawai‘i County, Office of the Mayor- Mr. Harry Kim
County Council Member – Dr. Fred C. Holschuh, M.D.

Individuals

Mr. David Kawika Lovell
Mr. Anthony Ako Anjo & Ms. Valerie Luhiau Anjo
Mr. Kepa Maly and Ms. Kamakaonaona Pomroy-Maly
Ms. Anakura Melemai
Mr. John F. Villesvik
Reverend Tuck Wah K. Lee
Mr. Genesis Lee Loy
Ms. Elizabeth G.L. Loy
Ms. Hanna Wahinemaikai o Ka‘ahumanu Keli‘iulanui Naniole O Kalama Kane Reeves
Ms. Ululani T. Evangelista
Ms. Eleanor K Ahuna
Ms. Carole Nervig
Ms. Connie Erger
*Mr. Edward G. Stevens (see Kahu Ku Mauna Council)
*Mr. Roy Thompson(1)
Mr. Toby Hazel
*Ms. Deborah Ward (see Sierra Club)
Mrs. Alexa Russell
Mr. George Russell

(1) Not on the DEA distribution list but submitted comment and received response.

Hawai'i Notices

APRIL 8, 2006

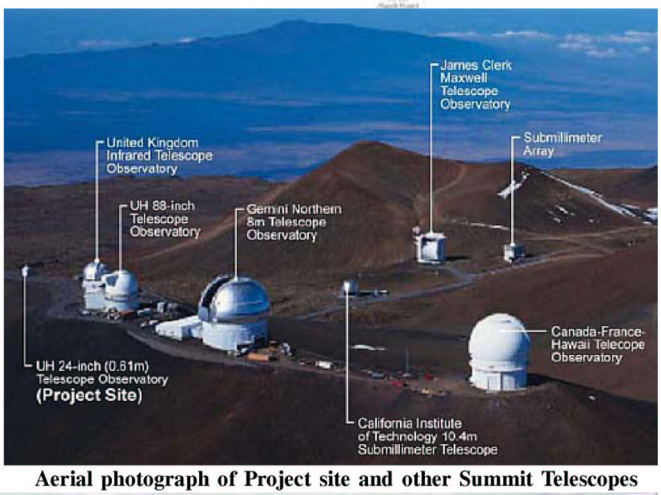
UH 24-inch Telescope Observatory Renovation (HRS 343 DEA) Joint NEPA-DEA

District: Hamakua
TMK: (3) 4-4-15:09
Applicant: University of Hawaii at Hilo
200 West Kawili St., Hilo, HI 96720-4091
Contact: Dr. William Heacox (974-7382)
and
National Science Foundation
4201 Wilson Blvd., Arlington, VA 22230
Contact: Andrew Clegg (703-292-8580)
Approving Agency: University of Hawaii at Hilo
200 West Kawili St., Hilo, HI 96720-4091
Contact: Dr. Bill Chen (974-7311)
and
National Science Foundation
4201 Wilson Blvd., Arlington, VA 22230
Contact: Andrew Clegg (703-292-8580)
Consultant: Helber Hastert & Fee, Planners
733 Bishop St., Ste. 2590, Honolulu, HI 96813
Contact: Martha Spengler (545-2055 ext. 238)
Public Comment Deadline: May 8, 2006
Status: Draft environmental assessment (DEA) notice pending 30-day public comment. Address comments to the applicant with copies to the approving agency, consultant and OEQC.
Permits Required: NEPA compliance, NHPA Section 106 consultation, CDUA

The National Science Foundation (NSF) proposes to fund the proposal of the University of Hawai'i at Hilo (UHH) to replace an existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope. UHH further proposes to renovate the existing observatory building using State funds. The Proposed Action would occur within the 420 square foot (sf) University of Hawai'i (UH) 24-inch Telescope Observatory and an adjacent lay-down area comprised of approximately 20,000 sf within the Mauna Kea Science Reserve, Hamakua District, Hawai'i Island, State of Hawai'i. The observatory and optical telescope are owned by UH and managed by the University of Hawai'i at Manoa. The facility management would be transferred to UHH after the project is completed.

Remotely operated from the UHH campus, the new telescope would provide outstanding training for UHH undergraduate students in observatory operations and how to conduct and participate in research projects, essential job skills for careers in astronomy – in addition to supporting outreach programs in local high schools. The 37-year old telescope and building is in a deteriorated state; the dome is in marginal mechanical condition and cannot protect the telescope/equipment from dust and water infiltration.

The National Environmental Policy Act and National Historic Preservation Act Section 106 processes are being run concurrently and public comments are invited. Proposed building renovations require no ground disturbance and would utilize the same building foundation/footprint. The existing interior and exterior components and electrical/ communications lines would be upgraded. Existing utility conduits would be used. No wastewater facilities would be required. The renovated building would be six to twelve inches taller and painted white, similar to the existing paint.



Aerial photograph of Project site and other Summit Telescopes

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

RECEIVED
MAY - 9 2006
HELBER, HASTERT & FEE
PLANNERS

May 8, 2006

Dr. Rose Tseng, Chancellor
Dr. William Heacox
University of Hawai'i at Hilo
200 West Kawili Street
Hilo, Hawai'i 96720-4091

Mr. Andrew Clegg
National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

Martha Spengler
Helber Hastert and Fee, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawai'i 96813

Dear Drs. Tseng and Heacox and Ms. Spengler:

Having reviewed the draft environmental assessment for University of Hawai'i 24-inch Telescope Observatory Renovations, (3rd) 4-4-15:09, in the judicial district of Hamakua, the Office of Environmental Quality Control has the following questions at this time:

1. Is the footprint the same as the old project?
2. Will the existing building be demolished? If so, what will happen to the debris?

Thank you for the opportunity to comment. If there are any questions, please contact Mr. Leslie Segundo, Environmental Health Specialist, at (808) 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Ms. Genevieve Salmonson
Director, State of Hawaii Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Ms. Salmonson,

Thank you for your letter dated 8 May 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1: Is the footprint the same as the old project?

Response to Comment: Yes. References to the use of the existing footprint can be found in Paragraph 2, Cover Sheet and Section 2.1.1 Proposed Action: "NSF proposes to fund UHH's proposal to replace an existing 24-inch telescope with a new 36-inch telescope and, using State funds, UHH proposes to replace/upgrade the existing dome, siding, interior wall panels, associated interior power and communication wiring, and doors utilizing the same foundation and footprint and install controls to make the facility remotely operable from the UHH campus ("Proposed Action")."

Section 2.1.1 Proposed Action, first paragraph: "Utilizing Federal NSF grant funds, UHH proposes to replace an existing 24-inch telescope with a new 36-inch telescope and, using State funds, renovate an existing 37 year old, 420 sf observatory building located at the Project Site (Figure 1, Location Map, and Figure 2, Project Site). UHH proposes to replace/upgrade the existing dome, siding, interior wall panels, associated interior power and communication wiring, and doors utilizing the same foundation and footprint and install controls to make the facility remotely operable from the UHH campus ("Proposed Action"). UHH has received NSF funding to purchase a new, state-of-the-art 36-inch optical telescope for use in undergraduate instruction and educational research."

Comment 1(B) Will the existing building be demolished? If so, what will happen to the debris?

Response to Comment: No. The existing building will not be demolished but will be renovated. Reference to renovation debris is found in Section 4.17, EO 13101, 2nd paragraph, 1st and 2nd sentences: "The Proposed Action and Telescope Replacement Without Building Renovation Alternative would incorporate efficient waste handling provisions for recycling waste products. The renovation debris would be recycled to the maximum extent possible, and the remaining renovation debris would be disposed in a local landfill to be determined by the renovation contractor."

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Helber Hastert & Fee
Planners, Inc.

Section 106 Consultation Letter (revised)
UH 24-inch Telescope Observatory Renovation, Mauna Kea Science Reserve
August 15, 2006
Page 2 of 2

Sincerely,

Thomas A. Fee, AICP
Principal

cc:

Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

OMKM
Office of Mauna Kea Management

University of Hawai'i at Hilo
640 N. A'ohoku Place, Room 203, Hilo, Hawai'i 96720
Telephone (808) 933-0734 Facsimile (808) 933-3208
Mailing Address: 200 W. Kawili Street, Hilo, Hawai'i 96720

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MAY - 9 2006
HELBER, HASTERT & FEE PLANNERS

May 8, 2006

Dr. William Heacox
200 West Kawili Street
Hilo, Hawai'i 96720-4091

Dr. Andrew Clegg
National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

Dear Drs. Heacox and Clegg:

The Office of Mauna Kea Management respectfully submits the following comments on the *Draft Environmental Assessment for the University of Hawai'i 24-Inch Telescope Observatory Renovation* dated April 2006:

Page 1-6 **Table 1, last line item.**

- The Office of Mauna Kea Management (OMKM) does not issue Construction and Use/Occupancy Permits.
- Before a project is allowed to proceed either the President or Board of Regents (BOR) must approve the project.
  - If a proposed project is deemed Minor, the UH President is authorized to approve/disapprove the project.
  - If a proposed project is deemed Major, the Board of Regents approves/disapproves the project.

Page 3-10 **Last paragraph regarding the green coloration of Lake Waiau.**

- Records dating from 1840 reference the green color of Lake Waiau:
  - "It [Waiau] lies in the basin of a small crater, and at a distance appeared green and slimy." (Jarves, in The Polynesian, July 25, 1840.)
  - Other historical accounts of Lake Waiau's green coloration were made by Lawrence Dangerfield in 1922; Jerome Kilmartin in 1925-26; E.H. Bryan and Marie C. Neal in 1935.

  - It was Neal who actually examined the lake's water and discovered it contained "[n]ot only living organic matter but also the accumulation of debris resulting from the succession of generation by generation clouds the water of the lake." Bacteria were one of the chief causes of turbidity. (Neal, *Paradise of the Pacific*, October 1939.)

Page 3-11 **Last line in the last paragraph in section 3.3.2, Cultural Practices and Beliefs.**

- There is no regulation that requires non-commercial groups "numbering more than eight, including groups of Native Hawaiians" to obtain a permit before going up to the summit.
- Commercial tour operators offering tours for a fee to Mauna Kea, are required to have permits. The permits limit the number of daily tours to Mauna Kea and also sets the maximum size for commercial vehicles to a 14-passenger van.

Page 3-12 **Table 3. Estimated Number of Vehicles Trips.**

- Mauna Kea Rangers record daily vehicle counts.
- See attached for total vehicle counts for the period May 1, 2005 through April 30, 2006.

Page 4-3 **Last paragraph under Proposed Action.**
Page 4-28 **Second to the last line in the last paragraph.**
Please remove the word "park" before the word rangers. It should say Mauna Kea Rangers. Mauna Kea is not a park.

Thank you for the opportunity to review this document.

Sincerely,

William Stormont
Director

Attachment

OMKM Ranger Report

Mālama MAUNA KEA

Reports: 365 For the period: 5/1/2005 to 4/30/2006

Vehicle Type	AM	EM	LM	AN	PM	Total
2WD	0	200	1090	1170	699	3159
4x4s	0	679	2952	3485	2603	9719
Commerical Operator	0	8	182	137	4046	4371
Motorcycle	0	16	27	23	1	67
Observatory Vehicle	0	1967	6269	2309	3521	14066
Unlicensed Operator	0	0	0	3	4	7
	0	2870	10520	7127	10874	31389

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. William Stormont
Director, Office of Mauna Kea Management
University of Hawai'i at Hilo
200 West Kawili Street
Hilo, HI 96720

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i**

Dear Mr. Stormont,

Thank you for your letter dated 8 May 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1: Section 1, 1-6, Table, last line. The Office of Mauna Kea Management does not issue Construction and Use/Occupancy Permits. Before a project is allowed to proceed, either the President or the Board of Regents (BOR) must approve the project. If a project is deemed Minor, the UH President is authorized to approved/disapprove the project. If a proposed project is deemed Major, the BOR approves/disapproves the project.

Response to comment: Table 1 was revised to reflect that the UH President or Board of Regents must approve the project prior to construction.

Comment 2: Regarding the green coloration of Lake Waiau: Records dating from 1840 reference the green color of Lake Waiau: "It [Waiau] lies in the basin of a small crater, and at a distance appeared green and slimy." (Jarves, in The Polynesian, July 25, 1840.). Other historical accounts of Lake Wai'au's green coloration were made by Lawrence Dangerfield in 1922; Jerome Kilmartin in 1925-1926; E.H. Bryan and Marie C. Neal in 1935. It was Neal who actually examined the lake's water and discovered it contained "[n]ot only living organic matter but also the accumulation of debris resulting from the succession of generation by generation clouds the water of the lake." Bacteria were one of the chief causes of turbidity. (Neal, *Paradise of the Pacific*, October 1939).

Response to comment: The text on page 3-10 was revised as follows: "In addition, some of the religious practitioners have concerns regarding the use of septic systems on the mountain. They are concerned that the septic systems have caused the green coloration of Lake Wai'au's water, thus interfering with the practitioner's ability to see the reflection of the stars on the water (NASA 2005). However, historical accounts have indicated that the green coloration of the lake was present prior to the construction of astronomy facilities at the summit (see Section 6.2 letter from OMKM). Recent research on the lake's water quality and isotope studies indicate that the lake water is derived from precipitation and snow melt originating in the lake's vicinity (NASA 2005)."

Comment 3: Last line in the last paragraph in section 3.3.2, Cultural Practices and Beliefs. There is no regulation that requires non-commercial groups "numbering more than eight, including groups of Native Hawaiians" to obtain a permit before going up to the summit. Commercial tour operators offering tours for a fee to Mauna Kea are required to have permits.

Helber Hastert & Fee
Planners, Inc.
Draft Environmental Assessment
UH 24-inch Telescope Observatory Renovation, Mauna Kea Science Reserve
August 15, 2006
Page 2 of 2

The permit limits the number of daily tours to Mauna Kea and also sets the maximum size for commercial vehicles to a 14-passenger van.

Response to comment: This sentence was deleted. The original sentence pertained to the Natural Area Reserve (NAR) **vice** the Mauna Kea Science Reserve (MKSR). A permit is required for groups of 12 or more persons visiting the NAR (personal communication, Stephanie Nagata, OMKM).

Comment 4: Section 3, 3-12, Table 3. Estimated Number of Vehicle Trips, Mauna Kea Rangers record daily vehicle counts. See attached for total vehicle counts for the period May 1, 2005 through April 30, 2006.

Response to comment: Table 3 was revised to reflect the following information: Observatory Personnel: 14,066; Commercial Operators: 4,371; Others including cultural practitioners, tourists, recreational users, local traffic: 12,852; total: 31,389 (2,616 per month average)

Comment 5: Section 4, 4-3 and 4-28, Last paragraph under Proposed Action (4-3); Second to last line in the last paragraph (4-28). Please remove the word "park" before the word rangers. It should say Mauna Kea Rangers. Mauna Kea is not a park.

Response to comment: The text was revised per comment.

We are in the process of finalizing the Environmental Assessment document and will forward a copy to your office.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

UNIVERSITY OF HAWAI'I AT MĀNOA

Institute for Astronomy
Office of the Director

May 5, 2006

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HELBER, HASTERT & FEE PLANNERS

Dr. William Heacox
University of Hawaii at Hilo
200 West Kawili Street
Hilo, Hawaii 96720-4091

Dr. Andrew Clegg
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Dear Drs. Heacox and Clegg:

Re: Draft Environmental Assessment
University of Hawaii 24-Inch Telescope Observatory Renovation

We have reviewed the subject draft Environmental Assessment (EA) and submit the following comments.

We note that the operational aspects are described (p. 2-1), as suggested in our letter of November 23, 2005.

The first sentence on p. 4-26 reads:

"The Proposed Action and the redevelopment/development actions summarized in Table 6 involve no ground disturbing activities and would not affect archeological or architectural resources."

We understand that the Proposed Action would not involve ground disturbing activities, but such would not be the case for some of the actions listed in Table 6, as seems to be implied by the above statement.

The area of the Mauna Kea Science Reserve is 11,288 acres, not 11,228, as stated in Section 3-1.

Thank you for the opportunity to review and comment on the draft EA.

Sincerely,

Robert A. Mclaren
Associate Director

c: OEQC
✓Helber Hastert & Fee

2680 Woodlawn Drive, Honolulu, Hawai'i 96822
An Equal Opportunity/Affirmative Action Institution

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Dr. Robert McLaren
Associate Director, Office of Director
Institute for Astronomy
University of Hawai'i at Manoa
2680 Woodlawn Road
Honolulu, HI 96822

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Dr. McLaren,

Thank you for your letter dated 5 May 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1: General. We note that the operational aspects are described (p. 2-1), as suggested in our letter of November 23, 2005.

Response to comment: Comment noted.

Comment 2: Section 4, 4-26, 1st sentence. The first sentence on p. 4-26 reads: "The Proposed Action and the redevelopment/development actions summarized in Table 6 involve no ground disturbing activities and would not affect archeological or architectural resources." We understand that the Proposed Action would not involve ground disturbing activities, but such would not be the case for some of the actions listed in Table 6, as seems to be implied by the above statement.

Response to comment: Section 4.16.1, 2nd paragraph, the text was revised as follows: "The Proposed Action does not involve ground disturbing activities and would not affect archaeological or architectural resources. Other redevelopment/development projects listed in Table 6 involve ground disturbing activities."

Comment 3: Section 3.1 The area of the Mauna Kea Science Reserve is 11,288 acres, not 11,228, as stated in Section 3-1.

Response to comment: The text was revised per comment.

We are in the process of finalizing the Environmental Assessment document and will forward a copy to your office.

Helber Hastert & Fee
Planners, Inc.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:

Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

MAY-26-2006 12:43 From:UHH NAT SCIENCE 8089747693 To:808 545 2050 P.2/2

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
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ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Office of Conservation and Coastal Lands
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

MAY 12 2006

COPY

Mr. William D. Heacox, Project Manager
University of Hawaii, Hilo
Department of Physics & Astronomy
200 W. Kawili Street
Hilo, Hawaii 96720

Dear Mr. Heacox:

Subject: Draft Environmental Assessment for the Renovation of the 24-inch Telescope Observatory in the Mauna Kea Science Reserve, District of Hamakua, Hawaii TMK: 4-4-15:9

We are in receipt of a draft environmental assessment (DEA) to support renovations to a 24-inch telescope observatory at Mauna Kea, Island of Hawaii. Our comments on the DEA are intended to address the content of the DEA only. The applicant is required to apply for a Conservation District Use Permit for the proposed work. The information contained in the final EA will assist the Department in its recommendation to either approve or deny the proposed action. The DEA provides a good overview of the project and appears to be generally complete and thorough. However, we have a few comments to offer.

On Page 2-2: figure three is difficult to read. The narrative indicates that siding and interior wall panels are to be replaced. Does the structure (other than the dome) have a frame that will remain intact? What parts of the observatory will be unchanged?

On Page 2-5: Relocation/New Construction at the MKSR. The discussion concerns the removal of existing structures and construction of a 1 m optical telescope. However, the Master Plan calls for the site to be redeveloped with a 2-3 m telescope. Moreover, this alternative is dismissed altogether. It is our understanding that the UH Regents approved the Master Plan which included the recommendation for redevelopment of the site with a 2-3 meter telescope. Would it be wise to amend the Master Plan via an internal memorandum between UHIfA and UHH without the approval of the Regents? What is the rational basis for the change? How does the decision to refurbish an old telescope impact the idea that sites would be recycled with new telescopes to reduce the need to develop new areas of Mauna Kea?

Thank you for allowing us to provide comments on this matter. Please feel free to contact me at 587-0377, should you have any questions.

Sam Lemmo, Administrator
Office of Conservation and Coastal Lands

C: Chairperson

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Lemmo,

Thank you for your letter dated 11 May 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1: "2-2: Figure three hard to read. From narrative/figure, not sure exactly what is being replaced/demolished (I gathered that the dome will be replaced). Are the sides of the observatory being removed replaced? Foundation?"

Response to comment: Figure 3 was enlarged to make it more legible. The building exterior cladding is being removed and replaced with new materials and no changes to the existing foundation are proposed.

Comment 2: "2-5: Relocation/New Construction alternative. This is confusing. The Master Plan calls for the site to be redeveloped with a 2-3 meter telescope, but this is not mentioned in the paragraph. This does not make sense to me. The Regents approved the Master Plan, but two parties can get together and dismiss parts of the plan - i.e, Memorandum referenced by Mr. Heacox. What is the rational for the site not being appropriate for the 2-3 meter telescope. I would think that you would want to provide a rational explanation why this alternative is being chosen over the one in the Mater Plan. The idea in the Master Plan was that sites would be recycled to reduce the need to develop new areas on Mauna Kea. Don't mean to be rough on you guys but we have taken too many lumps on head on this one, and have lost many many hours and resources dealing with legislative inquiries and contested cases. Much of this comes down to an issue of trust. Can the University back up what is says its going to do on Mauna Kea? Its not so much that there is a deviation, but the way it is handled. What does OMKM say about this. Is this an issue?"

Response to comment: Comment noted. The text was revised as follows: "This alternative involves the construction of a 2- to 3-meter telescope observatory on the site of the existing UH 24-inch Telescope Observatory and a new facility to be used by UHH at the existing "Utility Building" north of the Project Site (see Figure 2, Project Site), in accordance with the Mauna Kea Science Reserve Master Plan (hereinafter known as the "Master Plan"; UH, 2000). Proposed improvements would include: 1) demolition of existing structures, pavements and utilities; 2) construction of a new building to house a new 2-to 3-m optical telescope at the Project Site and a new building to house a new 1-m optical telescope at the Utility Building site; 3) installation of a 2- to 3-m optical telescope at the Project Site and installation of a 1-m optical telescope at the Utility Building site; and 4) installation of electrical and communication systems, potable water systems, and wastewater systems at both locations. The Astronomy Precinct is a culturally and biologically

sensitive environment. Ground disturbance at the Project Site and the Utility Building site could present new important issues pertaining to cultural and natural resources at the summit. Therefore, this alternative is not considered a viable alterative and has been eliminated from further consideration."

According to the Master Plan, Section XI (Implementation Plan), p XI-15 (Exempt Activities): a project that "does not significantly change the scale or character of a structure" is exempt from the need for a Master Plan amendments; thus, this proposal is not in conflict with the current master plan even though it is not explicitly envisioned in the plan. The change from the MKSR Master Plan ("Proposed Action") was decided by IfA and agreed to by UHH and includes installation of a 0.9-meter (36-inch) telescope at the UH 24-inch telescope observatory building (Project Site) and the renovation of that building using the existing footprint. The change abandons the plan for a 2-to 3-meter telescope on a new foundation at the Project Site and the creation of a 1-meter telescope observatory at another previously disturbed site (Utility Building). The change in the Master Plan minimizes the disturbance and reduces the planned density of facilities at the summit of Mauna Kea.

We are in the process of finalizing the Environmental Assessment document and will forward a copy to your office.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

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LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

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ACTING DEPUTY DIRECTOR - WATER

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COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

July 10, 2006

Dr. William D. Heacox
200 West Kawili Street
Hilo, Hawai'i 96720-4091

LOG NO: 2006.2013
DOC NO: 0606KK01
Architecture

Dear Dr. Heacox:

SUBJECT: Chapter 6E-8 (HRS) Review for University of Hawaii at Hilo
24-Inch Telescope Observatory Renovation
Mauna Kea Science Reserve
Hamakua, Hawai'i
TMK: (3) 4-4-015:009

Thank you for your submittal which we received on April 10, 2006 informing us of the proposed project for the replacement of existing 24-inch telescope with a new 36-inch telescope and the renovation of the existing observatory building located in the Astronomy District of the Mauna Kea Science Reserve.

The observatory building is only 37 years old and is not eligible for listing on the National Register of Historic Places. Any historic structures are located six miles away from the site. Therefore, we concur that the determination for the architectural concerns of the proposed project is "no historic properties affected."

Should you have any questions regarding architectural concerns please call Katie Kastner at our Oahu office at (808) 692-8023.

Aloha,

Melanie A. Chinen, Administrator
State Historic Preservation Division

KK:jen

c: The Office of Environmental Quality Control, 235 S. Beretania Street, Suite 702, Honolulu, HI 96813
Helber, Hastert & Fee, Planners, 733 Bishop Street, Suite 2590, Honolulu, HI 96813

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Ms. Melanie A. Chinen, Administrator
State Historic Preservation Division
State of Hawaii Department of Land and Natural Resources
601 Kamokila Boulevard, Room 555
Kapolei, HI 96707

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation
Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Ms. Chinen,

Thank you for your letter dated 10 July 2006 in response to our Draft Environmental Assessment for the above-referenced project and restatement of your concurrence with the finding of "no historic properties affected."

We are in the process of finalizing the EA and will forward a copy to your office.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

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JUN - 5 2006
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HRD05/2132C

June 1, 2006

Thomas A. Fee, AICP
Principal
Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, HI 96813

ATTN: Martha Spengler

RE: Draft Environmental Assessment Consultation for the University of Hawai'i at Hilo Mauna Kea Science Reserve Telescope Observatory Renovation, Hāmākua, Hawai'i; TMK: 4-4-015:009

Dear Thomas Fee,

The Office of Hawaiian Affairs (OHA) is in receipt of your April 6, 2006, request for comments on the above project, which would include replacing an existing 24-inch optical telescope with a new 36-inch optical telescope, and renovating an existing 37-year-old building on the summit of Mauna Kea, within the Astronomy Precinct of the Mauna Kea Science Reserve. OHA apologizes for the delayed response and offers the following comments.

Thank you for respecting our earlier requests and consulting with various groups within the Native Hawaiian community who have strong links to Mauna Kea. We note that the current document appears to respond to concerns noted by the group that responded in writing (Kahu Ku Mauna Council) and to incorporate their information.

OHA continues to hope that the religious, cultural, traditional and historic significance attached to this mountain by Native Hawaiians will be respected by the applicant throughout this project. Equally, as we have noted before, because the Astronomy Precinct sits on ceded lands, we hope that the applicant continues to remember that ceded lands are public lands, held in trust. OHA has a fiduciary duty to our beneficiaries – all Hawaiians, to assure that these lands are used and treated properly.

OHA appreciates that the proposed project on the summit will be replacing existing equipment, thereby not adding to the construction footprints on the summit. We also appreciate that this project focuses on the facilitation of educational and instructional goals.

Thank you for the opportunity to comment. If you have any further questions or concerns please contact Heidi Guth at (808) 594-1962 or e-mail her at heidig@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

CC: Ruby McDonald
Community Resource Coordinator
OHA – Kona Office
75-5706 Hanama Place, Suite 107
Kailua-Kona, HI 96740

Lukela Ruddle
Community Resource Coordinator
OHA – Hilo Office
162 A Baker Ave.
Hilo, HI 96720-4869

Dr. William D. Heacox
University of Hawai'i at Hilo
200 West Kawili Street
Hilo, HI 96720-4091

Dr. Andrew Clegg
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

The Office of Environmental Quality Control
235 South Beretania Street
Suite 702
Honolulu, HI 96813

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Clyde Nāmuʻo
State of Hawaiʻi
Office of Hawaiian Affairs
711 Kapiʻolani Boulevard, Suite 500
Honolulu, HI 96813

Subject: **University of Hawaiʻi 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawaiʻi, State of Hawaiʻi

Dear Mr. Nāmuʻo,

Thank you for your letter dated 1 June 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment: The Office of Hawaiian Affairs (OHA) is in receipt of your April 6, 2006, request for comments on the above project, which would include replacing an existing 24-inch optical telescope with a new 36-inch optical telescope, and renovating an existing 37-year old building on the summit of Mauna Kea, within the Astronomy Precinct of the Mauna Kea Science Reserve. OHA apologizes for the delayed response and offers the following comments.

Thank you for respecting our earlier requests and consulting with various groups within the Native Hawaiian community who have strong links to Mauna Kea. We note that the current document appears to respond to concerns noted by the group that responded in writing (Kahu Ku Mauna Council) and to incorporate their information.

OHA continues to hope that the religious, cultural, traditional and historic significance attached to this mountain by Native Hawaiians will be respected by the applicant throughout this project. Equally, as we have noted before, because the Astronomy Precinct sits on ceded lands, we hope that the applicant continues to remember that ceded lands are public lands, held in trust. OHA has a fiduciary duty to our beneficiaries – all Hawaiians, to assure that these lands are used and treated properly.

OHA appreciates that the proposed project on the summit will be replacing existing equipment, thereby not adding to the construction footprints on the summit. We also appreciate that this project focuses on the facilitation of educational and instructional goals.

Response to comment: Comment noted.

We are in the process of finalizing the Environmental Assessment document and will forward a copy to your office.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

LINDA LINGLE
GOVERNOR

MAJOR GENERAL ROBERT G. F. LEE
DIRECTOR OF CIVIL DEFENSE

EDWARD T. TEIXEIRA
VICE DIRECTOR OF CIVIL DEFENSE

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

PHONE (808) 733-4300
FAX (808) 733-4287

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APR 27 2006
HELBER, HASTERT & FEE
PLANNERS

April 25, 2006

TO: Dr. William D. Heacox
University of Hawaii at Hilo

Dr. Andrew Clegg
National Science Foundation

FROM: Edward T. Teixeira
Vice Director of Civil Defense

SUBJECT: PROPOSED RENOVATION; UHH 24 INCH TELESCOPE OBSERVATORY

Thank you for the opportunity to review and comment on the proposed renovation of the University of Hawaii 24-inch telescope observatory described in your *Draft Environmental Assessment* dated April 2006.

State Civil Defense (SCD) does not have any comments with regard to the proposed renovation project. SCD planners are available for further discussion or to provide information if needed.

Should you have any questions, please contact me at 733-4300, extension 501.

c: The Office of Environmental Quality Control
✓Hefbert Hastert & Fee, Planners

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Edward T. Teixeira
Vice Director of Civil Defense
State of Hawaii, Department of Defense
3949 Diamond Head Road
Honolulu, HI 96816-4495

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Teixeira,

Thank you for your letter dated 25 April 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. Your comments are noted.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
BARRY FUKUNAGA
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.1974

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

December 1, 2005

Ms. Martha Spengler
Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Spengler:

Subject: University of Hawaii Hilo Mauna Kea Science Reserve Telescope
Observatory Renovation – Draft Environmental Assessment
Pre-Assessment Consultation

Thank you for your transmittal requesting our review on the subject project.

The proposed replacement of an existing telescope with a new one and renovation of the old observatory are not expected to have an impact on any of our State transportation facilities.

However, the project contractor should contact our Highways Division Hawaii District Office to discuss the need for an Oversize and Overweight Vehicles Permit to cover any transport of large observatory equipment.

We appreciate the opportunity to provide our comments.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

ET:km

LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BARRY FUKUNAGA
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.2117

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

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APR 24 2006
HELBER, HASTERT & FEE PLANNERS

April 19, 2006

Dr. William D. Heacox
Department of Physics and Astronomy
University of Hawaii at Hilo
200 West Kawili Street
Hilo, Hawaii 96720-7382

Dr. Andrew Clegg
National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

Dear Dr. Heacox and Dr. Clegg:

Subject: Draft Environmental Assessment
University of Hawaii 24-inch Telescope Observatory Renovation
TMK: 3rd Division; 4-4-15: 09

In reply to the University's request for our review of the proposed project, this is to advise you that our prior comments, letter STP 8.1974 (copy attached), of no impact and need to check on an oversize and overweight vehicle permit for the transport of the telescope or any other very large equipment are still valid and applicable to the draft environmental assessment.

We appreciate the opportunity to provide our comments.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

Attach.

c: Genevieve Salmonson, Office of Environmental Quality Control
Martha Spengler, Helber Hastert & Fee, Planners

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Rodney K. Haraga
Director of Transportation, Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Haraga,

Thank you for your letter dated 19 April 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment: In reply to the University's request for our review of the proposed project, this is to advise you that our prior comments, letter STP 8.1974 (copy attached), of no impact and need to check on an oversize and overweight vehicle permit for the transport of the telescope or any other very large equipment are still valid and applicable to the draft environmental assessment.

Response to comment: The comment received in letter STP 8.1974 were addressed in Section 4.5.1, 1st paragraph, last sentence of the DEA. That paragraph reads as follows: "During the renovation period, the removal of the existing telescope and building components and the delivery of the new telescope and building components would not exceed weight, height, or size restrictions for the roadways and, therefore, a permit would not be required by the Department of Transportation."

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

Harry Kim
Mayor

County of Hawaii
PLANNING DEPARTMENT
101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-3043
(808) 961-8288 • FAX (808) 961-8742

Christopher J. Yu
Director
Brad Kurokawa, AS
LEED® AP
Deputy Director

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APR 27 2006
HELBER, HASTERT & FEE PLANNERS

April 25, 2006

Helber Hastert & Fee, Planners
Attn: Ms. Martha Spengler, Project Planner
733 Bishop Street, Suite 2590
Honolulu, Hawai`i 96813

Dear: Ms. Spengler:

Subject: Draft Environmental Assessment for University of Hawai`i 24-Inch Telescope Observatory Renovation
Mauna Kea Science Reserve, Hāmākua, Hawai`i
TMK: 4-4-015:009

This is in response to your request for comments on the above-referenced project. Our comments and recommendations are as follows:

1. Please add the County of Hawai`i's Department of Public Works - Building Division to Table 1 on page 1-6. Building Permits will be required prior to building renovations.
2. Page 4-24 states that "Pedestrian access on the mountain would not be restricted in any way by the Proposed Action or alternatives." It would help to know what the present pedestrian and vehicular access regulations are with regards to access to the summit and use of the Kūka`iau - `Umikoa ancient trail. Please elaborate on what is presently allowed and who controls (a) public access and (b) access by cultural practitioners. This relates to the County of Hawai`i General Plan goal that "Access to significant historic sites, buildings and objects of public interest should be made available."

Should you have questions, please contact Deborah Chang of my staff at 961-8288, Ext. 254.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

DLC:cd
P:\public\WPWIN60\Deborah\Comments\MaunaKeaTelescope4.4.15.9.doc

cc: Ms. Deborah Chang – Long Range Planning

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Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Christopher J. Yuen
Planning Director, County of Hawai'i Department of Planning
101 Pauahi Street, Suite 3
Hilo, HI 96720-3043

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Yuen,

Thank you for your letter dated 25 April 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1: Section 1, 1-6, Table 1, Please add the County of Hawaii's Department of Public Works – Building Division to Table 1 on page 1-6. Building permits will be required prior to the building renovations.

Response to comment: Table 1 was revised to reflect building permits would be required from the County of Hawaii – Building Division.

Comment 2: Section 4.15.3, pg 4-24, Paragraph 1, Line 1, Page 4-24 states that "Pedestrian access on the mountain would not be restricted in any way by the Proposed Action or alternatives." It would help to know what the present pedestrian and vehicular access regulations are with regards to access to the summit and use of the Kuka'iau-'Umiko ancient trail. Please elaborate on what is presently allowed and who controls (a) public access and (b) access by cultural practitioners. This relates to the County of Hawaii General Plan goal that "Access to significant historic sites, buildings, and objects of public interest should be made available."

Response to comment: The following was added to the text: "The summit access road is open to the public. UH holds a non-exclusive easement from DLNR for the section of roadway between Hale Pohaku and the summit. Vehicular traffic is restricted to paved and unpaved roadways. UH has the authority to close the road at Hale Pohaku or further above, to vehicular traffic, only if weather creates unsafe conditions. There are no restrictions for foot traffic within the UH-managed lands, including the Hale Pohaku area, and the science reserve. The Kuka'iau-'Umiko trail is said to come from the northeast toward the summit and appears on older maps. Access to the area where the trail is said to traverse is available, as long as the road is open. Access to the trail from makai is via DLNR (forest reserve) and makai ranch lands. The same is true for the Humu'ula trail, which also comes from makai out of DLNR-managed lands, through the Mauna Kea Ice Age NAR (see Section 6.2 letter from OMKM). Pedestrian access on the mountain would not be restricted in any way by the Proposed Action or the alternatives."

We are in the process of finalizing the Environmental Assessment document and will forward a copy to your office.

Helber Hastert & Fee
Planners, Inc.
Draft Environmental Assessment
UH 24-inch Telescope Observatory Renovation, Mauna Kea Science Reserve
August 15, 2006
Page 2 of 2

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

May 8, 2006

RECEIVED
MAY 10 2006
HELBER, HASTERT & FEE PLANNERS

State of Hawai'i
University of Hawai'i at Hilo
ATTENTION: DR. WILLIAM D. HEACOX
200 West Kawili Street
Hilo, HI 96720

UNIVERSITY OF HAWAI'I 24-INCH TELESCOPE OBSERVATORY RENOVATION
DRAFT ENVIRONMENTAL ASSESSMENT
HAMAKUA, ISLAND OF HAWAI'I, HAWAI'I
TAX MAP KEY (3) 4-4-015:009

Thank you for allowing us the opportunity to comment on the subject Draft Environmental Assessment.

Please be informed that there are no Department of Water Supply facilities in the area that will be affected by the proposed project.

If you have any questions, please contact Mr. Finn McCall of our Water Resources and Planning Branch at (808) 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:sco

copy - Dr. Andrew Clegg, National Science Foundation
State of Hawai'i, Office of Environmental Quality Control
Ms. Martha Spengler, Helbert Hastert & Fee, Planners

...Water brings progress...

The Department of Water Supply is an Equal Opportunity provider and employer. To file a complaint of discrimination, write: USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410. Or call (202) 720-5964 (voice and TDD)

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Milton Pavao, P.E.
Manager, Department of Water Supply
County of Hawaii
345 Kekūanaōa Street, Suite 20
Hilo, HI 96720

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Pavao,

Thank you for your letter dated 8 May 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. Your comments are noted.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Desmond K. Wery
Deputy Fire Chief

County of Hawai'i
FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 961-8297 • Fax (808) 961-8296

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APR 25 2006
HELBER, HASTERT & FEE
PLANNERS

April 20, 2006

Dr. William D. Heacox
University of Hawaii at Hilo
200 West Kawili Street
Hilo, Hawaii 96720

RE: DRAFT ENVIRONMENT ASSESSMENT
Project: UNIVERSITY OF HAWAII, 24-INCH TELESCOPE OBSERVATORY RENOVATION
Location: MAUNA KEA SCIENCE RESERVE, HAMAKUA, HAWAII
TAX MAP KEY 3RD DIVISION; 4-4-15:09

We have no comments to offer at this time in reference to the above-mentioned Draft Environmental Assessment.

DARRYL OLIVEIRA
Fire Chief

DO:lpc

CC: Dr. Andrew Clegg, National Science Foundation
Office of Environmental Quality Control
Helber Hastert & Fee, Planners

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Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Darryl Oliveira
Fire Chief
County of Hawai'i Fire Department
24 Aupuni Street, Suite 103
Hilo, HI 96720

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Oliveira,

Thank you for your letter dated 20 April 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. Your comments are noted.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

KAHU KU MAUNA COUNCIL
c/o Office of Mauna Kea Management
University of Hawai`i at Hilo
200 W. Kawili Street
Hilo, Hawai`i 96720

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MAY - 5 2006
HELBER, HASTERT & FEE PLANNERS

COPY

May 3, 2006

Dr. William D Heacox
Department of Physics and Astronomy
University of Hawai`i at Hilo
200 W. Kawili Street
Hilo, Hawai`i 96720

Dear Dr. Heacox,

Subject: Draft EA for UHH 24-inch Telescope Renovation on Mauna Kea.

On February 15, 2006, the Kahu Ku Mauna Council sent a letter to Mr. Thomas A. Fee of Helbert, Hastert & Fee, Planners Inc., offering our comments regarding a Pre-Assessment Consultation for the UHH 24-inch Telescope Observatory Renovation on Mauna Kea (per NHPA Section 106). A copy of this letter was also sent to you.

In development of the proposed EA document, we want to underscore the importance of having all users of the mountain understand and respect the host culture in our desire to preserve for future generations, all that Mauna Kea holds for us in cultural traditions. We want it known that Mauna Kea is our sacred mountain and that any and every activity in the summit area, no matter how insignificant it may appear, adds to the cumulative impact and subsequent degradation and deterioration of its spiritual ambience. We ask that the EA document be done with sensitivity to this, and with acknowledgement to the host culture's beliefs.

In regards to the project undertaking, the Council suggests that a project management plan be developed similar to the "Best Management Plan" developed by Keck people for the Outrigger Project. Additionally, a memorandum of understanding between applicant and consulting parties may need to be considered, if not already considered. Finally, as a reminder, it is very important that the new telescope be installed in the same existing structure (with necessary improvements), and that the same footprint be maintained.

Thank you for this opportunity to provide our comments.

Sincerely,

Ed Stevens
(for) Kahu Ku Mauna Council

Copy to:

Dr. Andrew Clegg
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

The Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Ms. Martha Spengler, Project Planner
Helber, Hastert & Fee, Planners, Inc.
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Mr. Bill Stormont, Director
Office of Mauna Kea Management
University of Hawai`i at Hilo
200 W. Kawili Street
Hilo, Hawai`i 96720

Dr. Rolf-Peter Kudritzki, Director
Institute for Astronomy
University of Hawai`i - Manoa
2680 Woodlawn Drive
Honolulu, Hawai`i 96822

Dr. Robert A. McLaren, Associate Director
Institute for Astronomy
University of Hawai`i - Manoa
2680 Woodlawn Drive
Honolulu, Hawai`i 96822

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Ed Stevens
Kahu Ku Mauna Council
Office of Mauna Kea Management
University of Hawai'i at Hilo
200 West Kawili Street
Hilo, HI 96720

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Stevens,

Thank you for your letter dated 3 May 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1: "In development of the proposed EA document, we want to underscore the importance of having all users of the mountain understand and respect the host culture in our desire to preserve for future generations, all that Mauna Kea holds for in cultural traditions. We want it known that Mauna Kea is our sacred mountain and that any and every activity in the summit area, no matter how insignificant it may appear, adds to the cumulative impact and subsequent degradation and deterioration of its spiritual ambience. We ask that the EA document be done with sensitivity to this and with acknowledgement to the host culture's beliefs."

Response to Comment: Comment noted. Please note inclusions of language in Section 4.16.1, 1st paragraph per your letter of 15 February 2006: "The reasonable geographic boundaries for cultural resources consist of the Astronomy Precinct of the MKSR where the Project Site is located. Many believe that any new development activity on the summit of Mauna Kea, regardless of how insignificant or how major in scope, coupled with all internal and external activities of the 12 astronomy facilities on the mountain, adds to a cumulative impact that is disturbing to the serenity, significance, and spiritual ambience of this sacred region as wao akua to the Hawaiian people."

Comment 2. "In regards to the project undertaking, the Council suggests that a project management plan be developed similar to the "Best Management Plan" developed by Keck people for the Outrigger Project."

Response to Comment: As agreed between Dr. Bill Heacox, Mr. Bill Stormont, and Mr. Ed Stevens on 06 July 2006, a plan for the facility management will be included in the application to the University, via Office of Mauna Kea Management, for the project. This is the appropriate vehicle for management planning for the project.

Comment 3. "Additionally, a memorandum of understanding between applicant and consulting parties may need to be considered, if not already considered."

Response to Comment: Per conversation with Dr. William Heacox and Mr. Stevens, it is our understanding that a MOA is not desired for this project but for the management plan for the MKSR.

Comment 4. Finally, as reminder, it is very important that the new telescope be installed in the same existing structure (with necessary improvements), and that the same footprint be maintained.

Response to Comment: Comment noted. The installation of the new telescope and the observatory building renovations will be located within the same footprint as the existing observatory building.

We are in the process of finalizing the Environmental Assessment document and will forward a copy to the council.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

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MAY - 9 2006
HELBER, HASTERT & FEE PLANNERS

TO: **The University of Hawai`i at Hilo**
200 West Kawili Street
Hilo, Hawai`i 96720-4091
Tel: 808.974.7382
ATTN: Dr. William Heacox

National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230
Tel: 703.292.8580
ATTN: Dr. Andrew Clegg

CC: Office of Environmental Quality Control
235 South Beretania St Suite 702
Honolulu HI 96813

CC: Helber Hastert & Fee
ATTN: Martha Spengler
733 Bishop St Suite 2590
Honolulu HI 96813
Tel: 808. 545.2055

FROM: Mauna Kea Anaina Hou
230 Lyman Avenue
Hilo, Hawai`i 96720
Tel: 808.934.7668
Email: kealohap@aloha.net
ATTN: Ms. Kealoha Pisciotta, President

Date: May 7, 2006

Subject: Draft Environmental Assessment Comments Relating To The University of Hawai`i 24-Inch (24") Telescope Observatory Renovation Project, Mauna Kea, Hawai`i

Thank you for providing Mauna Kea Anaina Hou the opportunity to comment on the draft environmental assessment (Hereafter "DEA") for the proposed University of Hawai`i 24-Inch Telescope Observatory Renovation Project, Mauna Kea, Hawai`i (hereafter "UHH-24-Project"). MKAH has reviewed the DEA relating to the UHH-24"-Project.

The following comments are filed on behalf of Mauna Kea Anaina Hou, a Native Hawaiian Organization as defined by the National Historic Preservation Act (NHPA). Mauna Kea Anaina Hou (MKAH) is dedicated to the protection, preservation and restoration of the traditional and customary Native Hawaiian traditional, cultural and religious practices relating to Mauna Kea.

First, we would like the record to reflect that it is our understanding that the project as described in the DEA is to replace the UH 24-Inch Telescope with a 36-Inch Telescope and to renovate the existing building with no changes being made to the foot-print or existing infrastructure (i.e. no land altering or ground disturbing activities resulting from construction or upgrading of communication systems etc.). We further understand that this specific UHH-24"-Project is to take place in lieu of a previous proposed redevelopment project that would have redeveloped the UHH 24"-Inch telescope into a larger two-to-three meter (2-3m) telescope on an adjacent site on the summit of Mauna Kea.

I. Tax Map Numbers

It should be noted that the tax map key cited to in the DEA is the tax map key number for the entire Mauna Kea Science Reserve ("MKSR") General Lease. The correct tax map key number for the UHH 24-Inch Telescope site specifically should be cited as well as the MKSR General Lease tax map key.

II. Section 106 Consultation pursuant to the National Historic Preservation Act (NHPA)

We would like the record to *clearly* reflect, that Mauna Kea Anaina Hou, has never signed a Memorandum of Agreement (MOA) pursuant to the Section 106 of NHPA relating to development of Mauna Kea. While MKAH along with many other Native Hawaiian groups previously participated in the NHPA, Section 106 Consultation (as Consulting Parties), relating the NASA/William M. Keck Observatory, (WMKO) Outriggers Telescopes Project; MKAH **did not sign** the Memorandum of Agreement (MOA) offered by NASA and KECK.

In fact the Office of Hawaiian Affairs, the Royal Order of Kamehameha I, and the other Native Hawaiian Group also rejected the NASA- KECK MOA. The only group that signed the MOA for the NASA-KECK Telescopes Project was the Universities Kahu Ku Mauna ("KKM") Group (NOTE: While the KKM group did sign the MOA, they did so with caveats relating to the development of the project).

We would like the abovementioned information to be included in the Final EA. The current statements contained the DEA could mislead reader into believing that the majority of Native Hawaiian groups consulted pursuant to

Section 106 of NHPA, concur with further development atop Mauna Kea. This is not the case, and should be expressly noted.

III. The Universities Mauna Kea Master Plan – No Federal EIS or Section 106 for Master Plan.

The University's Mauna Kea Master Plan was approved by the Universities Board of Regents (hereafter "UHBOR") in June of 2000. The DEA makes repeated references to the "Mauna Kea Master Plan 1999". This is incorrect, we are not aware of any document by that name. All references to a "Mauna Kea Master Plan of 1999" should be replaced with "Mauna Kea Master Plan 2000". Furthermore, there was no Federal EIS or Section 106 Consultation pursuant to NEPA or NHPA respectively, prepared for the University's Mauna Kea Master Plan 2000 ("MKMP 2000"); Therefore, all references to the contrary should be deleted.

The MKMP 2000 was never approved by the State's Board of Land and Natural Resources (BLNR) pursuant to state statute or related rules and regulations. There is no dispute. What is disputed however is the question of whether or not a comprehensive Management Plan pursuant to the state law relating to astronomy development should be completed for the entire summit of Mauna Kea, prior to any further development. The abovementioned issue is the subject of a pending lawsuit currently before the Third Circuit Court of Appeals (please see Civil No. 04-1-397). The Royal Order of Kamehameha I, The Sierra Club (Hawai`i Island Chapter), MKAH and individual practitioner Mr. Clarence Ching are all parties to the abovementioned lawsuit.

Please delete any references to a Federal EIS and/or Section 106 consultations relating to the MKMP 2000, because it is an incorrect assertion. The University did not conduct a federal EIS or Section 106 consultation pursuant to either NEPA or NHPA for the MKMP 2000.

IV. Hazardous Waste and Disposal

We understand that mirror washing for the 36-Inch Telescope upgrade will be conducted at the Universities 88-Inch Telescope (hereafter "UH-88") on the Summit of Mauna Kea (p. 2-8). We note that no specific information relating to the type of sewage system that is used on the UH-88-inch is included, nor does the DEA provided specific information relating to the impact that additional mirror washing will have on the current UH-88" sewage system.

According to the documents produce in the BLNR Contested Case Hearing regarding the NASA-KECK Outrigger Telescopes Project, approximately 500,000 gallons of human waste per year is introduced into sub-standard septic tank/leech fields/cesspool systems. Furthermore, over 10,000 documents relating to the use, storage and handling of hazardous materials and regulated materials used at the observatories was received pursuant to a subpoena in the Contested Case Hearing. Little has been done b the UH or the State to address the impacts that these materials might have on the natural and cultural resources of the summit of Mauna Kea. While some work was done by NASA, there are still no baseline studies regarding the impacts of these specific materials on the cultural and natural environs of Mauna Kea (i.e these uses include but are not limited to the cultural, traditional, and religious uses, the delicate flora and fauna, and the impacts to the complex hydrology of the summit region).

From a Native Hawaiian perspective, dumping of sewage, and hazardous materials this is a severe form of desecration to one of the most sacred places n all of Hawai`i. Therefore, the assertions made in the DEA that there will be "no impact" is not accurate or at least does not does not reflect the cultural perspective of the Host and indigenous cultural of Hawai`i.

We note further, that while the DEA does state, "Any hazardous and regulated materials encountered would be handled in accordance with applicable regulations" *Id.*, all hazardous materials used, stored and handled in the facility as well as all methods of disposal need to be listed specifically. Furthermore, all relevant regulations, relating to the use, storage and handling of sewage and hazardous materials also need to be identified and listed.

Because there is no comprehensive summit wide management plan, the cumulative hazardous, and sewage treatment has not being completely assessed or evaluated; therefore, there is no base-line data to determine what impact additional waster or hazardous materials may have on the natural or cultural resources of Mauna Kea.

V. Hydrology – Ground and Surface Water Resources (at pages 3-15)

We strongly object to the above mentioned section relating to the Hydrology. We object principally because the data referenced was challenged by all parties during the contested case hearing (except the HIEDB), and continues to be challenged today. The UH, KECK and NASA based their entire negative determination regarding the hydrology of Mauna Kea on the "data" provided by a Mr. Tom Nance. The "data" provided by Mr. Nance represented a single data set.

Mr. Nance did not provide baseline data relating to the hydrology systems of Mauna Kea, he provided one data point. Even Mr. Nance himself, confirmed that for this reason the "data" could not be used effectively for determining impact to the hydrology of the Mauna Kea. (Please see Contested Case Hearing Transcripts – Tom Nance). To date there is no baseline data on the complex hydrology of Mauna Kea. With no baseline data, it is hard to sustain claims that no impact will result from any action -- good or bad.

We concur also with the information provided by the Sierra Club relating to the Wekiu bug. The Wekiu bug is a candidate for listing on the Endangered Species list. The Wekiu bug's population has declined by 99.7%. This means the Wekiu is in need of maximum protections if recovery is to happen. Hawai`i is considered the endangered species capital of the world. From a cultural perspective, we have not the province to de-create—extinction is that. We can co-create but not de-create; because de-creation sets the process of creation out of balance and un-raveling. It is hard for us to imagine how good science would engender extinction as an acceptable condition of success and or progress.

As we have stated for many years, we believe astronomy is a noble endeavor that should be supported, however, not at the expense of our culture or natural world. We believe good science would not seek such zero sum conditions. We hope that your program joins in the effort to protect the delicate life forms of Mauna Kea, and help to preserve and protect the last vestiges of cultural and traditional uses of Mauna Kea, for both of these aspects of Mauna Kea are found nowhere else in the world.

In Aloha we remain,
Kealoha Pisciotta

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Ms. Kealoha Pisciotta
President, Mauna Kea Anaina Hou
230 Lyman Street
Hilo, HI 96720

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Ms. Pisciotta,

Thank you for your letter dated 7 May 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1: General. "First, we would like the record to reflect that our understanding that the project described in the DEA is to replace the UH 24-inch Telescope with a 36-inch telescope and to renovate the existing building with no changes being made to the foot-print or existing infrastructure (i.e., no land altering or ground disturbing activities resulting from the construction or upgrading of communication systems, etc.). We further understand that this specific UHH -24"-Project is to take place in lieu of a previous proposed redevelopment project that would have redeveloped the UHH24"-Inch telescope into a larger two-to-three meter (2-3 m) telescope on an adjacent site on the summit of Mauna Kea."

Response to comment: Comment noted. Please note that the 2-3 meter telescope was to be located at the Project site and the 1 meter telescope was to be located at an adjacent site.

Comment 2: "I. Tax Map Numbers. It should be noted that the tax map key cited to in the DEA is the tax map key number for the entire Mauna Kea Science Reserve (MKSR) General Lease. The correct tax map key number for the UHH 24-Inch Telescope site specifically should be cited as well as the MKSR General Lease tax map key."

Response to comment: According to the Hawaii County Real Property Tax Office, there has been no additional tax parcels created within Parcel 9 nor have there been any condominium property regime parcels created. The Tax Map Key number (3-4-4-015: 009) is the most current parcel identifier.

Comment 3: "II. Section 106 Consultation pursuant to the National Historic Preservation Act (NHPA). We would like the record to *clearly* reflect, that Mauna Kea Anaina Hou has never signed a Memorandum of Agreement (MOA) pursuant to Section 106 NHPA relating to the development of Mauna Kea. While MKAH along with many other Native Hawaiian groups previously participated in the NHPA, Section 106 Consultation (as Consulting Parties), relating to the NASA/William M. Keck Observatory (WMKO) Outriggers Telescope Project; MKAH **did not sign** the Memorandum of Agreement (MOA) offered by NASA and KECK. In fact the Office of Hawaiian Affairs, the Royal Order of Kamehameha I, and the other Native Hawaiian Group also rejected the NASA-KECK MOA. The only group that signed the MOA for the NASA-KECK Telescopes Project was the Universities Kahu Ku Mauna ("KKM") Group (NOTE: While the KKM group did sign the MOA, they did so with caveats relating to the development of the project). We would like the abovementioned information to be included in the Final EA. The current

statements contained the DEA could mislead reader into believing the majority of Native Hawaiian groups consulted pursuant to Section 106 of NHPA, concur with further development atop Mauna Kea. This is not the case, and should be expressly noted."

Response to comment: Section 4.3.1 "Historic Properties" "Proposed Action". The second to last paragraph was revised as follows: "The NHPA and NEPA processes were run concurrentl and public comments were invited. Based on a careful review and analysis, and in accordance with Chapter 6E Hawai'i Revised Statutes and Section 106 of the NHPA, NSF has determined that the Proposed Action would result in "no historic property affected." NSF has sought concurrence with this determination with the SHPD, OHA, Kahu Ku Mauna, the Royal Order of Kamehameha I, and Mauna Kea Anaina Hou. SHPD has indicated its concurrence with this determination. OHA, Kahu Ku Mauna, and Mauna Kea Anaina Hou have provided comments. Mauna Kea Aina Hou has expressed that the group has never signed a Memorandum of Agreement pursuant to Section 106 NHPA relating to previous development of Mauna Kea (se Section 6.2 letter from Mauna Kea Anaina Hou). No response was received from the Royal Order of Kamehameha I. Correspondence related to the Section 106 consultation process is provided in Appendix B." Similar language changes were made to Table 2, and Section 5.2 (#

Comment 4 (A): "III. The Universities Mauna Kea Master Plan – No Federal EIS or Sectio 106 for Master Plan. The University's Mauna Kea Master Plan was approved by the Universit Board of Regents (hereafter "UHBOR") in June 2000. The DEA makes repeated references to the "Mauna Kea Master Plan 1999". This is incorrect, we are not aware of a document by that name. All references to a "Mauna Kea Master Plan of 1999" should be replaced with "Mauna K Master Plan 2000". Furthermore, there was no Federal EIS or Section 106 Consultation pursu to NEPA or NHPA respectively, prepared for the University's Mauna Kea Master Plan 2000 ("MKMP 2000"); therefore, all references to the contrary should be deleted.

Response to comment: The 1999 reference is to the Final Environmental Impact Statement (FEIS) for the Mauna Kea Science Reserve Master Plan which was issued in December 1999. All references to the FEIS refer to the Final EIS vice Federal EIS as indicated in the comment The text was reviewed and revised to indicate either to the 1999 FEIS for the Mauna Kea Scier Reserve Master Plan or the 2000 Mauna Kea Science Reserve Master Plan, as appropriate.

Comment 4 (B): "The MKMP 2000 was never approved by the State's Board of Land and Natural Resources (BLNR) pursuant to state statute or related rules and regulations. There is dispute. What is disputed however is the question of whether or not a comprehensive Management Plan pursuant to state law relating to astronomy development should be complet for the entire summit of Mauna Kea, prior to any further development. The abovementioned is is the subject of a pending lawsuit currently before the Third Circuit Court of Appeals (please s Civil No. 04-1-0397). The Royal Order of Kamehameha I, The Sierra Club (Hawaii Island Chapter), MKAH and individual practitioner Mr. Clarence Ching are all parties to the abovementioned lawsuit."

Response to comment: Comment noted.

Comment 4 (C): "Please delete any references to a Federal EIS or Section 106 consultations relating to the MKMP 2000, because it is an incorrect assertion. The University did not conduc federal EIS or Section 106 consultation pursuant to either NEPA or NHPA for the MKMP 2000.

Response to comment: The text was reviewed for references to a Federal EIS; none were found. As mentioned previously, references to the 1999 FEIS for the Mauna Kea Science Reserve Master Plan were retained where appropriate. The text was reviewed for references to Section 106 consultations relating to the Mauna Kea Science Reserve Master Plan (UH 2000); none were found.

Comment 5: "IV. Hazardous Waste. We understand that mirror washing for the 36-inch Telescope upgrade will be conducted at the Universities 88-Inch Telescope (hereafter "UH-88") on the Summit of Mauna Kea (p. 2-8). We note that no specific information relating to the type of sewage system that is used on the UH-88-inch is included, nor does the DEA provided specific information relating to the impact that additional mirror washing will have on the current UH-88" sewage system.

"According to the documents produce in the BLNR Contested Case Hearing regarding the NASA-KECK Outrigger Telescopes Project, approximately 500,000 gallons of human waste per year is introduced into substandard septic/leech fields/cesspool systems. Furthermore, over 10,000 documents relating to the use, storage, and handling of hazardous materials and regulated materials used at the observatories was received pursuant to a subpoena in the Contested Case Hearing. Little has been done by the UH or the State to address the impacts that these materials might have on the natural and cultural resources of the summit of Mauna Kea. While some work was done by NASA, there are still no baseline studies regarding the impacts of these specific materials on the cultural and natural environs of Mauna Kea (i.e., these uses include but are not limited to the cultural, traditional, and religious uses, the delicate flora and fauna, and the complex hydrology of the summit region).

"From a Native Hawaiian perspective, dumping of sewage, and hazardous materials this is a severe form of desecration to one of the most sacred places in all of Hawaii. Therefore, the assertions made in the DEA that there will be "no impact" is not accurate or at least does not reflect the cultural perspective of the Host and indigenous culture of Hawaii.

"We note further, that while the DEA does state, "Any hazardous and regulated materials encountered would be handled in accordance with applicable regulations" Id., all hazardous materials used, stored and handled in the facility as well as all methods of disposal need to be listed specifically. Furthermore, all relevant regulations, relating to the use, storage, and handling of sewage and hazardous materials also need to be identified and listed.

"Because there is no comprehensive summit wide management plan, the cumulative hazardous, and sewage treatment has not been completely assessed or evaluated; therefore, there is no base-line data to determine what impact additional waste water or hazardous materials may have on the natural and cultural resources of Mauna Kea."

Response to comment: All hazardous materials storage, use, and disposal associated with the Proposed Action and alternatives would occur off site and would remain in compliance with appropriate Federal, State, and local regulations and laws. As indicated in Section 4.12.1: "The Proposed Action would not impact hazardous and regulated materials. No hazardous or regulated materials are currently stored, used, or disposed of at the Project Site and any hazardous and regulated materials encountered would be handled in accordance with applicable regulations."

Helber Hastert & Fee
Planners, Inc.

Comment 6 (A): "V. Hydrology – Ground and Surface Water Resources
We strongly object to the above mentioned section relating to the hydrology. We object principally because the data referenced was challenged by all parties during the contested case hearing (except the HIEDB), and continues to be challenged today. The UH, KECK and NASA based their entire negative determination regarding the hydrology of Mauna Kea on the "data" provided by a Mr. Tom Nance. The "data" provided by Mr. Nance represented a single data set. Mr. Nance did not provide baseline data relating to the hydrology systems of Mauna Kea, he provided one data point. Even Mr. Nance himself, confirmed that for this reason the "data" could not be used effectively for determining impact to the hydrology of the Mauna Kea (Please see Contested Case Hearing Transcripts – Tom Nance). To date there is no baseline data on the complex hydrology of Mauna Kea. With no baseline data, it is hard to sustain claims that no impact will result from any action – good or bad."

Response to comment: Comment noted. The Proposed Action (renovation of an existing observatory with no ground disturbing activity) will have no effect on ground and surface water resources. The paragraphs in Section 3.8 are excerpted from the Keck Outrigger FEIS and provide a general background on the hydrogeology and hydrology of the Project Site as it is currently understood.

We are in the process of finalizing the Environmental Assessment document and will forward a copy to your office.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

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HELBER, HASTERT & FEE PLANNERS

April 25, 2006

To: University of Hawaii at Hilo
Dr. William Heacox (808) 974-7382
200 West Kawili St
Hilo HI 96720-04091

To: National Science Foundation
Dr Andrew Clegg (703) 292-8580
4201 Wilson Boulevard
Arlington VA 22230

Cc: Office of Environmental Quality Control
235 South Beretania St Suite 702
Honolulu HI 96813

Cc: Helber Hastert & Fee, Planners
Martha Spengler, Project Planner (808) 545-2055
733 Bishop St Suite 2590
Honolulu HI 96813

From:

Sierra Club, Hawaii Chapter
Deborah Ward, Mauna Kea Issues Co-Chair
c/o P.O.Box 918
Kurtistown HI 96760

RE: University of Hawaii 24-inch Telescope Observatory Renovation
Mauna Kea Science Reserve, Hamakua HI, 3rd Division, 4-4-15:09

Thank you for providing Sierra Club, Hawaii Chapter the opportunity to comment on the draft environmental assessment for the proposed UHH telescope observatory renovation and upgrade.

Sierra Club supports the intent of the proposed project, to provide UHH undergraduate astronomy program with a modern observatory and to support education and fundamental research in astronomy.

We note the efforts that have been made to confine the upgrade to the existing facility footprint, and the plans to install controls that would make the telescope remotely operable from the University campus. We note that no new excavation would be needed for power and communication.

Recycled Content

1. Purpose and Need for Action: Management Issues and Regulatory Overview

We note that the facility is currently being managed by the University of Hawaii at Manoa's Institute for Astronomy, and after completion of the proposed action, the observatory management responsibility would be transferred to UHH (page 1-1), and all maintenance of the facility would be performed by UHH personnel (2-1).

On page 1-2, we note that the "Astronomy Precinct" outlined on the Figure 1 is not a BLNR approved designation. The "precinct" was designated in the UH Master Plan 2000, and as you correctly note in 4-18, "although the Master Plan was prepared by UH in accordance with its use of the Conservation District lands; it is not a document prepared for or by the DLNR, and therefore, does not require the DLNR or to follow or agree to the provisions made in the Master Plan". Likewise, use of the "astronomy precinct" in 4-20 in relation to DLNR rules regarding natural beauty, open space, or "Natural and Cultural Preservation Area" has no merit, however "Astronomy facilities under are an identified land use in the resource subzone", according to Haw. Admin. Rules § 13-5-24

On page 1-6, Table 1, we note that the "List of Potential Permits, Approvals and Consultations" omits the preparation of a management plan for the site, as required by Haw. Admin. Rules § 13-5-24 "Astronomy facilities in the resource subzone require a board permit and an approved management plan".

On Page 1-6 Table 1, we note that the "List of Potential Permits, Approvals and Consultations" omits the preparation of a comprehensive and integrated resource management plan approved by BLNR as required by June 2007. (See documentation that follows.)

On Page 1-6, Table 1 we note that the "List of Potential Permits, Approvals and Consultations" omits consultation with the Office of Mauna Kea Management, the Mauna Kea Management Board and its advisory committees, and the University of Hawaii Board of Regents.

Spelling of Mauna Kea Anaina Hou is incorrect on page ES-3, and Page 1-6 Table 1.

Discussion:
In a contested case over the Keck Outrigger telescopes CDUA, the Hearing Officer's recommendation to the Board of Land & Natural Resources on CDUA and Management Plan stated the following:

"A management plan is defined in HAR 13-5-2 as a "comprehensive plan for carrying out multiple land uses."... It is not the purpose of the contested case hearing or the burden of the intervenors or the hearing officer to develop an acceptable management plan for the applicant through the contested case process... In this case, Applicant University of Hawaii Institute for Astronomy failed to meet its burden of coming forward with an acceptable management plan."

"A comprehensive management plan should name responsible parties, cumulative protection functions...address corrective actions to be taken and mitigation actions to be implemented and monitoring and consequence for non-compliance."

The BLNR Record of Decision on the Keck Outrigger telescopes project found, in part:

"Evidence presented in this case raises significant concerns about the adequacy of current management efforts in ensuring the protection of natural and cultural resources within the science reserve. We would not be upholding our duty to protect the State's natural and cultural resources by adding to the management tasks unless we can be assured of more appropriate and effective management practices than are currently in place. In short, we do not believe that the cumulative impacts can be mitigated under the present management structure....

The Office of Mauna Kea Management (OMKM) acts in an advisory capacity to the University of Hawaii Board of Regents, and is ultimately a creature of the Regents. The Mauna Kea Management Board is appointed by the Regents, and the Regents have the power to discontinue the board and the office or to dramatically alter their functions and purposes. Under this current structure, there is no assurance that OMKM will continue to exist to promote good management and to protect the natural and cultural resources, especially if those goals clashed with the University's interest in promoting its astronomy program. As the Auditor's Report pointed out, the University's focus on pursuing the development of the summit for astronomical research to enhance the prestige of its astronomy program has been at the expense of protecting our natural resources.

We are also imposing regular reporting requirements on the University. Non-compliance with permit conditions sometimes results from inattention rather than conscious omission. By having to report on compliance efforts, the University will be forced into continual awareness of its obligations and continuous assessment of its progress."

The Board required the University to comply with the following conditions on or before June 2007:

"Within two (2) years from the date of issuance of this permit, the Office of Mauna Kea Management, with consultation with interested Native Hawaiian individuals and organizations, shall develop a comprehensive and integrated resource management plan for the purposes of:

(a) identifying important cultural and environmental resources within the summit area, beyond the project site boundaries, and other locations on Mauna Kea that may be determined to be appropriate for such plan; and

(b) providing a plan for the proper protection and management of such resources and the responsible public and private use of the summit, consistent with the protection of such resources."

The Legislative Auditor found in 1997, and in a follow-up report in 2005, that there is weak monitoring and inadequate protection of Mauna Kea's natural and cultural resources. The audit recommends that the UH update all planning documents, leases, and subleases; create a comprehensive management plan for the natural cultural and historic resources in the Hale Pohaku and summit areas; and implement a permit and sublease monitoring program to encourage the astronomy community to be better stewards of the summit region.

Sadly, Sierra Club concurs with the finding cited in NASA's EIS for the Keck Outrigger Telescope application (2005) regarding astronomy development on Mauna Kea that the cumulative impact of past, present and reasonably foreseeable activities is substantial, adverse and significant for the cultural and natural resources.

Further, Sierra Club believes that because the lease rent currently being charged to the University is nominal, the taxpayer is being asked to carry the burden of management of the site without sufficient revenue to conduct this task appropriately. The 2006 Hawaii State Legislature is considering SCR

131 calling for the formation of a task force to ascertain a fair lease rent to cover activities including management. Each telescope facility should allocate a portion of the annual budget to the management of the Mauna Kea Science Reserve.

The ongoing preparation of a Historic Preservation Management Plan for Mauna Kea being conducted by SHPD (page 3-6) is only one component of a comprehensive summit wide management plan that should be in place for Mauna Kea.

In Section 3.3.2 on page 3-11 reference is made (NASA 2005) to a requirement that groups of more than eight be required to obtain a permit before going up to the summit. Where is the documentation for this "requirement"? Is this a DLNR or University "rule"?

2. Alternatives Including Proposed Action

In section 2.1.4 under the discussion of Leasing, it is asserted that "time on current MKSR telescopes is inadequate to current research and graduate education needs, and would be extremely expensive, if available for leasing to UHH or other institutions". Does the University require that all sub-lessees provide a percentage (10-15%) of viewing time to the University in lieu of fair market rent? If so, then what percentage of this time is made available to UHH undergraduates? Has UHH requested a percentage of this time? What has been the outcome of this request?

3. Affected Environment: Data Issues

Section 3.6.2 Wastewater: Even though the DEA says that no toilet facility will be provided to this building, Sierra Club knows that telescope users will be using other existing facilities and portable toilets. What is the additional use anticipated by this proposed facility during construction?

We request that older, unlined cesspools be taken out of service and wastewater be removed from the summit. Many Hawaiians feel that it is a desecration to allow unlined cesspools in the summit region. On their behalf, starting in 1994, Sierra Club has asked for this change. This action will show good faith that the University is serious about their commitment to cultural sensitivity.

Section 3.10.2 Fauna: Figure 10 on page 3-18 shows only data for wekiu bug (Nysius wekiucola) collected in 1997-98, and does not reflect current data or all known habitats. Since 1998, extensive surveys have been conducted by Dan Polhemus from the Smithsonian, and Ron Englund at al, from Bishop Museum. A map of all currently known populations should be included in the Final Environmental Assessment.

Section 3.14 Socio-Economic: The data on page 3-21 regarding employment and median household income is six to nine years out of date, and should reflect current figures. Employment data from observatories and related industries is seven years old, and should be updated.

4. Environmental Consequences: Consistency with Policies, Plans and Controls

Section 4.10.1 How will the project renovation avoid introduction of alien arthropods such as ants on construction materials?

Section 4.15.2 State of Hawaii Plans and Controls: sections below not included in the DEA should be appended.

CONSTITUTIONAL AUTHORITY AND ADMINISTRATIVE RULES

1. Article XII, Section 1 of the Hawai'i State Constitution provides: For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawai'i's natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency for the State.

2. Article XII, Section 7 of the Hawai'i State Constitution provides: The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural, and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the rights of the State to regulate such rights.

3. Article, XII, Sec 9 of the Hawai'i State Constitution provides: "Each Person has the right to a clean and healthful environment, as defined bylaws relating to environmental quality, including control of pollution and, conservation, protection and enhancement of natural resources…(Emphasis added)

4. The conservation district is the most restrictive of the four land use classifications authorized under Hawaii's Land Use Law, Hawai'i Revised Statutes ("HRS") Chapter 205. Conservation districts are defined to include:

> areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous or endemic plants, fish and wildlife, including those which are threatened or endangered; preventing floods and soil erosion; forestry; open space and areas whose existing openness, natural condition or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept. HRS § 205-2(e).

5. The Department of Land and Natural Resources ("DLNR") administers public lands within the Conservation District pursuant to HRS Ch. 1 83C. That chapter makes the following statement of public policy:

> [t]he legislature finds that lands within the state land use conservation district contain important natural resources essential to the preservation of the State's fragile natural ecosystems and the sustainability of the State's water supply. It is therefore, the intent of the legislature to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare. HRS § 183C-1.

6. In evaluating the merits of a proposed land use, the department or the board shall apply the following criteria:

The proposed land use is **consistent with the purpose of the Conservation district**;

HAR 13-5-1 Purpose. The purpose of the Conservation District is conserving protecting and preserving important natural resources…through appropriate management and use …to promote long-term sustainability and public health safety and welfare.

HAR 13-5-2 Definitions. Natural resources are plants, wildlife, cultural, historic or archaeological sites and minerals.

In evaluating the merits of a proposed use in the conservation district, the Board evaluates eight criteria found in Haw. Admin. Rules § 13-5-30(c). The eight criteria are:

a) The proposed land use is consistent with the purpose of the conservation district;

b) The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;

c) The proposed land use complies with provisions and guidelines contained in chapter 205A, Haw. Rev. Stat., entitled "Coastal Zone Management," where applicable;

d) The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region;

e) The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;

f) The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;

g) Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and

h) The proposed land use will not be materially detrimental to the public health, safety and welfare.

6. The conservation district lands are categorized into subzones. The subzone in which the UHH 24-Inch Observatory Renovation is proposed is the resource subzone. Resource subzones include lands necessary to ensure the sustained use of natural resources and include lands suitable for parks, outdoor recreational uses, and the like. Haw. Admin. Rules § 13-5-13.

7. Astronomy facilities under are an identified land use in the resource subzone. Haw. Admin. Rules § 13-5-24.

8. Astronomy facilities in the resource subzone require a board permit and an approved management plan. Haw. Admin. Rules § 13-5-24.

9. The burden of proof is on the UH IfA to prove that it meets the requirements for the granting of the application. The degree of proof is a preponderance of the evidence. Haw. Admin. Rules § 13-5-30(c); Haw. Rev. Stat. 91-10(5).

The Discussion of Criteria 6 on Page 4-20 is inappropriate. The issue is NOT whether the proposed action would impact the Natural and Cultural Preservation Area located *outside* the "Astronomy Precinct". The issue is whether "*the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon*" at the site itself—that is your burden to prove.

4.15.3 County of Hawaii Plans and Policies: On Page 4-23, the document states that the presence of rangers and interpretive signs on the mountain educate visitors and residents about the proper treatment of significant cultural resources. Sadly, this is not always the case; interpretive signs do not exist at the site, and desecration of sacred and cultural sites has been frequent. Further, the OMKM has not acted appropriately to request in a timely fashion that DOCARE enforcement when desecration has occurred. The law ignored in this instance is HRS 700-1107.

HRS §711-1107 Desecration. (1) A person commits the offense of desecration if the person intentionally desecrates:

(a) Any public monument or structure; or

(b) A place of worship or burial; or

(c) In a public place the national flag or any other object of veneration by a substantial segment of the public.

(2) "Desecrate" means defacing, damaging, polluting, or otherwise physically mistreating in a way that the defendant knows will outrage the sensibilities of persons likely to observe or discover the defendant's action.

(3) Any person convicted of committing the offense of desecration shall be sentenced to a term of imprisonment of not more than one year, a fine of not more than $10,000, or both. [L 1972, c 9, pt of §1; gen ch 1993; am L 2002, c 198, §1]

COMMENTARY ON §711-1107

Previous Hawaii law prohibited certain types of desecration. For example, desecration of the United States flag was prohibited.[1] Section 711-1107 deals more generally with all acts of desecration; i.e., acts of physical damage to or mistreatment of venerated places and objects under circumstances which the defendant knows are likely to outrage the sensibilities of persons who observe or discover the defendant's actions. Thus, any desecration of a public monument or structure; or a place of worship or burial (public or private); or, in a public place, the national flag, or any other object (such as certain religious objects) revered by a substantial segment of the public, will constitute an offense. Damage by desecration is treated separately from other types of property damage because the sense of outrage produced by such acts is out of proportion to the monetary value of the damage. Thus, desecration is a misdemeanor, although many such cases might otherwise be petty misdemeanors under §708-823 because the object desecrated is worth less than $50.

Act 198, Session Laws 2002, amended this section by changing the penalty for desecration from a misdemeanor to one year imprisonment, a fine of $10,000, or both. The legislature found that recent vandalism at cemeteries denoted that the current financial penalties of a misdemeanor offense for desecration were an insufficient deterrent. The $10,000 fine was consistent with the penalty in §6E-11(c), relating to destruction of historic property. The legislature believed that a burial place or grave deserved no less a penalty for damage than did a historical monument. Senate Standing Committee Report No. 2957, House Standing Committee Report No. 416-02.

H.R.S. §733-6; another example is §734-3 which prohibits desecration of a grave.

5 Compliance with Chapter 343, Hawaii Revised Statutes

Citing the intent of maximizing use of "underutilized state-owned property" in Section 5.2.2 on page 5-2 (2): This is an egregious mis-statement of the situation. The University obtained a lease for the construction of a single telescope on Mauna Kea, which is a sacred site that holds strong cultural, traditional and religious significance for the Hawaiian people. Mauna Kea is also the habitat of unique flora and fauna found nowhere else on the planet, and is a biological heritage worthy of protecting intact. Nevertheless, the University built not just one, but six, including the observatory in question (without a CDUP, approved only after-the-fact) before the BLNR required a management plan in 1983, and eventually approved construction of two minor and eleven major telescopes on the summit. The number has been exceeded, the University is no longer in compliance with the BLNR agreement, and the only BLNR approved management plan was written in 1983 and amended to include commercial activities in 1995.

The summit of Mauna Kea is not only Conservation Land, but it is Ceded Land, **held in trust** by the State of Hawaii and protected on behalf of the right holders. OHA's consultation letter pointed out that it has a fiduciary duty to assure that these lands are used and treated properly. The right holders under the constitution and other statutory provisions are the Native Hawaiians and the General Public. Lawmakers and the Board of Land and Natural Resources (BLNR) are constitutionally and statutorily mandated to protect and hold in trust these lands for the betterment of conditions for the Native Hawaiian and the Public.

Omitted from this section is compliance with the UH General Lease: decommissioning the telescope and restoring the site to its original condition at the termination of the lease in 2033 is not detailed. An estimate of the cost and funding source should be provided.

Sierra Club looks forward to seeing our concerns addressed.

Mahalo,

Deborah Ward

Deborah J. Ward
Sierra Club, Hawaii Chapter, Mauna Kea Issues Co-Chair
c/o P.O.Box 918
Kurtistown HI 96760

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Ms. Deborah Ward, Mauna Kea Issues Co-Chair
Sierra Club, Hawaii Chapter
c/o P.O. Box 918
Kurtistown, HI 96760

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Ms. Ward,

Thank you for your letter dated 25 April 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1(A): "1. Purpose and Need for Action: Management Issues and Regulatory Overview. We note that the facility is currently being managed by the University of Hawaii at Manoa's Institute for Astronomy, and after completion of the proposed action, the observatory management responsibility would be transferred to UHH (page 1-1), and all maintenance of the facility would be performed by UHH personnel (page 2-1)."

Response to comment: Comment noted.

Comment 1(B): "On page 1-2, we note that the "Astronomy Precinct" outlined in Figure 1 is not a BLNR approved designation. The "precinct" was designated in the UH Master Plan 2000, and as you correctly note in 4-18, "although the Master Plan was prepared by UH in accordance with its use of the Conservation District lands, it is not a document prepared for or by the DLNR, and therefore, does not require the DLNR to follow or agree to the provisions in the Master Plan." Likewise, use of the "astronomy precinct" in 4-20 in relations to DLNR rules regarding natural beauty, open space, or "Natural and Cultural Preservation Area" has no merit, however, "Astronomy facilities are an identified land use in the resource subzone", according to Haw. Admin. Rules § 13-5-24."

Response to comment: Comment noted. We recognize the term "Astronomy Precinct" has no legal meaning in the context of conservation land regulations. It is a descriptive term used for convenience to describe the summit area used by the University of Hawaii (UH) for astronomy facilities within its Mauna Kea Science Reserve (MKSR).

Comment 1(C): "On page 1-6, Table 1, we note that the "List of Potential Permits, Approvals and Consultations" omits the preparation of a management plan for the site, as required by Haw. Admin. Rules § 13-5-24, 'Astronomy facilities in the resource subzone require a board permit and an approved management plan.'"

Response to comment: The requirement for approval of a Conservation District Use Permit from DLNR is listed in Table 1. This is the general requirement and includes required components of the CDUA process. The current and proposed use of the facility is an identified land use in the Resource Subzone (Hawaii Administrative Rules [HAR] 13-5-24, R-3), and the proposed renovation falls within the Protective Subzone category P-9 (C-1) of HAR 13-5-22, Alteration of Existing Structure, and requires a departmental permit. By HAR 13-5-24 (a), "all identified land uses and their associated permit or site plan approval requirements listed for the

protective and limited subzones also apply to the resource subzone, unless otherwise noted." The proposed project thus requires a departmental permit. DLNR's Office of Conservation and Coastal Lands has concurred with this interpretation.

Comment 1(D): "On page 1-6 Table 1 we note that the "List of Potential Permits, Approvals and Consultations" omits consultation with the Office of Mauna Kea Management, the Mauna Kea Management Board and its advisory committees, and the University of Hawaii Board of Regents"

Response to comment: Table 1 was revised to indicate that consultation with OMKM, Mauna Kea Management Board and its advisory committees, and approval by the UHH President or the UH Board of Regents.

Comment 1(E): "Spelling of Mauna Kea Anaina Hou is incorrect on page ES-3, and Page 1-6 Table 1"

Response to Comment: The spelling was corrected per comment.

Comment 1(F): Discussion: "In a contested case over the Keck Outrigger telescopes CDUA, the Hearing Officer's recommendation to the Board of Land & Natural Resources on CDUA and Management Plan stated the following:

> "A management plan is defined in HAR 13-5-2 as a "comprehensive plan for carrying out multiple land uses." It is not the purpose of the contested case hearing or the burden of the intervenors or the hearing officer to develop an acceptable management plan for the application through the contested case process…In this case, Applicant University of Hawaii Institute for Astronomy failed to meet its burden of coming forward with an acceptable management plan."
>
> "A comprehensive management plan should name responsible parties, cumulative protection functions…address corrective actions to be taken and mitigation actions to be implemented and monitoring and consequence for non-compliance."

The BLNR Record of Decision on the Keck Outrigger telescopes project found, in part:

> "Evidence presented in this case raises significant concerns about the adequacy of current management efforts in ensuring the protection of natural and cultural resources within the science reserve. We would not be upholding our duty to protect the State's natural and cultural resources by adding to the management tasks unless we can be assured of more appropriate and effective management practices than are currently in place. In short, we do not believe that the cumulative impacts can be mitigated under the present management structure…
>
> "The Office of Mauna Kea Management (OMKM) acts in an advisory capacity to the University of Hawaii Board of Regents, and is ultimately a creature of the Regents. The Mauna Kea Management Board is appointed by the Regents, and the Regents have the power to discontinue the board and the office or to dramatically alter their functions and purposes. Under this current structure, there is no assurance that OMKM will continue to exist to promote good management and to protect the natural and cultural resources, especially if those goals clashed with the University's interest in promoting its astronomy program. As the Auditor's Report pointed out, the University's focus on pursuing the

development of the summit for astronomical research to enhance the prestige of its astronomy program has been at the expense of protecting our natural resources.

"We are also imposing regular reporting requirements on the University. Non-compliance with permit conditions sometimes results from inattention rather than conscious omission. By having to report on compliance efforts, the University will be forced into a continual awareness of its obligations and continuous assessment of its progress."

Response to Comment: Comment noted.

Comment 1(G): The Board required the University to comply with the following conditions on or before June 2007:

"Within two (2) years from the date of issuance of this permit, the Office of Mauna Kea Management, with consultation with interested Native Hawaiian individuals and organizations, shall develop a comprehensive and integrated resource management plan for the purposes of: (a) identifying important cultural and environmental resources within the summit area, beyond the project site boundaries, and other locations on Mauna Kea that may be determined to be appropriate for such plan; and (b) providing a plan for the proper protection and management of such resources and the responsible public and private use of the summit, consistent with the protection of such resources."

Response to Comment: Comment noted.

Comment 1(H): "The Legislative Auditor found in 1997 and in a follow-up report in 2005, that there is weak monitoring and inadequate protection of Mauna Kea's natural and cultural resources. The audit recommends that the UH update all planning documents, leases, and subleases; create a comprehensive management plan for the natural cultural and historic resources in Hale Pohaku and summit areas; and implement a permit and sublease monitoring program to encourage the astronomy community to be better stewards of the summit region.

"Sadly, Sierra Club concurs with the finding cited in NASA's EIS for the Keck Outrigger Telescope application (2005) regarding astronomy development on Mauna Kea that the cumulative impact of past, present, and reasonably foreseeable activities is substantial, adverse, and significant for the cultural and natural resources.

"Further, Sierra Club believes that because the lease rent currently being charged to the University is nominal, the taxpayer is being asked to carry the burden of management of the site without sufficient revenue to conduct this task appropriately. The 2006 Hawaii State Legislature is considering SCR 131 calling for the formation of a task force to ascertain a fair lease rent to cover activities including management. Each telescope should allocate a portion of the annual budget to the management of Mauna Kea Science Reserve."

Response to Comment: Comment noted.

Comment 1(I): "The ongoing preparation of a Historic Preservation Management Plan for Mauna Kea being conducted by SHPD (page 3-6) is only one component of a comprehensive summit wide management plan that should be in place for Mauna Kea."

Response to Comment: Comment noted.

Comment 1(J): "In Section 3.3.2 on page 3-11 reference is made (NASA 2005) to a requirement that groups of more than eight be required to obtain a permit before going up to the summit. Where is the documentation for this "requirement"? Is this a DLNR or University "rule"?"

Response to comment: This sentence was deleted. The original sentence pertained to the Natural Area Reserve (NAR) **vice** the MKSR. A permit is required for groups of 12 or more persons visiting the NAR (personal communication, Stephanie Nagata, Office of Mauna Kea Management [OMKM]).

Comment: "2. Alternatives Including Proposed Action. In Section 2.1.4 under the discussion of Leasing, it is asserted that "time on current MKSR telescopes is inadequate for current research and graduate education needs, and would be extremely expensive, if available for leasing to UHH or other institutions". Does the University require that all sub-lessees provide a percentage (10-15%) of viewing time to the University in lieu of fair market rent? If so, then what percentage of this time is made available to UHH undergraduates? Has UHH requested a percentage of this time? What has been the outcome of this request?"

Response to Comment: The text was revised as follows: "This alternative involves leasing observatory time from existing MKSR observatories. About 30 to 40 nights per semester would be needed, at a minimum, to realize the UH-Hawaii (UHH) astronomy program's academic needs. No time is available on current MKSR telescopes. All the telescopes are heavily oversubscribed for research purposes only, typically by a factor of 3 or 4. Diverting significant amounts of current telescope time to educational purposes would detrimentally affect research at one of the world's premiere research facilities. Since large (as opposed to small) telescope access is not needed for educational purposes, this would be a mis-allocation of scarce resources."

Comment 3 (A): "3. Affected Environment: Data Issues, Section 3.6.2 Wastewater: Even though the DEA says that no toilet facility will be provided to this building, Sierra Club knows that the telescope users will be using other existing facilities and portable toilets. What is the additional use anticipated by this proposed facility during construction?"

Response to comment: The Contractor will be required to provide and maintain portable toilet facilities for renovation workers.

Comment 3 (B): "We request that older, unlined cesspools be taken out of service and wastewater be removed from the summit. Many Hawaiians feel that it is a desecration to allow unlined cesspools in the summit region. On their behalf, starting in 1994, Sierra Club has asked for this change. This action will show good faith that the University is serious about their commitment to cultural sensitivity."

Response to comment: Comment noted.

Comment 3 (C): "Section 3.10.2 Fauna: Figure 10 on page 3-18 shows only the data for Wēkiu bug (Nysius wekiuicola) collect in 1997-1998, and does not reflect current data or all known habitats. Since 1998, extensive surveys have been conducted by Dan Polhemus for the Smithsonian and Ron Englund et al, from Bishop Museum. A map of all currently known populations should be included in the Final Environmental Assessment."

Response to comment: The best available information supports the conclusion that the Proposed Action and alternatives would not impact the Wēkiu bug or its habitat. In addition,

according to Bishop Museum entomologists, there have been no new Wēkiu bug surveys in the vicinity of the Project Site and a single map of all currently known populations is not currently available (personal communication Mr. David Preston 2006; Dr. Ronald Englund 2006 Bishop Museum).

Comment 3 (D): "Section 3.14 Socio-Economic: The data on page 3-21 regarding employment and median household income is six to nine years out of date, and should reflect current figures. Employment data from observatories and related industries is seven years old, and should be updated."

Response to comment: Comment noted. The data used was derived from the 2000 U.S. Census and adequately represents the existing employment and income of the project area for the purposes of this project.

Comment 4(A): "Environmental Consequences: Consistency with Policies, Plans, and Controls. Section 4.10.1 How will the project renovation avoid introduction of alien arthropods such as ants on construction materials?"

Response to Comment: A qualified inspector will be retained to inspect all renovation materials and heavy equipment for introduced arthropods and insects.

Comment 4 (B): "Section 4.15.2 State of Hawaii Plans and Controls: sections below not included in the DEA should be appended.

1. Article XI, Section 1 of the Hawaii State Constitution provide: For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii's natural beauty and all natural resources, including land, water, air, minerals, and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation of the self-sufficiency for the State.
2. Article XII, Section 7 of the Hawaii State Constitution provides: The State affirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaa tenants who are descendants of native Hawaiians who inhabited the Hawaiian islands prior to 1778, subject to the rights of the State to regulate such rights.
3. Article XI, Section 9 of the Hawaii State Constitution provides: "Each Person has the right to a clean and healthful environment, as defined bylaws relating to environmental quality, including control of pollution and, conservation, protection and enhancement of natural resources… (emphasis added).
4. The conservation district is the most restrictive of the four land use classifications authorized under Hawaii's Land Use Law, Hawaii Revised Statutes ("HRS") Chapter 205. Conservation districts are defined to include: areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous and endemic plants, fish and wildlife, including those which are threatened or endangered; preventing floods and soil erosion; forestry; open space and areas whose existing openness, natural condition or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept. HRS § 205-2(e).
5. The Department of Land and Natural Resources ("DLNR" administers public lands within the Conservation District pursuant to HRS Ch. 183C. That chapter makes the following statement of

public policy: [t]he legislature finds that lands within the state land use conservation district contain important natural resources essential to the preservation of the State's fragile natural ecosystems and the sustainability of the State's water supply. It is therefore, the intent of the legislature to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. HRS § 183C-1.

6. In evaluating the merits of a proposed land use, the department or the board shall apply the following criteria: The proposed land use is consistent with the purpose of the Conservation district;

HAR 13-5-1 Purpose. The purpose of the Conservation District is conserving, protecting, and preserving important natural resources… through appropriate management and use…to promote long-term sustainability and public health, safety, and welfare.
HAR 13-5-2 Definitions: Natural resources are plants, wildlife, cultural, historic, or archaeological sites and minerals.
In evaluating the merits of proposed use in the conservation district, the Board evaluates eight criteria found in Haw. Admin. Rules § 13-5-30 (c) The eight criteria are:

a) The proposed land use is consistent with the purpose of the conservation district.
b) The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;
c) The proposed land use complies with provisions and guidelines contained in chapter 205A, Hawaii Revised Statutes, entitled "Coastal Zone Management," where applicable;
d) The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region;
e) The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;
f) The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;
g) Subdivision of land will not be used to increase intensity of land uses in the conservation district; and
h) The proposed land use will not be materially detrimental to the public health, safety, and welfare.

7. The conservation district lands are categorized into subzones. The subzone in which the UH 24-inch Observatory Renovation is proposed is the resource subzone. Resource subzones include lands necessary to ensure the sustained use of natural resources and include lands suitable for parks, outdoor recreation uses, and the like. Haw. Admin. Rules § 13-5-13.
8. Astronomy facilities are an identified land use in the resource subzone. Haw. Admin. Rules § 13-5-24.
9. Astronomy facilities in the resource subzone require a board permit and an approved management plan. Haw. Admin. Rules § 13-5-24.
10. The burden of proof is on the UH IfA to prove that it meets the requirements for the granting application. The degree of proof is a preponderance of the evidence. Haw. Admin. Rules § 13-5-30(c); Haw. Rev. Stat. 91-10(5)."

Response to Comment: Points 1-3 were added to Section 4.15.2 (#1), point 4 was added to Section 4.15.2 (#4). Point 5 was added to Section 4.15.2 (#5). Point 6 was already included in Section 4.15.2 (#5). Points 7 to 9 were already summarized in Section 4.15.2 #5. Point 10 – comment noted.

Comment 4 (C): "The Discussion of Criteria 6 on Page 4-20 is inappropriate. The issue is NOT whether the proposed action would impact the Natural and Cultural Preservation Area located *outside* the "Astronomy Precinct". The issue is whether "*the existing physical and environmental*

aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon" at the site itself – that is your burden to prove."

Response to comment: The text was revised as follows: "Proposed Action would not impact the existing physical and environmental aspects of the land in the "Astronomy Precinct"."

Comment 4 (D): "4.15.3 County of Hawaii Plans and Policies: On Page 4-23, the document states that the presence of rangers and interpretive signs on the mountain educate visitors and residents about the proper treatment of significant cultural resources. Sadly, this not always the case; interpretive signs do not exist at the site, and desecration of sacred and cultural sites has been frequent. Further, the OMKM has not acted appropriately to request in a timely fashion that DOCARE enforcement when desecration has occurred. The law ignored in this instance is HRS 700-1107.

"HRS § 711-1107 Desecration. (1) A person commits the offense of desecration if the person intentionally desecrates: (a) any public monument or structure; or (b) a place of worship or burial; or (c) in a public place the national flag or any other object of veneration by a substantial segment of the public. (2) "Desecrate" means defacing, damaging, polluting, or otherwise physically mistreating in a way that the defendant knows will outrage the sensibilities of persons likely to observe or discover the defendant's action. (3) Any person convicted of committing the offense of desecration shall be sentenced to a term of imprisonment of not more than one year, a fine of not more than $10,000, or both. [L 1972, c9, pt of §1; gen ch 1993; am L2002, c 198, §1]"

Response to comment: Comment noted.

Comment 4 (E): "Commentary on §711-1107
Previous Hawaii law prohibited certain types of desecration. For example, desecration of the United States flag was prohibited. [1] Section 711-1107 deals more generally with all acts of desecration; i.e. acts of physical damage to or mistreatment of venerated places and objects under circumstances which the defendant knows are likely to outrage the sensibilities of persons who observe or discover the defendant's actions. Thus any desecration of a public monument or structure; or a place of worship or burial (public or private); or in a public place, the national flag, or any other objects (such as certain religious objects) revered by a substantial segment of the public will constitute an offense. Damage by desecration is treated separately from other types of property damage because the sense of outrage produced by such acts is out of proportion to the monetary value of the damage. Thus, desecration is a misdemeanor, although many such cases might otherwise be petty misdemeanors under §708-823 because the object desecrated is worth less than $50.
"Act 198, Session Laws 2002, amended this section by changing the penalty for desecration from a misdemeanor to one year imprisonment, a fine of $10,000, or both. The legislature found that recent vandalism at cemeteries denoted that the current penalties of a misdemeanor offense for desecrations were an insufficient deterrent. The $10,000 fine was consistent with the penalty in §6E-11(c), relating to destruction of historic property. The legislature believed that a burial place or grave deserved no less a penalty for damage than did a historical monument. Senate Standing Committee Report No. 2957, House Standing Committee Report No. 416-02.
H.R.S. §733-6, another example is §734-3 which prohibits desecration of a grave."

Response to comment: Comment noted.

Comment 5: "5. Compliance with Chapter 343, Hawaii Revised Statute

Citing the intent of maximizing the use of "underutilized state-owned property" in Section 5.5.2 on page 5-2 (2): This is an egregious mis-statement of the situation. The University obtained a lease for the construction of a single telescope on Mauna Kea, which is a sacred site that holds strong cultural, traditional, and religious significance for the Hawaiian people. Mauna Kea is also the habitat of unique flora and fauna found nowhere else on the planet, and is a biological heritage worthy of protecting intact. Nevertheless, the University of Hawaii built not just one, but six, including the observatory in question (without a CDUP, approved only after-the-fact) before the BLNR required a management plan in the summit. The number has been exceeded, the University is no longer in compliance with the BLNR agreement, and the only BLNR approved management plan was written in 1983 and amended to include commercial activities in 1995. The summit of Mauna Kea is not only Conservation Land, but is Ceded Land, **held in trust** by the State of Hawaii and protected on behalf of the right holders. OHA's consultation letter pointed out that it has a fiduciary duty to assure that these lands are used and treated properly. The right holders under the constitution and other statutory provisions are the Native Hawaiians and the General Public. Lawmakers and the Board of Land and Natural Resources (BLNR) are constitutionally and statutorily mandated to protect and hold in trust these lands for the betterment of conditions for the Native Hawaiians and the Public.

"Omitted from this section is compliance with the UH General Lease: decommissioning the telescope and restoring the site to its original condition at the termination of the lease in 2033 is not detailed."

Response to comment: The sentence was revised as follows: "The Proposed Action would revitalize an aging but important State-owned observatory resulting in the positive long-term benefits associated with upgrading and renovating a previously developed facility."

We are in the process of finalizing the Environmental Assessment document and will forward a copy to your office.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
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Roy R. Thompson
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APR 21 2006
HELBER, HASTERT & FUJI PLANNING

April 17, 2006

Ken Ikeda, Safety Office
University of Hawaii at Hilo
200 W. Kawili St.
Hilo HI 96720

To Ken Ikeda, and others:

I have comments to make regarding the construction of the UH-H Telescope atop Mauna Kea.

First, the announcement in the newspaper (Hawaii Tribune-Herald, 4/16/2006) was confusing and somewhat misleading. In the third paragraph it states that the new telescope "will be placed in the observatory that <currently> houses the 24 inch telescope." Later, it states that the existing 'footprint' would be preserved, but that the structure was in poor condition and offered little protection from dust, etc. It sounds as though the structure is being replaced in the latter half of the article, which is contrary to what is being stated in the third paragraph. The public deserves a more accurate and specific description of what is taking place in order to properly evaluate their feelings about this particular project. A clarification should be issued and the deadline for submitting comments should be extended in fairness to the members of the public who may have input.

Secondly, I am the technician who was hired for the purpose of maintaining that telescope once it was constructed. I have a vested interest in seeing that the project is done properly. My major concern is over the lack of running water and wastewater facilities. The University is prohibited, both under current state regulations and my present bargaining contract, from constructing any new facilities which do not conform to certain minimum standards. My labor contract requires that I be provided with running water and restroom facilities "at the worksite". I was discouraged, (it fell a little short of being bullied) by the person spearheading the construction effort on behalf of our department, from raising this issue. At the time I was still on probation and subject to dismissal without cause, so I kept my mouth shut then.

You will probably hear several arguments from that person as to why the facilities are not necessary, and I will endeavor to anticipate those arguments and refute them to the best of my ability.

First, you may hear the argument that I am out with an injury and unlikely to return to the position. At this point in time, no one knows for certain whether I will return or not, but even if I weren't and that were somehow significant, my replacement would still be covered by the same collective bargaining agreement, and protected by the same state regulations. Thus, the point is moot.

Another alternative being bandied about is that 'some day' Mauna Kea Management may build restrooms there, obviating the need for UH-Hilo to do so. If true, the telescope construction should be contingent on the bathroom(s) being operational prior to completion of the facility, and any assessment of the telescope project should encompass the restroom construction, provisions for running water, and the wastewater facilities. These 'some day' projects have a propensity for never being actualized. The public deserves to know if these restrooms are going to be associated with the telescope, and should be notified and comments solicited.

If you are told that use of the portable lavatories several hundred yards upslope of the facility are acceptable, you need to take a hard look at that. Ask the person if he can give you another example of a telescope without a restroom. I don't know of any. My interpretation of the applicable laws and the labor contract leads me to conclude that using those portable lavatories will no longer be acceptable once major renovations are conducted on the site. Furthermore, it is unsafe and unhealthful to compel workers, visitors, and others to walk that far in the dark and/or snow, etc. That is true particularly because there is no running water there. Try it sometime yourself at night, with snow on the ground and the wind whistling past at 40 M.P.H. I know what it is like and I have fallen more than once. You may also get into trouble due to A.D.A requirements for accessible restrooms. I am legally disabled, and was when I was hired. The next technician may be as well.

One argument I heard from the aforementioned faculty member is that the facility would be infrequently serviced and thus there was no justification for the restrooms. That argument is both self-serving and wrong. There seems very little point in spending several million dollars on a facility which will not be maintained regularly. What you will have is exactly what is up there now, a run down, decaying, obsolete pile of junk that is jury-rigged to the point of being dangerous. Some people fear that if the University administration knows the true cost of erecting and properly maintaining an appropriate facility, the project will be killed. They want to cut corners in order to better ensure they get their telescope, but are not properly concerned about taking care of it (and the technician) once it is built. In truth, someone should be working there at least two to three days per week. The 88 inch telescope, which has an aperture less than 2-1/2 times the size of the one in question, had a full time crew of four technicians and one support astronomer working at least four days a week. And contractors were up there regularly as well. A new telescope will need a lot of unanticipated work (I worked at Subaru Telescope before and after commissioning, so I know about it) and so you can predict that someone will have work there full time for months after the construction is finished.

Of course, you will probably get at least one person that will try to maintain that the small restroom at the UH-88 inch is 'at the jobsite', and thus an acceptable alternative. The UH-88 facility is 1/4-1/2 mile upslope, locked, difficult to enter, and darkened at night. Inclement weather often precludes walking there, not to mention that it is uphill. Headlights are prohibited on the summit at night, thus making the drive dangerous. Too many people are already sharing that restroom, and the telescope is due to be shut down soon. While we (UH-Hilo) have an implied right to use the bathroom there, that is primarily because the telescope we are now using is owned by UH-Manoa and any research conducted therein is co-owned by them. Once UH-Hilo takes formal custody of the site and builds its own facility, using the UH-88 restrooms would be at the pleasure or discretion of any subsequent UH-Manoa IFA administration. If the building is shut down for extensive renovations (as is likely soon) the bathrooms could be

completely inaccessible for an extended period of time. UH-Hilo personnel have no other access to running water at the summit, thus, how would someone clean up prior to eating lunch, etc.?

If you are told that bottled water will be available, take into consideration that it freezes up there at night. What if someone need to wash their eyes or clean off chemicals in an emergency. Is bottled water going to be sufficient? Why not get a list of chemicals commonly used around telescopes, such as strong acids, alcohols, solvents, sodium hydroxide, etc. and ask yourself if you would want a family member working around those products without any running water. Especially considering how remote the site is and the likelihood that person will be working all alone. Would you like it if your sister had to run 200 yards in the snow, with 40 M.P.H. wind, to use the toilet? Would you like to know that your son is using solvents before lunch, and there is no running water to clean up with before he eats?

One problem with letting the faculty run the design/construction phase is that they don't do the actual work on the equipment. It's easy enough for them to say "it won't need much maintenance" or "he can drive up to the '88 to use the toilet". Building the facility with restrooms and running water is the right way to do it, and I believe it is required by law. If those are not included, I will fight the project through the union and at every public venue I can attend. There is little question that I would be granted standing if I requested a contested case hearing. Instead of spending the money on attorneys, why not just build the bathroom?

Roy R. Thompson

Helber Hastert & Fee
Planners, Inc.

August 15, 2006

Mr. Roy Thompson
P.O. Box 7001
Hilo, HI 96720

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment**
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Thompson,

Thank you for your letter dated 17 April 2006 in response to our Draft Environmental Assessment (DEA) for the above-referenced project. We have the following responses to your comments:

Comment 1: "First, the announcement in the newspaper (Hawaii Tribune-Herald, 4/16/2006) was confusing and somewhat misleading. In the third paragraph it states that the new telescope "will be placed in the observatory that (currently) houses the 24inch telescope." Later, it states that the existing "footprint" would be preserved, but that the structure was in poor condition and offered little protection from dust, etc. It sounds as the structure is being replace in the latter half of the article, which is contrary to what is being stated in the third paragraph. The public deserves a more accurate and specific description of what is taking place in order to properly evaluate their feelings about this particular project. A clarification should be issued and the deadline for submitting comments should be extended in fairness to members of the public who may have input."

Response to Comment: The reference is to an independent newspaper article which we cannot be responsible for. The EA clearly describes the Proposed Action and alternatives being considered. A new 36-inch telescope will replace the existing telescope, the existing observatory building will be renovated using the existing footprint. References to the use of the existing footprint can be found in Paragraph 2, Cover Sheet and Section 2.1.1 Proposed Action: "NSF proposes to fund UHH's proposal to replace an existing 24-inch telescope with a new 36-inch telescope and, using State funds, UHH proposes to replace/upgrade the existing dome, siding, interior wall panels, associated interior power and communication wiring, and doors utilizing the same foundation and footprint (emphasis added) and install controls to make the facility remotely operable from the UHH campus ("Proposed Action")."

Section 2.1.1 Proposed Action, first paragraph states: "Utilizing Federal NSF grant funds, UHH proposes to replace an existing 24-inch telescope with a new 36-inch telescope and, using State funds, renovate an existing 37 year old, 420 sf observatory building located at the Project Site (Figure 1, Location Map, and Figure 2, Project Site). UHH proposes to replace/upgrade the existing dome, siding, interior wall panels, associated interior power and communication wiring, and doors utilizing the same foundation and footprint (emphasis added) and install controls to make the facility remotely operable from the UHH campus ("Proposed Action"). UHH has received NSF funding to purchase a new, state-of-the-art 36-inch optical telescope for use in undergraduate instruction and educational research."

Comment 2: "Secondly, I am the technician who was hired for the purpose of maintaining that telescope once it was constructed. I have a vested interest in seeing that the project is done properly. My major concern is over the lack of running water and wastewater facilities. The

University is prohibited, both under current state regulations and my present bargaining contract, from constructing any new facilities which do not conform to certain minimum standards. My labor contract requires that I be provided with running water and restroom facilities "at the worksite". I was discouraged, (it fell a little short of being bullied) by the person spearheading the construction effort on behalf of our department, from raising this issue. At the time I was still on probation and subject to dismissal without cause, so I kept my mouth shut then.
You will probably hear the argument that I am out with an injury and unlikely to return to the position. At this point in time, no one knows for certain whether I will return or not, but even if I weren't and that were somehow significant, my replacement would still be covered by the same collective bargaining agreement, and protected by the same state regulations. Thus, the point is moot."

Response to comment: Comment noted. Under the Proposed Action and alternatives, no new restroom facilities are planned. It is estimated that the majority of the maintenance of the telescope and observatory would occur during daylight hours. In addition, the telescope will be remotely controlled from the UHH campus which will decrease the number of on-site visits. The Proposed Action and alternatives do not require ground-disturbing activities and would be restricted to the footprint of the existing building. The introduction of restroom facilities at the Project Site would require increasing the building footprint and ground disturbance – outcomes that are not desired by many community members; therefore, the decision to forego the addition of a restroom was made. Facility users will need to use the existing portable toilets, the toilet facilities at the UH 88-inch Telescope Observatory, or the restrooms at the Hale Pohaku.

Comment 3: "Another alternative being bandied about is that "some day" Mauna Kea Management may build restrooms there, obviating the need for UH-Hilo to do so. If true, the telescope construction should be contingent on the bathroom(s) being operational prior to completion of the facility, and any assessment of the telescope project should encompass the restroom construction, provisions for running water, and the wastewater facilities. These "some day" projects have a propensity for never being actualized. The public deserves to know if these restrooms are going to be associated with the telescope, and should be notified and comments solicited.

"If you are told that use of the portable lavatories several hundred yards upslope of the facility are acceptable, you need to take a hard look at that. Ask the person if he can give you another example of a telescope without a restroom. I don't know of any. My interpretation of the applicable laws and the labor contracts leads me to conclude that using those portable lavatories will no longer be acceptable once major renovations are conducted on site. Furthermore, it is unsafe and unhealthful to compel workers, visitors, and others to walk that far in the dark and/or snow, etc. That is true particularly because there is no running water there. Try it sometime yourself at night, with snow on the ground and the wind whistling past at 40 M.P.H. I know what it is like and I have fallen more than once. You may also get into trouble due to A.D.A. requirements for accessible restrooms. I am legally disabled, and was when I was first hired. The next technician may be as well."

Response to comment: Comment noted.

Comment 4: "One argument that I have heard from the aforementioned faculty member is that the facility would be infrequently serviced and thus there was no justification for the restrooms. That argument is both self-serving and wrong. There seems very little point in spending several million dollars on a facility which will not be maintained regularly. What you will have is exactly

what is up there now, a run-down, decaying, obsolete pile of junk that is jury-rigged to the point of being dangerous. Some people fear that if the University administration knows the true cost of erecting and properly maintaining an appropriate facility, the project will be killed. They want to cut corners in order to better ensure they get their telescope, but are not properly concerned about taking care of it (and the technician) once it is built. In truth, someone should be working at least two to three days per week. The 88-inch telescope, which has an aperture less than 2-1/2 times the size the one in question, has a full time crew of four technicians and one support astronomer working at least four days a week. And contractors were up there regularly as well. A new telescope will need a lot of unanticipated work (I worked at Subaru Telescope before and after commissioning, so I know about it) and so you can predict that someone will have work there full time for months after construction is finished."

Response to comment: After the initial installation period adjustments, it is estimated that the new 36-inch telescope will require maintenance on weekly basis.

Comment 5: "Of course, you will probably get at least one person that will try to maintain that the small restroom at the UH-88inch is "at the jobsite", and thus an acceptable alternative. The UH-88 facility is ¼ to ½ mile upslope, locked, difficult to enter, and darkened at night. Inclement weather often precludes walking there, not to mention that it is uphill. Headlights are prohibited on the summit at night, thus making the drive dangerous. Too many people are already sharing that restroom, and the telescope is due to be shut down soon. While we (UH-Hilo) have an implied right to use the bathroom there, that is primarily because the telescope we are now using is owned by UH-Manoa and any research conducted there is co-owned by them. Once UH-Hilo takes formal custody of the site and builds its own facility, using the UH-88 restrooms would be at the pleasure or discretion of any subsequent UH-Manoa IFA Administration. If the building is shut down for extensive renovations (as is likely soon) the bathrooms could be completely inaccessible for an extended period of time. UH-Hilo personnel have no other access to running water at the summit, thus how could someone clean up prior to eating lunch, etc.?"

Response to comment: Comment noted. See response to comment #2.

Comment 6: If you are told that bottled water will be available, take into consideration that it freezes up there at night. What if someone need to wash their eyes or clean off chemicals commonly used around telescopes, such as strong acids, alcohol, solvents, sodium hydroxide, etc. and ask yourself if you would want a family member working around those products without any running water. Especially considering how remote the site is and the likelihood the person will be working all alone. Would you like it if your sister had to run 200 yards in the snow, with 40 M.P.H. wind to use the toilet? Would you like to know that your son is using solvents before lunch, and there is no running water to clean up with before he eats.

Response to comment: Comment noted. All facility maintenance and use will be conducted in accordance with applicable laws including occupational health & safety requirements.

Comment 7: One problem with letting the faculty run the design/construction phase is that they don't do the actual work on the equipment. It's easy enough for them to say "it won't need much maintenance" or "he can drive up to the '88 to use the toilet". Building the facility with restrooms and running water is the right way to do it, and I believe it is required by law. If those are not included, I will fight the project through the union and at every public venue I can attend. There is little question that I would be granted standing if I requested a contested case hearing. Instead of spending money on attorneys, why not just build the bathroom?

Response to comment: Comment noted. See response to comment #2.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc:
Dr. Julian Christou, Program Director, Advanced Technologies and Instrumentation, Division of Astronomy, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

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8 LIST OF PREPARERS

University of Hawai‘i at Hilo

Professor of Astronomy	Dr. William Heacox Ph.D. Astronomy
Director of Facilities and Construction	Mr. Lo-Li Chih

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Assistant General Counsel	Bijan Gilanshah, Esq.
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Principal-In-Charge	Mr. Thomas A. Fee, AICP M.A. Urban Planning
Principal EA Author/Project Manager	Ms. Martha Spengler, REA M.S. Geology and Geophysics

Urban Works

Architect	Mr. Lorrin Matsunaga, AIA

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APPENDIX A

COOPERATING AGENCY AGREEMENT BETWEEN THE UNIVERSITY OF HAWAI‘I AT HILO AND THE NATIONAL SCIENCE FOUNDATION

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UNIVERSITY OF HAWAI'I AT HILO

Administration
Administrative Affairs

Date: February 3, 2006

G. Wayne Van Citters
Division Director, Division of Astronomical Science
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Re: The University of Hawai'i at Hilo's Cooperation with National Science Foundation's in the conduct of the environmental review process for the Renovation of the 24-inch Telescope Observatory Project, Mauna Kea, Hawai'i Island, Hawai'i

Dear Mr. Van Citters:

The purpose of this letter is to document the agreement of the University of Hawai'i at Hilo ("UHH") and the National Science Foundation (NSF) regarding participation and cooperation in preparing the required environmental analyses and documentation associated with the renovation of the University of Hawai'i's 24-inch telescope observatory on Mauna Kea, Hawai'i Island, Hawai'i.

We agree that the UHH will be the lead State agency with primary responsibility for preparing an Environmental Assessment (EA) as required by the State of Hawaii Chapter 343 Hawai'i Revised Statues and the National Environmental Policy Act and for meeting the requirements of the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), and all other applicable state and federal laws. NSF will be the leas federal agency for this process, and will actively participate with UHH as a cooperating agency in these activities, ensuring compliance with applicable federal laws. NSF's participation will include, but not limited to providing review and comment on the EA, jointly approving the EA, and ensuring proper application of NHPA and ESA. Separate Findings of No Significant Impact, if warranted, will be required for each agency.

UHH's Department of Physics and Astronomy is taking the lead on this project for UH Hilo under the direction of Dr. William Heacox. He can be reached at (808) 974-7382. Please feel free to contact him with any questions or concerns, and he will direct them to the appropriate person.

Sincerely,

Bill Chen
Interim Vice Chancellor

cc: Dr. William Heacox

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APPENDIX B

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 CORRESPONDENCE

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National Historic Preservation Act, Section 106 Consultation

The following agencies and organizations were consulted in compliance with Section 106 of the National Historic Preservation Act. Parties who responded to the Section 106 Consultation letters are identified by an asterisk (*). Correspondence is presented in the following pages.

*State Historic Preservation Division/State Historic Preservation Officer
*Office of Hawaiian Affairs
*Kahu Ku Mauna
Royal Order of Kamehameha I
Mauna Kea Anaina Hou (see Section 6.3).

Helber Hastert & Fee
Planners, Inc.

13 January 2006

Mr. Peter Young
Chairperson and State Historic Preservation Officer
Department of Land and Natural Resources
State Historic Preservation Division
Kakuhihewa Building
601 Kamokila Boulevard, Room 555
Kapolei, HI 96707

Subject: Section 106 Consultation for the University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Young,

Pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and the National Environmental Protection Policy Act (NEPA), the University of Hawai'i at Hilo (UHH) has contracted our firm to prepare an environmental assessment (EA) and to prepare this National Historic Preservation Act (NHPA) Section 106 Consultation Letter. We are requesting your review of the proposed renovation of the existing astronomy observatory. The UHH proposes to renovate an 37-year old existing observatory and replace the existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope located within the Astronomy Precinct at the Mauna Kea Science Reserve (MKSR), Hāmākua District, island of Hawai'i, State of Hawai'i. In accordance with the implementing regulations for Section 106, we have reviewed the project and determined that it is an undertaking as defined in 36 Code of Federal Regulations (CFR) 800.16 (y).

The Proposed Action would occur at the 420 square foot (sf) University of Hawai'i (UH) 24-inch Telescope Observatory and a proposed renovation lay-down area comprised of less than 20,000 sf immediately north and south of the building. The MKSR is located at the summit of Mauna Kea volcano (See enclosures 1 and 2) and is part of Tax Map Key 4-4-15:09. The observatory and optical telescope are owned by UH and managed by the University of Hawai'i at Manoa Institute for Astronomy. After the completion of the Proposed Action, the observatory and telescope would be managed by UHH. An aerial photo of the summit telescopes, including the UH 24-inch Telescope Observatory, is provided in enclosure 3.

Project Description

This project proposes replacement of the existing the UH 24-inch research telescope with a modern instructional telescope and renovation of the existing observatory building utilizing the existing building footprint. The replacement of the telescope and the renovation of the observatory building would provide updated and modern facilities in support of the UHH's educational astronomy program and astronomy outreach programs to local high schools. A new 36-inch telescope would replace the existing 24-inch optical research telescope. The existing dome, siding, interior wall panels, associated power and communication wiring, and double doors would be removed from the observatory building and replaced with new

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components. A new dome would raise the height of the 20-foot tall building by approximately 6 inches. An additional door would be added to the north side of the observatory building (enclosures 4 and 5). The new exterior components would be painted to match the existing color of the observatory.

The Proposed Action represents a decrease in use intensity from that indicated in the 1999 MKSR Master Plan prepared by UH. Under the Master Plan, the 24-inch Telescope Observatory would be replaced with a larger (72 to 108-inch) telescope and observatory with a larger footprint and building envelope.

Area of Potential Effect

The area of potential effect (APE) includes the concrete footprint of the observatory building and the immediate surroundings that will be affected during renovation activities as indicated in enclosure 2.

Identification of Cultural Resources

Cultural resources, as defined by the NHPA, include both historic properties and cultural values or traditional cultural practices. Historic properties are defined by the NHPA as any prehistoric or historic districts, sites, buildings, structures, or objects, significant in American history, architecture, archaeology, engineering, or culture that are included in, or eligible for inclusion on, the National Register of Historic Places (NRHP). Historic properties include archaeological sites, historic buildings and structures, historic districts, and other evidence of human activity, as well as artifacts, remains, and records related to and located within such properties. Historic properties also include places of traditional religious and cultural importance to an Indian tribe or a Native Hawaiian organization. These traditional cultural properties are places associated with the practices and beliefs of a living community, are rooted in its history, and are important in maintaining the continuing cultural identity of the community. Historic properties are protected under Chapter 6E HRS, Article IX Section 7 of the State Constitution, and the NHPA.

Cultural values or traditional cultural practices reflect the beliefs of particular ethnic or cultural groups. These values and practices are identified in ethnographic studies and other personal accounts. The American Indian Religious Freedom Act of 1978 makes it Federal policy to protect and preserve the rights of indigenous groups, including Native Hawaiians, to practice their traditional religion, access sites, and to conduct ceremonial and traditional rites.

Cultural resources, as used in Chapter 343, HRS, include the "practices and beliefs of a particular cultural or ethnic group or groups" (Office of Environmental Quality Control [OEQC] 1997). The types of cultural practices and beliefs to be assessed may include "subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs (OEQC 1997), and may also include traditional cultural properties or other historic sites that support such beliefs and practices. Native Hawaiian traditional and customary rights are protected under Article XII, Section 7 of the State Constitution.

Historic Properties The UH 24-inch Telescope Observatory building does not have exceptional importance or meet the NRHP eligibility criteria for historic significance. The UH 24-inch Telescope Observatory was constructed in 1968 as part of the initial development of the MKSR. In 1968, the State Board of Land and Natural Resources (BLNR) recognized the importance of Mauna Kea for astronomy observations and leased an area of land to the UH for a 65 year period. The 37-year old observatory building is not considered an historic architectural resource (UH 1999). Historic properties that are located in the vicinity of the Project Site include an historic district, a national historic landmark, archaeological sites, historic buildings, and traditional cultural properties (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape).

Historic District. The location of the Project Site lies within the cluster of three cinder cones: Pu'u Hau'oki, Pu'u Kea, and Pu'u Wēkiu that form the summit of Mauna Kea (see Figure 8, Cultural Landscape). State Historic Preservation Division (SHPD) Archaeologists have concluded this cluster of cones is an historic property that probably bore the name of Kūkahau'ula (National Aeronautics and Space Administration [NASA], 2005). Their conclusion is based on evidence that at least a part of the summit cluster was named for Kukahau'ula, a figure who appears in legends about Mauna Kea as an aumakua (family deity) of fishermen. Furthermore, the SHPD has stated it intends to propose the summit region of Mauna Kea for inclusion on the NRHP as an historic district, because "it encompasses a sufficient concentration of historic properties (i.e. shrines, burials and culturally significant landscape features) that are historically, culturally, and visually linked within the context of their setting and environment" (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; UH 1999; NASA 2005).

National Historic Landmark. The Mauna Kea Adze Quarry, the largest pre-industrial quarry in the world, used by Hawaiians before Contact to obtain basalt for stone artifacts, is located approximately 6,000 feet south of the Project Site. It is listed as a National Historic Landmark by the National Park Service under National Register No. 66000285 (See enclosure 6, Archaeological Sites; UH 1999).

Archaeological Sites. Over the past 20 years, archaeologists have surveyed approximately 27 percent or 3,000 acres of the MKSR. Surveys to date have identified 93 archaeological sites within the MKSR; however, no individual archaeological sites have been identified within the Project Site (See enclosure 6, Archaeological Sites). Seventy-six of the sites are shrines, 4 are adze-manufacturing workshops with shrines, and 3 are stone piles that serve as markers. One burial site and 4 possible burial sites (marked by cairns) have also been identified outside the proposed project area, but within the MKSR. Five sites are of unknown function (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; UH 1999). Dr. Patrick McCoy and colleague Dr. Holly McEldowney of the SHPD are in the process of preparing a Historic Preservation Management Plan for Mauna Kea. As part of this plan, McCoy has inventoried and summarized the known archaeological sites that provide a wealth of knowledge of past use of the mountain. No archaeological sites have been found at the Project Site (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscapes; UH 1999).

Historic Buildings. There are no historic buildings at the Project Site (UH 1999). The stone cabins within Hale Pohaku, approximately 6 miles south of the MKSR, are more than 50 years old and the SHPD considers these two buildings to be historic properties (UH 1999).

Places of Traditional Cultural Significance. Documentary archival research and oral history interviews with kupuna familiar with the mountain and cultural practitioners have identified several traditional cultural places that may be eligible for the NRHP on Mauna Kea. The mountain is a traditional cultural property, but there are also particular landscape features on the mountain that hold individual traditional importance within Hawaiian culture. Three places that have been identified by SHPD as traditional cultural properties are: (1) Kūkahau'ula (Site 21438); (2) Pu'u Līīnoe (Site 21439); and (3) Wai'au (Site 21440). Other traditional places that may qualify include: (1) Pu'u Poli'ahu; (2) Pu'u Mākanaka and Kaupō; (3) Kūka'iau-'Umiko Trail; and (4) Mauna Kea-Humu'ula Trail. (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; NASA 2005).

Cultural Practices and Beliefs. Cultural values and traditional cultural practices include intangible resources that are important to culture. Contemporary cultural practices relate to current beliefs or practices. Traditional cultural practices on Mauna Kea are associated with resource locations (e.g., stone, water, hunting), trails, individual topographic features, burial locations, and cultural landscapes (NASA 2005).

According to the 2005 Final EIS (FEIS) for the Outrigger Telescopes Project (NASA 2005), in Native Hawaiian society, cultural and religious practices and observations are inseparably intertwined; the good favor of the gods (na akua) is sought before every endeavor, from the very mundane tasks to the most fearsome ventures. Na akua were believed to dwell in earthly forms such as the pu'u on Mauna Kea and the waters spouting from the earth or running in the streams. In addition, Native Hawaiians deified their family ancestors as na 'aumakua which took the form of animals such as sharks, owls, hawks, and many others. These ancestors were asked to support and assist in the coming effort from planting taro to waging war.

Furthermore, Native Hawaiians also delineated the inland areas of the islands according to the right, or restriction, of access by the maka'ainana, or commoner, and the presence of the deities. Thus, wao kanaka is an inland area of lower elevation where the maka'ainana can inhabit or move about freely. Wao kele is the upland forested area into which the maka'ainana can enter for the purpose of gathering materials for their daily lives. Above the wao kele is the wao akua, also called the wao ke akua, which is believed be inhabited by na akua; here the maka' ainana hesitate to enter, and only did so with prayer and great respect. The wao akua is generally the desert region above the tree line or wao kele, and is believed to be inhabited by na akua; hence, the name. Some cultural practitioners believe that only persons of the 'ali'i (chiefly) class and the highest priests or kahuna nui were permitted to enter the wao akua. An area inhabited by na akua may also be called pō. The summit of Mauna Kea from about the 9,000-foot level is considered wao akua, a sacred region, with kapu, or restriction in what may be done on the land (NASA 2005).

The presence of shrines and monuments in the summit region of Mauna Kea indicates that certain religious observances or worship services were conducted there. However, there is no written record or description of those ceremonies and with the advent of Christianity as the overriding religious influence in Native Hawaiian society, virtually all knowledge of the nature of such observances has been lost. Persons knowledgeable about Native Hawaiian culture and practices have expressed their belief that no credible knowledge exists today about the particular observances traditionally practiced on Mauna Kea (NASA 2005).

Contemporary religious practitioners who continue to pay homage to the deities enshrined in their early forms on Mauna Kea and to the ʻuhane or spirits of their ancestors whom they believe also reside or visit the sacred grounds. Those contemporary practitioners consider themselves na koa, or warriors, whose enduring task is to protect the mountain from unwarranted intrusion, particularly under the present circumstances. They ardently believe that Mauna Kea is inhabited by akua or ʻuhane and that the development on the summit is an invasion by ordinary man into the sacred realm. The practitioners find that the presence of the observatory domes on the summit, and the noise emanating from them and created by vehicular traffic, is destructive of the silence and spiritual ambience that is necessary to their proper religious observances. Additionally, the observatory domes obscure their view of certain stars, thus interfering with the practitioners' proper alignment with the stars for worship, and preventing an unobstructed 360-degree view of the summit region and the neighboring mountains (NASA 2005).

Each puʻu, at the summit and at the lower elevations, has a cultural and spiritual significance; most are named for the akua, whose forms are represented by the puʻu, stars, and other formations of nature. Moreover, they do not stand-alone; they each have a relationship to the other puʻu that is meaningful to the practitioners. By orienting their worship with the alignment of the puʻu the practitioners are able to determine whether they are in a spot that is propitious for worshipping na akua and seeking their assistance. The presence of the observatory domes, and the removal of the top of Puʻu Kūkahauʻula (recently name Puʻu Wēkiu) interferes with the practitioners' ability to achieve that correct orientation (NASA 2005).

Some of the practitioners believe that the effluent from the observatories does enters the aquifer and has caused the green coloration of Lake Waiʻau's water. However, research on the lake's water quality and isotope studies indicate that this is not the case; the lake water is derived from the precipitation and snowmelt originating in the lake's vicinity (NASA 2005). Practitioners indicate that the green color of the water interferes with their ability to see the reflection of the stars on the water and is disruptive of their religious observances (NASA 2005).

According to the 2005 FEIS for the Outrigger Project (NASA 2005), the practitioners, and many other families in the community, continue to carry the umbilical cords (piko) of their newborn children to the summit for concealment. This is a deeply spiritual activity, and the piko may be concealed anywhere on the summit. Only the families, who mark the site by alignment of physical features, including the puʻu and other geographic characteristics as well as the stars, know the location of the piko. Thus the ability to achieve orientation

through the alignment of the puʻu is critical. In keeping with this tradition, each family considers itself as caretaker of a sector on the mountain in the vicinity of the piko location.

Many families erect family shrines (ʻahu) and others visit the adze quarry to engage in their cultural and religious rituals. The practitioners consider their observances as being in place of those ceremonies lost in antiquity. They are "adaptations" of present day practices to allow them to worship na akua and na ʻaumakua in proper fashion and with proper reverence. One of those adaptations is the spiritual observance of the winter solstice begun in 1998. The practitioners interviewed deemed it proper, as part of the protest against the development of the summit, to observe the solstice, much as they believe their ancestors observed the passage of the seasons. The event is observed by gathering at Puʻu Huluhulu at a lower elevation of the mountain and proceeding on foot up to the summit with chants and prayers. During their first observance the practitioners erected a lele or altar on the summit (NASA 2005).

The practitioners assert that the cumulative impact assessment must include consideration of the developments' impact on the whole mountain, "from the bottom up," not merely the impact on the top. These practitioners stress that their right to access the mountain is of fundamental importance. It is an absolute requirement for their cultural and religious observances. Although they know of no denials of access at the present time, they are fearful that such will come in the future. Even now, they are concerned about a partial limitation: groups numbering more than eight, including groups of Native Hawaiians, are required to obtain a permit before going up to the summit (NASA 2005).

Determination of Effect

The proposed renovation of the existing observatory building is not expected to affect any archaeological sites, historical resources, or places of traditional cultural significance in the vicinity of the UH 24-inch telescope observatory. There will be no modification to the footprint of the existing building. The existing building is the smallest of the MKSR observatories (See enclosure 3, Summit Telescopes) and the planned renovation would not significantly increase its height. The proposed project would not be visually intrusive because the building envelope would essentially remain unchanged and its exterior would be improved by replacing the existing dome and original siding with new materials painted to match its existing color of the observatory. The renovation of the UH 24-inch Telescope Observatory represents a decrease in use intensity over the MKSR Master Plan as no ground disturbance or significant changes in existing building envelopes would occur.

Consequently, we have reached a finding of "no historic property affected." In accordance with 36 CFR Section 800.4 (d), if we receive no objection from your office within 30 days from receipt of this letter, the UHH's responsibilities under Section 106 are fulfilled.

Should you have any questions regarding this undertaking, please contact the undersigned or Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., at 808-545-2055 extension 238 or via email at mspengler@hhf.com.

Helber Hastert & Fee
Planners, Inc.

Section 106 Consultation Letter
UH 24-inch Telescope Observatory Renovation, Mauna Kea Science Reserve
13 January 2006
Page 7 of 7

Sincerely,

Thomas A. Fee, AICP
Principal

Enclosures
(1) Location Map; (2) Project Site; (3) Summit Telescopes (View from the east) (4) Observatory Building Floor Plans; (5) Observatory Building Section; (6) Archaeology Sites Map; (7) Cultural Landscape Map.

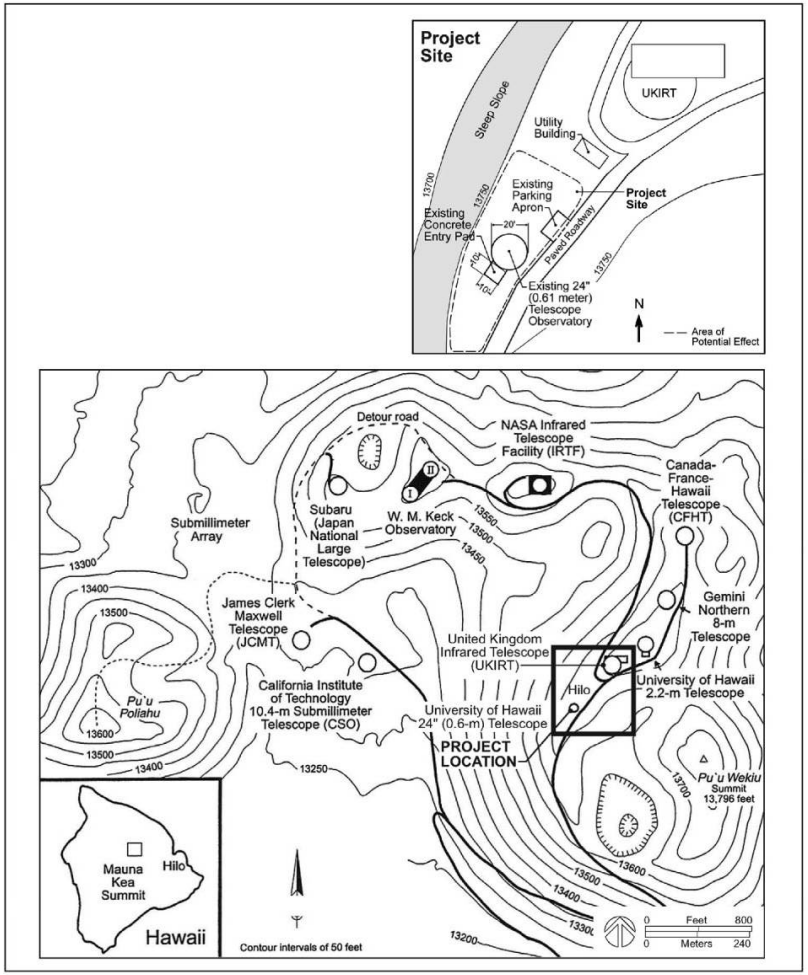
cc:
Ms. Charisse A Carney-Nunes, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Dr. William Heacox, UHH Department of Physics and Astronomy

References Cited:

Office of Environmental Quality Control. 1997. Guidelines for Assessing Cultural Impacts.

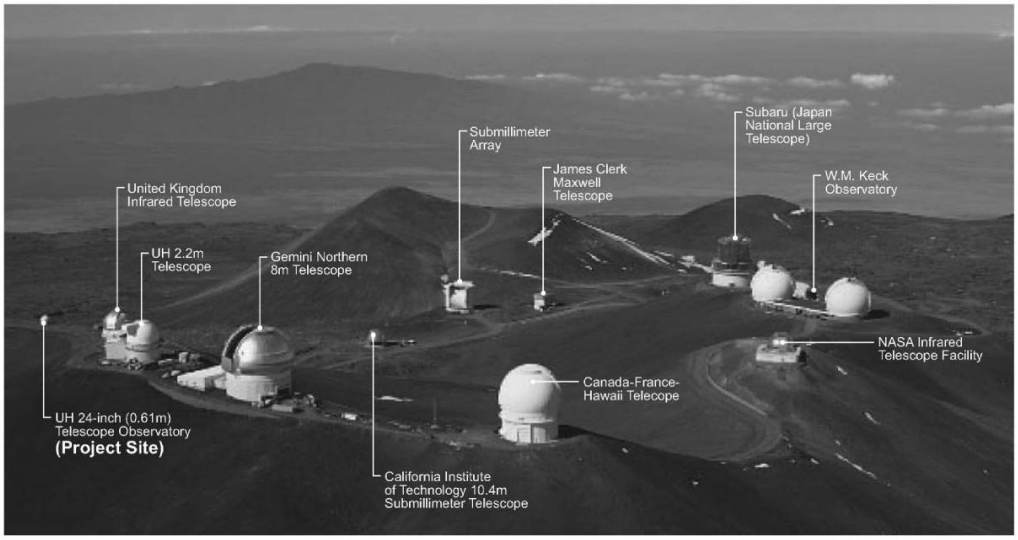
NASA. 2005. Final Environmental Impact Statement for the Outrigger Telescopes Project.

University of Hawaii. 1999. Mauna Kea Science Reserve Master Plan.



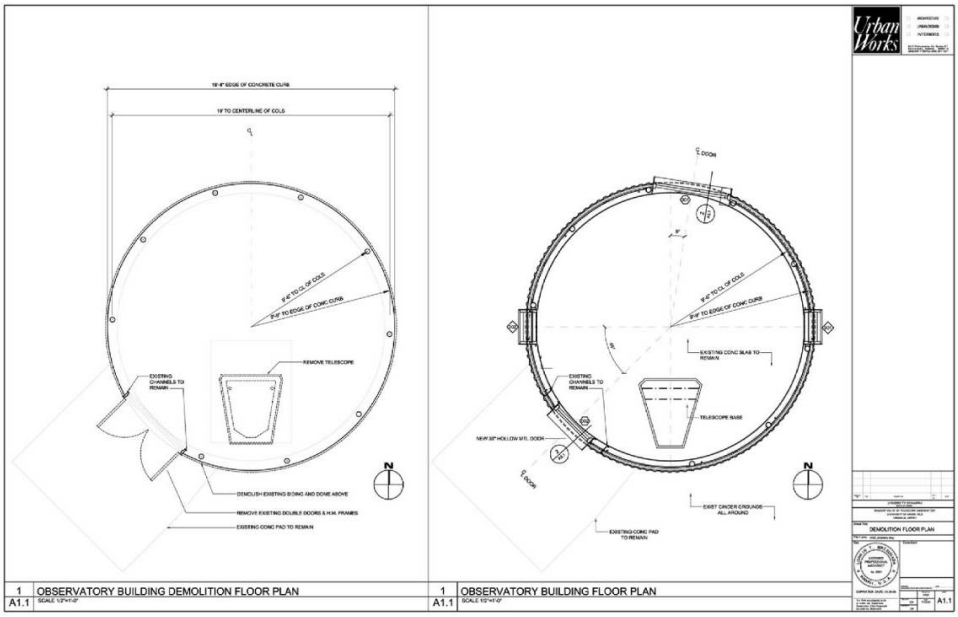
Project Location **Enclosure 1**

Renovation of 24" Telescope Observatory
University of Hawaii, Hilo, Hamakua, Hawaii



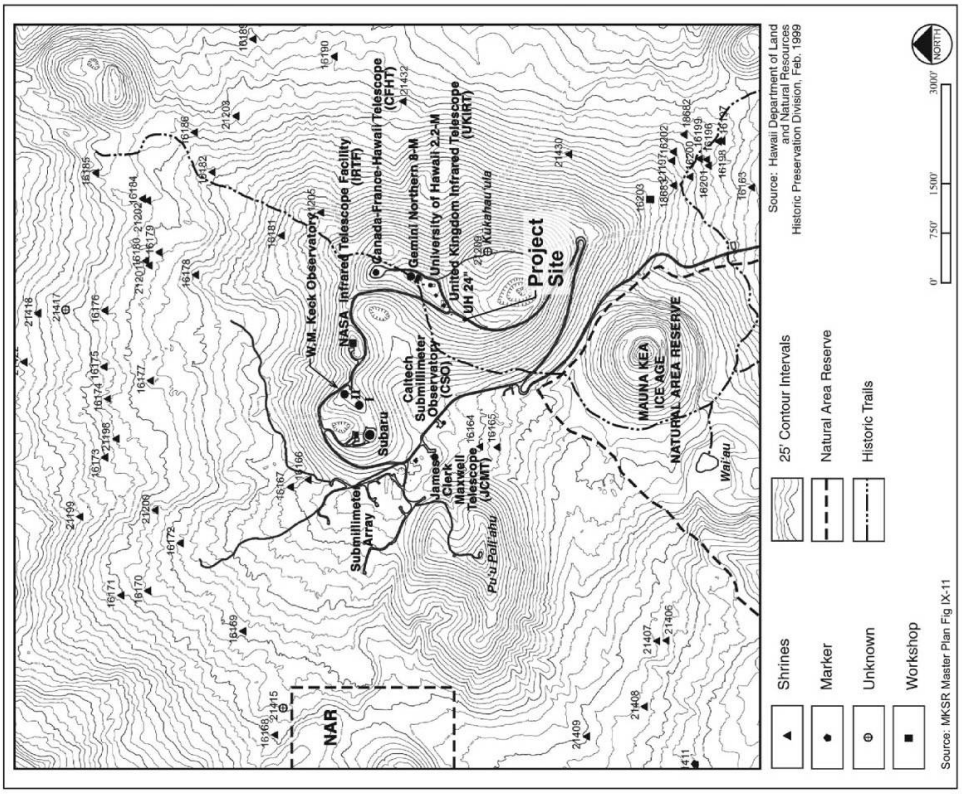
Summit Telescopes (View from the east) **Enclosure 2**

Renovation of 24" Telescope Observatory
University of Hawaii, Hilo, Hamakua, Hawaii



Observatory Building Floor Plans **Enclosure 3**

Renovation of 24" Telescope Observatory
University of Hawaii, Hilo, Hamakua, Hawaii

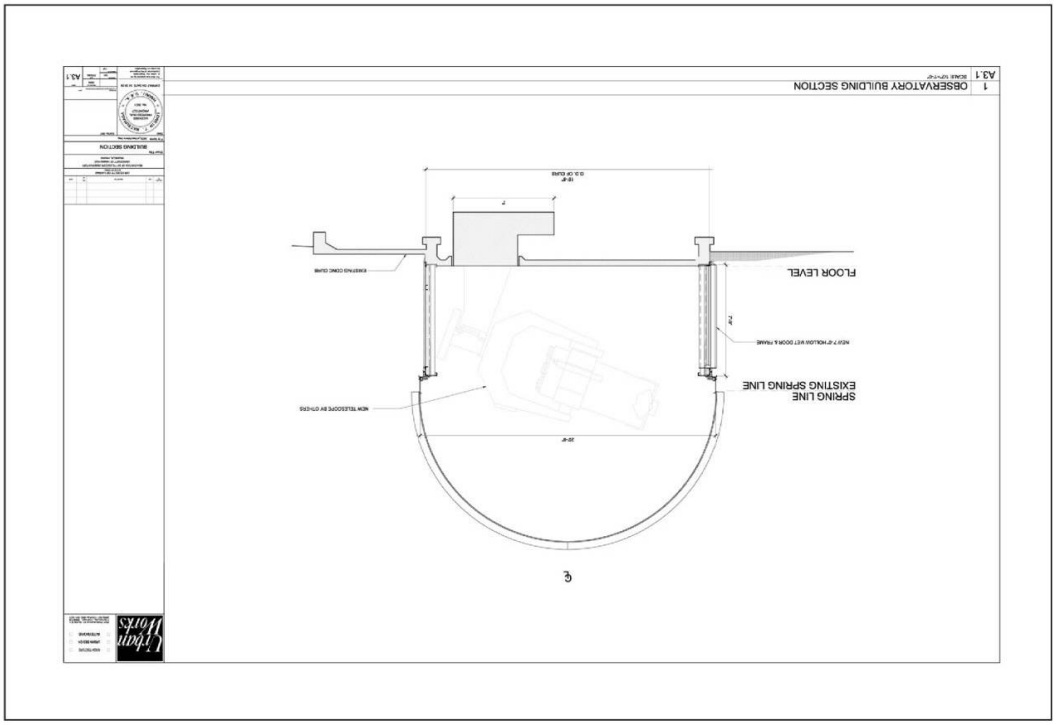


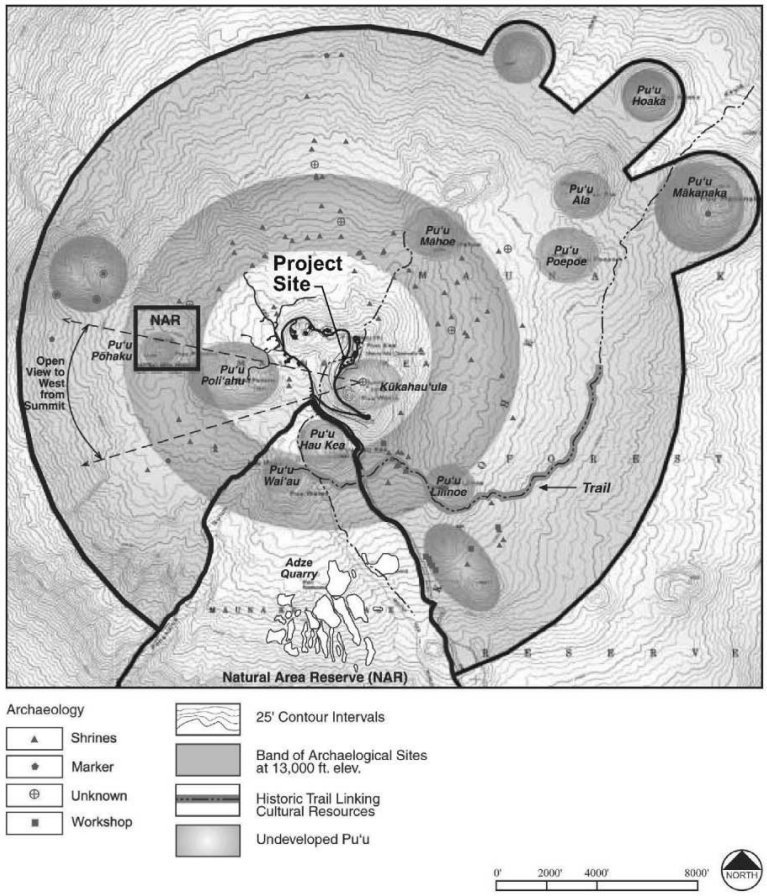
Archaeology Sites Map **Enclosure 5**

Renovation of 24" Telescope Observatory
University of Hawaii, Hilo, Hamakua, Hawaii

Observatory Building Section **Enclosure 4**

Renovation of 24" Telescope Observatory
University of Hawaii, Hilo, Hamakua, Hawaii





Source: MKSR Master Plan, Fig IX-13

Cultural Landscape Map **Enclosure 6**

Renovation of 24" Telescope Observatory
University of Hawaii, Hilo, Hamakua, Hawaii

57416

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
JAN 26 2006
HELBER, HASTERT & FEE PLANNERS

JAN 24 2006

Mr. Thomas A. Fee, AICP
Principal, Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, Oahu, Hawai'i 96713
Attention: Martha Spengler

Log No.: 2006.0074
Doc No.: 0601ST04
Architecture

Dear Ms. Spengler:

SUBJECT: **Section 106 (NHPA) Review**
Draft Environmental Assessment Pre-Assessment Consultation
University of Hawaii at Hilo, Mauna Kea Science Reserve Telescope Observatory Renovation
Hamakua, Island of Hawaii, Hawaii
TMK: (3) 4-4-015:009

Thank you for the submittal received January 04, 2006. The proposed project is replacement of an existing 24-inch optical telescope with a new 36-inch optical telescope and renovation of an existing 37-year-old observatory building located at the summit of Mauna Kea and within the Astronomy Precinct of the Mauna Kea Science Reserve (MKSR) on the Island of Hawaii. Use of federal funds triggers the National Environmental Protection Act of 1969 and Section 106, National Historic Preservation Act (NHPA), compliance. Therefore, a forthcoming draft environmental assessment has been prepared. There is no ground disturbance.

The observatory building is less than 50 years old. Therefore, we concur that the determination for the architectural concerns of the proposed project is "no historic properties affected."

Thank you for the opportunity to comment. Should you have any questions regarding architectural concerns, please call Susan Tasaki at 692-8032.

Sincerely,

Peter T. Young
State Historic Preservation Officer

ST:jen

Helber Hastert & Fee
Planners, Inc.

13 January 2006

Mr. Clyde W. Namuo, Administrator
State of Hawai'i Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, HI 96813

Subject: Section 106 Consultation for the University of Hawai'i 24-inch Telescope Observatory Renovation
Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Namuo,

Pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and the National Environmental Protection Policy Act (NEPA), the University of Hawai'i at Hilo (UHH) has contracted our firm to prepare an environmental assessment (EA) and to prepare this National Historic Preservation Act (NHPA) Section 106 Consultation Letter. We are requesting your review of the proposed renovation of the existing astronomy observatory. The UHH proposes to renovate an 37-year old existing observatory and replace the existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope located within the Astronomy Precinct at the Mauna Kea Science Reserve (MKSR), Hāmākua District, island of Hawai'i, State of Hawai'i. In accordance with the implementing regulations for Section 106, we have reviewed the project and determined that it is an undertaking as defined in 36 Code of Federal Regulations (CFR) 800.16 (y).

The Proposed Action would occur at the 420 square foot (sf) University of Hawai'i (UH) 24-inch Telescope Observatory and a proposed renovation lay-down area comprised of less than 20,000 sf immediately north and south of the building. The MKSR is located at the summit of Mauna Kea volcano (See enclosures 1 and 2) and is part of Tax Map Key 4-4-15:09. The observatory and optical telescope are owned by UH and managed by the University of Hawai'i at Manoa Institute for Astronomy. After the completion of the Proposed Action, the observatory and telescope would be managed by UHH. An aerial photo of the summit telescopes, including the UH 24-inch Telescope Observatory, is provided in enclosure 3.

Project Description

This project proposes replacement of the existing the UH 24-inch research telescope with a modern instructional telescope and renovation of the existing observatory building utilizing the existing building footprint. The replacement of the telescope and the renovation of the observatory building would provide updated and modern facilities in support of the UHH's educational astronomy program and astronomy outreach programs to local high schools. A new 36-inch telescope would replace the existing 24-inch optical research telescope. The existing dome, siding, interior wall panels, associated power and communication wiring, and double doors would be removed from the observatory building and replaced with new components. A new dome would raise the height of the 20-foot tall building by approximately 6 inches. An additional door would be added to the north side of the observatory building

Helber Hastert & Fee
Planners, Inc.

February 24, 2006

Mr. Peter T. Young, State Historic Preservation Officer
State of Hawaii Department of Land and Natural Resources
Post Office Box 621
Honolulu, HI 96809

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation
Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Young,

Thank you for your letter dated January 24, 2006 in response to our Section 106 consultation letter concerning the above-referenced project. Your comments are noted and are included in the draft Environmental Assessment document. In addition, it is our understanding that because there is no ground disturbance associated with this renovation project then the State Historic Preservation Division believes that there are no archaeological concerns regarding the Proposed Action.

Should you have any questions regarding this project, please contact me or Ms. Martha Spengler by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813.

(enclosures 4 and 5). The new exterior components would be painted to match the existing color of the observatory.

The Proposed Action represents a decrease in use intensity from that indicated in the 1999 MKSR Master Plan prepared by UH. Under the Master Plan, the 24-inch Telescope Observatory would be replaced with a larger (72 to 108-inch) telescope and observatory with a larger footprint and building envelope.

Area of Potential Effect

The area of potential effect (APE) includes the concrete footprint of the observatory building and the immediate surroundings that will be affected during renovation activities as indicated in enclosure 2.

Identification of Cultural Resources

Cultural resources, as defined by the NHPA, include both historic properties and cultural values or traditional cultural practices. Historic properties are defined by the NHPA as any prehistoric or historic districts, sites, buildings, structures, or objects, significant in American history, architecture, archaeology, engineering, or culture that are included in, or eligible for inclusion on, the National Register of Historic Places (NRHP). Historic properties include archaeological sites, historic buildings and structures, historic districts, and other evidence of human activity, as well as artifacts, remains, and records related to and located within such properties. Historic properties also include places of traditional religious and cultural importance to an Indian tribe or a Native Hawaiian organization. These traditional cultural properties are places associated with the practices and beliefs of a living community, are rooted in its history, and are important in maintaining the continuing cultural identity of the community. Historic properties are protected under Chapter 6E HRS, Article IX Section 7 of the State Constitution, and the NHPA.

Cultural values or traditional cultural practices reflect the beliefs of particular ethnic or cultural groups. These values and practices are identified in ethnographic studies and other personal accounts. The American Indian Religious Freedom Act of 1978 makes it Federal policy to protect and preserve the rights of indigenous groups, including Native Hawaiians, to practice their traditional religion, access sites, and to conduct ceremonial and traditional rites.

Cultural resources, as used in Chapter 343, HRS, include the "practices and beliefs of a particular cultural or ethnic group or groups" (Office of Environmental Quality Control [OEQC] 1997). The types of cultural practices and beliefs to be assessed may include "subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs (OEQC 1997), and may also include traditional cultural properties or other historic sites that support such beliefs and practices. Native Hawaiian traditional and customary rights are protected under Article XII, Section 7 of the State Constitution.

Historic Properties The UH 24-inch Telescope Observatory building does not have exceptional importance or meet the NRHP eligibility criteria for historic significance. The UH

24-inch Telescope Observatory was constructed in 1968 as part of the initial development of the MKSR. In 1968, the State Board of Land and Natural Resources (BLNR) recognized the importance of Mauna Kea for astronomy observations and leased an area of land to the UH for a 65 year period. The 37-year old observatory building is not considered an historic architectural resource (UH 1999). Historic properties that are located in the vicinity of the Project Site include an historic district, a national historic landmark, archaeological sites, historic buildings, and traditional cultural properties (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape).

Historic District. The location of the Project Site lies within the cluster of three cinder cones: Pu'u Hau'oki, Pu'u Kea, and Pu'u Wēkiu that form the summit of Mauna Kea (see Figure 8, Cultural Landscape). State Historic Preservation Division (SHPD) Archaeologists have concluded this cluster of cones is an historic property that probably bore the name of Kūkahau'ula (National Aeronautics and Space Administration [NASA], 2005). Their conclusion is based on evidence that at least a part of the summit cluster was named for Kukahau'ula, a figure who appears in legends about Mauna Kea as an aumakua (family deity) of fishermen. Furthermore, the SHPD has stated it intends to propose the summit region of Mauna Kea for inclusion on the NRHP as an historic district, because "it encompasses a sufficient concentration of historic properties (i.e. shrines, burials and culturally significant landscape features) that are historically, culturally, and visually linked within the context of their setting and environment" (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; UH 1999; NASA 2005).

National Historic Landmark. The Mauna Kea Adze Quarry, the largest pre-industrial quarry in the world, used by Hawaiians before Contact to obtain basalt for stone artifacts, is located approximately 6,000 feet south of the Project Site. It is listed as a National Historic Landmark by the National Park Service under National Register No. 66000285 (See enclosure 6, Archaeological Sites; UH 1999).

Archaeological Sites. Over the past 20 years, archaeologists have surveyed approximately 27 percent or 3,000 acres of the MKSR. Surveys to date have identified 93 archaeological sites within the MKSR; however, no individual archaeological sites have been identified within the Project Site (See enclosure 6, Archaeological Sites). Seventy-six of the sites are shrines, 4 are adze-manufacturing workshops with shrines, and 3 are stone piles that serve as markers. One burial site and 4 possible burial sites (marked by cairns) have also been identified outside the proposed project area, but within the MKSR. Five sites are of unknown function (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; UH 1999). Dr. Patrick McCoy and colleague Dr. Holly McEldowney of the SHPD are in the process of preparing a Historic Preservation Management Plan for Mauna Kea. As part of this plan, McCoy has inventoried and summarized the known archaeological sites that provide a wealth of knowledge of past use of the mountain. No archaeological sites have been found at the Project Site (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscapes; UH 1999).

Historic Buildings. There are no historic buildings at the Project Site (UH 1999). The stone cabins within Hale Pohaku, approximately 6 miles south of the MKSR, are more than 50 years old and the SHPD considers these two buildings to be historic properties (UH 1999).

Places of Traditional Cultural Significance. Documentary archival research and oral history interviews with kupuna familiar with the mountain and cultural practitioners have identified several traditional cultural places that may be eligible for the NRHP on Mauna Kea. The mountain is a traditional cultural property, but there are also particular landscape features on the mountain that hold individual traditional importance within Hawaiian culture. Three places that have been identified by SHPD as traditional cultural properties are: (1) Kūkahau'ula (Site 21438); (2) Pu'u Līīnoe (Site 21439); and (3) Wai'au (Site 21440). Other traditional places that may qualify include: (1) Pu'u Poli'ahu; (2) Pu'u Mākanaka and Kaupō; (3) Kūka'iau-'Umiko Trail; and (4) Mauna Kea-Humu'ula Trail. (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; NASA 2005).

Cultural Practices and Beliefs. Cultural values and traditional cultural practices include intangible resources that are important to culture. Contemporary cultural practices relate to current beliefs or practices. Traditional cultural practices on Mauna Kea are associated with resource locations (e.g., stone, water, hunting), trails, individual topographic features, burial locations, and cultural landscapes (NASA 2005).

According to the 2005 Final EIS (FEIS) for the Outrigger Telescopes Project (NASA 2005), in Native Hawaiian society, cultural and religious practices and observations are inseparably intertwined; the good favor of the gods (na akua) is sought before every endeavor, from the very mundane tasks to the most fearsome ventures. Na akua were believed to dwell in earthly forms such as the pu'u on Mauna Kea and the waters spouting from the earth or running in the streams. In addition, Native Hawaiians deified their family ancestors as na 'aumakua which took the form of animals such as sharks, owls, hawks, and many others. These ancestors were asked to support and assist in the coming effort from planting taro to waging war.

Furthermore, Native Hawaiians also delineated the inland areas of the islands according to the right, or restriction, of access by the maka'ainana, or commoner, and the presence of the deities. Thus, wao kanaka is an inland area of lower elevation where the maka'ainana can inhabit or move about freely. Wao kele is the upland forested area into which the maka'ainana can enter for the purpose of gathering materials for their daily lives. Above the wao kele is the wao akua, also called the wao ke akua, which is believed be inhabited by na akua; here the maka' ainana hesitate to enter, and only did so with prayer and great respect. The wao akua is generally the desert region above the tree line or wao kele, and is believed to be inhabited by na akua; hence, the name. Some cultural practitioners believe that only persons of the 'ali'i (chiefly) class and the highest priests or kahuna nui were permitted to enter the wao akua. An area inhabited by na akua may also be called pō. The summit of Mauna Kea from about the 9,000-foot level is considered wao akua, a sacred region, with kapu, or restriction in what may be done on the land (NASA 2005).

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through the alignment of the pu'u is critical. In keeping with this tradition, each family considers itself as caretaker of a sector on the mountain in the vicinity of the piko location.

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Determination of Effect

The proposed renovation of the existing observatory building is not expected to affect any archaeological sites, historical resources, or places of traditional cultural significance in the vicinity of the UH 24-inch telescope observatory. There will be no modification to the footprint of the existing building. The existing building is the smallest of the MKSR observatories (See enclosure 3, Summit Telescopes) and the planned renovation would not significantly increase its height. The proposed project would not be visually intrusive because the building envelope would essentially remain unchanged and its exterior would be improved by replacing the existing dome and original siding with new materials painted to match its existing color of the observatory. The renovation of the UH 24-inch Telescope Observatory represents a decrease in use intensity over the MKSR Master Plan as no ground disturbance or significant changes in existing building envelopes would occur.

Consequently, we have reached a finding of "no historic property affected." In accordance with 36 CFR Section 800.4 (d), if we receive no objection from your office within 30 days from receipt of this letter, the UHH's responsibilities under Section 106 are fulfilled.

Should you have any questions regarding this undertaking, please contact the undersigned or Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., at 808-545-2055 extension 238 or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

Enclosures
(1) Location Map; (2) Project Site; (3) Summit Telescopes (View from the east) (4) Observatory Building Floor Plans; (5) Observatory Building Section; (6) Archaeology Sites Map; (7) Cultural Landscape Map.

cc:
Ms. Charisse A Carney-Nunes, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Dr. William Heacox, UHH Department of Physics and Astronomy

References Cited:

Office of Environmental Quality Control. 1997. Guidelines for Assessing Cultural Impacts.

NASA. 2005. Final Environmental Impact Statement for the Outrigger Telescopes Project.

University of Hawaii. 1999. Mauna Kea Science Reserve Master Plan.

PHONE (808) 594-1888

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

FAX (808) 594-1865

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HELBER, HASTERT & FEE PLANNERS

HRD06/2132 B

February 14, 2006

Thomas A. Fee, AICP
Principal
Helber, Hastert & Fee Planners
733 Bishop Street, Suite 2590
Honolulu, HI 96813

ATTN: Martha Spengler

RE: Section 106 Consultation for the University of Hawai'i at Hilo Mauna Kea Science Reserve 24-ince Telescope Observatory Renovation, Hāmākua, Hawai'i; TMK: 4-4-015:009

Dear Thomas Fee,

The Office of Hawaiian Affairs (OHA) is in receipt of your January 13, 2005, request for comments and concurrence on the above project, which would include replacing an existing 24-inch optical telescope with a new 36-inch optical telescope, and renovating an existing 37-year-old building on the summit of Mauna Kea, within the Astronomy Precinct of the Mauna Kea Science Reserve. OHA offers the following comments.

We note that we previously received a pre-environmental assessment request for comments from your office, and that we responded to that request on November 29, 2005. Our comments remain similar in that we continue to request that you also contact, if you have not already, our Hilo and Kona Community Resource Coordinators (addresses below), who can best advise you with whom else you should consult on cultural and historic matters. We hope that you have already contacted the Office of Mauna Kea Management and their cultural advisory group, Kahu Ku Mauna. Other groups with distinct cultural concerns include Mauna Kea Anaina Hou and the Royal Order of Kamehameha I. As stated in your consultation letter, Mauna Kea is a sacred site that holds strong cultural, traditional and religious significance to the Hawaiian people. The Hawaiian people should therefore be consulted, and their feelings for the land should be respected.

Please note that the Astronomy Precinct sits on ceded lands, and should be afforded the respect that deserves. Ceded lands are public lands, held in trust, and OHA has a fiduciary duty to our beneficiaries – all Hawaiians, to assure that these lands are used and treated properly.

OHA appreciates that this latest project on the summit will be replacing existing equipment, thereby not adding to the construction footprints on the summit. We remain concerned, however, about the continued impact on the viewplane of this traditional cultural property. OHA continues to look forward to the opportunity to review, and comment upon, the forthcoming Draft Environmental Assessment and the supplemental traditional practices assessment and cultural resource evaluation.

Thank you for the opportunity to comment at this time. If you have any further questions or concerns please contact Heidi Guth at (808) 594-1962 or e-mail her at heidig@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

CC: Ruby McDonald
Community Resource Coordinator
OHA – Kona Office
75-5706 Hanama Place, Suite 107
Kailua-Kona, HI 96740

Lukela Ruddle
Community Resource Coordinator
OHA – Hilo Office
162 A Baker Ave.
Hilo, HI 96720-4869

Helber Hastert & Fee
Planners, Inc.

13 January 2006

Kahu Ku Mauna
c/o Mr. William T. Stormont, Director
Office of Mauna Kea Management
University of Hawai'i at Hilo
200 W. Kawili Street
Hilo, HI 96720

Subject: **Section 106 Consultation for the University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i**

Dear Gentleman and Ladies,

Pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and the National Environmental Protection Policy Act (NEPA), the University of Hawai'i at Hilo (UHH) has contracted our firm to prepare an environmental assessment (EA) and to prepare this National Historic Preservation Act (NHPA) Section 106 Consultation Letter. We are requesting your review of the proposed renovation of the existing astronomy observatory. The UHH proposes to renovate an 37-year old existing observatory and replace the existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope located within the Astronomy Precinct at the Mauna Kea Science Reserve (MKSR), Hāmākua District, island of Hawai'i, State of Hawai'i. In accordance with the implementing regulations for Section 106, we have reviewed the project and determined that it is an undertaking as defined in 36 Code of Federal Regulations (CFR) 800.16 (y).

The Proposed Action would occur at the 420 square foot (sf) University of Hawai'i (UH) 24-inch Telescope Observatory and a proposed renovation lay-down area comprised of less than 20,000 sf immediately north and south of the building. The MKSR is located at the summit of Mauna Kea volcano (See enclosures 1 and 2) and is part of Tax Map Key 4-4-15:09. The observatory and optical telescope are owned by UH and managed by the University of Hawai'i at Manoa Institute for Astronomy. After the completion of the Proposed Action, the observatory and telescope would be managed by UHH. An aerial photo of the summit telescopes, including the UH 24-inch Telescope Observatory, is provided in enclosure 3.

Project Description

This project proposes replacement of the existing the UH 24-inch research telescope with a modern instructional telescope and renovation of the existing observatory building utilizing the existing building footprint. The replacement of the telescope and the renovation of the observatory building would provide updated and modern facilities in support of the UHH's educational astronomy program and astronomy outreach programs to local high schools. A new 36-inch telescope would replace the existing 24-inch optical research telescope. The existing dome, siding, interior wall panels, associated power and communication wiring, and double doors would be removed from the observatory building and replaced with new

Helber Hastert & Fee
Planners, Inc.

February 24, 2006

Mr. Clyde W. Nāmu'o, Administrator
State of Hawaii Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, HI 96813

Subject: **University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i**

Dear Mr. Nāmu'o,

Thank you for your letter dated February 14, 2006 in response to our Section 106 consultation letter concerning the above-referenced project. Your comments are noted and have been included in the draft Environmental Assessment document. As requested, we have contacted Ms. Ruby McDonald, Kona Community Resource Coordinator for the Office of Hawaiian Affairs, Ms. Lukela Ruddle, Hilo Community Resource Coordinator for the Office of Hawaiian Affairs, Office of Mauna Kea Management, and Kahu Ku Mauna. In addition, we have initiated contact with members of Mauna Kea Anaina Hou and the Royal Order of Kamehameha I.

Should you have any questions regarding this project, please contact me or Ms. Martha Spengler by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813.

components. A new dome would raise the height of the 20-foot tall building by approximately 6 inches. An additional door would be added to the north side of the observatory building (enclosures 4 and 5). The new exterior components would be painted to match the existing color of the observatory.

The Proposed Action represents a decrease in use intensity from that indicated in the 1999 MKSR Master Plan prepared by UH. Under the Master Plan, the 24-inch Telescope Observatory would be replaced with a larger (72 to 108-inch) telescope and observatory with a larger footprint and building envelope.

Area of Potential Effect

The area of potential effect (APE) includes the concrete footprint of the observatory building and the immediate surroundings that will be affected during renovation activities as indicated in enclosure 2.

Identification of Cultural Resources

Cultural resources, as defined by the NHPA, include both historic properties and cultural values or traditional cultural practices. Historic properties are defined by the NHPA as any prehistoric or historic districts, sites, buildings, structures, or objects, significant in American history, architecture, archaeology, engineering, or culture that are included in, or eligible for inclusion on, the National Register of Historic Places (NRHP). Historic properties include archaeological sites, historic buildings and structures, historic districts, and other evidence of human activity, as well as artifacts, remains, and records related to and located within such properties. Historic properties also include places of traditional religious and cultural importance to an Indian tribe or a Native Hawaiian organization. These traditional cultural properties are places associated with the practices and beliefs of a living community, are rooted in its history, and are important in maintaining the continuing cultural identity of the community. Historic properties are protected under Chapter 6E HRS, Article IX Section 7 of the State Constitution, and the NHPA.

Cultural values or traditional cultural practices reflect the beliefs of particular ethnic or cultural groups. These values and practices are identified in ethnographic studies and other personal accounts. The American Indian Religious Freedom Act of 1978 makes it Federal policy to protect and preserve the rights of indigenous groups, including Native Hawaiians, to practice their traditional religion, access sites, and to conduct ceremonial and traditional rites.

Cultural resources, as used in Chapter 343, HRS, include the "practices and beliefs of a particular cultural or ethnic group or groups" (Office of Environmental Quality Control [OEQC] 1997). The types of cultural practices and beliefs to be assessed may include "subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs (OEQC 1997), and may also include traditional cultural properties or other historic sites that support such beliefs and practices. Native Hawaiian traditional and customary rights are protected under Article XII, Section 7 of the State Constitution.

Historic Properties The UH 24-inch Telescope Observatory building does not have exceptional importance or meet the NRHP eligibility criteria for historic significance. The UH 24-inch Telescope Observatory was constructed in 1968 as part of the initial development of the MKSR. In 1968, the State Board of Land and Natural Resources (BLNR) recognized the importance of Mauna Kea for astronomy observations and leased an area of land to the UH for a 65 year period. The 37-year old observatory building is not considered an historic architectural resource (UH 1999). Historic properties that are located in the vicinity of the Project Site include an historic district, a national historic landmark, archaeological sites, historic buildings, and traditional cultural properties (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape).

Historic District. The location of the Project Site lies within the cluster of three cinder cones: Pu'u Hau'oki, Pu'u Kea, and Pu'u Wēkiu that form the summit of Mauna Kea (see Figure 8, Cultural Landscape). State Historic Preservation Division (SHPD) Archaeologists have concluded this cluster of cones is an historic property that probably bore the name of Kūkahau'ula (National Aeronautics and Space Administration [NASA], 2005). Their conclusion is based on evidence that at least a part of the summit cluster was named for Kukahau'ula, a figure who appears in legends about Mauna Kea as an aumakua (family deity) of fishermen. Furthermore, the SHPD has stated it intends to propose the summit region of Mauna Kea for inclusion on the NRHP as an historic district, because "it encompasses a sufficient concentration of historic properties (i.e. shrines, burials and culturally significant landscape features) that are historically, culturally, and visually linked within the context of their setting and environment" (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; UH 1999; NASA 2005).

National Historic Landmark. The Mauna Kea Adze Quarry, the largest pre-industrial quarry in the world, used by Hawaiians before Contact to obtain basalt for stone artifacts, is located approximately 6,000 feet south of the Project Site. It is listed as a National Historic Landmark by the National Park Service under National Register No. 66000285 (See enclosure 6, Archaeological Sites; UH 1999).

Archaeological Sites. Over the past 20 years, archaeologists have surveyed approximately 27 percent or 3,000 acres of the MKSR. Surveys to date have identified 93 archaeological sites within the MKSR; however, no individual archaeological sites have been identified within the Project Site (See enclosure 6, Archaeological Sites). Seventy-six of the sites are shrines, 4 are adze-manufacturing workshops with shrines, and 3 are stone piles that serve as markers. One burial site and 4 possible burial sites (marked by cairns) have also been identified outside the proposed project area, but within the MKSR. Five sites are of unknown function (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; UH 1999). Dr. Patrick McCoy and colleague Dr. Holly McEldowney of the SHPD are in the process of preparing a Historic Preservation Management Plan for Mauna Kea. As part of this plan, McCoy has inventoried and summarized the known archaeological sites that provide a wealth of knowledge of past use of the mountain. No archaeological sites have been found at the Project Site (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscapes; UH 1999).

Historic Buildings. There are no historic buildings at the Project Site (UH 1999). The stone cabins within Hale Pohaku, approximately 6 miles south of the MKSR, are more than 50 years old and the SHPD considers these two buildings to be historic properties (UH 1999).

Places of Traditional Cultural Significance. Documentary archival research and oral history interviews with kupuna familiar with the mountain and cultural practitioners have identified several traditional cultural places that may be eligible for the NRHP on Mauna Kea. The mountain is a traditional cultural property, but there are also particular landscape features on the mountain that hold individual traditional importance within Hawaiian culture. Three places that have been identified by SHPD as traditional cultural properties are: (1) Kūkahau'ula (Site 21438); (2) Pu'u Līīnoe (Site 21439); and (3) Wai'au (Site 21440). Other traditional places that may qualify include: (1) Pu'u Poli'ahu; (2) Pu'u Mākanaka and Kaupō; (3) Kūka'iau-'Umiko Trail; and (4) Mauna Kea-Humu'ula Trail. (See enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; NASA 2005).

Cultural Practices and Beliefs. Cultural values and traditional cultural practices include intangible resources that are important to culture. Contemporary cultural practices relate to current beliefs or practices. Traditional cultural practices on Mauna Kea are associated with resource locations (e.g., stone, water, hunting), trails, individual topographic features, burial locations, and cultural landscapes (NASA 2005).

According to the 2005 Final EIS (FEIS) for the Outrigger Telescopes Project (NASA 2005), in Native Hawaiian society, cultural and religious practices and observations are inseparably intertwined; the good favor of the gods (na akua) is sought before every endeavor, from the very mundane tasks to the most fearsome ventures. Na akua were believed to dwell in earthly forms such as the pu'u on Mauna Kea and the waters spouting from the earth or running in the streams. In addition, Native Hawaiians deified their family ancestors as na 'aumakua which took the form of animals such as sharks, owls, hawks, and many others. These ancestors were asked to support and assist in the coming effort from planting taro to waging war.

Furthermore, Native Hawaiians also delineated the inland areas of the islands according to the right, or restriction, of access by the maka'ainana, or commoner, and the presence of the deities. Thus, wao kanaka is an inland area of lower elevation where the maka'ainana can inhabit or move about freely. Wao kele is the upland forested area into which the maka'ainana can enter for the purpose of gathering materials for their daily lives. Above the wao kele is the wao akua, also called the wao ke akua, which is believed be inhabited by na akua; here the maka' ainana hesitate to enter, and only did so with prayer and great respect. The wao akua is generally the desert region above the tree line or wao kele, and is believed to be inhabited by na akua; hence, the name. Some cultural practitioners believe that only persons of the 'ali'i (chiefly) class and the highest priests or kahuna nui were permitted to enter the wao akua. An area inhabited by na akua may also be called pō. The summit of Mauna Kea from about the 9,000-foot level is considered wao akua, a sacred region, with kapu, or restriction in what may be done on the land (NASA 2005).

The presence of shrines and monuments in the summit region of Mauna Kea indicates that certain religious observances or worship services were conducted there. However, there is no written record or description of those ceremonies and with the advent of Christianity as the overriding religious influence in Native Hawaiian society, virtually all knowledge of the nature of such observances has been lost. Persons knowledgeable about Native Hawaiian culture and practices have expressed their belief that no credible knowledge exists today about the particular observances traditionally practiced on Mauna Kea (NASA 2005).

Contemporary religious practitioners who continue to pay homage to the deities enshrined in their early forms on Mauna Kea and to the 'uhane or spirits of their ancestors whom they believe also reside or visit the sacred grounds. Those contemporary practitioners consider themselves na koa, or warriors, whose enduring task is to protect the mountain from unwarranted intrusion, particularly under the present circumstances. They ardently believe that Mauna Kea is inhabited by akua or 'uhane and that the development on the summit is an invasion by ordinary man into the sacred realm. The practitioners find that the presence of the observatory domes on the summit, and the noise emanating from them and created by vehicular traffic, is destructive of the silence and spiritual ambience that is necessary to their proper religious observances. Additionally, the observatory domes obscure their view of certain stars, thus interfering with the practitioners' proper alignment with the stars for worship, and preventing an unobstructed 360-degree view of the summit region and the neighboring mountains (NASA 2005).

Each pu'u, at the summit and at the lower elevations, has a cultural and spiritual significance; most are named for the akua, whose forms are represented by the pu'u, stars, and other formations of nature. Moreover, they do not stand-alone; they each have a relationship to the other pu'u that is meaningful to the practitioners. By orienting their worship with the alignment of the pu'u the practitioners are able to determine whether they are in a spot that is propitious for worshipping na akua and seeking their assistance. The presence of the observatory domes, and the removal of the top of Pu'u Kūkahau'ula (recently name Pu'u Wēkiu) interferes with the practitioners' ability to achieve that correct orientation (NASA 2005).

Some of the practitioners believe that the effluent from the observatories does enters the aquifer and has caused the green coloration of Lake Wai'au's water. However, research on the lake's water quality and isotope studies indicate that this is not the case; the lake water is derived from the precipitation and snowmelt originating in the lake's vicinity (NASA 2005). Practitioners indicate that the green color of the water interferes with their ability to see the reflection of the stars on the water and is disruptive of their religious observances (NASA 2005).

According to the 2005 FEIS for the Outrigger Project (NASA 2005), the practitioners, and many other families in the community, continue to carry the umbilical cords (piko) of their newborn children to the summit for concealment. This is a deeply spiritual activity, and the piko may be concealed anywhere on the summit. Only the families, who mark the site by alignment of physical features, including the pu'u and other geographic characteristics as well as the stars, know the location of the piko. Thus the ability to achieve orientation

through the alignment of the pu'u is critical. In keeping with this tradition, each family considers itself as caretaker of a sector on the mountain in the vicinity of the piko location.

Many families erect family shrines ('ahu) and others visit the adze quarry to engage in their cultural and religious rituals. The practitioners consider their observances as being in place of those ceremonies lost in antiquity. They are "adaptations" of present day practices to allow them to worship na akua and na 'aumakua in proper fashion and with proper reverence. One of those adaptations is the spiritual observance of the winter solstice begun in 1998. The practitioners interviewed deemed it proper, as part of the protest against the development of the summit, to observe the solstice, much as they believe their ancestors observed the passage of the seasons. The event is observed by gathering at Pu'u Huluhulu at a lower elevation of the mountain and proceeding on foot up to the summit with chants and prayers. During their first observance the practitioners erected a lele or altar on the summit (NASA 2005).

The practitioners assert that the cumulative impact assessment must include consideration of the developments' impact on the whole mountain, "from the bottom up," not merely the impact on the top. These practitioners stress that their right to access the mountain is of fundamental importance. It is an absolute requirement for their cultural and religious observances. Although they know of no denials of access at the present time, they are fearful that such will come in the future. Even now, they are concerned about a partial limitation: groups numbering more than eight, including groups of Native Hawaiians, are required to obtain a permit before going up to the summit (NASA 2005).

Determination of Effect

The proposed renovation of the existing observatory building is not expected to affect any archaeological sites, historical resources, or places of traditional cultural significance in the vicinity of the UH 24-inch telescope observatory. There will be no modification to the footprint of the existing building. The existing building is the smallest of the MKSR observatories (See enclosure 3, Summit Telescopes) and the planned renovation would not significantly increase its height. The proposed project would not be visually intrusive because the building envelope would essentially remain unchanged and its exterior would be improved by replacing the existing dome and original siding with new materials painted to match its existing color of the observatory. The renovation of the UH 24-inch Telescope Observatory represents a decrease in use intensity over the MKSR Master Plan as no ground disturbance or significant changes in existing building envelopes would occur.

Consequently, we have reached a finding of "no historic property affected." In accordance with 36 CFR Section 800.4 (d), if we receive no objection from your office within 30 days from receipt of this letter, the UHH's responsibilities under Section 106 are fulfilled.

Should you have any questions regarding this undertaking, please contact the undersigned or Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., at 808-545-2055 extension 238 or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

Enclosures
(1) Location Map; (2) Project Site; (3) Summit Telescopes (View from the east) (4) Observatory Building Floor Plans; (5) Observatory Building Section; (6) Archaeology Sites Map; (7) Cultural Landscape Map.

cc:
Ms. Charisse A Carney-Nunes, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Dr. William Heacox, UHH Department of Physics and Astronomy

References Cited:

Office of Environmental Quality Control. 1997. Guidelines for Assessing Cultural Impacts.

NASA. 2005. Final Environmental Impact Statement for the Outrigger Telescopes Project.

University of Hawaii. 1999. Mauna Kea Science Reserve Master Plan.

KAHU KU MAUNA COUNCIL
c/o Office of Mauna Kea Management
University of Hawai`i at Hilo
200 W. Kawili Street
Hilo, Hawai`i 96720
ATTN: Ed Stevens

RECEIVED
FEB 16 2006
HELBER, HASTERT & FEE PLANNERS

February 15 2006

Mr. Thomas A. Fee, AICP
Helber, Hastert & Fee
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Fee,

Subject: Section 106 Consultation for the UH 24-inch Telescope Observatory Renovation on Mauna Kea

Thank you for your letter of 13 January 2006, inviting the Kahu Ku Mauna Council to comment on a proposed upgrade/renovation of the UH 24-inch telescope Observatory on Mauna Kea.

The Council acknowledges your letter which is intended to comply with the consultation provisions of the National Historic Preservation Act, Section 106, and to announce the upcoming Environmental Assessment to be developed for the telescope project. We respond to your letter based on assumptions that valid recommendations or concerns raised in this consultation process will be given due consideration, and subsequently incorporated into the proposed EA. Our comments and suggestions are as follows:

Page 1.
First paragraph, after third sentence ending with State of Hawai`i, we suggest highlighting even further the purpose of this proposal by adding "This facility will be used primarily as an instructional telescope for UH graduate students majoring in the science of astronomy, as well as astronomy outreach programs focusing on high school students." Even though this is alluded to under "Project Description" it should be highlighted in your opening paragraph to make clear the overall purpose and scope of this telescope renovation project.

Page 2.
Second paragraph, first sentence, the correct date for the approved plan was June 2000 instead of 1999. Also, after last sentence in this paragraph ending with "building envelope", add two new sentences: "The proposed 1-meter instructional telescope was originally intended as a separate new facility in the Mauna Kea Science Reserve. These two have since been consolidated by proposing to upgrade the 24-inch telescope with a 36-inch Instructional Telescope, retaining the same footprint."

Page 3.
First paragraph, third sentence under "Historic Properties", change "leased an area of land" to "leased 11,288 acres of land to the University of Hawaii for a 65-year period, to create a Science Reserve on the summit area of Mauna Kea".

Page 5.
The first paragraph is totally incorrect and should be deleted or reworded. This paragraph belittles and degrades what we have been saying over and over about how we hold Mauna Kea to be our sacred mountain.

In reference to the first sentence, Dr. Patrick McCoy, an archaeologist formerly with State Historic Preservation Division, reports that only 27 percent of the Science Reserve had been previously surveyed for cultural properties, resulting in 93 sites inventoried and catalogued. Seventy six of these sites were shrines erected for religious purposes The presence of these numerous shrines erected in singles and in clusters forming a belt around the entire summit between the 12,000 and 13,000 foot elevation, exemplifies the spiritual reverence held for Mauna Kea by early Hawaiians.

In reference to the second sentence, it is true that there were no written records or descriptions of cultural or religious observances on Mauna Kea, solely because the Hawaiian language was unwritten up until the arrival of the American missionaries. Notwithstanding, all things of importance at earlier times were handed down generation after generation through oral history. Although a great deal was lost over time, a great deal continues to be used and practiced by cultural practitioners of today.

And finally, in the above same paragraph, the last sentence is contradictory in that persons knowledgeable in Native Hawaiian culture and practices know of the practices used then and continue to be used on Mauna Kea. Many of us have knowledge of these practices and will continue to refrain from divulging this information.

Third paragraph, fourth sentence should be changed to "The presence of the observatory domes, and the removal of the tops of their respective cinder cones interferes with the practitioners' ability to achieve that appropriate cultural orientation (NASA 2005). (NOTE: the top of Pu`u Kukahau`ula was never removed).

Page 6.
Second to the last paragraph under Determination of Effect, after the first sentence ending with "no historic property affected." add the following: "We acknowledge, however, that any new work related activity on the summit of Mauna Kea, regardless of how insignificant or how major in scope, coupled with all internal and external activities of the 12 other astronomy facilities on the mountain, adds to a cumulative impact that is disturbing to the serenity, significance and spiritual ambience of this sacred region known

as ***wao akua*** to the Hawaiian people."

CONCLUSION

In summary, the Kahu Ku Mauna Council wishes to emphasize the importance of respecting the host culture, and to demonstrate that respect when preparing the Environmental Assessment. By delving deeply in search of truth, accuracy and completeness, a fair and balanced assessment disclosing all of the adverse or beneficial possibilities are accomplished.

Thank you for this opportunity to participate in the consultation process. We look forward to receiving your draft of the Environmental Assessment, and the opportunity to offer our comments on it before it is finalized.

Sincerely,

Ed Stevens
(for) Kahu Ku Mauna Council

Home Telephone Number (808) 329-9255
Mailing Address: 76-6335 Leone Street
Kailua Kona, HI 96740

Copies to
Office of Mauna Kea Management
Dr. William Heacox
Kahu Ku Mauna Council
Ahahui Ku Mauna

Helber Hastert & Fee
Planners, Inc.

23 February 2006

Kahu Ku Mauna Council
c/o Office of Mauna Kea Management
University of Hawaii at Hilo
200 W. Kawili Street
Honolulu, HI 96720
Attention: Mr. Ed Stevens

Subject: University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Mr. Stevens,

Thank you for your letter dated 15 February 2006 in response to our Section 106 consultation letter concerning the above-referenced project. Your comments are noted and are addressed in the draft Environmental Assessment document.

Should you have any questions regarding this project, please contact Ms. Martha Spengler, Senior Planner, Helber, Hastert & Fee Planners Inc., by mail at Pacific Guardian Center, Makai Tower, 733 Bishop Street, Suite 2590, Honolulu, HI 96813; by phone at 808-545-2055 extension 238; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

cc: Dr. William Heacox, UHH Department of Physics and Astronomy
Mr. Lo-Li Chih, UHH, Facilities Planning and Conservation Office
Ms. Charisse A Carney-Nunes, National Science Foundation

Helber Hastert & Fee
Planners, Inc.

March 28, 2006

Ms. Kealoha Pisciotta, President
Mauna Kea Anaina Hou
230 Lyman Street
Hilo, HI 96720

Subject: Section 106 Consultation for the University of Hawai'i 24-inch Telescope Observatory Renovation
Environmental Assessment
Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i

Dear Ms. Pisciotta,

The National Science Foundation (NSF) and the University of Hawai'i at Hilo (UHH) are undertaking a review pursuant to the National Environmental Policy Act (NEPA) and Chapter 343, Hawaii Revised Statutes (HRS) concerning the proposed renovation of an existing 24-inch astronomy observatory on Mauna Kea. Pursuant to Section 106 of the National Historic Preservation Act (NHPA) and on behalf of NSF and UHH, we hereby invite your comments as a consulting party on the proposed undertaking.

Specifically, NSF proposes to fund the proposal of UHH to replace an existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope. UHH further proposes to renovate the existing observatory building using State funds. The project site is located within the Astronomy Precinct at the Mauna Kea Science Reserve (MKSR), Hāmākua District, island of Hawai'i, State of Hawai'i (see enclosures 1 and 2, Location Map and Project Site, respectively). This facility would be used primarily as an instructional telescope for UH undergraduate students majoring in the science of astronomy, as well as astronomy outreach programs focusing on high school students.

The proposed undertaking would occur at the 420 square foot (sf) University of Hawai'i (UH) 24-inch Telescope Observatory and a proposed renovation lay-down area comprised of less than 20,000 sf immediately north and south of the building. The MKSR is located at the summit of Mauna Kea volcano (see enclosure 1, Location Map, and enclosure 2, Project Site) on ceded land which are part of Tax Map Key 4-4-15:09. The observatory and optical telescope are owned by UH and managed by the University of Hawai'i at Manoa Institute for Astronomy. After the completion of the Proposed Action, the observatory and telescope would be managed by UHH. An aerial photo of the summit telescopes, including the UH 24-inch Telescope Observatory, is provided in enclosure 3 (Summit Telescopes).

Project Description

Using requested federal NSF grant funds, UHH proposes replacement of the existing 24-inch optical research telescope with a modern instructional telescope and, using State funds, renovation of the existing observatory building utilizing the existing building footprint. The replacement of the telescope and the renovation of the observatory building would provide updated and modern facilities in support of UHH's educational astronomy program and astronomy outreach programs to local high schools. A new 36-inch telescope would replace the existing 24-inch telescope. The existing dome, siding, interior wall panels, associated power and communication wiring, and double doors would be removed from the observatory

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building and replaced with new components. A new dome would raise the height of the 20-foot tall building by less than 12 inches. An additional door would be added to the north side of the observatory building (see enclosures 4 and 5, Observatory Building Floor Plans and Observatory Building Section, respectively). The new exterior components would be painted to match the existing color of the observatory. There would be no ground disturbing activities and all renovation activities will follow best management practices to minimize disturbance to cultural practitioners. The remote operation capabilities of the new telescope and renovated observatory building would reduce summit activity.

The Proposed Action represents a decrease in use intensity from that indicated in the 2000 MKSR Master Plan prepared by UH. The Master Plan indicated that the UH 24-inch Telescope Observatory would be demolished. In its place, an observatory building with a larger footprint and building envelope would be built which would house a larger (72 to 108-inch) telescope operated by another entity. A new UH observatory building with a 1-meter telescope would be built at a separate location within the MKSR. These two observatories have since been consolidated by proposing to upgrade the 24-inch telescope with 36-inch Instructional Telescope, retaining the same footprint, location, and operator (UH) as the UH 24-inch Telescope Observatory.

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The area of potential effect includes the concrete footprint of the observatory building and the immediate surroundings that will be affected during renovation activities as indicated in enclosure 2.

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Cultural resources, as defined by the NHPA, include both historic properties and cultural values or traditional cultural practices. Historic properties are defined by the NHPA as any prehistoric or historic districts, sites, buildings, structures, or objects, significant in American history, architecture, archaeology, engineering, or culture that are included in, or eligible for inclusion on, the National Register of Historic Places (NRHP). Historic properties include archaeological sites, historic buildings and structures, historic districts, and other evidence of human activity, as well as artifacts, remains, and records related to and located within such properties. Historic properties also include places of traditional religious and cultural importance to an Indian tribe or a Native Hawaiian organization. These traditional cultural properties are places associated with the practices and beliefs of a living community, are rooted in its history, and are important in maintaining the continuing cultural identity of the community. Historic properties are protected under Chapter 6E Hawai'i Revised Statutes (HRS), Article IX Section 7 of the State Constitution, and the NHPA. The NHPA process for this project is being run concurrent with the NEPA process and public comments are invited.

Cultural values or traditional cultural practices reflect the beliefs of particular ethnic or cultural groups. These values and practices are identified in ethnographic studies and other personal accounts. The American Indian Religious Freedom Act of 1978 makes it Federal

policy to protect and preserve the rights of indigenous groups, including Native Hawaiians, to practice their traditional religion, access sites, and to conduct ceremonial and traditional rites.

Cultural resources, as used in Chapter 343, HRS, include the "practices and beliefs of a particular cultural or ethnic group or groups" (Office of Environmental Quality Control [OEQC] 1997). The types of cultural practices and beliefs to be assessed may include "subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs (OEQC 1997), and may also include traditional cultural properties or other historic sites that support such beliefs and practices. Native Hawaiian traditional and customary rights are protected under Article XII, Section 7 of the State Constitution.

The following is a summary of the cultural resources for the Project Site determined from previous surveys and assessments detailed in the Final EIS (FEIS) for the MKSR Master Plan (UH 1999) and the FEIS Outrigger Project (National Aeronautics and Space Administration [NASA] 2005). This information is considered to be current and applicable to the Project Site.

Historic Properties

The UH 24-inch Telescope Observatory building does not have exceptional importance or meet the NRHP eligibility criteria for historic significance (UH 1999). It was constructed in 1968 as part of the initial development of the MKSR. In 1968, the BLNR recognized the importance of Mauna Kea for astronomy observations and leased 11,288 acres of land that comprises the MKSR to the UH for a 65 year period, to create a science reserve on the summit of Mauna Kea. The 37-year old observatory building is not considered an historic architectural resource. Historic properties that are located in the vicinity of the Project Site include an historic district, a national historic landmark (NHL), archaeological sites, historic buildings, and traditional cultural places discussed in the following paragraphs (see enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape).

Historic District

The location of the Project Site lies within the cluster of three cinder cones: Pu'u Hau'oki, Pu'u Kea, and Pu'u Wēkiu that form the summit of Mauna Kea (see enclosure 7, Cultural Landscape). SHPD Archaeologists have concluded this cluster of cones is an historic property that probably bore the name of Kūkahau'ula (NASA 2005). Their conclusion is based on evidence that at least a part of the summit cluster was named for Kūkahau'ula, a figure who appears in legends about Mauna Kea as an 'aumakua (family deity) of fishermen. Furthermore, the SHPD has stated it intends to propose the summit region of Mauna Kea for inclusion on the NRHP as an historic district, because "it encompasses a sufficient concentration of historic properties (i.e., shrines, burials and culturally significant landscape features) that are historically, culturally, and visually linked within the context of their setting and environment" (see enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; UH 1999; NASA 2005).

National Historic Landmark

The Mauna Kea Adze Quarry, the largest pre-industrial quarry in the world, used by Hawaiians before Contact to obtain basalt for stone artifacts, is located approximately 6,000 feet south of the Project Site. It is listed as an NHL by the National Park Service under National Register No. 66000285 (UH 1999) (see enclosure 6, Archaeological Sites; UH 1999) and is located within the Mauna Kea Ice Age NAR.

Archaeological Sites

Over the past 20 years, archaeologists have surveyed approximately 27 percent or 3,000 acres of the MKSR. Surveys to date have identified 93 archaeological sites within the MKSR; however, no individual archaeological sites have been identified within the Project Site (see enclosure 6, Archaeological Sites). Seventy-six of the sites are shrines, 4 are adze-manufacturing workshops with shrines, and 3 are stone piles that serve as markers. One burial site and 4 possible burial sites (marked by cairns) have also been identified outside the Project Site, but within the MKSR. Five sites are of unknown function (see enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; UH 1999). The SHPD is in the process of preparing a Historic Preservation Management Plan for Mauna Kea. As part of this plan, archaeologists have inventoried and summarized the known archaeological sites that provide a wealth of knowledge of past use of the mountain. No archaeological sites have been found at the Project Site (see enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscapes; UH 1999).

Historic Buildings

There are no historic buildings at the Project Site (UH 1999). The stone cabins within Hale Pōhaku, approximately 6 miles south of the MKSR, are more than 50 years old and the SHPD considers these two buildings to be historic properties (UH 1999).

Chapter 343, Hawai'i Revised Statutes – Cultural Resources

Cultural resources, as used in Chapter 343, HRS, include the "practices and beliefs of a particular cultural or ethnic group or groups" (Office of Environmental Quality Control [OEQC] 1997). The types of cultural practices and beliefs to be assessed may include "subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs" (OEQC 1997), and may also include traditional cultural properties or other historic sites that support such beliefs and practices.

Places of Traditional Cultural Significance

Documentary archival research and oral history interviews with kupuna familiar with the mountain and cultural practitioners have identified several traditional cultural places that may be eligible for the NRHP on Mauna Kea (NASA 2005). The mountain is a traditional cultural property, but there are also particular landscape features on the mountain that hold individual traditional importance within Hawaiian culture. Three places that have been identified by the SHPD as traditional cultural properties are: (1) Kūkahau'ula (Site 21438); (2) Pu'u Līīnoe

(Site 21439); and (3) Waiʻau (Site 21440). Other traditional places that may qualify include: (1) Puʻu Poliʻahu; (2) Puʻu Mākanaka and Kaupō; (3) Kūkaʻiau-ʻUmiko Trail; and (4) Mauna Kea-Humuʻula Trail. (see enclosure 6, Archaeological Sites, and enclosure 7, Cultural Landscape; NASA 2005). An important view plane to the west from the Puʻu Wēkiu summit is also shown on enclosure 7.

Cultural Practices and Beliefs

Cultural values and traditional cultural practices include intangible resources that are important to culture. Contemporary cultural practices relate to current beliefs or practices. Traditional cultural practices on Mauna Kea are associated with resource locations (e.g., stone, water, hunting), trails, individual topographic features, burial locations, and cultural landscapes (NASA 2005).

According to the 2005 FEIS for the Outrigger Project (NASA 2005), in Native Hawaiian society, cultural and religious practices and observations are inseparably intertwined; the good favor of the gods (na akua) is sought before every endeavor, from the very mundane tasks to the most fearsome ventures. Na akua were believed to dwell in earthly forms such as the puʻu on Mauna Kea and the waters spouting from the earth or running in the streams. In addition, Native Hawaiians deified their family ancestors as na ʻaumakua which took the form of animals such as sharks, owls, hawks, and many others. These ancestors were asked to support and assist in the coming effort from planting taro to waging war.

Furthermore, Native Hawaiians also delineated the inland areas of the islands according to the right, or restriction, of access by the makaʻanaina, or commoner, and the presence of the deities. Thus, wao kanaka is an inland area of lower elevation where the makaʻanaina can inhabit or move about freely. Wao kele is the upland forested area into which the makaʻanaina can enter for the purpose of gathering materials for their daily lives. Above the wao kele is the wao akua, also called the wao ke akua, which is believed to be inhabited by na akua; here the makaʻanaina hesitate to enter, and only did so with prayer and great respect. The wao akua is generally the desert region above the tree line or wao kele, and is believed to be inhabited by na akua; hence, the name. Some cultural practitioners believe that only persons of the ʻaliʻi (chiefly) class and the highest priests or kahuna nui were permitted to enter the wao akua. An area inhabited by na akua may also be called pō. The summit of Mauna Kea from about the 9,000-foot level is considered wao akua, a sacred region, with kapu, or restriction in what may be done on the land (NASA 2005).

The SHPD reports that only 27 percent of the MKSR has been previously surveyed for cultural properties, resulting in 93 sites inventoried and catalogued. Seventy-six of the sites were shrines erected for religious purposes. The presence of these numerous shrines erected in singles and in clusters forming a belt around the entire summit between 12,000 and 13,000 foot elevation, exemplifies the spiritual reverence held for Mauna Kea by early Hawaiians. The presence of shrines and monuments in the summit region of Mauna Kea indicates that certain religious observances or worship services have been conducted there. However, there is no written record or description of those ceremonies solely because the Hawaiian language was unwritten up until the arrival of American missionaries (mid 1800's).

Notwithstanding, all things of importance at earlier times were handed down generation after generation through oral history. Although a great deal was lost over time, a great deal continues to be used and practiced by cultural practitioners of today (personal communication, Mr. Edward Stevens, 2006).

Contemporary religious practitioners who continue to pay homage to the deities enshrined in their early forms on Mauna Kea and to the ʻuhane or spirits of their ancestors whom they believe also reside or visit the sacred grounds. Those contemporary practitioners consider themselves na koa, or warriors, whose enduring task is to protect the mountain from unwarranted intrusion, particularly under the present circumstances. They ardently believe that Mauna Kea is inhabited by akua or ʻuhane and that the development on the summit is an invasion by ordinary man into the sacred realm. The practitioners find that the presence of the observatories on the summit, and the noise emanating from them and created by vehicular traffic, is destructive of the silence and spiritual ambience that is necessary to their proper religious observances. Additionally, the observatories obscure their view of certain stars, thus interfering with the practitioners' proper alignment with the stars for worship, and preventing an unobstructed 360-degree view of the summit region and the neighboring mountains (NASA 2005).

Each puʻu, at the summit and at the lower elevations, has a cultural and spiritual significance; most are named for the akua, whose forms are represented by the puʻu, stars, and other formations of nature. Moreover, they do not stand-alone; they each have a relationship to the other puʻu that is meaningful to the practitioners. By orienting their worship with the alignment of the puʻu the practitioners are able to determine whether they are in a spot that is propitious for worshipping na akua and seeking their assistance. The presence of the observatories, and the removal of the top of some of the puʻu interferes with the practitioners' ability to achieve that correct orientation (NASA 2005).

According to the 2005 FEIS for the Outrigger Project (NASA 2005), the practitioners, and many other families in the community, continue to carry the umbilical cords (piko) of their newborn children to the summit for concealment. This is a deeply spiritual activity, and the piko may be concealed anywhere on the summit. Only the families, who mark the site by alignment of physical features, including the puʻu and other geographic characteristics as well as the stars, know the location of the piko. Thus the ability to achieve orientation through the alignment of the puʻu is critical. In keeping with this tradition, each family considers itself as caretaker of a sector on the mountain in the vicinity of the piko location.

According to the FEIS for the Outrigger Project, many families erect family shrines (ʻahu) and others visit the adze quarry to engage in their cultural and religious rituals (NASA 2005). The practitioners consider their observances as being in place of those ceremonies lost in antiquity. They are "adaptations" of present day practices to allow them to worship na akua and na ʻaumakua in proper fashion and with proper reverence. One of those adaptations is the spiritual observance of the winter solstice begun in 1998. The practitioners interviewed deemed it proper, as part of the protest against the development of the summit, to observe the solstice, much as they believe their ancestors observed the passage of the seasons. The event is observed by gathering at Puʻu Huluhulu at a lower elevation of the mountain

and proceeding on foot up to the summit with chants and prayers. During their first observance the practitioners erected a lele or altar on the summit (NASA 2005).

Cultural practitioners assert that a cumulative impact assessment must include consideration of the developments' impact on the whole mountain, "from the bottom up," not merely the impact on the top. These practitioners stress that their right to access the mountain is of fundamental importance. It is an absolute requirement for their cultural and religious observances. Although they know of no denials of access at the present time, they are fearful that such will come in the future. Even now, they are concerned about a partial limitation: groups numbering more than eight, including groups of Native Hawaiians, are required to obtain a permit before going up to the summit (NASA 2005).

Determination of Effect

Significant historic resources are those properties listed or eligible for listing in the NRHP. As defined in the implementing regulations for Section 106 of the NHPA, impacts of an undertaking on significant cultural resources are considered adverse if they "diminish the integrity of the property's location, design setting, materials, workmanship, feeling, or association" (36 CFR § 800.5 (a)(1). Examples of adverse effects include, but are not limited to, the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from, or alteration of the character of, the property's setting when that character contributes to the property's qualification for listing on the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property, or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property (36 CFR § 800.5[a][2]).

The summit of Mauna Kea is recognized as eligible for inclusion on the NRHP as "it encompasses a sufficient concentration of historic properties (shrines, burials, and culturally significant landscape features) that are historically, culturally, and visually linked within the context of their setting and environment." (NASA 2005). The Proposed Action (i.e., the replacement of the telescope and renovation of the observatory building) and the alternatives would not further destroy, damage, or alter the summit area as the telescope observatory is an existing structure. Moreover, the observatory building itself is not deemed eligible for inclusion in the NRHP, and, therefore, the Proposed Action and alternatives would not directly or indirectly impact a historic building.

The Proposed Action would not involve ground disturbing activities, changes in the landscape or access to the Project Site. Exterior renovations would be made to the observatory building, including a potential increase in the overall dome height of less than 12 inches, which would not adversely affect important view planes. Moreover, because a significant decrease in required on-site support due to remote operations capability would be achieved existing cultural impacts would be lessened. Proposed construction activities would be short in duration (14-18 weeks) and would follow best management practices to minimize disturbance to cultural practitioners.

Based on a careful review and analysis, and in accordance with Chapter 6E HRS and Section 106 of the NHPA, NSF has determined that the Proposed Action would result in "no historic property affected". NSF has also sought concurrence with this determination from SHPD, OHA, Kahu Ku Mauna, and the Royal Order of Kamehameha I. We welcome your advice and input on this important project. In accordance with 36 CFR § 800.4 (d), if we receive no objection from your organization within 30 days from receipt of this letter, NSF's responsibilities under Section 106 will be fulfilled.

Should you have any questions regarding this project, please contact me or Ms. Martha Spengler by phone at 808-545-2055; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

Enclosures
(1) Location Map; (2) Project Site; (3) Summit Telescopes (View from the east) (4) Observatory Building Floor Plans; (5) Observatory Building Section; (6) Archaeology Sites Map; (7) Cultural Landscape Map.

cc:
Ms. Charisse A Carney-Nunes, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

References Cited:

Office of Environmental Quality Control. 1997. Guidelines for Assessing Cultural Impacts.

NASA. 2005. Final Environmental Impact Statement for the Outrigger Telescopes Project.

Stevens, Edward. 2006. personal communication.

University of Hawaii. 1999. Final Environmental Impact Statement for the Mauna Kea Science Reserve Master Plan.

University of Hawaii. 2000. Mauna Kea Science Reserve Master Plan.

See Section 6.3 for Mauna Kea Anaina Hou comments.

Helber Hastert & Fee
Planners, Inc.

March 28, 2006

The Royal Order of Kamehameha I
Care of Mr. Ali'i Aimoku Paul Neves
380 Nahale-A Avenue
Hilo, HI 96720

Subject: **Section 106 Consultation for the University of Hawai'i 24-inch Telescope Observatory Renovation Environmental Assessment Mauna Kea Science Reserve, Hāmākua, Hawai'i, State of Hawai'i**

Dear Mr. Neves,

The National Science Foundation (NSF) and the University of Hawai'i at Hilo (UHH) are undertaking a review pursuant to the National Environmental Policy Act (NEPA) and Chapter 343, Hawaii Revised Statutes (HRS) concerning the proposed renovation of an existing 24-inch astronomy observatory on Mauna Kea. Pursuant to Section 106 of the National Historic Preservation Act (NHPA) and on behalf of NSF and UHH, we hereby invite your comments as a consulting party on the proposed undertaking.

Specifically, NSF proposes to fund the proposal of UHH to replace an existing 24-inch (0.6 meter [m]) telescope with a new 36-inch (0.9 m) telescope. UHH further proposes to renovate the existing observatory building using State funds. The project site is located within the Astronomy Precinct at the Mauna Kea Science Reserve (MKSR), Hāmākua District, island of Hawai'i, State of Hawai'i (see enclosures 1 and 2, Location Map and Project Site, respectively). This facility would be used primarily as an instructional telescope for UH undergraduate students majoring in the science of astronomy, as well as astronomy outreach programs focusing on high school students.

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Cultural Practices and Beliefs

Cultural values and traditional cultural practices include intangible resources that are important to culture. Contemporary cultural practices relate to current beliefs or practices. Traditional cultural practices on Mauna Kea are associated with resource locations (e.g., stone, water, hunting), trails, individual topographic features, burial locations, and cultural landscapes (NASA 2005).

According to the 2005 FEIS for the Outrigger Project (NASA 2005), in Native Hawaiian society, cultural and religious practices and observations are inseparably intertwined; the good favor of the gods (na akua) is sought before every endeavor, from the very mundane tasks to the most fearsome ventures. Na akua were believed to dwell in earthly forms such as the pu'u on Mauna Kea and the waters spouting from the earth or running in the streams. In addition, Native Hawaiians deified their family ancestors as na 'aumakua which took the form of animals such as sharks, owls, hawks, and many others. These ancestors were asked to support and assist in the coming effort from planting taro to waging war.

Furthermore, Native Hawaiians also delineated the inland areas of the islands according to the right, or restriction, of access by the maka'anaina, or commoner, and the presence of the deities. Thus, wao kanaka is an inland area of lower elevation where the maka'anaina can inhabit or move about freely. Wao kele is the upland forested area into which the maka'anaina can enter for the purpose of gathering materials for their daily lives. Above the wao kele is the wao akua, also called the wao ke akua, which is believed to be inhabited by na akua; here the maka'anaina hesitate to enter, and only did so with prayer and great respect. The wao akua is generally the desert region above the tree line or wao kele, and is believed to be inhabited by na akua; hence, the name. Some cultural practitioners believe that only persons of the 'ali'i (chiefly) class and the highest priests or kahuna nui were permitted to enter the wao akua. An area inhabited by na akua may also be called pō. The summit of Mauna Kea from about the 9,000-foot level is considered wao akua, a sacred region, with kapu, or restriction in what may be done on the land (NASA 2005).

The SHPD reports that only 27 percent of the MKSR has been previously surveyed for cultural properties, resulting in 93 sites inventoried and catalogued. Seventy-six of the sites were shrines erected for religious purposes. The presence of these numerous shrines erected in singles and in clusters forming a belt around the entire summit between 12,000 and 13,000 foot elevation, exemplifies the spiritual reverence held for Mauna Kea by early Hawaiians. The presence of shrines and monuments in the summit region of Mauna Kea indicates that certain religious observances or worship services have been conducted there. However, there is no written record or description of those ceremonies solely because the Hawaiian language was unwritten up until the arrival of American missionaries (mid 1800's).

Notwithstanding, all things of importance at earlier times were handed down generation after generation through oral history. Although a great deal was lost over time, a great deal continues to be used and practiced by cultural practitioners of today (personal communication, Mr. Edward Stevens, 2006).

Contemporary religious practitioners who continue to pay homage to the deities enshrined in their early forms on Mauna Kea and to the ʻuhane or spirits of their ancestors whom they believe also reside or visit the sacred grounds. Those contemporary practitioners consider themselves na koa, or warriors, whose enduring task is to protect the mountain from unwarranted intrusion, particularly under the present circumstances. They ardently believe that Mauna Kea is inhabited by akua or ʻuhane and that the development on the summit is an invasion by ordinary man into the sacred realm. The practitioners find that the presence of the observatories on the summit, and the noise emanating from them and created by vehicular traffic, is destructive of the silence and spiritual ambience that is necessary to their proper religious observances. Additionally, the observatories obscure their view of certain stars, thus interfering with the practitioners' proper alignment with the stars for worship, and preventing an unobstructed 360-degree view of the summit region and the neighboring mountains (NASA 2005).

Each puʻu, at the summit and at the lower elevations, has a cultural and spiritual significance; most are named for the akua, whose forms are represented by the puʻu, stars, and other formations of nature. Moreover, they do not stand-alone; they each have a relationship to the other puʻu that is meaningful to the practitioners. By orienting their worship with the alignment of the puʻu the practitioners are able to determine whether they are in a spot that is propitious for worshipping na akua and seeking their assistance. The presence of the observatories, and the removal of the top of some of the puʻu interferes with the practitioners' ability to achieve that correct orientation (NASA 2005).

According to the 2005 FEIS for the Outrigger Project (NASA 2005), the practitioners, and many other families in the community, continue to carry the umbilical cords (piko) of their newborn children to the summit for concealment. This is a deeply spiritual activity, and the piko may be concealed anywhere on the summit. Only the families, who mark the site by alignment of physical features, including the puʻu and other geographic characteristics as well as the stars, know the location of the piko. Thus the ability to achieve orientation through the alignment of the puʻu is critical. In keeping with this tradition, each family considers itself as caretaker of a sector on the mountain in the vicinity of the piko location.

According to the FEIS for the Outrigger Project, many families erect family shrines (ʻahu) and others visit the adze quarry to engage in their cultural and religious rituals (NASA 2005). The practitioners consider their observances as being in place of those ceremonies lost in antiquity. They are "adaptations" of present day practices to allow them to worship na akua and na ʻaumakua in proper fashion and with proper reverence. One of those adaptations is the spiritual observance of the winter solstice begun in 1998. The practitioners interviewed deemed it proper, as part of the protest against the development of the summit, to observe the solstice, much as they believe their ancestors observed the passage of the seasons. The event is observed by gathering at Puʻu Huluhulu at a lower elevation of the mountain

and proceeding on foot up to the summit with chants and prayers. During their first observance the practitioners erected a lele or altar on the summit (NASA 2005).

Cultural practitioners assert that a cumulative impact assessment must include consideration of the developments' impact on the whole mountain, "from the bottom up," not merely the impact on the top. These practitioners stress that their right to access the mountain is of fundamental importance. It is an absolute requirement for their cultural and religious observances. Although they know of no denials of access at the present time, they are fearful that such will come in the future. Even now, they are concerned about a partial limitation: groups numbering more than eight, including groups of Native Hawaiians, are required to obtain a permit before going up to the summit (NASA 2005).

Determination of Effect

Significant historic resources are those properties listed or eligible for listing in the NRHP. As defined in the implementing regulations for Section 106 of the NHPA, impacts of an undertaking on significant cultural resources are considered adverse if they "diminish the integrity of the property's location, design setting, materials, workmanship, feeling, or association" (36 CFR § 800.5 (a)(1). Examples of adverse effects include, but are not limited to, the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from, or alteration of the character of, the property's setting when that character contributes to the property's qualification for listing on the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property, or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property (36 CFR § 800.5[a][2]).

The summit of Mauna Kea is recognized as eligible for inclusion on the NRHP as "it encompasses a sufficient concentration of historic properties (shrines, burials, and culturally significant landscape features) that are historically, culturally, and visually linked within the context of their setting and environment." (NASA 2005). The Proposed Action (i.e., the replacement of the telescope and renovation of the observatory building) and the alternatives would not further destroy, damage, or alter the summit area as the telescope observatory is an existing structure. Moreover, the observatory building itself is not deemed eligible for inclusion in the NRHP, and, therefore, the Proposed Action and alternatives would not directly or indirectly impact a historic building.

The Proposed Action would not involve ground disturbing activities, changes in the landscape or access to the Project Site. Exterior renovations would be made to the observatory building, including a potential increase in the overall dome height of less than 12 inches, which would not adversely affect important view planes. Moreover, because a significant decrease in required on-site support due to remote operations capability would be achieved existing cultural impacts would be lessened. Proposed construction activities would be short in duration (14-18 weeks) and would follow best management practices to minimize disturbance to cultural practitioners.

Helber Hastert & Fee
Planners, Inc.

The Royal Order of Kamehameha I Section 106 Consultation Letter
UH 24-inch Telescope Observatory Renovation, Mauna Kea Science Reserve
March 28, 2006
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Based on a careful review and analysis, and in accordance with Chapter 6E HRS and Section 106 of the NHPA, NSF has determined that the Proposed Action would result in "no historic property affected". NSF has also sought concurrence with this determination from SHPD, OHA, Kahu Ku Mauna and Mauna Kea Anaina Hou. We welcome your advice and input on this important project. In accordance with 36 CFR § 800.4 (d), if we receive no objection from your organization within 30 days from receipt of this letter, NSF's responsibilities under Section 106 will be fulfilled.

Should you have any questions regarding this project, please contact me or Ms. Martha Spengler by phone at 808-545-2055; or via email at mspengler@hhf.com.

Sincerely,

Thomas A. Fee, AICP
Principal

Enclosures
(1) Location Map; (2) Project Site; (3) Summit Telescopes (View from the east) (4) Observatory Building Floor Plans; (5) Observatory Building Section; (6) Archaeology Sites Map; (7) Cultural Landscape Map.

cc:
Ms. Charisse A Carney-Nunes, National Science Foundation
Mr. Lo-Li Chih, UHH, Facilities Planning and Construction Office
Dr. William Heacox, UHH Department of Physics and Astronomy

References Cited:

Office of Environmental Quality Control. 1997. Guidelines for Assessing Cultural Impacts.

NASA. 2005. Final Environmental Impact Statement for the Outrigger Telescopes Project.

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A response to the Section 106 Consultation letter was not received from the Royal Order of Kamehameha I.