

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
OFFICE OF CONSERVATION AND COASTAL LANDS  
Honolulu, Hawaii

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February 25, 2011

Board of Land and  
Natural Resources  
State of Hawaii  
Honolulu, Hawaii

**REGARDING:** Conservation District Use Application HA-3568  
Thirty Meter Telescope

**APPLICANT:** University of Hawai'i at Hilo

**AGENT:** Dr. Donald Straney, Chancellor; 200 W. Kāwili Street, Hilo, HI 96720

**LANDOWNER:** State of Hawai'i; leased to the University of Hawai'i under General  
Lease S-4191, with management delegated to the Office of Mauna Kea  
Management (OMKM)

**LOCATION:** Mauna Kea Science Reserve, Ka'ōhe Mauka, Hāmākua District, Hawai'i  
**Observatory:** 13-N Site, "Area E," North Plateau, elevation 13,150-  
13,175 feet above sea level  
**Access Way:** Mauna Kea Loop Road to 13-N  
**Batch Plant Staging Area:** Access Road, below Pu'u Wēkiu  
**HELCO Substation:** near Hale Pōhaku, @ 7 miles down road

**TMK:** (3) 4-4-015:009

**ARE OF PARCEL:** Approximately 11,288 acres (Mauna Kea Science Reserve)

**AREA OF USE:** **Observatory:** approximately 4.9 acres  
**Access Way:** approximately 3.6 acres / 3,400 linear feet  
**Batch Plant Staging Area:** approximately 4 acres; temporary  
**HELCO Substation:** No change in footprint

**SUBZONE:** Resource

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## DESCRIPTION OF AREA AND CURRENT USE

The proposed 30-Meter Telescope (TMT) will involve four geographic locations at the summit of Mauna Kea: The observatory itself on approximately 5 acres of land on the north plateau; a 3,400-foot long Access Way to connect the observatory with existing roads; a Batch Plant Staging Area on a 4-acre site where the Mauna Kea Access Road forks near the summit; and upgrades to the Hawaiian Electric and Light Company (HELCO) substation near Hale Pōhaku.

The project site is in the Mauna Kea Science Reserve. The Reserve encompasses 11,288 acres of State land leased to the University of Hawai'i (UH) under General Lease S-4191. It contains most land within a 2.5-mile radius of the site of the UH 2.2-m telescope – in effect, all land above 12,140 feet (ft.) above sea level (ASL)<sup>1</sup>, with the exception of a pie-shaped wedge set aside as the Mauna Kea Ice Age Natural Reserve. The Science Reserve is located within the Resource subzone of the State Conservation District.

Kepā Maly, in his 1997 review of the historical records of the Mauna Kea ahupua`a of Humu`ula and Ka`ohe<sup>2</sup>, discusses the tradition of Kamiki, which identified the following environmental zones associated with the mountain:

- Ke kuahiwi* – the mountain summit<sup>3</sup>
- Ke kualono* – below the kuahiwi, the place of silence, or of hearing
- Ke kuamauna* – the mountain top
- Ke ku(a)hea* – the region of mists; the area of stunted trees
- Ke kaolo* – the region of paths and trails

Below the *kuaha* are the *wao*, the inhabited places; these include the *wao kele* (regions of rain), *wao akua*<sup>4</sup> (remote areas inhabited by gods and spirits), *wao lā`au* (forested region), and *wao kānaka* (region of people). The environmental zones identified in this tradition extended seaward, from *ka po`ina nalu* (place washed by waves) and *ke kai kohola* (the shallow seas) to *ke kai pōpolohua a Kāne a Tahiti* (the deep purplish black sea of Kāne at Tahiti).

Mauna Kea rises from these deep seas, its base resting approximately 19,685 ft. below sea level, and its summit reaching 13,796 ft. ASL.

OCCL staff has observed that the term “summit” and “summit region” are not used with much precision in the discussions on Mauna Kea. While there is disagreement in the literature on how to apply the zones in the Kamiki tradition to specific areas on Mauna

<sup>1</sup> Elevations are approximate.

<sup>2</sup> Kepā Maly, *Mauna Kea – Kuahiwi ku ha`o i ka mālie, A Report on Archival and Historical Documentary Research*, prepared for the Native Lands Institute, 1997. These zones were taught in the story of a riddling contest between the hero Kamiki and Pina`au, the foremost riddler of Hilo Palikū. The Kamiki tradition was collected in *Ka Hōkū o Hawai`i, 1914-1917*.

<sup>3</sup> Other traditions use these or similar terms, but with slightly different connotations

<sup>4</sup> Other sources place the *wao akua* as the entire region above the clouds

Kea, we find that the underlying concepts would be useful in our analysis. In line with this, and in order to speak with more specificity, we will use the following terms for the summit region in this report (See Exhibits, pgs. 68-74):

The *Wēkiu summit cone*, for the highest point on the mountain. This cinder cone is commonly known as Pu`u Wēkiu, although some sources identify it as Pu`u Kūkahau`ula. The cone rises 13,796 ft. ASL.

The *Kūkahau`ula summit*, for the cluster of cones and ridgelines that are above 13,385 ft. ASL, including Pu`u Wēkiu, Pu`u Kea, and Pu`u Hau`oki. Some sources present these three cones as part of one unit, Pu`u Kūkahau`ula. The State Historic Preservation Division identifies Kūkahau`ula as a *Traditional Cultural Property (TCP)*. This area has a strong association in traditional Hawaiian culture with both *piko* ceremonies and burial practices.

The nearby Pu`u Poli`ahu and Pu`u Hau Kea also rise above 13,120 ft. ASL.

The *summit plateau*, for the alpine desert ecosystem above 12,795 ft. ASL. The slope shifts abruptly here, from approximately 27% downslope to less than 10% on the plateau. Geological evidence indicates that this broad, circular region was formed by remnant lava flows in the former caldera, and subsequently sculpted by glaciers. The plateau itself varies only approximately 330 ft. in elevation, but it is dotted with hundreds of cinder cones that rise 100 ft. to almost 600 ft. in elevation. Other significant geological features are the outcrops of hawaiite, an olivine basalt formed via the interaction of glacial ice and hot lava, and prized for adze making; the alpine Lake Waiau; and the glacial till that blankets most of the upper summit above 11,000 ft. ASL.

The *north plateau* is the portion of the plateau to the north of the summit, identified as the Great Rocky Table Summit in an 1891 government survey. This is the location of *Area E*, and the site of the proposed observatory.

The *lower summit region*, for the alpine shrub and grassland ecosystem above the tree line at 9,514 ft. ASL. OCCL notes that the record indicates that the tree line has shifted down-slope since the introduction of cattle.

The University of Hawai`i also identifies a 525-acre "astronomy precinct" that encompasses the summit the northern portion of the summit and a good percentage of the northern plateau. This precinct is shown as a blue dotted line on many of the maps attached to this report (see Exhibits pgs. 75-79).

As stated before, the Mauna Kea Science Reserve covers most of the land above 12,140 ft. ASL, thus encompassing the entire summit plateau and a portion of the lower summit region.

The name "Mauna Kea" itself is traced back to the earliest written cartographic sources for Hawai`i. Some sources translate the name directly as "White Mountain," while other sources identify Kea as a shortened form of Wākea. Both traditions identify Mauna Kea



as the first-born offspring of Papa Hānau Moku and Wākea. Mauna Kea is the ancestor of the *ali`i* class and elder brother to Hāloa, the ancestor of the Hawaiian people.

Poli`ahu, goddess of the snows of Mauna Kea, is the deity most often associated in the literature with the summit. Some early writings refer to the mountain as *mauna o Poli`ahu*, although it is not clear if this is intended as a descriptive term or as a proper name. Other significant gods and supernatural beings associated with the mountain include Poli`ahu's sister Līlīnoe, the goddess of mists; Kūkahau`ula, *Kū of the Red Snow*, an incarnation of Kū and the lover of Poli`ahu; Waiau, a chiefess-goddess companion of Poli`ahu; and Kahoupokāne, another close companion of Poli`ahu.

The summit plateau lies in the moku of Hāmākua and the ahupua`a of Ka`ohe. The land divisions for the island of Hawai`i appear to have been formally set in the early 1600's, in the reign of `Umialīloa. In 1862 the Kingdom of Hawai`i established the Commission on Boundaries to legally set the boundaries of the ahupua`a. Public testimony during the Commission hearings indicated that the traditional ahupua`a of Ka`ohe ran from the summit of Mauna Loa to the summit of Mauna Kea, there was a wide divergence of opinion on how much of Mauna Kea was included in the ahupua`a.

The Commission would eventually set the ahupua`a boundary to encompass the entire mountain summit and a good proportion of the highlands around it. Curtis Lyons, an early surveyor of the Hawaiian kingdom, wrote in 1875 that *the whole main body of Mauna Kea belongs to one land from Hamakua, viz., Kaohe, to whose owners belonged the sole privilege of capturing the ua`u, a mountain-inhabiting but sea-fishing bird.*<sup>5</sup>

The Boundary Commission hearings provide an important record of native practices that occurred on the mountain in the 18<sup>th</sup> and 19<sup>th</sup> Century. The practices included, but were not limited to, the collection of birds, collection of material for canoes, adze quarrying and making, *piko* ceremonies, and funerary practices.

Ongoing traditional cultural practices in the summit region include pilgrimage, prayer, shrine construction, offerings, collection of water from Lake Waiau, *piko* ceremonies, scattering of cremation ashes, and burial blessings. Many of these activities were *kapu* for non-*ali`i* during the Historic period; however, the abolishment of the *kapu* system and the elimination of castes opened up cultural practices to all Hawaiians.

OCCL also heard public testimony, from both supporters and opponents of the project, that Mauna Kea was associated with *nā mea kilo hōkū*, those who study the stars. However, specific accounts of *kilo hōkū* and Mauna Kea appear to be absent from the historical literature.

Modern recreational activities in the summit region include hiking, stargazing, skiing and sledding in winter, meditation, and touring. There are no established trails near the proposed project site or the Access Way, nor is either area conducive to snow play. A

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<sup>5</sup> As cited in Maly

modern trail is close to the Batch Plant Staging area, and this area is near an area popular for sledding and skiing.

Flora and fauna is scarce in the alpine desert above 12,795 ft. ASL. There are 21 known species of lichen, with ten being found in *Area E*. There are also 12 species of moss, which occur in deeply shaded rock overhangs. Two species were found in *Area E*. None of the lichen or moss species are unique to Hawai'i.

The few vascular plants in *Area E* occur in low densities. These include the endemic 'oāli'i (maidenhair spleenwort, *Asplenium trichomanes* subsp. *densum*) and Douglas' bladderfern (*Cystopteris douglasii*). The 'oāli'i is locally abundant in full sunlight and open lava fields. The bladderfern is a USFWS species of concern, but occurs at multiple locations in the islands.

The only fauna in the alpine stone desert are arthropods. Ten indigenous species have been noted in the summit plateau, including wēkiu bugs (*Nysius wekiuicola*), lycosid wolf spiders (*Lycosa* sp.), two sheetweb spiders (genus *Erigone*), two mites (Family *Aystidae* and Family *Eupodidae*, species unknown), two springtails (Family *Entomobryidae*, species unknown), a centipede (*Lithobius* sp.), and a noctuid moth (*Agrotis* sp.). Other non-indigenous arthropod species are thought to inhabit the summit's cinder cones.

The wēkiu is proposed as a candidate for Federal Listing under the Endangered Species Act. The bug lives in loose cinder above 11,713 ft. ASL, and feeds on lower-elevation insects that are blown up to the summit. They tend to be concentrated on the cinder cones. *Area E* does not contain the loose cinder that the wēkiu habit.

No federally or state listed threatened or endangered species are known to occur at Kūkahau'ula or in the project area.

According to the University of Hawaii, Institute for Astronomy (UHIfA), about 0.36 percent (40.5 acres) of the lease area is currently being used by observatories and related development. There are currently thirteen working telescopes on the mountain. Nine are for optical and infrared astronomy, three for submillimeter wavelength astronomy, and one for radio astronomy.

Although none of the telescopes are on Pu'u Wēkiu cone itself, eight lie on the Kūkahau'ula summit within the TCP: the Subaru telescope, the twin telescopes of the W. M. Keck Observatory (the world's second largest optical telescope), the NASA Infrared Telescope (IRTF), the Canada-France-Hawai'i Telescope (CFHT), the Gemini Northern Telescope, the University of Hawai'i 2.2m Telescope, the United Kingdom Infrared Telescope (UKIRT, the world's largest dedicated infrared telescope), and the University of Hawai'i 0.9m Telescope.

Two additional telescopes lie in the saddle between Kūkahau'ula and neighboring Pu'u Poli'ahu: the Caltech Submillimeter Telescope (CDO) and the James Clerk Maxwell Telescope (JCMT, the world's largest submillimeter telescope). Northwest of these, in

an area dubbed "submillimeter valley", are the eight 6-meter telescopes of the Submillimeter Array (SMA).

A further two miles down slope is The National Radio Astronomy Observatory's Very Long Baseline Array. When used in conjunction with the nine other VLBA sites worldwide, it comprises the world's largest dedicated, full-time astronomical instrument.

There are no current developments in the main part of the North Plateau. Approximately ten percent of the 13N Site in *Area E* has been previously disturbed; approximately 1/3 of the existing Access Right of Way has been previously graded; and the Batch Plant site was initially graded as part of the road-paving project and was used as a staging area during the construction of several observatories.

These telescopes, and other associated and related infrastructure, were approved under the following Conservation District Use Permits and Site Plan Approvals:

- 1973: HA-442 Electric conduit
- 1974: HA-527 Canada France Hawai'i Telescope
- 1975: HA-640 Temporary (one year) Portable Infrared Telescope
- HA-653 UKIRT
- 1976: HA-954 After the Fact for the Air Force/UH 0.6m telescope; 24 inch Planetary Patrol Telescope; UH 2.2m telescope (all built between 1968-1970)
- 1977: HA-955 Interim power plant expansion
- 1978: HA-1009 Tsunami Warning System improvements
- 1981: HA-1210 UH Observation Station (temporary; three years)
- 1982: HA-1492 Cal Tech Submillimeter Observatory
- 1983: HA-1515 James Clark Maxwell Telescope
- 1986: HA-1646 Keck I
- 1986: HA-1819 Midlevel Facilities at Hale Pōhaku
- 1989: HA-2174 Very Long Baseline Array
- 1991: HA-2462 Subaru
- 1992: HA-2509 Keck 2
- 1994: HA-2691 Gemini North
- 1995: HA-2728 Smithsonian Submillimeter Array
- 2004: HA-3065 Keck Outriggers (Never Constructed)
- 2005: HA-3225 Site Testing

## MANAGEMENT PLANS

The State-owned Mauna Kea Science Reserve is leased by the University of Hawai'i, with day-to-day management delegated by the Board of Regents to the Office of Mauna Kea Management (OMKM). The University also controls approximately 19 acres of Land at Hale Pōhaku, the site of the mid-elevation support facilities. A third management area is the Summit Access Road that extends from Hale Pōhaku to the boundary of the Science Reserve. This includes a 400-yard corridor on either side of the road, excluding those areas within the adjacent Mauna Kea Ice Age Natural Area Reserve.

### Comprehensive Management Plan

The Board of Land and Natural Resources approved a Comprehensive Management Plan (CMP) for the Mauna Kea Science Reserve on April 9, 2009. The CMP built on pre-existing management plans, including the 1995 Management Plan for UH Management Areas and the 2000 Mauna Kea Master Plan<sup>6</sup>.

The CMP differs from the standard Management Plan referred to in Hawai'i Administrative Rules (HAR) §13-5 Exhibit 3, MANAGEMENT PLAN REQUIREMENTS. The standard Management Plans discussed in Exhibit 3 are intended for projects with a specific, limited use (e.g. forestry, or agriculture). A CMP, by contrast, is needed for larger parcels or areas with multiple significant land uses, and natural resource concerns. The CMP provides a framework and guidelines for each use or resource, and identifies areas of joint or shared responsibility.

It should be noted that any land use proposal for Mauna Kea would still need to go through the complete environmental review process; the CMP is corollary to the review process, and provides an additional framework for project development.

The Mauna Kea CMP contained 103 management actions and associated reporting requirements that would govern the future of Mauna Kea. A condition of BLNR approval was that the University develop a *Project Development and Management Framework* and four resource sub-plans *Natural Resources Management Plan*; *Cultural Resource Management Plan*; *Public Access Plan*; and *Decommissioning Plan*. The BLNR action also required UH to submit an annual status report on the development of each sub plan and a status report on the development of each management action. The OCCL believes that the University is in compliance with these requirements as of the writing of this report.

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<sup>6</sup> The 2000 Mauna Kea Master Plan was never approved by BLNR. It is considered as an internal UH planning document. It should be noted however that many elements of the 2000 Mauna Kea Master Plan have been incorporated into the CMP, and several Subplans discussed in this report. The 2000 plan formed the basis for the establishment of the Office of Mauna Kea Management as well as new design guidelines to guide future telescope development.

## Project Development Implementation Framework

BLNR approved the Project Development Implementation Framework on February 18, 2010. The framework was based in large part on the 2000 Mauna Kea Science Reserve Master Plan. The plan aimed to improve management by replacing the top-down decision making process of the past with a community-oriented process under the University of Hawai'i at Hilo (UHH), while still keeping final decision making with the UH President and Board of Regents (BOR). This plan allowed for the establishment of the following entities.

The new management structure consists of:

- **The Office of Mauna Kea Management:** The office is charged with the day-to-day management of the Mauna Kea Science Reserve as prescribed in the Master Plan, and reports directly to the UHH Chancellor.
- **Mauna Kea Management Board:** An advisory body comprised of seven members of the community who are nominated by the UH Hilo Chancellor and approved by the BOR.
- **Kahu Kū Mauna Council:** A nine-member Native Hawaiian council appointed by the BOR, and advises the BOR and Chancellor on cultural matters and issues

When the BLNR approved the CMP in 2009, it included a condition that required the BOR to accept responsibility for implementation of the CMP. The BOR did accept this responsibility as a body, and the BOR is now recognized as the entity ultimately responsible for the implementation of the CMP.

## Resource Subplans

The 103 management actions were elaborated on in the four resource sub-plans, which the BLNR approved on March 25, 2010. The complete list of management actions is included in the **Exhibits section of this report, pgs. 107-113**. Significant elements of the sub-plans are:

### Natural Resources Management Plan (NRMP)

This is the first plan to focus on the protection and preservation of natural resources in the UH Management Areas. The plan offers specific management actions to reduce the identified threats to natural resources and to guide adaptive responses to future threats.

The NRMP has been further divided into five component plans:

*Natural Resource Inventory, Monitoring and Research Component Plan:* identifies data gaps and information needs for the natural resources found within UH Management Areas.

*Threat Prevention and Control Component Plan:* reviews current and potential threats to natural resources, and presents management actions to deal with identified threats.

*Natural Resources Preservation, Enhancement, and Restoration Component Plan:* describes and prioritizes preservation, enhancement, or restoration management activities to protect native plant and animal communities and their habitats.

*Education and Outreach Component Plan:* describes the continued development of OMKM's educational and outreach efforts and provides recommended education and outreach activities to improve understanding of the unique natural resources found within UH Management Areas to provide visitors and users with the information they need to understand and protect the natural resources.

*Information Management Component Plan:* describes the activities needed to successfully manage information on natural resources to inform management decisions. Recommendations include establishment of a geographic information system (GIS) at OMKM, maintaining data, and continued support and improvement of the OMKM library.

#### Cultural Resources Management Plan (CRMP)

The major objectives of the CRMP include promoting a greater understanding of the rich cultural heritage of Mauna Kea; preserving and managing cultural resources in a sustainable manner; maintaining opportunities for Native Hawaiians to engage in cultural and religious practices; and preserving the cultural landscape for the benefit of cultural practitioners, researchers, recreationalists, and other users.

CRMP is further divided into three parts: (1) general management issues; (2) specific public and commercial uses, and (3) long-term management programs, plans, strategies and other needs.

It also identifies two priority management actions: the preparation of a Burial Treatment Plan, and the preparation and implementation of a final Archaeological Monitoring Plan. An archaeological inventory survey for the Science Reserve was approved in Spring 2010, and OMKM is in the process of developing proposals for the development of these two mitigation plans.

#### Public Access Plan

The Public Access Plan was formulated with six key tenets in mind: (1) The UH Management Areas on Mauna Kea are public lands held in trust for Native Hawaiians and the general public by the State and UH; (2) Protection of public health and safety is of paramount importance when managing these public lands; (3) An informed public is best prepared to make good decisions and act responsibly while on Mauna Kea; (4) Native Hawaiian traditional and customary rights are legally and constitutionally

protected and can be accommodated and reasonably regulated in the interest of public health and safety and protection of natural and cultural resources; (5) Management decisions and actions should be guided by reliable data; and (6) UH has the responsibility to establish rules to govern public activities.

The sub-plan provides a range of recommendations for new or improved access guidelines for commercial and non-commercial visitors. These include maintaining interpretive and enforcement personnel to educate visitors and to provide deterrents for inappropriate behavior; improving signage to encourage visitors to stop at the visitor station; and providing alternatives to visitors at the midlevel facilities to reduce visitors in the summit area.

The CMP specifically identifies the following measures as being among those native Hawaiian rights for which access will be maintained insofar as they are consistent with other management actions:

- Access for traditional and customary practices, including the gathering of cultural resources, including but not limited to mamake, ko'oko'olau, māmane, `awa, and ōwī;
- Access for families to visit *na iwi kupuna*;
- Access to scatter `ohana ashes;
- Access through the trails located within the UH Management Areas for subsistence gathering and hunting;
- Access for families to continue to deposit their `ohana piko.
- Access for traditional and customary practices, including religious and spiritual observances;
- Pilgrimage, offerings, and prayers; and
- Access for families to gather water from Lake Waiau for religious and spiritual purposes.

For safety reasons, the TMT project would restrict access to construction areas. Such restrictions would be temporary in nature and limited to the immediate vicinity of the construction work. After completion of construction, access to the interior of the TMT Observatory would be restricted for safety considerations. These restrictions would not prevent or preclude access to any resources available within the UH Management Areas of Mauna Kea for the practice of traditional and customary Native Hawaiian rights.

#### Decommissioning Plan

The Decommissioning Plan describes the process for decommissioning observatories on Mauna Kea, including financial planning. It outlines expectations for both existing and future observatories on Mauna Kea and describes the roles of DLNR (land owner and lessor), UH (lessee), and the observatories (sublesses).

The plan defines decommissioning as a process that results in the *partial or total* removal of all structures associated with an observatory facility and the restoration of the site, to the *greatest extent possible*, to its pre-construction condition.

Provisions for financial planning for decommissioning are included to ensure that adequate funds are available to pay for the costs of deconstruction and site restoration at the end of the life of the observatory.

CDUPs may be required as part of the decommissioning process when the observatory is demolished and provide the opportunity for BLNR to impose additional conditions.

The Plan notes that the Caltech Submillimeter Observatory (CSO) is scheduled to be decommissioned and removed between 2016 and 2018. The Institute for Astronomy also predicts that UKIRT (the 3.8m United Kingdom Infrared Telescope), will be removed from the Kūkahau`ula Summit by the end of the current lease in 2033, along with one more radio telescopes from the saddle between Kūkahau`ula and Pu`u Poli`ahu, and the Very Long Baseline Array from the southeastern portion of the summit plateau.

If the TMT is approved and built, and three telescopes decommissioned by 2033 as predicted, then eight telescopes will remain on the Kūkahau`ula Summit (currently nine), and two on the summit plateau, for a total of ten telescopes on the mountain (currently thirteen) (see Exhibits pg. 80).

The Office of Mauna Kea Management has stated that they have the long-term goal of migrating observatories off Kūkahau`ula and onto the summit plateau.

The Decommissioning Plan does not address specific timelines or dates for decommissioning observatories, except that all decommissioning activities shall be completed by the end of the master lease, nor does it address the process of renegotiation of a new master lease or sublease agreements. It should be recognized that if no new lease is granted, the observatories will need to be removed and the site restored no later than the end of the master lease.



## PROPOSED USE

The University of Hawai'i is seeking a Conservation District Use Permit (CDUP) for the Thirty Meter Telescope (TMT), a "next-generation" Giant Segmented Mirror Telescope (GSMT) (see Exhibit pgs. 81-99). The University is seeking the permit on behalf of the non-profit TMT Observatory Corporation<sup>7</sup>. The Corporation was founded in 2003 by the California Institute of Technology, the University of California, and the Association of Canadian Universities for Research in Astronomy. The National Astronomical Observatory of Japan (NAOJ) joined as a Collaborating Institution in 2008; the National Astronomical Observatories of the Chinese Academy of Sciences joined as an Observer in 2009; and India joined as an Observer in June 2010.

### Next Generation Telescopes

In August 2010 the National Academy of Sciences released *Astro2010: The Astronomy and Astrophysics Decadal Survey (New Worlds, New Horizons in Astronomy and Astrophysics)*. The report laid out a plan for sustaining the current level of scientific progress over the coming decade, and identified three core science objectives: the exploration of the origin of the universe, the search for habitable planets outside our solar system, and the use of astronomical observation to investigate fundamental physics.

In support of these objectives, and noting that the greatest strides in astronomical understanding have been the result of bold research initiatives, *Astro2010* identified four large-scale space-based initiatives and four large-scale ground-based initiatives. One of the four priority ground-based recommendations is for a "next generation" Giant Segmented Mirror Telescope (GSMT) which, per the report, will be *a large optical and near-infrared telescope that will revolutionize astronomy and provide a spectroscopic complement to the James Webb Space Telescope, the Atacama Large Millimeter/submillimeter Array, and the Large Synoptic Survey Telescope.*

**The James Webb Telescope**, a 6.5m infrared-optimized space telescope, is scheduled for launch in 2014. Webb will reside in an orbit about 1.5 million km (1 million miles) from the Earth. It is designed to study the first phase of the early Universe through four main science themes: *The End of the Dark Ages: First Light and Reionization; The Assembly of Galaxies; The Birth of Stars and Protoplanetary Systems; and Planetary Systems and the Origins of Life.*

**The Atacama Large Millimeter/submillimeter Array** will be the largest astronomical project in existence. It comprises an array of 66 12-meter and 7-meter diameter radio telescopes being built on a 5000-meter AMS plateau in the Atacama Desert in northern Chile. It is scheduled to be fully operational by the end of 2012. It will be a complete astronomical imaging and spectroscopic instrument for the millimeter/submillimeter regime, providing scientists with capabilities and wavelength coverage that complement those of other research facilities. It is expected to provide insight on star birth during the early universe and detailed imaging of local star and planet formation.

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<sup>7</sup> More information on the TMT Corporation can be found at [www.tmt.org](http://www.tmt.org)

**The Large Synoptic Survey Telescope (LSST)** is an optical survey telescope currently in its design and development phase, and will achieve first light four years after construction starts. Full science operations for the ten-year survey will begin two years after that, toward the end of the decade. It will be located on the El Peñón peak of Cerro Pachón, an 8,800 ft. ASL Mountain in northern Chile alongside the existing Gemini South and Southern Astrophysical Research Telescopes. LSST will image the entire visible sky every few nights for ten years, creating a 3-D map of the universe, and capturing changes and opening up the time-domain window to the observable universe.

TMT would be integrated with these by using an angular resolution matched to the Atacama Array, by having sensitivity sufficient to characterize the faintest sources imaged by the space telescope, and by utilizing a combination of field of view and collecting area matched to efficient study of the first emerging large-scale structures in the distant universe.

Light collection increases with the square of the diameter of the mirror; TMT will thus have ten times the light-collecting area of each of the twin Keck Telescopes, which are currently the world's largest. Additionally, sensitivity increases with the diameter to the fourth power. Consequently, a thirty-meter telescope will be 80 times more powerful than a ten-meter telescope, and will be 12 times sharper than Hubble.

There are currently three active international partnerships pursuing the development of, and in competition for funding for, an "Extremely Large Telescope (ELT)": Only two are likely to reach first light. Two of these have major participation by US institutions: Carnegie's Giant Magellan Telescope and the TMT. The third is the European Southern Observatory ELT. TMT is the only project under consideration for the Northern Hemisphere; the other two being considered for sites in Chile.

Elements of the TMT proposal include:

- **The 30-Meter Telescope (TMT).**  
The core of the project is a 30-meter in diameter aperture telescope composed of 492 individual mirror segments, secondary and tertiary mirrors directing the gathered light, and a network of interchangeable sensors and instruments that will collect and process the light. TMT will be located on the north plateau, approximately ½ mile from the Kūkahau`ula Summit, at an approximate elevation between 13,150 to 13,175 ft. ASL.
- **The TMT Access Way.** The 3400-foot long Access Way will consist of an improved road and underground utilities connecting the Observatory with existing roads and utilities. For the most part the Access Way will follow an existing 4-wheel drive road and the wider roads that serve the SMA facility. Only 200 feet will not follow existing roads. The Access Way will be single lane where it crosses Pu`u Hau`oki, then two lanes for the remainder.

- **The Batch Plant Staging Area.** The Staging Area is a 4-acre site northwest of where the Mauna Kea Access Road forks near the summit. It will be partially restored, and used for storing bulk materials and a concrete Batch Plant. This is the same use the area was put to during prior construction activities on the mountain.
- **Hawaiian Electric and Light Company (HELCO) Upgrades.** The proposal calls for the repair and upgrades of electrical transformers and related equipment at the substation near Hale Pōhaku. The operation and maintenance of the existing utility lines was authorized under CDUP HA-1573. The substation is located approximately 2000 feet southwest of the main headquarters, and about 1000 feet from Mauna Kea Access Road. The new transformers will replace the existing ones on a 1:1 basis, and the fenced compound will not be expanded.

Due to the challenges encountered when undertaking high-altitude construction, the applicant is requesting that the period allowed for the start of construction if a CDUP is granted by two (2) years, and that the total time allowed for construction be ten (10) years.

If a CDUP is issued the building and operation of the TMT Observatory will require a sublease from UH, which leases the lands from DLNR. The sublease would be subject to approval by the UH Board of Regents and the TMT Board, followed by approval by BLNR. The current UH lease expires in 2033, and the TMT Observatory will be required to either decommission and restore the site at that time or obtain a new lease from BLNR.

The core of the project is the 30-meter aperture telescope. The primary “eye” will be comprised of 492 individual mirror segments. Secondary and tertiary mirrors will direct light into different instruments for analysis. Interchangeable instruments and sensors will be mounted to the side of the mirror to collect and process light from an array of wavelengths.

The telescope will be the first large optical/infrared observatory to integrate “Adaptive Optics” into its design. The system will project up to eight lasers into the sky to create an asterism of guide stars that can be used to measure and correct for atmospheric distortion.

The dome will be a Calotte-type enclosure. Calotte domes feature a circular shutter and two planes of rotation, as compared to the rectangular shutter and single plan of standard domes. This allows for a tighter fit between dome and telescope. In Keck, the dome is three times the size of the telescope; the TMT will be designed so that the dome hugs significantly closer to the telescope, thus minimizing the size of the dome.

The total dome height will be 184 feet above finished grade, with an exterior radius of 108 feet. The dome shutter will be 102.5 feet in diameter, and will retract inside the dome when opened. The dome base, cap, and shutter structures will appear rounded and smooth, and have a reflective aluminum-like exterior coating.

The fixed cylindrical structure below the rotating base will enclose an area of 34,304 square feet, and extend 26.5 feet above grade. This part of the structure will be lava colored.

A support building attached to the dome will have a roof area of approximately 21,000 square feet, and a gross interior area of 18,736 square feet. It will be flat-roofed and lava colored. The building will include a mirror coating and staging area, laboratory and shop spaces, utility spaces, and administration spaces.

There will be a 6000 square foot external equipment area on the north side of the building. This area will contain two electrical transformers; three 5000 gallon underground storage tanks (one for water, one for domestic waste storage, and one double-walled tank for chemical waste storage); two 25,000 gallon water tank for fire suppression; and one double-walled 2000 gallon tank for diesel.

A tunnel will be built to function as an exhaust duct for heating, ventilation, and air-conditioning (HVAC) equipment.

An unpaved parking area will be placed just outside the support facility.

An atmospheric turbulence monitor will be mounted on a 30-foot tower on the north side of the graded area.

The entire footprint of these structures will be approximately five (5) acres.

### **Staffing**

TMT expects to employ about 140 people. They anticipate there will be on average 24 individuals working at the TMT site on a daily basis. Employees traveling beyond Hale Pōhaku will take part in a mandatory ride-sharing program using project vehicles.

### **TMT Access Way**

The proposed Access Way will start at the intersection of the Mauna Kea Loop Road and the Submillimeter Array (SMA) roadway. The majority of the Access Way will follow either the existing 4-wheel drive roads or the wider roads that serve SMA. The existing single-lane road was built in the 1960's. Only 200 feet of the 3400-foot long route will deviate from the existing route. This 200 foot section traverses an old jeep road where the route crosses beneath Pu`u Hau`oki in the Kūkahau`ula TCP. In order to mitigate impacts to the pu`u, and the TCP, the proposal calls for a single lane road through this section (see Exhibits pg. 84, bottom picture. **One lane road at base of Pu`u Hau`oki located on right portion of photograph**). The remainder of the access road will be two lanes.

The switch boxes needed to extend electricity and communications to TMT will be placed above ground next to the existing ones across from the SMA building.

The total area of disturbance for the Access Way will be 3.6 acres; of this 1.9 acres will be in an area that has been previously disturbed. Thus, approximately 1.7 acres of undisturbed lands, mostly lava rocks along side the gravel/lava road to TMT will need to be disturbed. Of the total acreage, approximately .2 acres of Type 3 Wekiu bug habitat will be disturbed (i.e. the one lane 200 foot section of road at the base of Pu`u Hau`oki in the TCP), Type 3 is considered moderate bug habitat. If the CDUA is approved the permittee will be required to implement a two (2) year arthropod monitoring effort. This will be included as a condition of the permit.

### **Batch Plant Staging Area**

The Batch Plant staging area is approximately four acres northwest of where the Mauna Kea Access Road forks near the summit. This area will be used for storing bulk materials, and for a concrete batch plant. It has been used for similar purposes during the construction of other observatories.

### **HELCO Upgrades**

HELCO will upgrade two transformers within the existing Hale Pōhaku Substation, which is located approximately 2000 feet from the main headquarters building at Hale Pōhaku. The compound will not be expanded.

Work will also be needed on the existing electrical conduit from Hale Pōhaku to the SMA building. The current wire conductors will be replaced with higher capacity conductors within the existing conduits. The majority of the route parallels Mauna Kea Access Road. One portion of the lower alignment follows the former Access Road, which is now part of the Ice Age Natural Area Reserve. There are existing pull boxes every 300 feet, and so no new ground disturbance will be needed to pull the cable.

### **TMT Lifecycle**

There will be four major stages to the TMT lifecycle: planning and design; construction and testing; operation; and decommissioning.

This application, and the Board's decision, marks the end of the first stage. If the Board approves the permit in the first quarter of 2011, the anticipated project schedule is as follows:

#### **Planning and Design**

Construction Plans      Second Quarter 2011

#### **Construction and Testing**

Grading and Foundation	2011-2012
Observatory Erection	2012-2016
Observatory Finish	2016-2017
<i>First Light</i>	<i>September 2018</i>

Operation	2018 – to be determined
Decommissioning	To be determined

TMT Observatory Corporation estimates that construction activities will take place 12 to 15 hours per day, seven days per week. Special operations and construction phases might require longer work days, while winter weather conditions will interrupt other work days until the dome is complete.

After First Light the telescope will be occupied and used continuously. Most staff will not need to visit the telescope on a daily basis, and the majority of operations and administration staff will work out of the headquarters at the University of Hawai'i, Hilo campus. Most of the daytime activities at the observatory will be associated with maintaining the facilities and setting up observational experiments. At night the observatory will be staffed by a small crew of six system operators.

A Notice of Intent to decommission the telescope must be given five years before the expiration of the lease, or the desired decommissioning date. This will be followed by environmental due diligence review and decommissioning and restoration planning. TMT will document the site prior to construction in order to provide a guideline for site restoration. A Decommissioning Review Process will be established to guide the activities; reviewers will include OMKM, Kahu Kū Mauna, and the Environment Committee. TMT will manage the process with oversight by OMKM.

## **IMPACTS AND PROPOSED MITIGATION MEASURES**

The CMP and supporting Subplans contain mitigative measures that seek to manage human impacts on natural and cultural resources within the Science Reserve. In addition to the broad reaching mitigation measures of the CMP and Subplans, the applicant proposes the following project-level mitigation measures:

### **Cultural Beliefs and Practices; Historic Resources:**

- Kahu Kū Mauna, a nine-member council selected on the basis of their awareness of Hawaiian cultural practices, traditions, will take the lead on advising OMKM and UH on cultural matters related to Mauna Kea.
- TMT is proposed for the 13N Site, where it will be removed from the culturally sensitive locations of Kūkahau`ula, Lake Waiau, or Pu`u Līlinoe.
- The Access Way was designed to limit impact on cultural resources by limiting it to one lane in places, following the same alignment as the existing 4WD road on the flank of Pu`u Hau`oki, and coloring the pavement to blend with the surroundings.
- Employees will attend mandatory cultural and natural resources training.
- The facilities will be furnished with items to provide a sense of place.
- Daytime activities at TMT will be minimized on up to four days per year, as identified by Kahu Kū Mauna.
- Outreach staff will work with the `Imiloa Astronomy Center and OMKM to develop information exhibits for visitors regarding the natural, cultural and archaeological resources of Mauna Kea.
- TMT will fund the re-naturalization of the closed Access Road on Poli`ahu, partially re-naturalize the Batch Plant Staging Area after construction, and camouflage the utility pull boxes in certain locations to reduce the visual impact from the summit area.

### **Biological Resources:**

- The Access Way has been designed to limit its effect on wēkiu bug habitat.
- An invasive species control program will be implemented.
- A ride-sharing program will be implemented to reduce traffic, dust, and noise.
- Arthropod monitoring will be performed prior to, during, and for two years following construction in the area of the Access Way on the alpine cinder cone habitat.
- The applicant will work with OMKM to develop and implement a habitat restoration study.

### **Visual and Aesthetic Resources:**

- The preferred site location is north of and below the summit.
- The dome has been designed to fit tightly around the telescope.

- The coating of the dome will be a reflective aluminum-like coating which will reflect the sky during the day, reducing visibility.

**Other Resources:**

- Wastewater will be collected and transported down the mountain for treatment as part of a “Zero Waste Management” policy.
- Employment opportunities will be filled locally to the greatest extent possible.
- TMT will dedicate funds to workforce development programs, including curriculum and program development.
- Employees traveling beyond Hale Pōhaku will take part in a mandatory ride-sharing program using project vehicles.
- Energy savings devices will include solar hot water systems, photovoltaic power systems, energy efficient light fixtures, and the use of Energy Star rated appliances.
- The project will place HVAC (Heating, Ventilating, and Air Conditioning) units indoors to reduce noise. Façade acoustical louvers and duct silencers will be used to further reduce noise.
- TMT will provide \$1 million annually, adjusted for inflation, for “Community Benefits Package” which will commence with construction and continue through the term of the sublease. The package will be administered via The Hawai`i Island New Knowledge (THINK) Fund Board of Advisors.
- TMT’s outreach office will work with OMKM and `Imiloa to support the development of exhibits regarding cultural, natural, and historic resources for the Visitor’s Center, TMT facility, and other appropriate locations.
- TMT will partner with other institutions to implement a Workforce Pipeline Program, headed by at least one full-time position through the Community Outreach office, to prepare local residents for jobs in science, engineering, and technical fields.
- There will be set minimum observation times for UH researchers; the amount will be negotiated as part of the sublease.
- The EIS has committed TMT to paying a “substantial” amount for sublease rent. The rent would be deposited into the Mauna Kea Land Fund, and only used for management of Mauna Kea.

TMT also proposes to implement the following project-level programs mitigation plans:

- A Cultural and Archaeological Monitoring Plan.
- An Invasive Species and Control Program.
- A Construction Best Management Practices (BMP) Plan.
- A Cultural and Natural Resources Training Plan for employees.
- A Materials Storage / Waste Management Plan, including a Spill Prevention and Response Plan.
- A Waste Minimization Plan, which will include the use of water-efficient fixtures, and incorporate audits of potable water use.



A complete list of proposed mitigation measures is included in the **Exhibits section of this report, pgs. 114-132 under "Summary of Impacts and Mitigation Measures"**. These mitigation measures will be incorporated as conditions of approval (should the BLNR choose to approve the permit) and would be monitored by DLNR staff and OMKM to ensure that they are being implemented.

## SUMMARY OF COMMENTS

Comments were received from the following agencies:

The Office of Conservation and Coastal Lands referred the application to the following agencies and offices for review and comment: DLNR – Land Division, Historic Preservation, DOFAW, Engineering; DBEDT – Energy, Resources, & Technology Division, Planning Office; Department of Education; Office of Hawaiian Affairs; University of Hawai'i - Institute for Astronomy, Hawaiian Studies, Environmental Center; US Fish and Wildlife Service; County of Hawai'i Planning Department; Hawaii State Public Libraries – State Library, Hilo, Kailua-Kona, Thelma Parker (Kamuela); Bishop Museum; US Senator Daniel Akaka; US Rep. Mazie Hirono; State Senators Kokubun, Takamine, Green.

A notice of the application was placed in the October 23, 2010 edition of the Office of Environmental Quality Control's *Environmental Notice*.

In addition, copies of the application were available for review at the Hawai'i State Library and the Kailua-Kona and Thelma Parker Public Libraries. A copy of the application was published on OCCL's website.

Public Hearings were held at Hilo on December 2, 2010, and at Kailua-Kona on December 3, 2010. Approximately 125 members of the public attended the Hilo meeting, with 51 persons providing oral testimony. Approximately 75 members of the public attended the Kailua-Kona meeting, with 33 members providing public testimony.

**The Exhibits section of this report, under "Public Comments" pgs. 169-268** contains a copy of all written comments on the TMT application. In addition, the University was able to prepare written responses to comments that were timely filed with OCCL, under **"University Response", pgs. 269-297**. The following pages of this report contain an overview of the comments that were timely filed on the TMT application followed by the University's written responses. OCCL notes that many comments arrived in our office after the comment period ended. Thus, the University did not prepare written responses to these later comments. All written comments may be found in Exhibits section of this report under "Public Comments" and "University's Response" and are also summarized below. OCCL considers and analyzes all written and oral comments (e.g., comments received during the two public hearings) entertained on this application. OCCL's commentary follows in subsequent sections of this report.

Following is a summary of the written comments:

### **Office of Hawaiian Affairs**

OHA recognizes that the BLNR approved a Comprehensive Management Plan and four Subplans, and that therefore a broad mitigation and management framework are in place to address the impacts of development on the mountain.

OHA believes that, when viewed in totality, the project has the potential to contribute to developing a new paradigm for the extremely sensitive nature of development on Mauna Kea, and looks forward to seeing this potential fully achieved.

#### **DLNR – Division of Forestry and Wildlife (DOFAW)**

DOFAW notes that the previously approved easement corridor for the power line has been surveyed and recorded. Not knowing the actual alignment makes it difficult to assess the potential impacts of the project, although the power line will pass through the Mauna Kea Ice Age Natural Area Reserve in some locations.

DOFAW also notes that the corridor has not witnessed any significant work in 20 years, and that erosion and settling have occurred. Access to the pill boxes will require improvements that might not fall within the 20-foot access corridor, and movement of heavy equipment over unstable terrain. DOFAW has the following recommendations:

- The formal land survey of the power line corridor must be completed; draft and final maps should be provided to DOFAW for comments and record keeping;
- Surveys for Wēkiu bugs and other invertebrates should be conducted along the easement corridor prior to any construction disturbance;
- HELCO and other contractors must be held to the same project construction mitigation measures outlined in the CDUA;
- Prior to construction, the Mauna Kea Ice Age NAR Archaeological Survey Report should be reviewed. Construction monitors, including one with archaeological expertise, should be provided;
- Improvements to the power lines should use construction practices that minimize potential disturbance to the corridor, such as using cranes on the Access Road to access pill boxes;
- The power line corridor should be restored back to its current condition after work;
- If access and line improvements prove to be too difficult on the existing corridors then the applicant should consider re-routing it.

DOFAW also notes that Wēkiu bug monitoring, general arthropod monitoring, and invasive species monitoring should occur across the affected environment.

#### ***Applicant's Response***

*The University will ensure that the survey of the power line corridor easement will comply with DLNR -Land Division and Department of Accounting and General Services' standards and in accordance with the conditions contained in the grant of easement (including the Mauna Kea Ice Age Natural Area Reserve) that was approved by the BLNR in August 1985. The University will provide copies to DOFAW as requested.*

*OMKM will consult with the U.S. Fish and Wildlife Service and experts who are advising OMKM, including representatives from the DLNR, on surveys of the wēkiu bug and*

*invertebrates regarding surveys along the utility corridor, including Pu'u Hau Kea and the pu'u west of the Parking Area 1.*

*The University will ensure applicable mitigation measures described in Section 4.2 of the CDUA will be implemented.*

*The archaeological consultants surveyed this area for the Natural Area Reserves System. Based on their survey, they have concluded that there are no inventoried historic properties within 100 feet of the HELCO easement in the Mauna Kea Ice Age NAR.*

*The University will review proposed construction practices, including the possible use of a crane to ensure minimal disturbance to the power line corridor.*

*The construction contractor will be required to minimize the visual changes to land within the utility line right-of-way during utility upgrades. Any disturbance outside of the easement area will be restored to the extent possible. However, continuing maintenance access will be needed in order for the easement to function as a utility corridor and some evidence of the facilities, such as manholes or utility boxes, will remain.*

*It is unlikely that the line improvements will prove too difficult along the existing corridor, but should this be the case, the University will consider re-routing as suggested if the additional (i.e., new) disturbance that re-routing would entail is acceptable to the Board of Land and Natural Resources.*

*The Invasive Species Prevention and Control Program calls for the type of monitoring for and eradication of invasive species that this comment suggests. The Office of Mauna Kea Management conducts annual surveys of the wēkiu bug and arthropods at Hale Pōhaku, summit batch plant and summit ridges, locations determined by scientists advising OMKM on wēkiu bug and arthropod matters.*

*As outlined in Chapter 5 of the TMT Management Plan, the TMT Management Plan will be updated every 5 years, as necessary, based on (a) updates to the Mauna Kea CMP; (b) based on strengths or weaknesses revealed through the monitoring and reporting program; (c) relevant new or modified laws, regulations, and policies; and (d) modifications to the operation of the TMT Observatory.*

*The existing Invasive Species Prevention and Control Program calls for the type of monitoring for and eradication of invasive species that this comment suggests. The Office of Mauna Kea Management conducts annual surveys of the wēkiu bug and arthropods at Hale Pōhaku, summit batch plant, and summit ridges, locations determined by scientists advising OMKM on wēkiu bug and arthropod matters.*

**DLNR – State Parks**

No comments

**DLNR – Land Division**

No comments

**DLNR – Engineering**

The applicant should provide the water demands and calculations to Engineering so it can be included in the State Water Projects Plan Update

**Applicant's Response**

*The TMT Corporation estimates that the proposed TMT Observatory and Hilo Headquarters will consume approximately 480 gallons per day and 1,600 gallons per day, respectively. It will provide updated estimates of the Project's water demand to the DLNR Engineering Division, as requested, upon the Project obtaining a CDUP and completing any design modifications related to CDUP conditions that might affect water demand by the Project.*

**DLNR – Historic Preservation Division (HPD)**

Project specific archeological reports were reviewed by HPD in 2009, and HPD believes that the information provided in the application is complete and accurate.

HPD notes that the application addresses the significance of the Kūkahau'ula TCP, which had not been fully recognized previously in the draft EIS. The proposed mitigation measures address the project-specific and cumulative impacts of TMT.

HPD will recommend that the Historic Preservation Mitigation Plan be specifically referenced by the Board as any condition of approval of the permit.

HPD appreciates that OMKM has been in contact with their office during the project development phase. HPD has no further comments, but assumes that the project will follow the Historic Preservation Mitigation Plan as well as other planning documents associated with the Science Reserve such as the Cultural Resources Management Plan.

HPD looks forward to receiving an Archaeological Monitoring Plan for review and approval prior to the onset of construction.

**Department of Health Clean Water Branch (CWB)**

CWB notes that the project will need to be compliant with the criteria set out in the Antidegradation Policy (HAR §11-54-1.1) and Designated Uses (HAR §11-54-3) regarding impacts on State waters.

The applicant will need to secure a National Pollution Discharge Elimination System (NPDES) permit for discharges of storm water associated with construction activities, and construction dewatering effluent. An NPDES individual permit might also be needed for other types of wastewater.

Additionally, all discharges must comply with State Water Quality Standards.

### **Applicant's Response**

*The applicant and the University understand that the proposed TMT Project is subject to other regulations as well, and it is the applicant's intention to comply with all federal, state, and county rules and regulations, including those cited. The Project will be applying for a NPDES general construction permit prior to performing any construction activities within the Conservation District, or elsewhere.*

### **County of Hawai'i Planning Department**

The Department has no objections to the proposed use.

### **Mauna Kea `Anaina Hou, The Royal Order of Kamehameha, Sierra Club, and Clarence Kukauakahi Ching**

The above hui opposes TMT as "there is no legal justification for more development on Mauna Kea, (and) therefore there is no legal justification for considering this CDUA." They ask that the BLNR deny the permit until the Intermediate Court of Appeals renders a decision on the Comprehensive Management Plan, as "submitting a CDUA ... burdens and prejudices the public and parties defending their case in the ICA."

Other points the letter raises include:

The TMT staff does not have the expertise to make such claims that TMT will not desecrate Mauna Kea. Mauna Kea is considered the Temple of the Supreme Being. It is the home of Na Akua (the Divine Deities), Na 'Aumakua (the Divine Ancestors), and the meeting place of Papa (Earth Mother) and Wakea (sky Father). The ceremonies and practices on Mauna Kea are practiced nowhere else, and formed the basis of the navigational knowledge that allowed Hawaiians to navigate over ten million square miles of the Pacific. Building TMT there is a desecration.

Mauna Kea is also home to some of the most unique, rare and fragile plant and animal species in the world. These include the `u`au (dark rumped petrel), palila bird, wēkiu bug, and silversword.

Mauna Kea is the principle aquifer for the island of Hawai'i. If these waters are contaminated, they can no longer be used for ceremonies, healing, and/or for drinking.

The letter also raises a number of quasi-legal issues. In brief: Unlike the summit district and the practices related to it, construction of astronomy facilities is not mentioned in any state statute or the constitution. It is not a protected public trust activity. TMT is not in compliance with State or Federal law. BLNR has not fulfilled court orders issued by Judge Hara. BLNR needs to comply with Hawai'i Supreme Court orders.

The group also objects to any project that will continue beyond the end of the current lease in 2033.

**Applicant's Response:**

*The applicant does note that the ICA case referenced in the comment is a challenge of the Board's decision to deny the request for a contested case.*

*Beliefs, and the feelings that accompany them, are highly personal and subjective in nature. The EIS and CDUA for the Project disclose that the summit region of Mauna Kea is a spiritual and sacred place for Native Hawaiians, relying on qualified sources for this opinion. By consulting with the holders of a broad variety of opinions about the Project and incorporating their feedback into its management of its leased land on Mauna Kea, UH believes the ongoing activities it has proposed will be beneficial to the mountain.*

*TMT Corporation has proposed on-site mitigation measures meant to reduce the effects of the TMT observatory construction. Examples of these include locating the observatory off the summit ridge (which is considered the most sacred area on Mauna Kea) and away from known historic properties and designing its Access Way so as to require a minimum of ground disturbance and alteration. It has also committed to additional measures (e.g., restoring the access road on Pu'u Poli'ahu).*

*Plans for the TMT Project include measures designed to avoid, minimize, and mitigate potential effects on the biological and environmental resources.*

*As a general point, the West Mauna Kea Aquifer that underlies the Project area is not the island's principal aquifer. In fact, the State Commission on Water Resource Management (CWRM) estimates that it accounts for only 1 percent of the total groundwater recharge that occurs on the island. Virtually none of the recharge to that West Mauna Kea Aquifer that does occur is in areas affected by the proposed Project. Instead, it takes place at lower elevations (especially in the 2,000' to 5,000' range) where rainfall is much higher.*

*As it stands the presence (or absence) of observatories is a matter that will be decided by the State in accordance with applicable laws and regulations.*

*It is not within the scope of this CDUA to speculate on the nature or outcome of those future lease negotiations, which would include a master lease negotiation between DLNR and UH and the subsequent sublease negotiation between UH and TMT. The Board of Land and Natural Resources must review and approve all new leases for State Land, including areas that will be needed for the proposed Project.*

**KAHEA, The Hawaiian-Environmental Alliance**

KAHEA opposes the proposal. The complete eight-page letter and the applicant's response are contained in the Exhibits section of this report (Public Comments). The main points KAHEA makes is that:

1. TMT contributes to the substantial, adverse, and significant impact of telescopes
2. Substantial, adverse impacts are not permitted in the conservation district.
3. TMT is offensive

4. Flawed processes and conflicts of interest plague summit management
  - Management Plan and Subplans not finalized
  - TMT agrees management plan is not comprehensive
  - The University serves conflicting interests
5. Significant questions remain unanswered
  - Why is UH submitting an application on behalf of TMT?
  - How does the University rationalize serving the conflicting roles of “applicant” and “manager?”
  - What is the carrying capacity for the summit?
  - How many telescopes are currently on the summit?
  - How big is the TMT?
  - Why did Kahu Kū Mauna only get four days (for cultural practice)?
  - What is the overall noise level, in dBA, of the TMT?
  - Where is the “approved landfill” for waste located?
  - Where would the TMT dispose of the toxic chemical wash?
  - How does the TMT manage not to cause substantial adverse impact?
  - How can the TMT be built and ... natural beauty and open space characteristics be approved upon?
  - If the University holds a lease for “one observatory how can it be that more than 13 subleases have been issued?
  - How can TMT ensure that it will not be materially detrimental to the public health, safety, and welfare?
  - What is the decommissioning plan for the TMT? Did the TMT commit to begin decommissioning by 2028? Did the TMT commit to fully restore the northern plateau by 2033? Does the TMT hope to stay pass (sic) the expiration date of the lease in 2033?

***Applicant's Response:***

Following is a summary of the applicant's response to Kahea. The applicant's complete response can be found in the Exhibits section of this report.

1. *The EIS and CDUA indicate that the existing cumulative impact to certain resources is already adverse and significant but conclude that the Thirty Meter Telescope Project, when considered in conjunction with other foreseeable actions, would not significantly increase or reduce the existing level of cumulative impact.*
2. *KAHEA's assertion that the Department cannot legally grant the TMT a permit to build in the Conservation District, no matter how well it mitigates its negative impacts, is incorrect.*
3. *KAHEA's belief is acknowledged. UH and the TMT Corporation believe that the construction and operation of the TMT, and the associated management activities, will have a net benefit to the Conservation District.*
4. *Neither the CMP nor the subplans are “currently undergoing legal review.” All have been approved by BLNR. BLNR denied certain individuals a contested case request on the management plans, a decision which as upheld by the Circuit Court of the Third Circuit on January 27, 2010.*



- *The second assertion is completely incorrect, and suggests that the commenter does not understand the scope of the CMP.*
  - *The proposal does not seek to advance University interests at the expense of other important values. All fees including sublease payments are to be deposited into the Mauna Kea special land fund and are to be used for managing Mauna Kea lands.*
5. *UH was the proposing agency because it holds the lease on the lands under consideration. TMT Observatory Corporation applied to UH through the Master Plan project review process, which included public input and review. UH approved the TMT Project through that process.*
- *The University, through OMKM, takes its role as manager of its managed lands on Mauna Kea seriously. This role is subject to oversight by the Board of Regents and ultimately the BLNR.*
  - *The carrying capacity of Mauna Kea for observatory development is large but difficult to define precisely.*
  - *There are eleven observatories and one radio telescope on Mauna Kea.*
  - *The University is requesting permission for long-term use on 8.6 acres, and temporary use on 4 acres.*
  - *SHPD suggested four days as an appropriate amount to set aside. These are days that TMT will minimize its activities; cultural practices will not be restricted on other days.*
  - *The HVAC system exhaust might reach 55 dBA. Figure 3-36 of the FEIS shows noise impacts.*
  - *The County of Hawai'i operates two landfills, one in South Hilo and one in Pu'uana'hulu.*
  - *Wastewater from existing observatories is treated at Hilo Wastewater Treatment Plant. It is possible that different options will be available when the first wastewater is generated.*
  - *The lease that the University holds does not limit astronomy use to "one observatory."*
  - *Decommissioning is discussed in Section 4.5.2 of the TMT Management Plan. Steps will include preparation of a Site Decommissioning Plan (SDP), a Notice of Intent (NOI), Environmental Due Diligence Review, a Site Deconstruction and Removal Plan (SDRP), and a Site Restoration Plan (SRP). It is not within the scope of this CDUA to speculate on the nature or outcome of future lease negotiations, which would likely include both a master lease negotiation between DLNR and UH and the subsequent sublease negotiation between UH and TMT.*

**E. Kalani Flores (Assistant Professor, Hawai'i Community College), B. Pualani Flores (Ike Hawai'i Resource Teacher)**

The Flores `ohana opposes TMT for the following reasons:

- *The TMT FEIS is incomplete as it does not consider or disclose the impacts of the project on the ancestral akua. The process of consultation with those recognized as the ancestral akua and spirits of Mauna a Wākea has not been done by the applicant.*

The Flores offered testimony from Mo`oinanea, the guardian of Lake Waiau, who offered her concerns via an individual who has the ability to interact and communicate with ancestral akua. The goddess stated that the project will obstruct the *piko* on top of the mountain and block the *piko*/portal to connect with Akua (Creator) and `Aumākua (Ancestors). This is a major portal for life forces that flow into the island, and blocking it will bring much change, none of it positive.

The Flores' recommended that BLNR conduct a site visit to the mountain, and that the applicant erect a temporary framework of pvc pipe or similar materials to provide a realistic perspective.

### ***Applicant's Response***

*We must respectfully disagree with your statement that the TMT Final Environmental Impact Statement (FEIS) is an incomplete document. The Governor of the State of Hawai'i accepted the document on May 19, 2010, and the time for legal challenge has passed.*

*While we cannot evaluate the statements attributed here to the akua, we would note that the FEIS and CDUA provide extensive consideration of the spiritual, religious, and cultural importance of Mauna Kea to a number of groups who have carried out traditional practices in the summit region. For example, an extensive Cultural Impact Assessment (CIA) can be found at Appendix 0 of the FEIS. In addition, the Executive Summary and Section 3 of Volume I of the FEIS contain detailed presentations on these topics as well as interviews with modern-day practitioners and other persons who have identified Mauna Kea as a locus for activities important to their cultural beliefs and practices.*

### **Cliff Souza**

Mr. Souza opposes TMT. He notes that 4 men died during a fire ten years ago at Subaru, and that the fire engines could not reach the scene as no access was provided. No construction should start until fire engine access and water supplies are provided.

### ***Applicant's Response***

*Fire trucks and personnel have unrestricted access to the Mauna Kea summit region. The roads, including the new TMT Access Way, allow for fire truck access to all developed areas in the Mauna Kea summit region. The response time for the County Fire Department is likely well over an hour due to the distance and road conditions. Therefore, UH and the observatories also have an agreement with the U.S. Army that allows its fire-fighting crew at the Pōhakuloa Training Area (PTA) to assist with fire emergencies.*

*Unfortunately, even the crew from PTA would likely take 45 minutes to reach the summit region. That is why additional fire-detection/fire-suppression measures are discussed in the Project EIS and incorporated into the TMT Observatory's design.*

### **Matt Binder**

Mr. Binder supports the project. As a science teacher he is thrilled at the opportunity for breakthrough research occurring here. He notes that all the telescopes combined make up a tiny fraction of the summit area, and cannot be blamed for any troubles the wēkiu are having.

### **Tom Peek**

Mr. Peek was a guide for Mauna Kea observatories from ten years, starting in 1988. He opposes TMT, and questions whether OCCL staff are experiencing undue pressure from UH Officials, DLNR superiors, influential Land Board members, Hawai'i's Congressional delegation or other political elites, or the construction industry<sup>8</sup>.

Mr. Peek states that the DLNR approved a fundamentally flawed and inadequate comprehensive management plan, and that DLNR failed to require that TMT submit a Federal EIS.

Mr. Peek also quotes a 2005 Audit, writing "To reverse this "lax attitude", the Auditor urged the department to write its own comprehensive management plan for the mountaintop: "The Department is required to prepare a comprehensive management plan for areas in the reserves system and is empowered to enforce the laws, rules and regulations applying to the reserves." (p.32)

### ***Applicant's Response***

*The statement by the State Auditor, found under the heading "A comprehensive management plan for the Mauna Kea Ice Age Natural Area Reserve has yet to be developed", clearly refers to the lack of a comprehensive management plan for the Ice Age Natural Areas Reserve (NAR). It does not refer to the Mauna Kea Science Reserve (MKSR), which is not part of the NAR.*

### **Fred D. Stone, Ph.D.**

Mr. Stone opposes TMT for the following reasons:

- The public hearings held in Hilo and Kailua-Kona do not replace the public hearing required by the BLNR when it considers TMT.

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<sup>8</sup> OCCL staff would like to state unequivocally that the assessments in this report are his own, and that he experienced no pressure from his superiors, the University, members of Congress, Land Board members, contractors, nor any "political elites" in reaching any of the conclusions found herein ( - Michael Cain, January 22, 2011).

- It is a violation of State Administrative Rules for BLNR to consider TMT as the required CMP is still under litigation.
- The UH CMP is referred to as the "Mauna Kea CMP" when in fact it only covers land leased to UH on Mauna Kea and not the whole mountain.
- Telescope construction is not included in the CMP in a comprehensive manner.
- There has been no Federal EIS or EA.
- This plan surpasses the limits set on telescopes.
- The Lease ends in 2033.
- Baseline inventories need to be done at Hale Pōhaku, the road corridors, the staging sites, and the telescope site itself.

### ***Applicant's Response***

*At no point does the CDUA state or imply that the University can make commitments for land (e.g., the Natural Area Reserves) outside its control.*

*The other concerns have been addressed previously.*

### **Deborah Ward**

"OMKM had convened a wēkiu bug committee, which included Fred Stone and Frank Howarth, two of the scientists who recorded multiple thousands of the organisms unique to the Mauna Kea summit, in 1982, while conducting studies that led to an EIS, and subsequently to the recommendations in the Mauna Kea Science Reserve Complex Management Plan... After a precipitous decline in observed wēkiu numbers, the wēkiu bug was considered for listing as an Endangered Species, and had been Category 1 (highest eligibility for listing). Negotiations between OMKM and USFWS have led to a downlisting of the wēkiu bug status, but recovery efforts are ill-defined. "

### ***Applicant's Response***

*The University shares Ms. Ward's continuing interest in the status of wēkiu bug populations. UH would like to clarify a few points mentioned in her comments.*

*The U.S. Fish and Wildlife Service determined that the wēkiu bug is a candidate for federal protection. Candidates are not categorized as either threatened or endangered. They are only categorized by priority. The wēkiu bug priority is an 8; low in priority. The determination of endangered or threatened is made when the species is listed.*

*"Category 1" is a term that has not been used by the USFWS for over 10 years; when it was used it did not mean "highest eligibility for listing." What it meant is that there was not enough information to consider the species for listing. Thus, there has not been a down listing of the wēkiu bug status because it was never listed. The USFWS has set the priority for listing at 8 due to the relatively low magnitude of the threats and the fact that threats did not occur throughout the species range. All candidate priority numbers are based on this type of threat assessment, not on negotiations.*

*Dr. Stone and Dr. Howarth participated in the 1982 survey of the wēkiu bug. During that survey multiple thousands of wēkiu bugs were not only recorded, but captured. In a subsequent survey there appeared to be many fewer wēkiu bugs. However, it is not certain whether this resulted from differences in natural environmental factors such as the amount of snowfall, the development of observatories, the trapping and removal of significantly large number of wēkiu bugs during the surveys, or a combination of these and other factors.*

*The TMT Project will not have a negative impact on the wēkiu bug, and TMT has agreed to work with OMKM on the development and implementation of a habitat restoration study.*

As mentioned on page 22 of this report, the following comments came in after the public comment period ended on December 3. Thus the University did not prepare a written response. However, all comments and concerns are addressed by OCCL in our analysis of conservation criteria, conclusion, and recommendations.

#### **Sierra Club Moku Loa Group (Nelson Ho, Chair)**

Sierra Club opposed the TMT for the following reasons:

- The CDUA is legally deficient, and contains insufficient information to allow BLNR to make an informed decision.
- There is an unresolved issue of how long the proposed facility will stay on Mauna Kea.
- There is insufficient disclosure of a major, new policy change in the management of Mauna Kea.
- The BLNR should not allow UH to front for the TMT with this CDUA.
- Without a Board discussion on the lease options ... the discussion on monetary requirements and 'community benefits package' are merely anomalous handouts.
- DLNR has its own procedures and rules to insure that Hawaiian cultural rights are preserved on state land. SC is concerned that you will be violating them if you approve this CDUA. Who is the Kahu Kū Mauna and can they determine the cultural rights and practices for all Hawaiians AND the public on Mauna Kea?

#### **Kona-Kohala Chamber of Commerce (KKCC)**

KKCC represents over 540 business members, and expresses full support for TMT. It will create exciting educational opportunities for our children, and support the local economy with high paying jobs.

#### **The Pacific Resource Partnership (PRP)**

PRP represents 240 union signatory contactors and the Hawaii Carpenters Union. PRP supports TMT, and feels that the Construction Plan is well thought out and will serve as a strong guide in complying with mitigation measures.

The Carpenters Union, Local 645, testify that 69% of their Hilo members and 91% of their Kona members are unemployed. Construction jobs have been the hardest hit in the on-going economic downturn. The TMT project will cost over \$1 billion dollars, most of which will be federal money infused into the State and County. Material and equipment will be bought locally. Jobs will be created for construction workers, administrative and financial workers, mechanical engineers, software and IT engineers, steelworkers, electricians, plumbers, heavy equipment operators, laborers, trucking and shipping service workers, paramedics, security personnel, and vehicle mechanics.

Construction crew personnel are expected to receive union wages.

**Hugh Y. Ono**

Mr. Ono supports the project.

**Roberta Chu**

Ms. Chu believes that there has been a paradigmatic shift in how development is handled on Mauna Kea, and supports the project.

**Cory Harden**

Mr. Harden states that the project is "about making the illegal occupier of Hawai'i, the United States, world astronomy's top dog." Opposes TMT.

**Richard Ha**

Mr. Ha testifies "we have a unique opportunity for change, where we can utilize these gifts so the economy can give, give, give and the culture can receive, receive, receive." He offers that TMT represents a patch to a brighter tomorrow, and supports the proposal.

**Kukauakahi (Clarence Ching)**

"The relationships acquiesced to by this CDUP could create dangerous hurdles for BLNR/DLNR, and has an odoriferous smell." Mr. Ching's complete testimony on privity, liability, credit and finance, banking feasibility, and fiduciary responsibilities can be found in the Exhibits section of this report (Public Comments). He opposes TMT.

**Hawaii Island Chamber of Commerce**

The Chamber represents 300 member businesses comprising more than 700 individual members. They estimate that 300 construction jobs will be created during the eight to ten years of the project's construction, and 140 full-time employees. They believe that TMT will contribute to diversifying the Hawaiian economy, and support the project.

**Nimr Tamimi**

Mr. Tamimi believes that TMT is committed to proper environmental stewardship and the concept of sustainability planning, and supports the proposal.

**Roxanne Kapuaimohalaikalani Stewart**

“As a practitioner of Kanaloa and of Laka, of Ku and of Hina, and as educator of young Hawaiians,” Ms. Stewart charges the Board to deny the proposal. She points out that “Once two stories of `aina has (sic) been unearthed and thousands of feet of sacred grounds has been demolished, there is no un-doing of these actions. The mountain is changed forever, the alignments are lost forever, the watershed is altered forever”

**Gene Leslie, VP Hawaiian Civic Clubs, President Hawaii Land Council**

“Because of open and transparent dialogue, we trust TMT in their commitment to be good stewards on Mauna Kea.”

**Gene Barber**

Mr. Barber is a volunteer at Imiloa, and feels that TMT is a most desirable project for Mauna Kea, a win-win situation for Hilo and Hawai`i.

**Vaughn G. T. Cook**

Mr. Cook is pleased to see the progress that has been made and is confident that TMT will be a good steward of the mountain. He has come to know people involved in the project, and testifies that they are “capable and reasonable people of the highest integrity who have the best interest of the entire community at heart.”

**Jerry Chang, State Representative, 2<sup>nd</sup> District**

Rep. Chang writes that “this is Hawaii’s opportunity to show the world that we can, at once, support the advancement of science while preserving and respecting the host culture.” He supports TMT.

**Hawaii Island Chamber of Commerce**

The Chamber has supported TMT from the very beginning due to the tremendous economic impact the project will have on the island for generations to come.

**James Albertini, Maui `Aina Center for Non-violent Education & Action**

The current state of Mauna Kea represents a microcosm of our planet heading off the cliff of Global Warming due to over-development. It is shameful that we disregard the host culture out of concern for science, prestige, and money. It is sinful. “The irony is that looking into the heavens will be our downfall because we have not shown respect.”

**Sara Peck**

Ms. Peck testifies that CEO's of tech companies don't want to locate to Hawai'i because we don't have the educational capacity to provide employees for high tech industries. She feels that TMT, and their support for the schools, could help change this. She supports TMT.

**Andrew Chun**

Mr. Chun believes that Hawaiians are open to change, and always have been, and that the ancestors would be supportive. He believes that we can be better stewards as we move forward, and supports TMT.

**Newton Chu**

Mr. Chu supports TMT. He would like to see astronomy move forward, and for our children to have jobs that would allow them to stay.

**Stephen Yee**

In this time of economic need, the opportunities TMT provides to the community cannot be missed.

**David A. Byrne**

Mr. Byrne believes that traditional culture, environmental concerns, and astronomy can coexist on Mauna Kea. He supports TMT.

**Inge Heyer, Chair of Mauna Kea Observatories Outreach Committee**

Ms. Heyer is impressed that the TMT team has been active in local outreach, and been an integral part of the community, from when they first arrived. She supports TMT.

**Jacqui Hoover**

Ms. Hoover's family hails from Waipi'o Valley; their oral history includes references to Mauna Kea and Poli'ahu. She writes, "My kupuna always thought and strategized in future tense – looking many generations forward. It is in keeping with this tradition, my education and training, and with the greatest respect for Mauna Kea and my kupuna that I support this conservation district use application."

**Contested Case requests were part of the testimony from Mauna Kea `Anaina Hou, Fred Stone, KAHEA Environmental Alliance, Clarence Kukauakahi Ching, and Sierra Club.**



## PUBLIC TESTIMONY

Public Hearings were held at Hilo on December 2, 2010, and at Kailua-Kona on December 3, 2010. The Hearings were noted in the paper of record. Approximately 125 members of the public attended the Hilo meeting, with 51 persons providing oral testimony. Approximately 75 members of the public attended the Kailua-Kona meeting, with 33 members providing public testimony. There was a small amount of overlap between speakers at the two meetings.

Below is a brief summary of who spoke, and their position. It is not possible to give a complete accounting for each person; our hope here is to show the breadth and variety of views on the proposal. OCCL recorded the meetings, and the tapes will be part of the permanent file. Staff believes that all issues are addressed by OCCL in our discussion of the project (see **Conservation Criteria, Conclusion, and Recommendations**, pgs. 45-66).

### Hilo

**Ross Wilson.** Supports TMT. Believes that they have established a new paradigm with their listening sessions, support for the community, and willingness to care for the mountain's resources.

**Roberta Chu.** Supports. Notes that lease negotiations will be open and transparent.

**Mike Kaleikini** (for Jackie Hoover). Supports. TMT is a modern way for *mo`opuna*<sup>9</sup> to carry on ancient traditions. This allows us to carry on traditions that we begun centuries ago. Perhaps one day wayfaring will extend out towards the skies.

**Skylark Rossetti** (Mahi Lineage). Supports, but make sure things are done pono. Kupuna in the district have no problem, and are more concerned with the future of the *mo`opuna*.

**David Byrne.** Supports. Traditional culture, environmental protection, and science can coexist on the mountain with proper management and appropriate mitigation.

**Frank Commendader.** Supports. Children and grandchildren moved 'cause no more work.

**Samuel Kaleiliki** (Kingdom of Hawai`i). Opposes TMT. Prayed to Jesus in the House of Nobles. Doesn't support anything America puts before us. This gathering is run by immigrants. People need to go back to the dirt and start planting.

**Mike Gleason** (Hawai`i Island Chamber of Commerce). Supported this from the beginning.

**Miles Yoshioka** (for State Rep. Jerry Chang). Supports. Submitted written testimony.

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<sup>9</sup> grandchildren, descendants; descendants two generations on.

**Deborah Ward.** Opposes. Asks for a Contested Case (OCCL presumes this request is on behalf of Sierra Club). Project ignores due process, CDUA is not applicable, the project isn't funded, TMT doesn't comply with NEPA, she's on the Environment Committee but OMKM ignores her suggestions.

**Cory Harden.** Opposes. This is about making the illegal occupier of Hawai'i the top dog internationally. UH violates laws for public trust land. This should discuss decommissioning in 2033 when the current lease ends.

**Fred Stone.** Opposes. Wants to know what the relationship is between Master Plan 2000 and CMP. Master Plan never went through the BLNR approval process, but CDUA is relying heavily on the plan. TMT also needs a federal EIS as there are federal funds involved, and this is grounds for a lawsuit.

**Inge Heyer.** Supports. TMT has volunteered to help many vital scientific education and literacy projects to survive. Their actions have shown beyond a doubt that they have a commitment to education on the island, and looks forward to the discoveries TMT might make.

**Tom Peek.** Opposes. Telescope limits have been sidestepped, there are inadequacies in management, the Department has not embraced its role as landowner.

**Catherine Robbins.** Opposes. There are twenty telescopes and the mountain is legally overbuilt.

**Jon Miyata** (Hawai'i Chamber of Commerce). Supports. Project will lead to 300+ direct and ancillary jobs.

**Wallace Ishibashi** (Poliahu Lineage). Supports. We must continue our search for knowledge, and he is proud that Hawai'i has the opportunity to do this.

**Sally Miller.** Opposes. This is not needed. This is a sacred mountain. There are environmental safety issues regarding digging into the soil. This mars the beauty of the mountain. It only provides jobs for scientists. Let people be farmers,

**Galen Kelly.** Opposes. Other kupuna are misguided. We are violated by the desecration of the sacred mountain, which is symbolic of the violation of the people. We should be able to go up and talk to god, to see god. There are also access issues.

**Kini Burke.** Opposes. Enough is enough.

**Bob Lindsay** (OHA Trustee). Supports. The framework for the protection of the mountain is now in place, and he wants to see its potential achieved.

**Jim Albertini** (Malu `Āina). Opposes. This type of industrial development is an environmental disaster. There is no study on carrying capacity. The host culture says the mountain is sacred. Science is all about prestige and money.

**Nelson Ho** (Sierra Club). Opposes. CDUA has insufficient information. There are unresolved issues of how long construction and lifetime of project will be. This represents a heavy industrial use forever. Says Hawaiian cultural rights must be preserved, and wonders who Kahu Kū Mauna is, and how they can represent Hawaiians.

**Kealoha Pisciotta** (Mauna Kea `Anaina Hou). Opposes. These proceedings violate due process and prejudice us as plaintiffs. Deny TMT for three reasons: There are legal issues involved, there is no federal EIS, the users are the parties who define desecration, and this cannot meet the 8 Conservation Criteria in HAR §13-5. "Creating jobs" is not a conservation criteria. You keep cutting up the culture, but where is the integrity for the sacred?

**Jim Kennedy**. Supports. TMT sets new standards of excellence.

**Nimr Tamimi**. Supports. Notes that there are cumulative impacts from hikers and skiers, yet these activities are allowed. Notes that there are numerous monitoring and environmental protection activities proposed.

**Hanalei Fergstrom**. Opposes. This is the Temple of Lono. We should spend more time correcting the known problems. The State of Hawai'i does not own the land; people of Hawai'i are only trustees and they don't have the right to give it away.

**Ronald Fujiyoshi**. Opposes. This is a monstrosity; Mauna Kea is a temple under siege.

**David Deluke**. Supports. There have been wrongs in the past, there will be mistakes in the future; the best we can do is learn from our past and attempt to apply that for the future. Is glad that there is dialogue. Feels that, at this point and time, TMT is needed.

**Mahina Patterson**. Opposes. Asks how to integrate science and culture. Telescopes have a direct cultural impact; the view of the telescopes on the mountain marred her understanding of her relationship with the akua and herself. This is not integration, this is desecration.

**Jessie Cleghorn**. Opposes. Utterly ashamed of what her government and her school have allowed to happen. The complete dominance of an externally focused industry on the most sacred lands Hawaiian have is ultimate environmental racism and injustice. Our worldview as Hawaiians is based on the indigenous, scientific, and spiritual scientific understanding of the importance of unaltered undeveloped land.

**Kaleo Lum**. Opposes. This strikes at our heart. There is a fine line between traditional rights and modernization. You need to respect the native people of this land. A people that have been ignored for centuries are asserting their rights.

**Dean Au** (Hawaiian Carpenters' Union). Supports. We need this work.

**Nancy Cabral**. Opposes. She rode Mauna Kea Road on horseback, and understands its value.

**Roxanne Stewart**. Opposes. As a science teacher, she knows how these projects leave nothing but decimation in their wake. Any decision but denial would destroy a precious resource.

**Randy Kurohara** (Japanese Chamber of Commerce). Supports. TMT provides economic opportunities that we direly need. Tourism is not a sustainable driving economic device.

**Keo Van Gogh** (Mauna Kea `Anaina Hou). Opposes. If somebody submits a CDUA then the top tier thing would be to see if they meet the 8 criteria; then we wouldn't need to spend tax payer money fighting this and UH wouldn't need expensive lawyers.

**Kihei Soli Niheu** (NFIP). Opposes. When haole say "aloha" they don't mean it, because they don't live it. People misuse the term Hawaiian. You are American if you support the US Constitution, but you are not Hawaiian just because you have the koko. Don't say "indigenous" because that means "without soul" in Latin. Hopes young people carry on their beliefs. Struggle for independence is a long road.

**Kukauakahi**. Objects to the Hearings. Under the Hawaiian Kingdom this is not a valid process, so he submits his testimony under protest.

**Kimo Lee**. Supports. These hearings shouldn't divide people. If the children can participate it will make him happy.

**Kristine Kubat**. Opposes. This is like geothermal, where "people like me, haole from the mainland, had to back up the Hawaiians. We took it to the line. Bring it on – your telescope will not be built."

**Paul Neves** (Royal Order of Kamehameha). Opposes. This project does not meet the 8 Conservation Criteria in HAR §13-5. Demands that DLNR does their job. DLNR are supposed to be our *konohiki*.

**Chad Kalepa**. Supports. Hawaiians shaped the land – look at adze quarries, or fishponds, or lo'i. There is a change in the way things are being done on Mauna Kea. He believes we should be advocates for good stewardship. He is part of Kahu Kū Mauna, and they don't rubber stamp projects, and he invites the young people to be part of the process.

**Isaac Kawika**. Opposes. As a soldier in Afghanistan he learned to win the hearts and minds of the people by manipulating their greed and then stealing their land. It is the same thing that TMT is doing here. He came back to Hilo to find a war going on at home.

**Denise Reggetti**. Opposes. End the military occupation of Hawai'i now.

**Kyle Kimura.** Supports. Has been at `Imiloa for ten years. Testifies that TMT has done things differently.

**Cristal.** Opposes. The voices for the land speak from the heart, not from a script. TMT is a piece of crap.

**Pete Lindsey (Local 3).** Supports.

### Kona

**E. Kalani Flores, B. Pualani Case, Kapulei Flores, Hāwane Rios.** Oppose. Submitted written testimony. The cumulative impacts are substantial, significant, and adverse. The FEIS is incomplete as there is no consultation with the akua or any ancestors, directly or indirectly. The summit of Mauna Kea is the piko of the island, and if it is blocked then the reaction will be manifested in the elements.

**Mike Kido (Pacific Resources Partnership).** Supports. Has reviewed the Construction Plans.

**Bob Trubell (Small Farmer).** Supports. Society deserves the best science possible. TMT is good, but must follow the proper protocols.

**Bob Meierdiercks (Hawaii Carpenters' Union).** Supports. 90% of their workforce is unemployed, over 200 have been unemployed over 2 years. All ethnicities in Hawai'i have worked on the mountain on the other telescopes. TMT will benefit all.

**Jacqui Hoover.** Supports. TMT is fully consistent with purposes of Conservation District. Family is from Waipi'o Valley & believe in respecting tradition and remaining relevant in the 21<sup>st</sup> Century.

**Greg Chun.** Supports. This is about our relationship with the mountain. This was a use by our kupuna. Every important activity always occurred in the most sacred of places. They can coexist.

**Vivian Landstrom.** Supports. Bring high tech jobs back to Hawai'i. Our children can come home.

**Richard Ha.** Supports. Those on the lowest rungs of the economic ladder will be the first to suffer when the economy is hard, many of these are Hawaiian. TMT will benefit all.

**Gene Leslie.** Supports. 35 years with the Civic Club. After many years of open dialogue they trust TMT to be respectful stewards.

**Bob Lindsey (OHA).** Supports. TMT affords us the opportunity to continue to create a new paradigm for sensitive development on Mauna Kea.

**Dennis Rattinger.** Supports. He has no outside agenda and represents no group. Feels that if the past Polynesian navigators were here they would support TMT.

**Marni Herkes.** Supports. Sometimes we are guilty of not setting high enough expectations for our young people. They can achieve high standards if given the chance. Supporting educational opportunities like TMT is a step in developing upstream programs that will provide downstream benefits.

**Sarah Peck.** Supports. Her passion is education, and the educational system will benefit from TMT.

**Cindy Armer.** Supports. We need to increase educational opportunities on island.

**David B. Gomes.** Partially supports. The Universe is a sentient being. We are responsible for our part in the universe, and everything we do. The TMT is not necessary. It will not open the third eye, but it does improve our scientific and religious knowledge? Mauna Kea is sacred and part of the ley lines. Science and religion are not different. The government also hides knowledge of the E.T.s around us. We should work together.

**Anne E. Field-Gomes.** Supports. Thinks these opportunities are wonderful, and is amazed to think that today's children could help discover things unknown to us.

**Russ Robinson.** Supports. The host culture takes *mana* from the sky, and we could do the same. The glaciers came and went. The ocean dropped 300 feet and rose again. Asteroids destroyed life. The earth survived. And Mauna Kea survived.

**Alfredo Gormozano.** Opposes. Spent days and nights on the mountain asking for guidance in his prayers. Wondered how many planners have done this. Can planners see that there is a lot outside of science? We don't need more destruction to create jobs. Jobs will come and go, but the telescopes will stay. If we're going to develop, we need to connect first.

**Donna Worden** (Kohala Health Library). Opposes. Was educated in biophysics. People on the mountain now don't pay fair rent, and they don't take care of the place. The photos in the papers never show the whole mountain. This project might give five people a job for a couple years. We need to grow more food, but not put up more telescopes.

**Kihei Soli Niheu.** Continued testimony from previous evening. He was the founder of Hawaiian Studies program. This history of America was built on slavery thievery rape and incest. It was built on lies, so when the government comes in they lie. Wants to know what the probity is between UH and TMT.

**Mahi** (?) The mountaintop is gone, so he can't fish. Fresh water comes from Waiau.

**Kealoha Pisciotta.** Continued testimony from previous evening. States the Batch Plant will be placed in the adze quarry, that the CMP was written by a public relations firm,

that not a single astronomer has gotten up to support the project, and that TMT is a "test bed" for a 100 meter or 200 meter telescope.

**Chad Baybayan.** Supports. We can start to remove telescopes that are less optimal, and start migrating off the summit ridge and onto the plateau. Also notes that TMT will pay higher rent than the existing facilities, and that people "complain about the one dollar but shoot down the million dollars."

**Josephine Keliipio.** Opposes.

**Deborah Ward.** Opposes. Continued testimony from previous evening. Written testimony attached.

**Kukauakahi.** Opposes. Continued testimony from previous evening. Written testimony attached.

## ANALYSIS

OCCL notified the applicant on October 14, 2010 that:

1. The project is an identified land use pursuant to HAR §13-5-22, Identified Land Uses in the Resource Subzone, R-3 ASTRONOMY FACILITIES, (D-1) *Astronomy facilities under an approved management plan*. This land use requires a permit from the Board of Land and Natural Resources (BLNR). The Board has the final authority to grant, modify, or deny any permit application.

The BLNR approved the Mauna Kea Comprehensive Management Plan on April 9, 2009. The BLNR required the University to submit four sub-plans: a Natural Resources Management Plan, a Cultural Resources Management Plan, a Public Access Plan, and a Decommissioning Plan. The BLNR approved the four sub-plans on March 25, 2010.

2. The Chair of the Board of Land and Natural Resources authorized OCCL to conduct a Public Hearing pursuant to HAR §13-5-40 HEARINGS (a) *Public hearings shall be held (4) On all applications determined by the chairperson that the scope of proposed use, or the public interest requires a public hearing on the application.*

Public Hearings were held at Hilo on December 2, 2010, and at Kailua-Kona on December 3, 2010. The Hearing was noted in the paper of record. Approximately 125 members of the public attended the Hilo meeting, with 51 persons providing oral testimony. Approximately 75 members of the public attended the Kailua-Kona meeting, with 33 members providing public testimony.

3. Pursuant to HAR §13-5-31 (4) *Permit applications*, the permit required an environmental impact statement (EIS).

The Final EIS and associated ancillary documents were prepared under the supervision of the University of Hawai'i at Hilo, and were published in the May 8, 2010 edition of the *Environmental Notice*.

Notice of CDUA HA-3568 was published in the October 23, 2010 issue of the *Environmental Notice*.



## CONSERVATION CRITERIA

The following discussion evaluates the merits of the proposed land use by applying the criteria established in HAR §13-5-30.

**1. *The proposed land use is consistent with the purpose of the Conservation District.***

The objective of the Conservation District is to conserve, protect and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare.

As discussed earlier, BLNR has approved the Comprehensive Management Plan and four associated resource sub plans to serve as a management framework for development in the Mauna Kea Science Reserve. All land uses and activities that take place within UH managed areas will be evaluated according to these plans and processes, subject to future modifications based on an adaptive management framework.

OCCL believes that astronomy is both an environmentally and economically sustainable use. In terms of the environment, it does not extract resources, nor consume significant resources once constructed. The TMT will have significant power requirements, but will not be a major contributor of greenhouse gasses in and of itself. The observatory will not be built in critical habitat for any species of concern, nor in an ecologically vulnerable area. It has a decommissioning plan associated with it which calls for the area to be restored to its existing condition once the observatory's lifecycle is complete.

Economically, the observatory will bring significant funds to Hawai'i and will provide needed blue-collar and professional jobs.

In addition, the financial and other resources that TMT will bring will improve the University's ability to implement many of the management plan actions.

OCCL has heard no credible testimony that the project would be a threat to the public health, safety, or welfare.

As the proposal will occur under a strong management framework, and represents a sustainable use of resources, OCCL concludes that it is consistent with this objective.

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

The objective of the Resource Subzone, pursuant to HAR 3-5-13, is *to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.*

The proposed use is an identified land use in the Resource subzone of the Conservation District, pursuant to HAR §13-5-24, R-3 ASTRONOMY FACILITIES, (D-1) *Astronomy facilities under an approved management plan.*

In April 2010 OMKM submitted their first yearly report to the BLNR on the status of the Comprehensive Management Plan's management actions. A copy of this report is included in the **Exhibits section of this report under "OMKM 2010 Annual Report to BLNR<sup>10</sup>, pgs, 133-168"**. According to their information, 24 actions are on going, 24 are implemented on an as-needed basis, and 4 are completed. OMKM also submitted an implementation schedule for the remaining 51 actions. The implementation schedule identifies whether the implementation must occur immediately, in the short-term, mid-term, or long-term. The annual report also identifies what entities are responsible for implementation of each Management Action.

Staff has reviewed the annual report. Approval and development of the TMT would not be inconsistent with or conflict with any of the CMP's Management Actions. In addition, the approved Environmental Impact Statement for TMT provided a complete disclosure, analysis, and mitigation for natural and cultural resources in the vicinity of the proposed TMT site.

In addition to all of the Management Actions contained in the CM and Subplans that are relevant to the Science Reserve and the TMT, TMT has developed its own project-specific management plan, which includes:

- A Historic Preservation Mitigation Plan (draft)
- A Construction Plan
- A Historical and Archaeological Site Plan
- A Maintenance Plan, and
- An Arthropod Monitoring Plan

These site specific plans contain numerous internal linkages to the much broader CMP and Subplans plans and strategies, including the reporting requirements, safety and accident prevention plan, cultural and natural resources training program, invasive species prevention and control program, waste minimization plan, ride sharing program, fire prevention and response plan, and rock movement plan – such that contractors, scientists, and project managers on TMT should all be equally aware of the important protocols governing activities in the Science Reserve.

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<sup>10</sup> The next annual report is due in April 2011.

The TMT Management Plan will be updated every 5 years, as necessary, based on updates to the Mauna Kea CMP; the strengths or weaknesses revealed through the monitoring and reporting program; relevant new or modified laws, regulations, and policies; and modifications to the operation of the TMT Observatory.

OCCL has concluded that the TMT project is consistent with these integrated and overlapping management plans, and therefore satisfies the objectives of the subzone.

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

The goals of the CZM program are to address issues from an integrated ecosystem perspective. In Hawai'i the entire State is considered to be in the Coastal Zone.

Many of the objectives of the CZM program outlined in HRS 205A, HRS – protection of historic resources, scenic and open space resources, and recreational resources – parallel the objectives of the Conservation District.

There are additional 205A, HRS objectives specific to coastal ecosystems, and the impact of upland areas on coastal ecosystems. These are *to promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.*

Potential impacts could occur from the paving of new, impermeable surfaces. Beyond this, TMT has committed to a policy of Zero Waste Management. All wastewater will be collected and transported down the mountain for disposal. No wastewater will be released into the substrate. Water efficient fixtures will be used when feasible.

TMT will also implement a Materials Storage/Waste Management Plan, including a Spill Prevention and Response Plan. These plans will be in concert with the guidelines of the CMP.

OCCL received testimony from KAHEA that TMT planned to “haul chemical wastewater and hazardous waste down to the county dump.” OCCL has not been able to confirm this, and notes that the application calls for waste to be transported to a waste treatment and disposal facility.

OCCL received testimony from Sierra Club and others that Mauna Kea is the principle aquifer for the island of Hawai'i, and they expressed concern that “if these waters are contaminated they can no longer be used for ceremonies, healing, and/or for drinking.”

OCCL notes that the watershed recharge areas for Mauna Kea occur at lower elevations, where it rains, and not in alpine deserts, where precipitation is minimal. The impact from any waste spill would be negative, intense and localized, but would unlikely have any impact on the island's drinking water. Moreover, the main anthropogenic threats to the Mauna Kea's aquifer occur at lower elevations in areas of heavier population and use.

We would like to note that we have had recent experience with toxic material spills at Mauna Kea, and we believe that the event was handled perfectly, without any deleterious effects. In May 2009 Caltech Submillimeter Observatory (CSO) reported a hydraulic line broke releasing approximately seven gallons of fluid into the concrete floor of their summit facility. It appeared that the fluid leaked through a 6-inch drain hole in the concrete floor. CSO immediately followed procedures and contacted appropriate authorities as required by law including the Coast Guard's National response Center.

Shortly after they contracted an environmental consulting firm, Myounghee Noh & Associates, LLC (MNA) to assist with assessing the situation and implementing clean up measures. Based on initial findings MNA excavated approximately 900 cubic inches of soil that was later removed by a licensed waste transporter. The faulty hydraulic line was replaced with a higher psi-rated line and the drain hole has been sealed with a metal plate and prevention maintenance procedures were improved to prevent fluid leaks. The OCCL was kept in the loop on this procedure at every step of the process and was pleased with the response actions and the outcome.

OCCL concurs with the applicant that the project's impact on water resources will not be significant, and that the proposal is consistent with the guidelines and objectives contained in HRS 205A.

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

The Environmental Impact Statement identified the following areas of potential impact:

**Cultural Practices and Historic Resources**

In *Ka Pa'akai O Ka 'Aina v. Land Use Commission*, 94 Haw. 31 (2000), hereafter, "Ka Pa'akai," the Hawai'i Supreme Court laid out a framework for assessing cultural impacts. An assessment must include:

- (1) the identity and scope of "valued cultural, historic, or natural resources" in the area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;
- (2) the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and
- (3) the feasible action, if any, to be taken by the (agency) to reasonably protect native Hawaiian rights if they are found to exist.

Cultural practices that occur or have been documented on the Mauna Kea plateau include worship, gathering of stones, burying of human remains, burying of *piko*, and gathering of water from Lake Waiau.

A number of historic trails also led to and crossed the summit plateau. Features found along these trails included religious and commemorative shrines, boundary markers, formal resting places (*o'io'ina*), places where mele were sung, and places where "propitiation would be made to various gods or spirits to insure safe passage of a completion of a task."<sup>11</sup> Historic maps do not show any paths crossing the northern plateau where the TMT is being proposed.

Of these, burial of human remains is currently illegal under state law, although lineal descendants still care for *iwi* that are on the mountain. The other practices continue, or are assumed to be continuing.

The State has identified three Traditional Cultural Properties that are most associated with these practices: Kūkahau'ula, Lake Waiau, or Pu'u Līlīnoe. The project will be located 3400 feet from Kūkahau'ula, and on the other side of the summit from Waiau and Līlīnoe. **A portion of the access way will traverse the lower portion of Pu'u Hau'oki in the Kūkahau'ula TCP. This is the one-lane 200-foot length of access road mentioned earlier in this report.**

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<sup>11</sup> Holly McEldowney 1982, taken from the *Mauna Kea Science Reserve Master Plan*

Historic resources identified by archaeological surveys in the + 11,000 acre Science Reserve include 141 shrines, 5 confirmed burial sites, 24 possible burial sites, 15 stone markers, 3 temporary shelters, 2 historic campsites, one historic route, and three sites of unknown function. There are an additional 300 ahu that have been built over the past 35 years.

There are no known burial sites, ahu, or other historic features near the project area. There is one ahu, built in the early 2000's, within 200 feet of the project area. The presence of the TMT will discourage the building of additional ahu on the five-acre site. No other cultural practices beyond the building of modern ahu have been documented at the project site.

Access will be limited to the site during construction. OCCL concurs with the applicant that this action is important for public safety. The long-term operation of the facility should have no adverse impact on public access to the summit or the traditional cultural properties there, except for a small area at the base of Kūkahau`ula where the access road will be slightly improved.

Many persons testified that the very presence of a new facility, anywhere on the mountain summit, would be sacrilegious. It would affect the spiritual nature of the mountain as a *wao akua*, or place of the gods, and thus directly affects a believer's religious practice.

OCCL also heard testimony from cultural practitioners who believed that modern astronomy and traditional practice are compatible, and that the observatories are a continuation of *kilo hoku*, the study of the stars engaged in by early Hawaiian astronomers, priests and navigators.

TMT has taken steps to minimize the direct and indirect impacts on cultural practice including: selecting a site off of the Kūkahau`ula Summit, and away from known resources and practices; selecting a location that minimizes the impact on view plains from recognized Traditional Cultural Properties; compliance with the actions outlined in the Cultural Resources Management Plan; and engaging in extensive consultation with Kahu Kū Mauna, the community, and cultural practitioners during the project development process.

In addition, TMT has proposed additional off-site mitigation measures that may reduce impacts on cultural resources or may even be considered to be culturally beneficial such as: 1) TMT will fund the re-naturalization of the closed Access Road on Poli`ahu, partially re-naturalize the Batch Plant Staging Area after construction, and camouflage the utility pull boxes in certain locations to reduce the visual impact from the summit area; 2) Employees of MT will attend mandatory cultural and natural resources training; 3) the TMT facilities will be furnished with items to provide a sense of place; 4) daytime activities at TMT will be minimized on up to four days per year, as identified by Kahu Kū Mauna to respect cultural practices; and 5) Outreach staff will work with the `Imiloa Astronomy Center and OMKM to develop information exhibits for visitors regarding the natural, cultural and archaeological resources of Mauna Kea.

Following the Ka Pa`akai framework, OCCL concurs with the applicant that the project will have a less than significant affect on the cultural practices, identified traditional cultural properties, and historic resources, provided that all project mitigation measures are implemented.

### **Biological Resources**

Potential impacts identified by the applicant include dust generated by vehicle traffic along unpaved roads, the destruction of 0.2 acres of wēkiu habitat below Pu`u Hau`oki, and the disruption of approximately 6 acres of alpine stone desert. All other project areas have been previously disturbed.

The Access Way has been designed to limit effect on wēkiu cinder cone habitat by using the alignment of existing roads, and by reducing it to a single lane. Arthropod monitoring will be done prior to construction, during construction, and for two years after. A ride-sharing program will be implemented for employees to reduce the impacts from dust generated by vehicle traffic. TMT will also work with OMKM to develop and implement a habitat restoration study.

The EIS notes that wēkiu were only found in low abundance in the above-mentioned habitat. Some surveys failed to uncover any. The disturbed area is not considered critical, and is relatively small. The larger wēkiu habitat will remain contiguous, which entomologists testified was the most important factor in sustaining healthy populations.

The alpine stone desert at the main project site is not considered critical habitat for any species of lichen, moss, floral, or arthropod species. Those that do occur also occur at higher densities elsewhere on the mountain, in more favorable habitats.

OCCL received testimony from Sierra Club and others that stated that TMT would put endangered species such as `u`au, (Hawaiian petrel, *Pterodroma sandwichensis*), palila (Hawaiian honeycreeper, *Loxioides bailleui*), and `āhinahina (Mauna Kea Silversword, *Argyroxiphium sandwicensis*), at risk of extinction.

The CMP and NRMP are intended to benefit the recovery of biological resources. While `āhinahina once dominated the Mauna Kea landscape, its population has been decimated by introduced feral ungulates. Federal and state agencies are cooperating to control feral animals and help `āhinahina recover. A new population was discovered in the Science Reserve in 2007. OCCL notes that of the avian species Sierra Club mentions, palila live, breed, and feed in the māmane forest at much lower elevations, and `ua`u have not been observed in the Science Reserve in modern times.

TMT is also proposing a number of mitigation measures that reduce impacts on biological resources such as: 1) The access way has been designed to limit its effect on Wekiu bug habitat; 2) An invasive species control program will be implemented; 3) A ride-sharing program will be implemented to reduce traffic, dust, and noise; 4) and



Arthropod monitoring will be performed prior to, during, and for two years following construction in the area of the access way on the alpine cinder cone habitat.

OCCL concurs with the applicant that the impact on biological resources will not be significant.

### **View Plains**

The current observatories are visible from 43 percent of the island's area. With TMT the observatories will be visible from 44.2 percent of the island. TMT itself will be visible from 14 percent of the island's area, and approximately 15.4 percent of the island's population. The impacted areas include portions of Honoka`a, Waimea, and Waikalua.

The view plain analysis shows that TMT will extend the view plain horizontally. However, as it is located lower on the summit than existing large observatories, it will not impact the view plain vertically. It will also not be visible from the Wēkiu peak of Mauna Kea, nor from the identified Traditional Cultural Properties of Waiu and Līlinoe.

TMT will be significantly visible from the lower peaks of Kūkahau`ula, where it will be the dominant feature on the landscape looking north. It will also be in the primary view plain of the town of Waimea and viewpoints along Highway 250.

**The Exhibits section of this report, pgs. 99-106** contains highlights of the view-shed analysis contained in the application.

The location of TMT, off the main Kūkahau`ula Summit, is the primary mitigative action taken. The coating for the dome is a secondary measure; the aluminum-like coating will be less visible than other alternatives during the day, although it will be more visible during sunrise and sunset.

When viewed in context with the other existing observatories, OCCL concurs with the applicant that TMT will not have a significant affect on view plains or aesthetic resources.

### **Recreational Resources**

OCCL notes that the summit region currently receives 200,000 visitors per year. Some do not venture past the visitor center, and OMKM does not have a count of how many continue to the summit. Of those who venture to the summit, some come to view the telescopes, or just for the views, some for recreation, and some for spiritual and cultural matters. Some come for all of these reasons. These numbers should be expected to increase as improvements continue on Saddle Road.

The primary recreational activities on Mauna Kea are hiking, stargazing, and snow play. The observatory is not near any active recreation area. It will not be lit at night, and will not interfere with any stargazing activities. The project should not have an impact on any of these activities during its normal operation.

The Batch Plant Staging Area is in an area used for hikers using the Lake Waiau trail, and for those who come to the mountain on snow days. Construction activities will limit parking here, and OCCL is concerned that visitors might be tempted to park off-road or in undisturbed habitat. We would like to see the applicant present a plan for handling recreational parking during construction.

OCCL also notes that, if the TMT is approved and built, it has the potential to be a significant tourist draw in its own right. OCCL notes that there do not appear to be any visitor facilities at the observatory site, and feels that this might be a missed opportunity for the project developers.

Sierra Club representatives have stated “TMT could [bring] new restrictions on islanders' access to their beloved mountaintop, including nighttime gate closures and prescreening of all visitors to the summit.”<sup>12</sup> OCCL can find no evidence to support this statement.

#### **Water Resources and Wastewater; Solid and Hazardous Waste**

These are discussed in the previous section.

#### **Cumulative Impacts**

There are currently nine observatories on the Kūkahauʻula Summit three observatories just below the summit, and one two miles down slope. Although the possibility exists for the removal of several of these telescopes, as discussed earlier in this report, only one of these is actually scheduled for removal.

OCCL heard public testimony stating that the maximum number of telescopes on the summit of Mauna Kea was officially set at (thirteen) 13, and that TMT would surpass this. It should be noted that the BLNR has never established a limit on telescope development and OCCL is not aware of any carrying capacity study that would support this claim. UH-internal planning documents such as the 1983, Mauna Kea Complex Development Plan, did limit the number of observatories to 13 under that plan, but we have not necessarily viewed that figure as a maximum limit or a carrying capacity. We also note that, if TMT is approved, and CSO decommissioned, the total number of telescopes on Mauna Kea would remain at thirteen (13). However, as suggested by UH, the total number of telescopes is likely to become smaller than larger over the next decade, and could even be reduced to a total number of ten (10).

OCCL concurs with the EIS that the post construction impacts on Mauna Kea's natural and cultural resources will be less than significant. Our conclusion is based on three significant factors: 1) Unlike the existing facilities, the proposed location is removed from the Kūkahauʻula Summit and other identified culturally significant features; 2) The

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<sup>12</sup> Nelson Ho, editorial Star Advertiser, June 4, 2010. The same quote was used in his letter to the editor of West Hawaii Today, June 18, 2010.

proposed location is removed from critical habitat for threatened and endangered species; and 3) The proposal will operate under a strong management regime.

The EIS concluded that the existence of observatories on Mauna Kea has had a significant impact on natural and cultural resources. The EIS noted that those impacts that are significant will remain significant with or without TMT, and that those impacts that have been less than significant will continue to be less than significant. In other words, the proposal is not significant in of itself, but will add incremental impacts to an area that has already undergone significant effects.

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

Both proponents and opponents of the project testified to the important role that mountain summits and Mauna Kea had for *kilo hoku*, the navigators, astronomers, and priests who studied the heavens. However, the cultural and historical studies have uncovered no known mo`olelo that specifically tie Mauna Kea to traditional astronomy.

Opponents of TMT argue that a facility on the summit violates the sacred nature of the summit, and that any modern observatory is intrinsically not compatible. Others argue that modern observatories do have their place, but that the TMT specifically is not compatible. Finally, proponents argue that modern observatories are a continuation of Hawaiian tradition, and that TMT has been planned and designed with respect to that tradition and that it is compatible.

There is a strong historical association between mountains and the sacred in most world cultures, and there is also a strong association between the sacred and astronomy. The association of modern, scientific astronomy with mountains, however, is more recent. Galileo's observatory at the University of Padua in 1609 was only 12 meters above sea level. It wasn't until 1888 that the first permanently occupied mountaintop observatory was built, the 36-inch Lick Observatory at Mount Hamilton in California, at 4,230 ft. ASL.

King David Kalākaua had expressed an interest in bringing modern astronomy to Hawai'i,<sup>13</sup> and visited the construction site for Lick Observatory at the beginning of his world tour in 1881. Although the dome had not been completed, the 12" telescope was set up in the open air for the King to observe through. A telescope was purchased for Punahou School shortly thereafter; it was placed in a dome above the campus in 1884.

Since then telescopes have steadily climbed the summits, coming to Haleakalā in 1940 with the Grote Reber radio antenna, Mauna Loa in 1956 with the Mauna Loa Observatory, and Makapu'u on O'ahu in 1957 with the UH Solar Observatory. The first road to the summit of Mauna Kea was built by NASA in 1964, and the "seeing" tests that established the summit as one of the world's premier modern astronomy sites were conducted later that year by the astronomer, mirror maker, and Hawaiian steel guitarist Alika Herring.

By the mid 1990's a spurt of rapid development led many residents to take a new look at the University's stewardship role on the mountain. Public opposition to development on Mauna Kea began to coalesce in 1995, when Nelson Ho of the Sierra Club and Mililani Trask became involved in issues regarding ceded lands. Their concerns led to a closer examination of the management regime on Mauna Kea, culminating in a 1998 State

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<sup>13</sup> In a 1880 letter to Captain R. S. Floyd, President of Lick Trustees, the King wrote: *I must thank you sincerely for the pamphlet you sent me of the "Lick Observatory Trust." Something of this kind is needed here very much but we have so few people who take interest in scientific matters. Every body is bent upon making money in sugar and the all mighty dollar.* The original letter is with the Bishop Museum.

Audit that found that the University had been negligent in managing the cultural and environmental resources in the Science Reserve. This Audit ultimately led to the development of the 2000 Mauna Kea Master Plan and OMKM.

In 2004 OCCL opened investigations into alleged land use violations, and fined the University in 2004 for a series of permit discrepancies and non-compliance issues at four observatories (reference, enforcement HA 05-08). UH was fined \$20,000 and ordered to correct various permit discrepancies.

As discussed in the previous sections, a strong management regime is now in place that addresses many of the community's concerns, and that should prevent the abuses of the past. However, there is a strong contingent of residents who have reached the conclusion that science and their beliefs are in conflict.

Ian Barbour, the American physicist and theologian, identifies four distinct ways in which science and religion are related to each other<sup>14</sup>:

1. **Conflict** — the conviction that science and religion are fundamentally irreconcilable;
2. **Contrast** — the claim that there can be no genuine conflict since religion and science are each responding to radically different questions;
3. **Contact** — an approach that looks for dialogue, interaction, and possible "consonance" between science and religion, and especially for ways in which science shapes religious and theological understanding; and
4. **Confirmation** — the perspective that highlights the ways in which, at a very deep level, religion supports and nourishes the entire scientific enterprise.

Based upon the written and public testimony, it appears that many of the project's opponents align with the 'conflict' perspective of the first category. OCCL heard repeated testimony that Mauna Kea is a temple under siege, and many tied astronomy on the mountain to broader issues of cultural sovereignty and survival. A group of students from UH Hilo testified passionately that the presence of the existing telescopes impeded their connection to the akua. Others took this position even further, accusing scientists of being "motivated by pride, greed and arrogance," and asserting that "science leaves nothing but decimation in its wake."

This group allows no middle ground; for them there is no mitigation possible.

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<sup>14</sup> from Ian G. Barbour, *Religion in an Age of Science* (Harper San Francisco, 1990)

Most of the project's proponents, on the other hand, appeared to be in the second and third categories. Those that addressed spiritual and cultural issues stated that the two were interrelated or else acknowledged the differences and looked for areas of dialogue.

This is a remarkable change from thirty or forty years ago – anecdotal evidence suggests that a previous generation of scientists and managers on Mauna Kea were more dismissive of any spiritual concerns. OCCL feels that this level of dialogue supports the applicant's assertion that TMT represents a new paradigm for development on Mauna Kea.

The second part of the question before the Board, though, is whether TMT itself is an appropriate use for the summit region, and more specifically, for the proposed site. There are those who support astronomy, and feel that it is a valid land use for the summit regions, and yet who feel that TMT is simply too big.

From a purely environmental perspective, staff believes that TMT is not "too big" – it's actual impact on resources will be less than smaller telescopes that were built in more vulnerable areas. On the other hand, it will be a significant *presence* on the mountain.

This is somewhat mitigated by the fact that TMT will be located at a lower elevation than the current group of telescopes, that it will be off the main Kūkahau'ula summit, and that it will not be visible from the Traditional Cultural Properties of Waiau and Līlinoe. It will, however, be absolutely the most dominant feature on the north plateau, and will match Keck and Subaru for visual impacts from Waimea and Honoka'a.

OCCL heard testimony from individuals who felt that even this was appropriate, that the Hawaiians ancestors had mastered the art of wayfaring, and that TMT was a modern way for their *mo'opuna* to carry on these traditions - and that Polynesian wayfaring could lead us to the stars. In this view, a large project on Mauna Kea might be appropriate, but it must reflect *kūlia i ka nu'u*, a Hawaiian commitment to excellence.

OCCL believes that we should set the bar high. We acknowledge the sacredness of the mountain, and would insist that any development on it meet the world's highest standards of excellence. By this criterion, we find that TMT is a compatible use for this location.

6. ***The existing physical and environmental aspect of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, which ever is applicable.***

As discussed in the previous discussions, when considered in the context of existing development, combined with mitigation measures, and the back drop of the comprehensive planning efforts that have been invested into Mauna Kea as a whole, OCCL has concluded that TMT will not have a significant impact on the environmental or cultural characteristics of the land.

In terms of beauty and open space, TMT represents a series of trade-offs. Astronomy is an identified use in the Conservation District, and BLNR has approved over a dozen permanent and temporary observatories on the parcel since 1974. The majority of these were built in or adjacent to an area that is now recognized by the State Historic Preservation Division as a Traditional Cultural Property.

OCCL supports the concept of moving observatories away from the Kūkahau`ula summit ridge. When viewed from the perspective of the whole summit region, and taking into consideration the off-site re-naturalization programs, OCCL concludes that the physical and environmental aspects of the land will be preserved and in some cases improved upon.

OMKM has stated that it is their goal for future telescopes to migrate off the main ridge and away from the TCP. TMT is being proposed for an area on the north plateau of Mauna Kea that has not hosted permanent facilities or developments. It is opening up a new area, but also leading the way in the move away from the more culturally and environmentally sensitive places in the summit region. It should also be noted that TMT is committed to paying a "substantial" amount for sublease rent in exchange for use of the site. The rent would be deposited into the Mauna Kea Land Fund, and only used for management of Mauna Kea. This is the first time a telescope operator would pay a substantial amount of lease rent for this purpose.

7. ***Subdivision of the land will not be utilized to increase the intensity of land uses in the Conservation District.***

There will be no subdivision of land for this proposed project.

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

OCCL has seen no evidence that the project will be detrimental to public health, safety, or welfare.

Staff believes the proposed project has the potential to benefit the public health, safety, and welfare. There will be direct economic benefits through construction contracts, new jobs, and incoming research grants; and educational benefits by keeping Hawaiian institutions at the forefront of astronomical research. There is also the less tangible benefit of increasing humanity's overall pool of knowledge.



## CONCLUSION

OCCL believes that the applicant has done a fair job in identifying the major and moderate impacts of the project, and in developing mitigation measures that will bring the long-term impacts down to moderate, minor or negligible levels

Our conclusion is based on a number of factors: that the proposed location is removed from the Kūkahauʻula Summit and other identified culturally significant features, that the proposed location is removed from critical habitat for threatened and endangered species; that the proposal will operate under a strong management regime; and that the proposal will offer significant benefits to the economy, educational programs, and environmental protection programs.

Opposition to the TMT has been led by the Sierra Club, KAHEA Environmental Alliance, Mauna Kea `Anaina Hou, and the Royal Order of Kamehameha. These groups put forward four main categories of objection: that the project is illegal; that the project will cause significant environmental damage via the extinction of species and damage to the aquifer; that the project requires stronger management plans; and that the project will impact the sacred nature of Mauna Kea.

OCCL notes that "astronomy" is an identified land use in the Resource Subzone of the State Land Use Conservation District under an approved management plan, and that the Board of Land and Natural Resources approved both a comprehensive management plan and four resource management Subplans. The Board has the legal authority to make a decision on the permit application. OCCL believes that the claims that the project is illegal are without merit.

Sierra Club representatives state that they are not opposed to astronomy or science, but have co-authored letters that "object to any telescope to continue its existence beyond the 2033 lease termination," and state that it is their policy "to discourage any further development within the Mauna Kea Science Reserve until such a plan has been approved by BLNR and taken into consideration in all future operational and development efforts in the Reserve."<sup>15</sup>

Sierra Club calls for BLNR to approve a new "stand-alone comprehensive plan to be prepared by a disinterested party, with active participation of community groups and interested parties, to faithfully serve as a planning and operations guide for a balanced approach towards activities and development within the Mauna Kea Science Reserve."

Like Sierra Club, KAHEA's official position also seems to vacillate between "do another plan" and "stop the bulldozers." In some public testimony they claim to respect astronomy, and that they merely seek better management of the mountain's resources. This position is then seemingly contradicted by statements that TMT is a "massive

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<sup>15</sup> Taken from [hawaii.sierraclub.org](http://hawaii.sierraclub.org); accessed January 18, 2011

expansion of industrial land use” backed by “immensely wealthy organizations and some of Hawai`i’s highest paid lawyers” intent on “further desecration.”<sup>16</sup>

Mauna Kea `Anaina Hou echoes the claim that the Comprehensive Management Plan is inadequate, but takes the argument a step further, stating that “Mauna Kea’s public lands are being exploited by foreign nations, corporations, and the University of Hawaii who are all seeking to profit from telescope construction on the summit at the expense of its unique natural habitat, pure drinking water, and sacred cultural resources.”<sup>17</sup>

Staff would like to point out that it was concerns raised by Sierra Club and others that led to the 1998 State Audit, which found that the University had been negligent in managing the cultural and environmental resources in the Science Reserve. The audit, and subsequent lawsuits, led to the formation of the Office of Mauna Kea Management (and its accompanying project management regime) and the development and BLNR approval of the Comprehensive Management Plan, the Cultural Resources Management Plan, the Natural Resources Management Plan, the Public Access Plan, and the Decommissioning Plan.

It is OCCL’s opinion that a strong management regime, approved by the BLNR, is now in place for caring for the mountain’s resources. TMT is the first significant project to be proposed under this new framework. It is the opinion of staff that the fundamental flaw that Sierra Club et al. make is not recognizing that strong management - *which they fought for* - requires significant investment. Environmental protection costs money. Protecting historic and cultural resources costs money. Education costs money. Maintaining public access and ensuring the public safety costs money. Routine infrastructure maintenance costs money.

Stopping TMT, and fighting any and all development, will not restore the mountain to a pre-Contact condition. The existing roads, electric lines, and facilities will not disappear. Rather, as funds dry up, active and strong management will become difficult, maintenance and renovations will slow, infrastructure will crumble – and the very cultural and environmental resources that Sierra Club et al purport to protect will suffer.

Concerns about the project’s impact on the spiritual nature of Mauna Kea remain. Interpretation of the spiritual impact is based upon individual perception; for some no mitigation is possible, and any development on the mountain would be sacrilegious. For other lineal descendants modern astronomy is consistent with the trajectory of Hawaiian culture, and they trace a line from the traditional navigators through King Kalākaua to today’s scientists.

The TMT proposal acknowledges traditional and cultural practices, and the applicants have worked extensively with cultural practitioners during the planning and design process. A site was chosen that is away from the most significant traditional cultural properties in the summit region.

<sup>16</sup> From KAHEA’s page on Sacred Summits, [kahea.groundwire.org/issues/sacred-summits](http://kahea.groundwire.org/issues/sacred-summits), Accessed January 18, 2011.

<sup>17</sup> From KAHEA’s website [salsa.democracyinaction.org](http://salsa.democracyinaction.org) Accessed January 18, 2011

As they have in the past, the Board faces the difficult task of deciding whether the project may proceed. OCCL has tried its best to represent the range of viewpoints on this project, and has included the full text of many documents for the record.

TMT will prepare annual reports for OMKM. These reports, due on December 31 each year, will provide OMKM with information about TMT's activities, potential new actions, goals, and objectives in the coming year. The reports would include information recorded in the on-going logs, records of annual staff Cultural and Natural Resources Training Program completion, and findings/outcomes of annual audits and inspections. **OCCL recommends that TMT provide OCCL with a copy of these annual reports.**

OMKM will conduct twice-annual inspections of the TMT Project site for evidence of CDUP and TMT Management Plan violations. **OCCL recommends that our office be notified of the inspection date, should staff be available to attend.**

The applicant proposes that the TMT Management Plan be updated every five years, as necessary, based on (a) updates to the Mauna Kea CMP; (b) strengths or weaknesses revealed through the monitoring and reporting program; (c) relevant new or modified laws, regulations, and policies; and (d) modifications to the operation of the TMT Observatory. OCCL feels that it would be valuable for DLNR to be active participants in the TMT Management Plan review. **OCCL recommends that the Chairperson name a representative from the Department to work with TMT on their Management Plan updates.**

Finally, we need to make sure that all of the mitigation measures are in place prior to the start of any construction on the TMT project. **OCCL recommends that a condition be added to require a status report of all BLNR imposed mitigation measures, and that no construction work be initiated until the applicant demonstrates compliance with all pre-construction conditions and mitigation measures outlined in this report. Once this condition has been satisfied, the Department will issue notice to proceed with construction work.**

**OCCL has concluded that the applicant meets the Conservation Criteria outlined in Hawai'i Administrative Rules (HAR) §13-5. After careful review of the application and associated environmental documents, and balancing the potential benefits against the potential impacts of the project, OCCL will recommend that the Board approve this application.**

#### RECOMMENDATION:

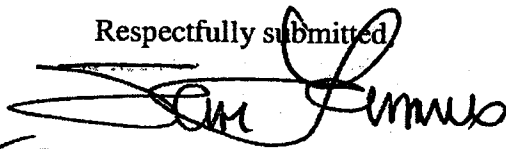
Based on the preceding analysis, Staff recommends that the Board of Land and Natural Resources Approve this Conservation District Use Application (CDUA) HA-3568 for the Thirty Meter Telescope, including all ancillary uses, at the Mauna Kea Science Reserve, Ka'ohē Mauka, Hāmākua District, Hawai'i, TMK (3) 4-4-015:009, subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules, regulations, and conditions of the Federal, State, and County governments, and applicable parts of the Hawaii Administrative Rules, Chapter 13-5;
2. The applicant shall obtain appropriate authorization from the department for the occupancy of state lands, if applicable;
3. The applicant shall comply with all applicable Department of Health administrative rules;
4. Any work done or construction to be done on the land shall be initiated within two (2) years of the approval of such use, in accordance with construction plans that have been signed by the Chairperson, and, unless otherwise authorized, shall be completed within twelve (12) years of the approval. The applicant shall notify the Department in writing when construction activity is initiated and when it is completed;
5. Before proceeding with any work authorized by the Board, the applicant shall submit four copies of the construction and grading plans and specifications to the Chairperson or his authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Three of the copies will be returned to the applicant. Plan approval by the Chairperson does not constitute approval required from other agencies;
6. All representations relative to mitigation set forth in the Environmental Impact Statement and Conservation District Use Application are incorporated as conditions of the permit;
7. The activities and conditions to be set forth in the Archaeological Monitoring Plan, Construction Plans, Maintenance Plan, and Arthropod Monitoring Plan are incorporated as conditions of this permit;
8. The project will comply with any terms, conditions, and management actions outlined in the Comprehensive Management Plan and associated Sub Plans;
9. The following additional conditions shall be implemented by OMKM and TMT:
  - Ensuring that employees attend mandatory cultural and natural resources training;
  - Working with the `Imiloa Astronomy Center to develop information exhibits for visitors regarding the natural, cultural and archaeological resources of Mauna Kea;
  - Funding the re-naturalization of the closed Access Road on Poli`ahu, partially re-naturalize the Batch Plant Staging Area after construction, and camouflage the utility pull boxes in certain locations to reduce the visual impact from the summit area;
  - Implementing an invasive species control program;
  - Working with OMKM to develop and implement a habitat restoration study;
  - Implementing the "Zero Waste Management" policy;
  - Filling employment opportunities locally to the greatest extent possible;

- Mandating that employees traveling beyond Hale Pōhaku take part in a ride-sharing program using project vehicles;
  - Using energy savings devices such as solar hot water systems, photovoltaic power systems, energy efficient light fixtures, and the use of Energy Star rated appliances;
  - Providing \$1 million annually, adjusted for inflation, for "Community Benefits Package" which will commence with construction and continue through the term of the sublease. The package will be administered via The Hawai'i Island New Knowledge (THINK) Fund Board of Advisors;
  - Partnering with other institutions to implement a Workforce Pipeline Program, headed by at least one full-time position through the Community Outreach office, to prepare local residents for jobs in science, engineering, and technical fields;
  - The University will ensure that the survey of the power line corridor easement complies with DLNR standards and is in accordance with the conditions contained in the grant of easement (including the Mauna Kea Ice Age Natural Area Reserve) that was approved by the BLNR in August 1985. The University will provide copies of the survey to DOFAW;
  - OMKM will consult with the U.S. Fish and Wildlife Service and experts who are advising OMKM, including representatives from the DLNR, on surveys of the wēkiu bug and invertebrates regarding surveys along the utility corridor, including Pu'u Hau Kea and the pu'u west of the Parking Area 1;
  - The construction contractor will be required to minimize the visual changes to land within the utility line right-of-way during utility upgrades. Any disturbance outside of the easement area of the construction corridor will be restored to the extent possible;
  - The applicant will present a plan for handling recreational parking during construction to the OCCL for review and approval prior to beginning construction;
  - Following construction, TMT shall keep their area clean and free of trash or unattended tools and equipment, unless authorized by OMKM and OCCL;
  - The Archaeological Monitoring Plan will be submitted to the State Historic Preservation Division for review and approval prior to the onset of construction; and
  - TMT remains committed to paying a "substantial" amount for sublease rent. The rent would be deposited into the Mauna Kea Land Fund, and only used for management of Mauna Kea.
10. The University will notify OCCL of the date of the twice-annual inspections of the project site, and allow staff to attend if available;
  11. The applicant will provide OCCL with a copy of their annual report to OMKM;
  12. The Chairperson shall name a DLNR representative to participate in the TMT five-year management review process;
  13. When provided or required, potable water supply and sanitation facilities shall have the approval of the department of health and the board of water supply;
  14. The applicant understands and agrees that this permit does not convey any vested rights or exclusive privilege;

15. In issuing this permit, the Department and Board have relied on the information and data that the applicant has provided in connection with this permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Department may, in addition, institute appropriate legal proceedings;
16. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the applicant shall be required to take the measures to minimize or eliminate the interference, nuisance, harm, or hazard;
17. Should historic remains such as artifacts, burials or concentration of charcoal be encountered during construction activities, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact HPD (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary; the applicant will also notify OHA at the same time;
18. During construction, appropriate mitigation measures shall be implemented to minimize impacts to off-site roadways, utilities, and public facilities;
19. No construction work shall be initiated until the applicant demonstrates compliance with all pre-construction conditions and mitigation measures outlined in this report. Once this condition has been satisfied, the Department will issue notice to proceed with construction;
20. Other terms and conditions as may be prescribed by the Chairperson; and
21. Failure to comply with any of these conditions shall render this Conservation District Use Permit null and void.

Respectfully submitted,

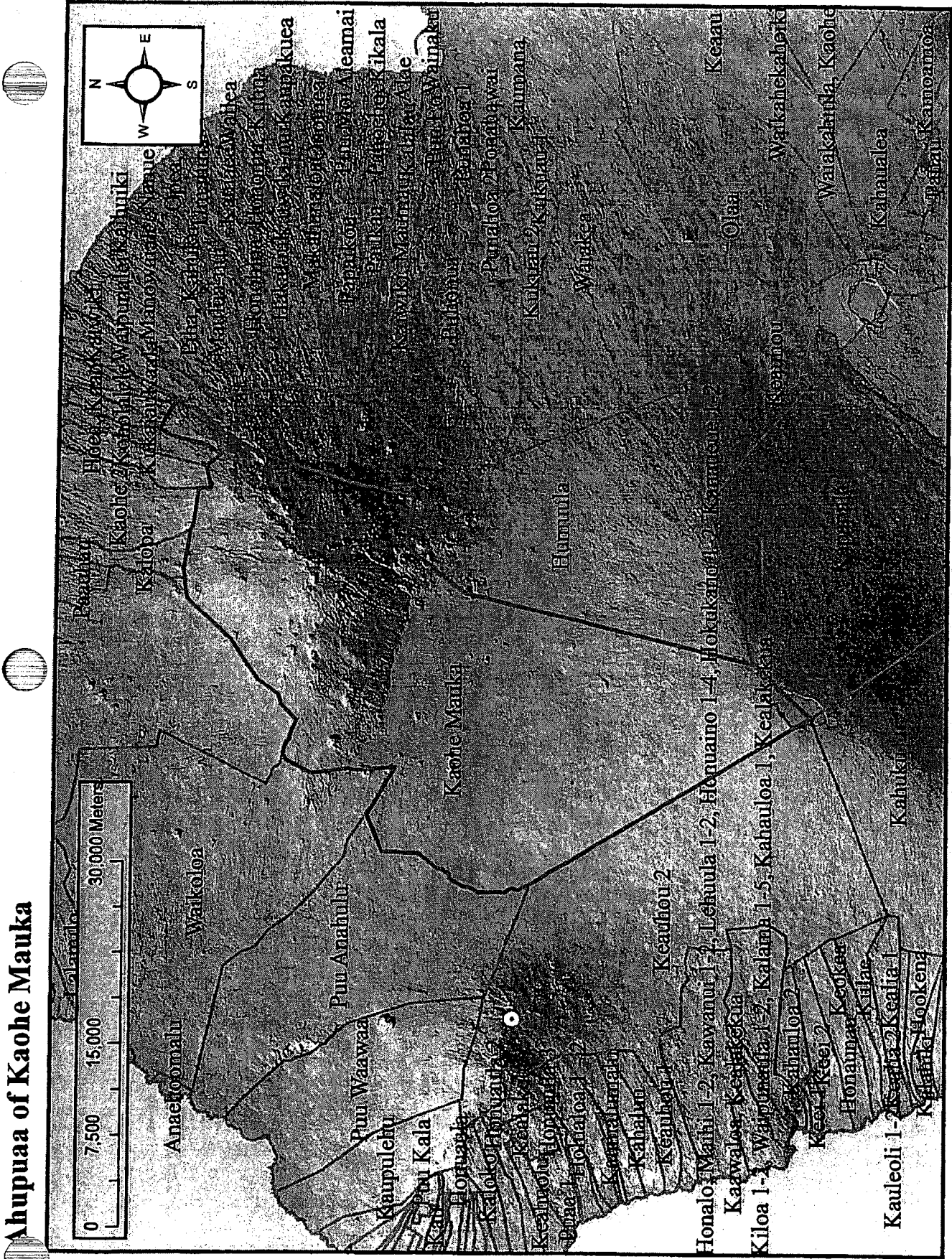


*FOR* Michael Cain, Staff Planner  
Office of Conservation and Coastal Lands

Approved for submittal:

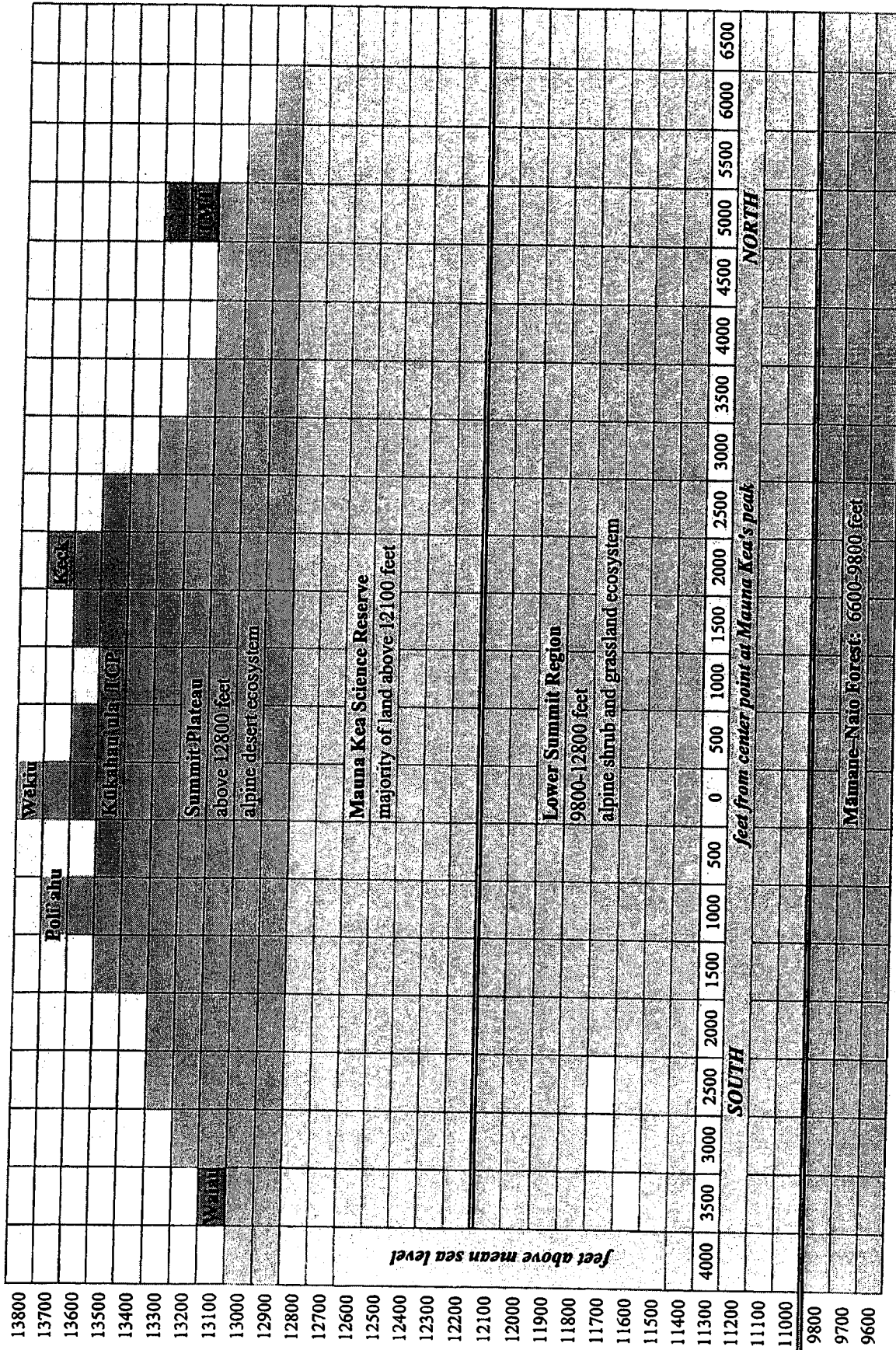
  
William J. Aila, Interim Chairperson  
Board of Land and Natural Resources

# Ahupuaa of Kaohae Mauka



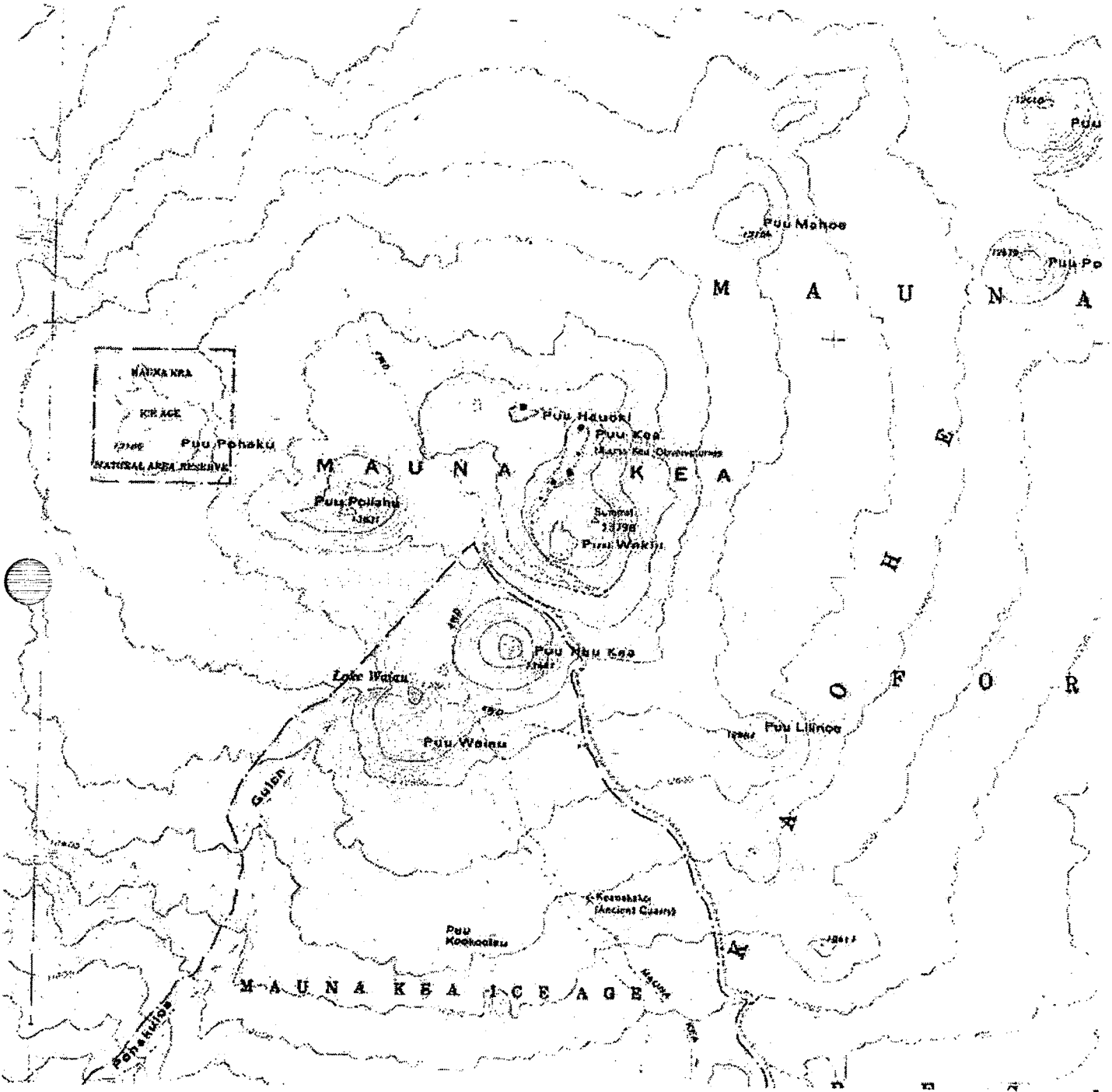
Produced by MC @ OCCL January 10, 2011 All boundaries are approximate

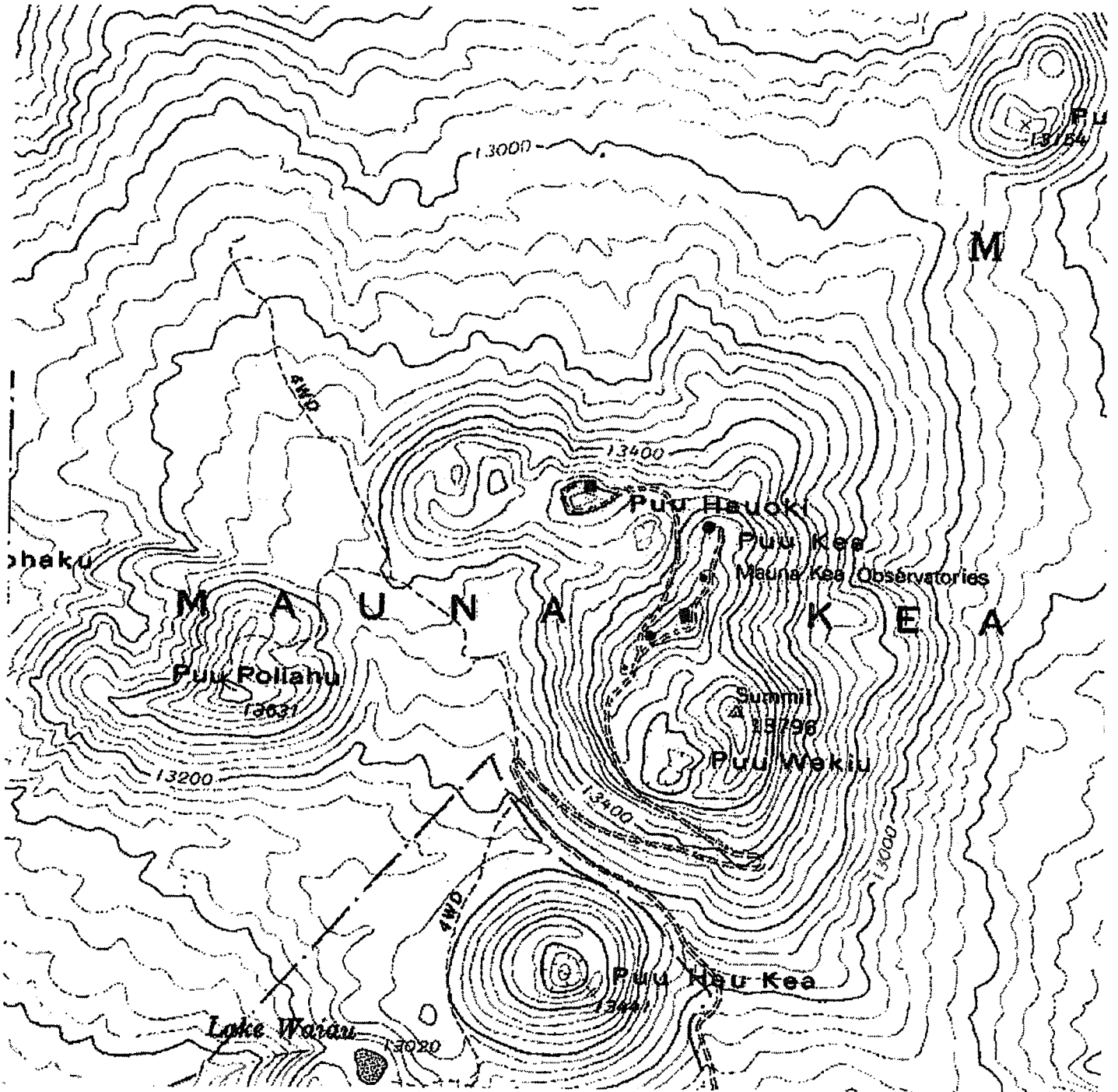


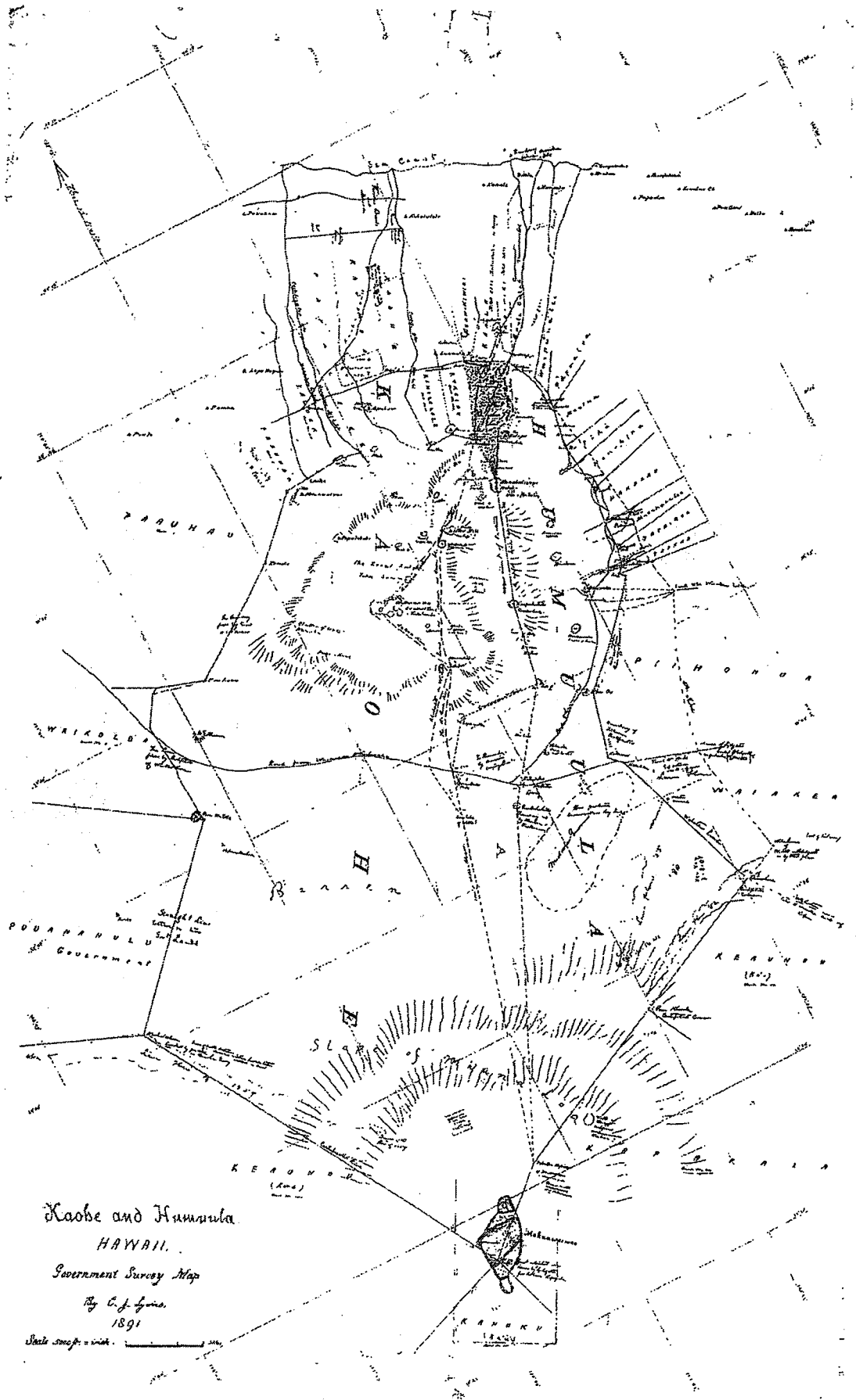


This map is an approximation intended for reference purposes only.  
Please note that x and y axes are not to scale.







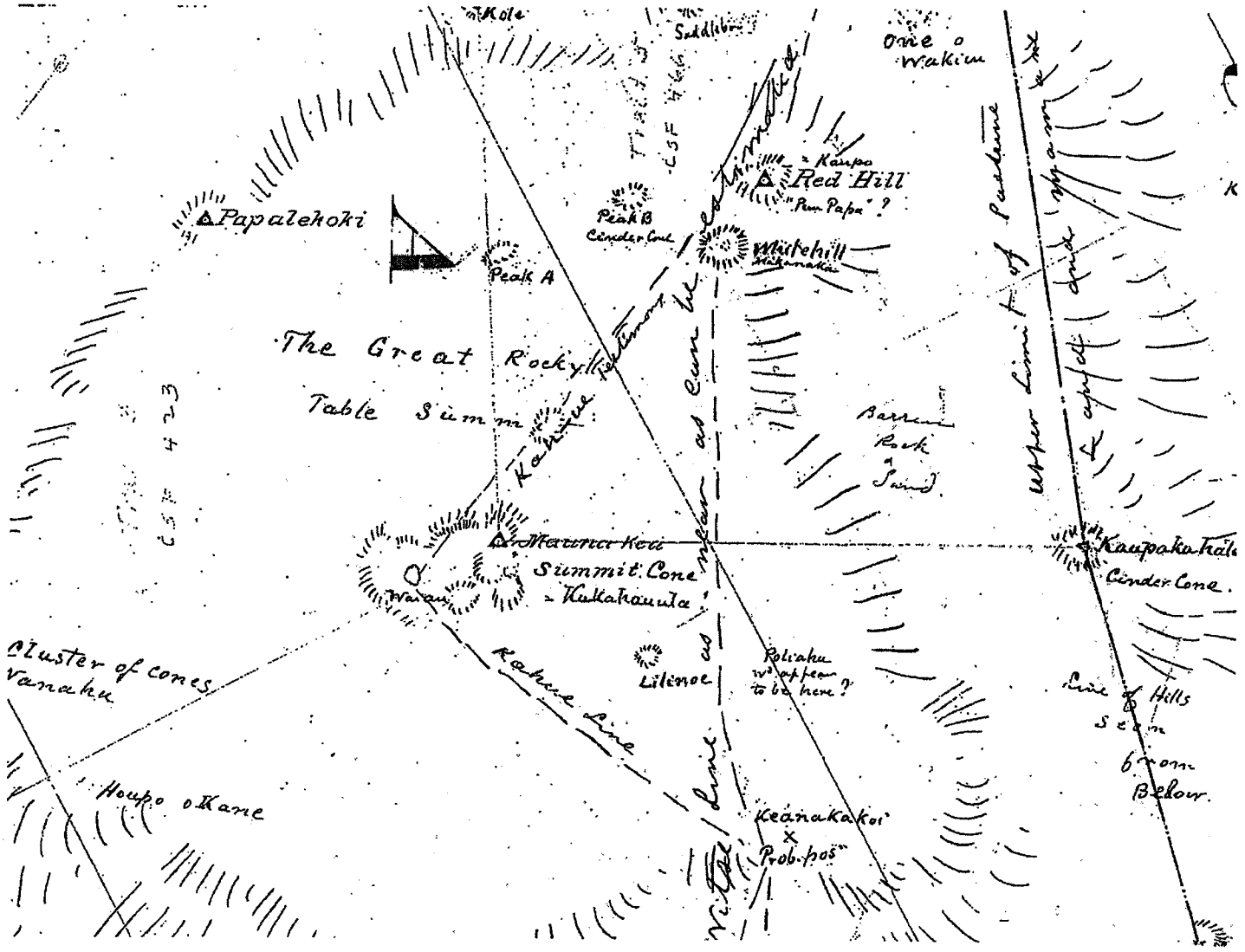


Kaobe and Humuila  
HAWAII.

Government Survey Map

By C. J. Lyman,  
1891

Scale 1 inch = 1 mile



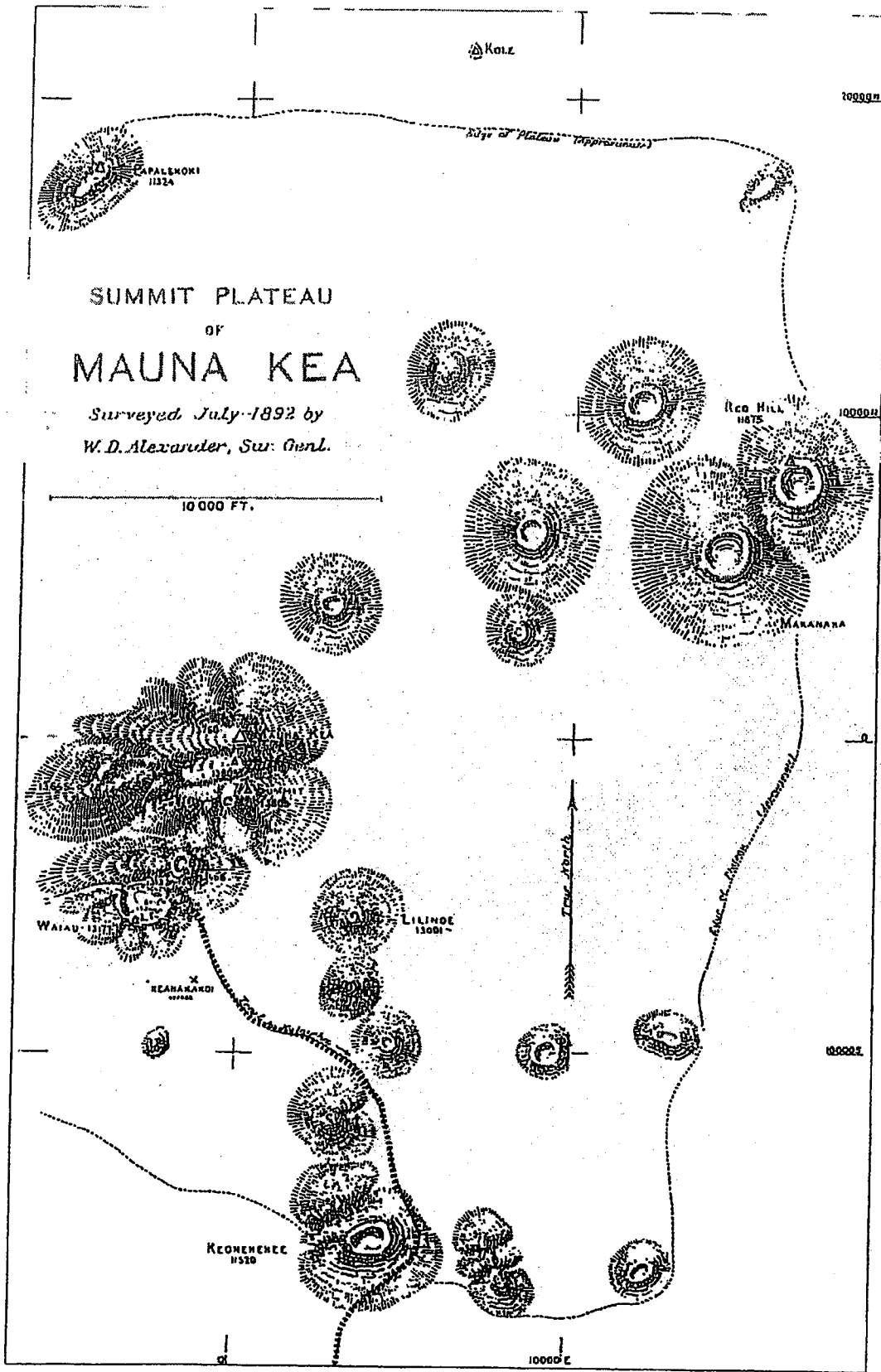


Figure 2.10. 1892 Alexander Map of the Summit Plateau and Alignment of the Humu'ula Trail.

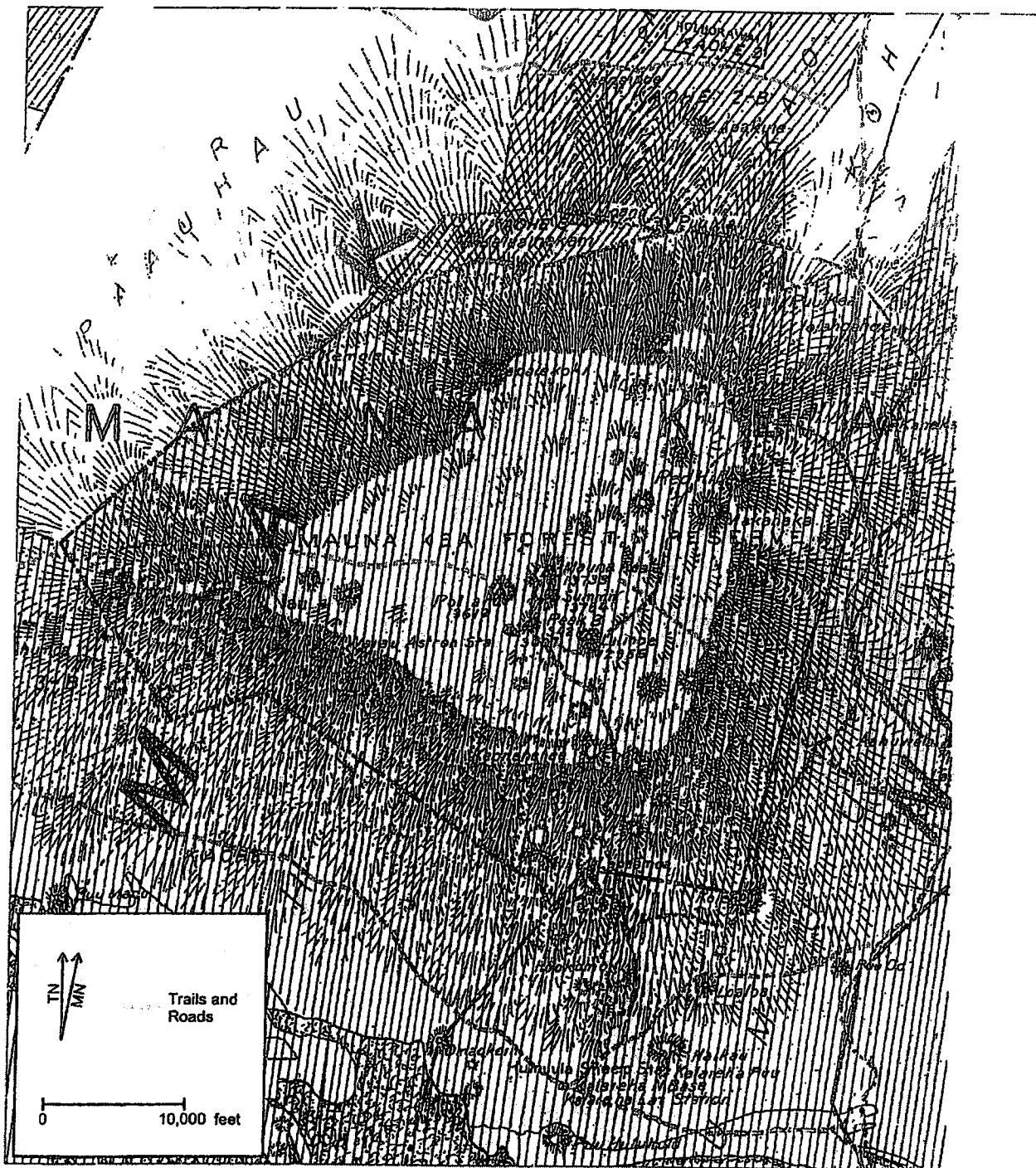


Figure 2.11. 1928 Walter E. Wall Map of the Island of Hawaii Showing Trails and Roads in the Summi Area and Lower Elevations.

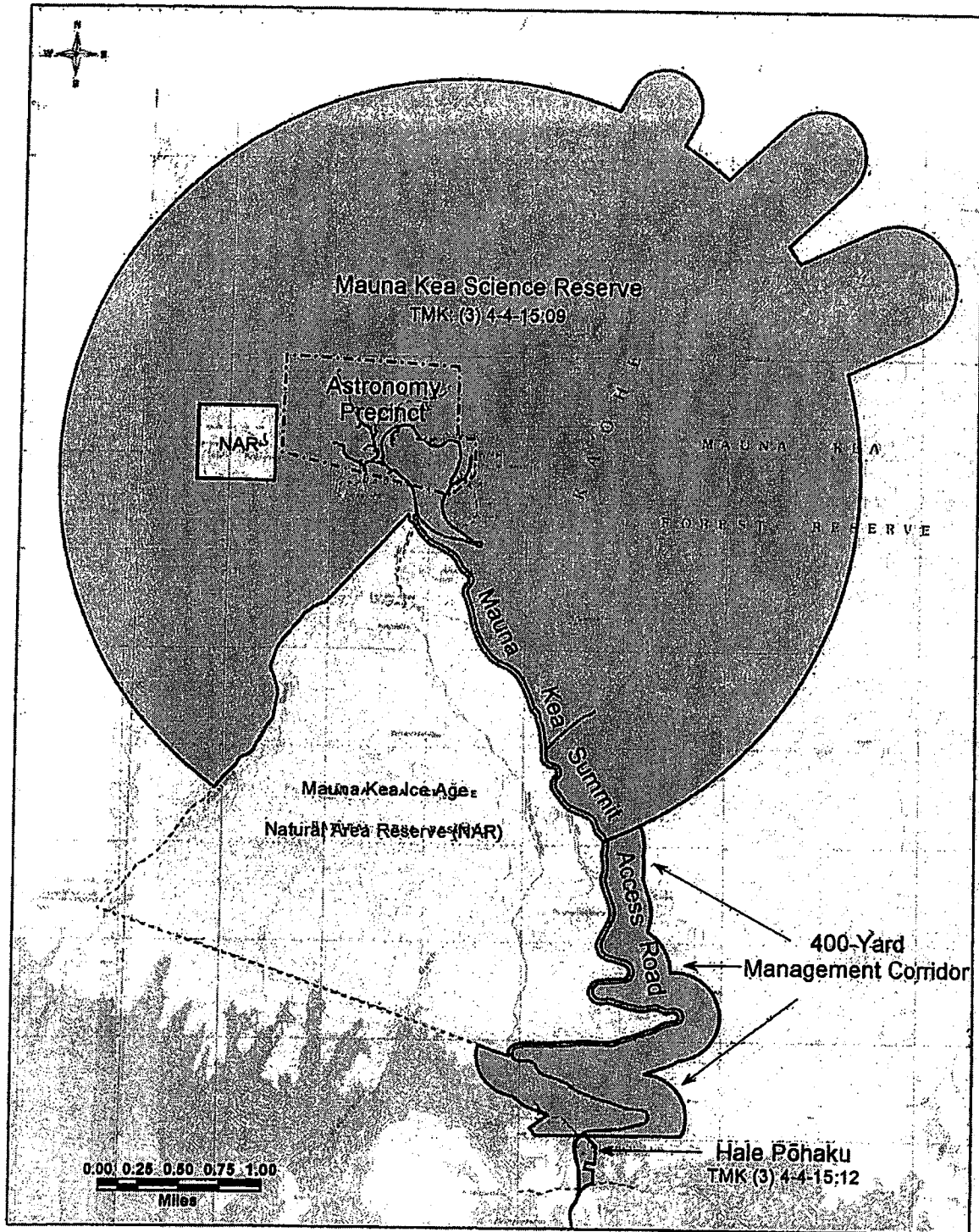
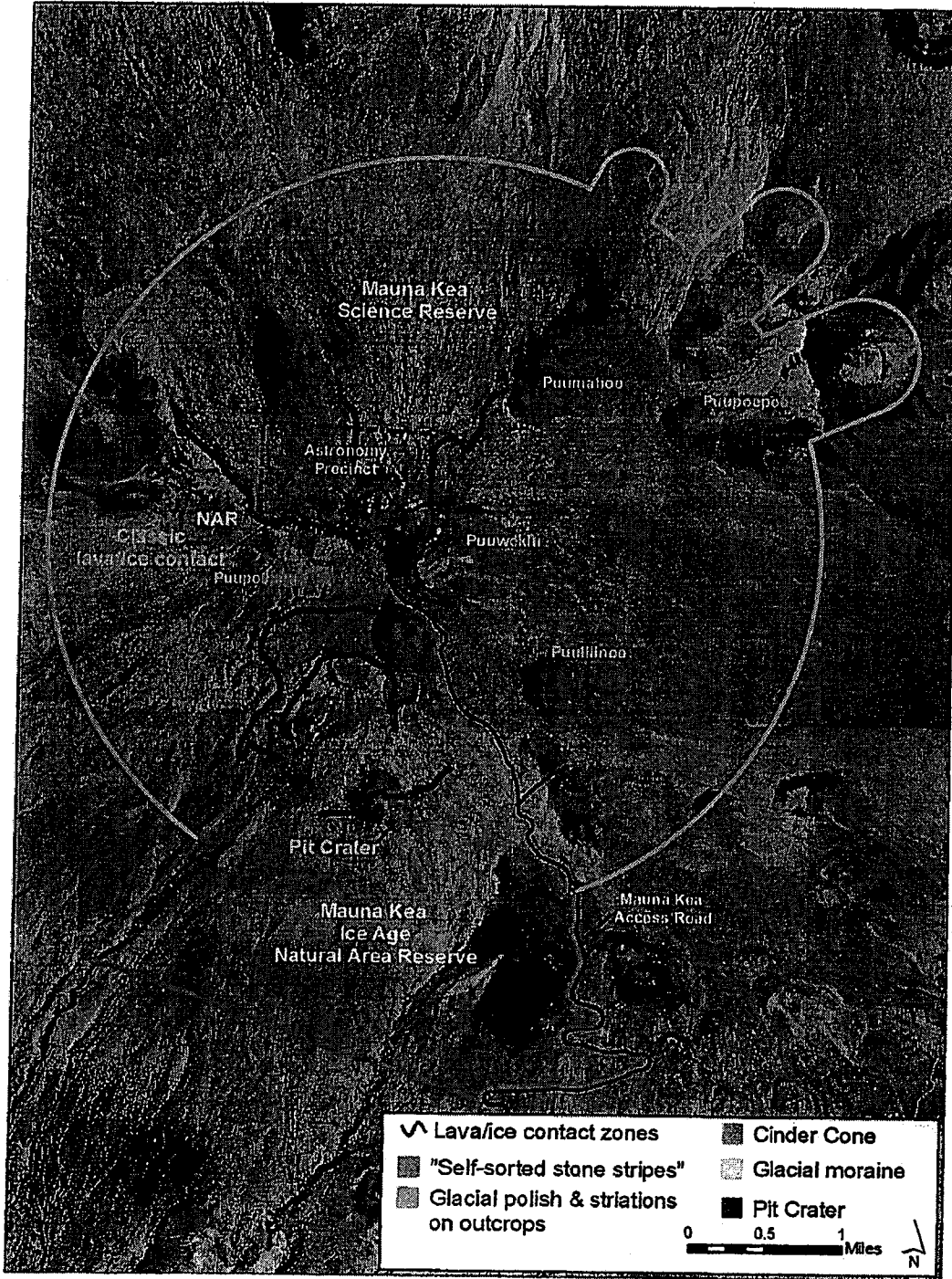


Figure 1-1. University of Hawai'i Management Areas

A Cultural Resources Management Plan for the University of Hawaii Management Areas on Mauna Kea:  
A Sub-Plan for the Mauna Kea Comprehensive Management Plan, October 2009

Mauna Kea Comprehensive Management Plan

Figure 5-2. Unique Geological Features in the Mauna Kea Summit Region





Mauna Kea Comprehensive Management Plan

Figure 5-1. Historic Sites, Find Spots and Traditional Cultural Properties in the UH Management Areas

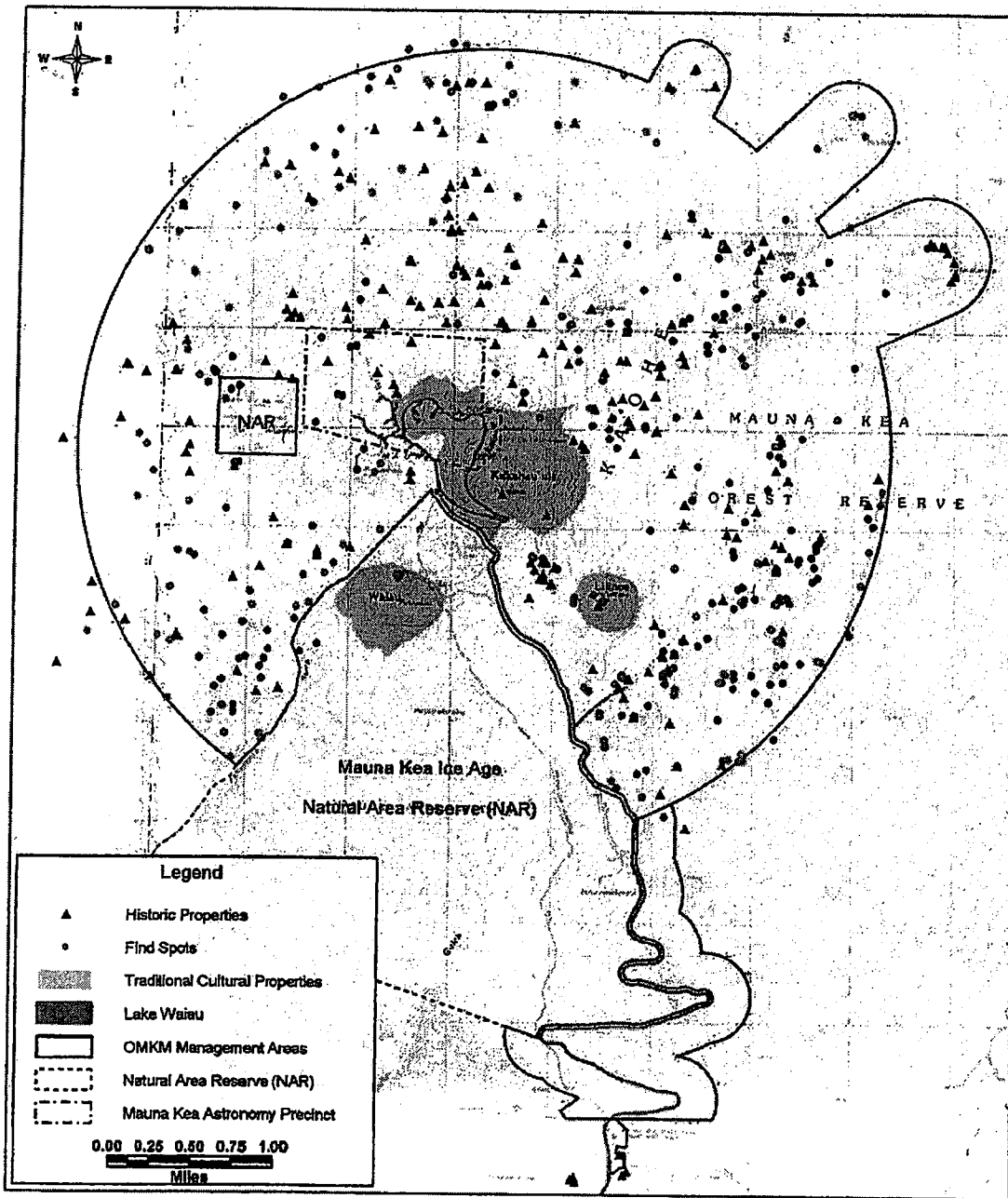


Figure 4.2. Aerial Photograph Showing the Kūkahau'ula TCP & Identifying Areas to be Developed



Source: TMT Observatory Corporation

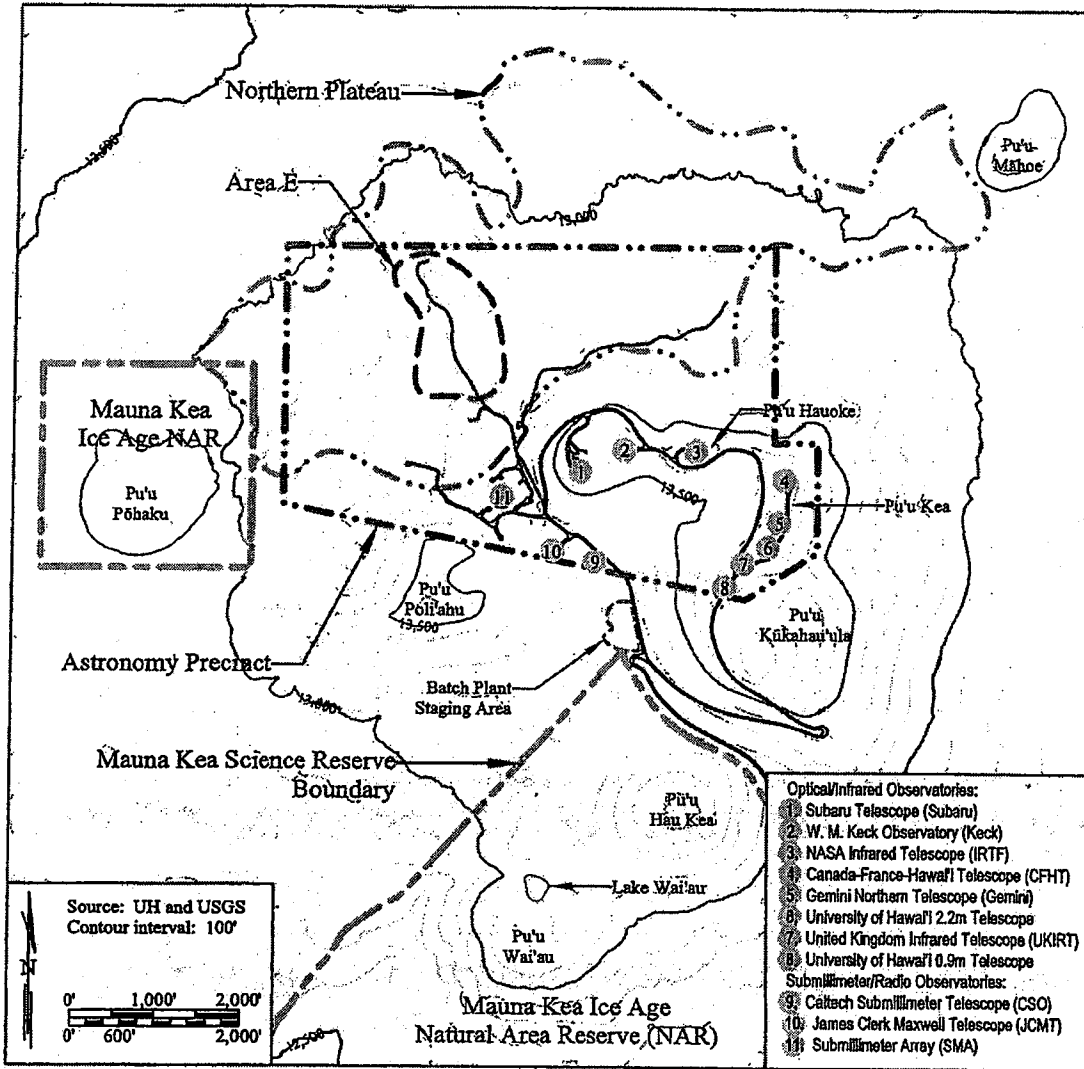


Table 7. Mauna Kea Telescopes (2010)

Source: [http://www.ifa.hawaii.edu/mko/telescope\\_table.htm](http://www.ifa.hawaii.edu/mko/telescope_table.htm)

Name	Mirror	Owner/Operator	Year Built
<b>Optical/Infrared</b>			
UHH 0.9m <sup>23</sup>	UHH 0.9-m Telescope	0.9m University of Hawai'i, Hilo	2008
UH 2.2m	UH 2.2-m Telescope	2.2m University of Hawai'i	1970
IRTF	NASA Infrared Telescope Facility	3.0m NASA	1979
CFHT	Canada-France-Hawai'i Telescope	3.6m Canada/France/UH	1979
UKIRT	United Kingdom Infrared Telescope	3.8m United Kingdom	1979
Keck I	W. M. Keck Observatory	10m Caltech/University of California	1992
Keck II	W. M. Keck Observatory	10m Caltech/University of California	1996
Subaru	Subaru Telescope	8.3m Japan	1999
Gemini	Gemini North Telescope	8.1m USA/UK/Canada/Argentina/Australia/Brazil/Chile	1999
<b>Radio</b>			
CSO	Caltech Submillimeter Observatory	10.4m Caltech/NSF	1987
JCMT	James Clerk Maxwell Telescope	15m UK/Canada/Netherlands	1987
SMA	Submillimeter Array	8x6m Smithsonian Astrophysical Observatory/Taiwan	2002
VLBA	Very Long Baseline Array	25m NRAO/AUI/NSF	1992

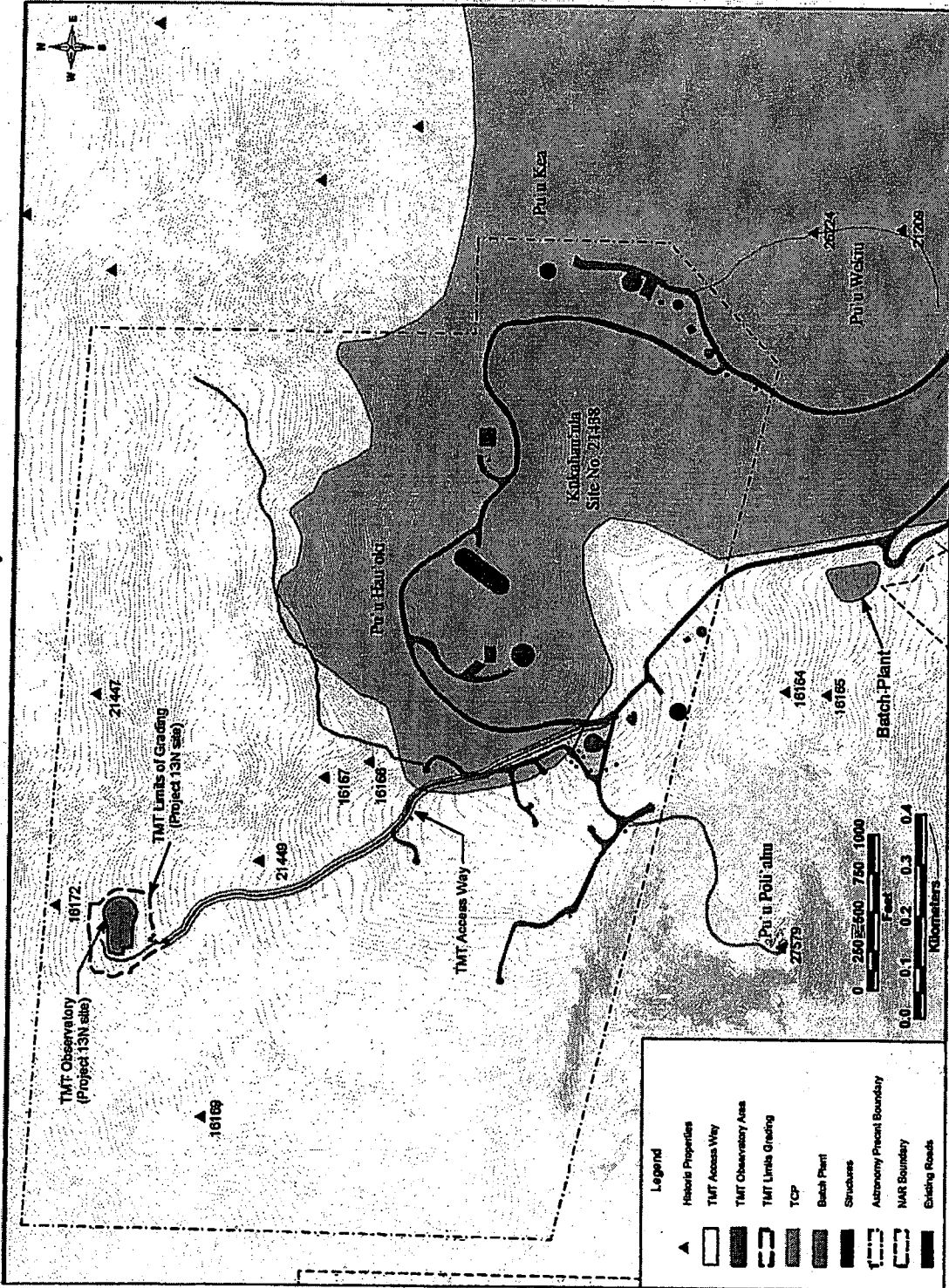
Table 8. Projected Observatories on Mauna Kea During Current Lease Term

Observatory	Count
<b>Current observatories in the Astronomy Precinct</b>	
CFHT, UH 2.2m, Gemini, IRTF, UHH 0.9m, Keck I, Keck II, Subaru, SMA, JCMT, CSO, UKIRT	12
<b>Current observatories off the summit</b>	
VLBA	1
<b>Total observatories currently in the Science Reserve</b>	
	13
<b>No replacement of facility; estimated to be removed by the end of the current lease</b>	
UKIRT	-1
VLBA	-1
Two of the three radio telescopes (SMA, JCMT, or CSO)	-2
<b>New facility</b>	
Thirty Meter Telescope	+1
<b>Total observatories in the Science Reserve approaching end of lease</b>	
	10

Observatory	Count
<b>Continued use or recycling of existing facilities</b>	
CFHT, UH 2.2m, Gemini, IRTF, UHH 0.9m, Keck I, Keck II, Subaru	8
One of the three radio telescopes (SMA, JCMT, or CSO)	1
<b>New facility</b>	
Thirty Meter Telescope	+1
<b>Total observatories in the Science Reserve approaching end of lease</b>	
	10

<sup>23</sup> In 2008 the UH 0.6-m telescope (built in 1968) was replaced by the UHH 0.9-m telescope.

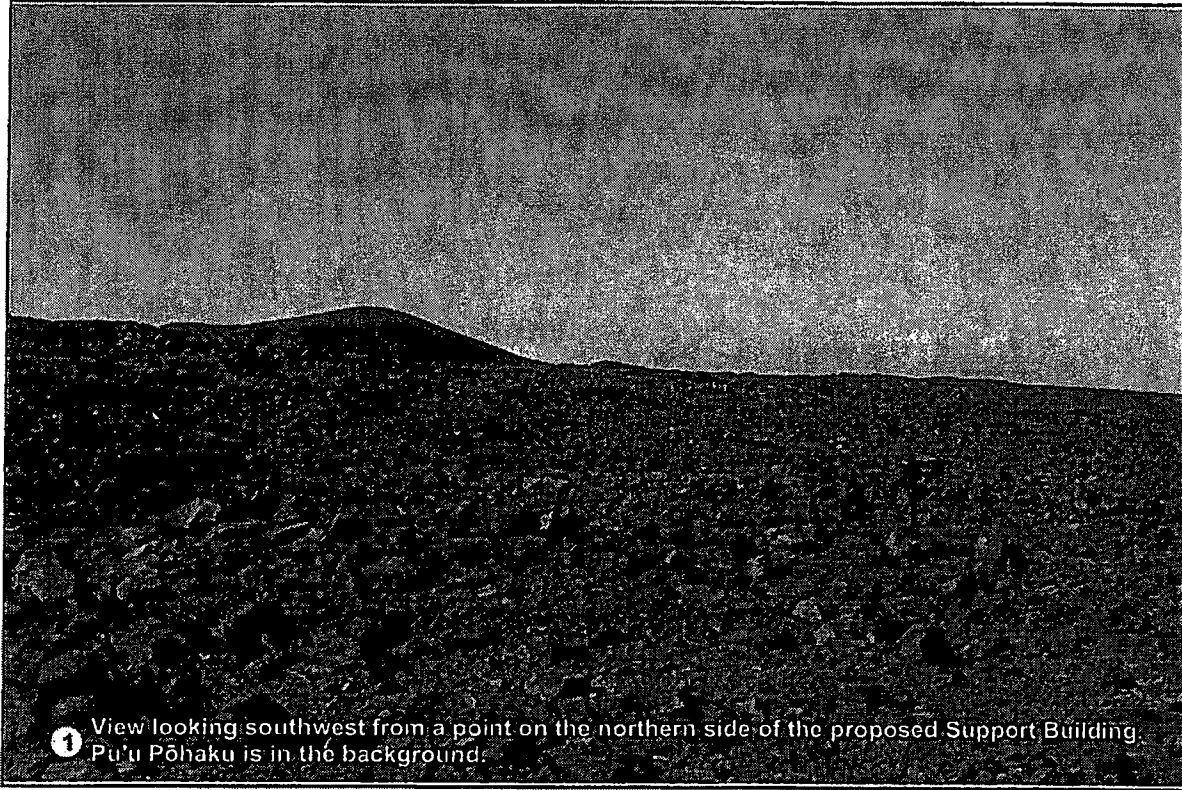
Figure A-1: Planned Location of the TMT Observatory and Access Way



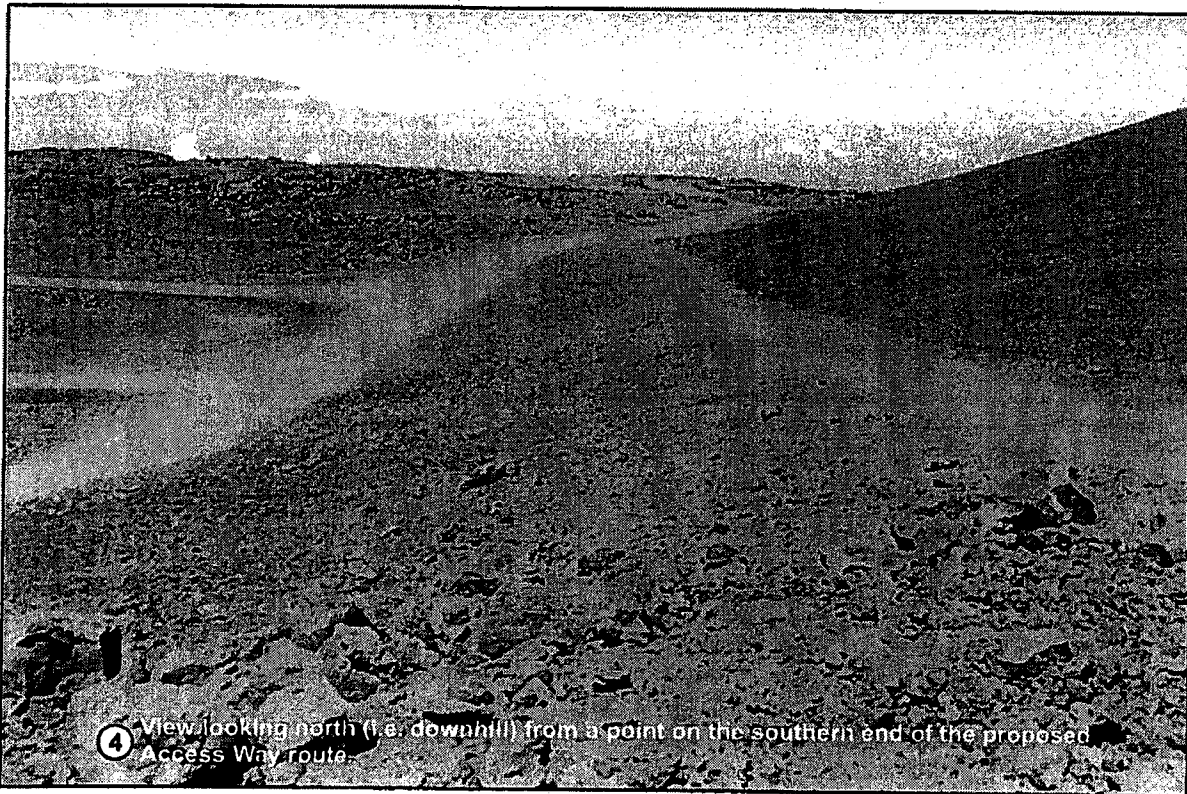
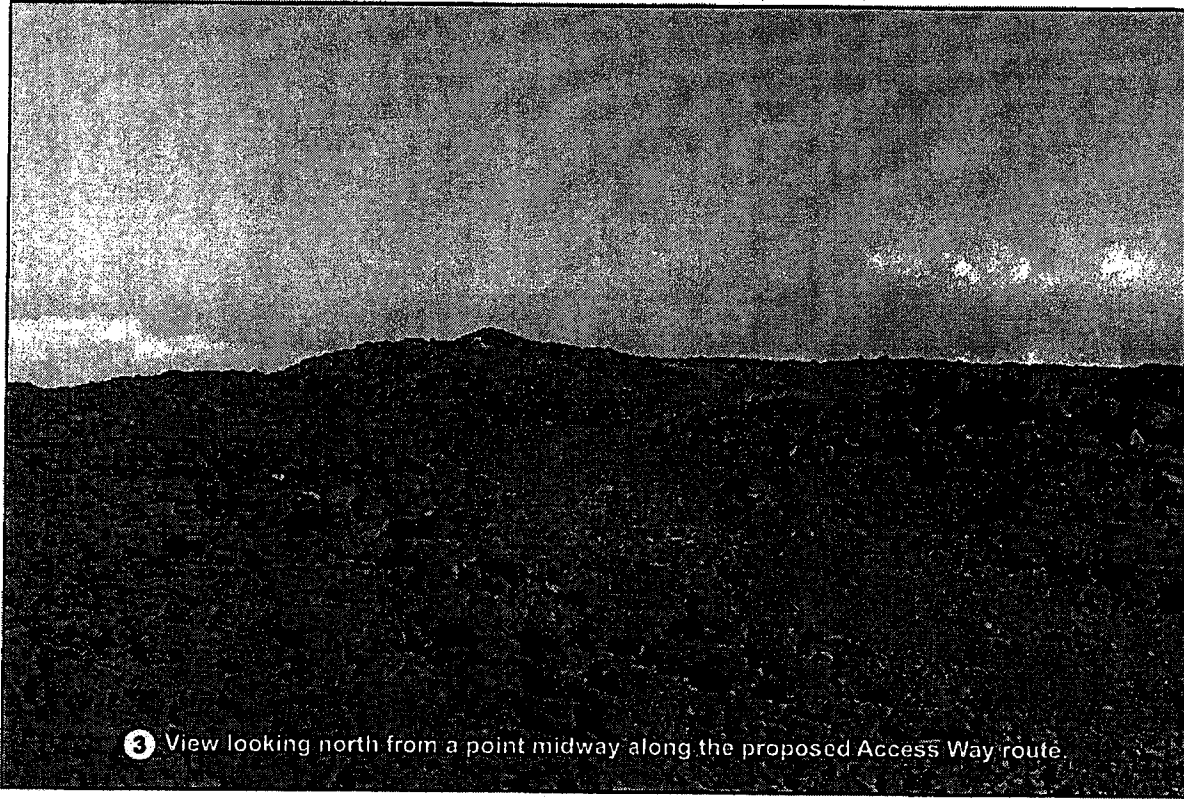




# Photographs of the 13N Site

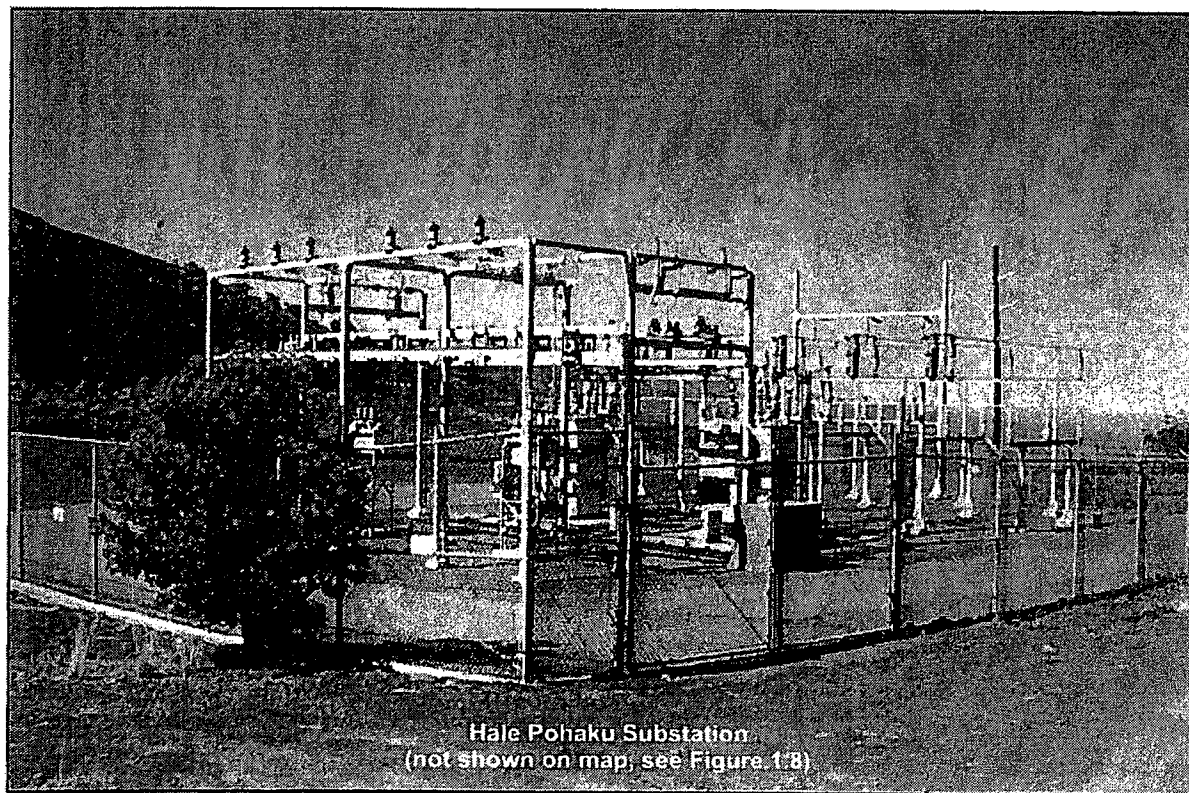
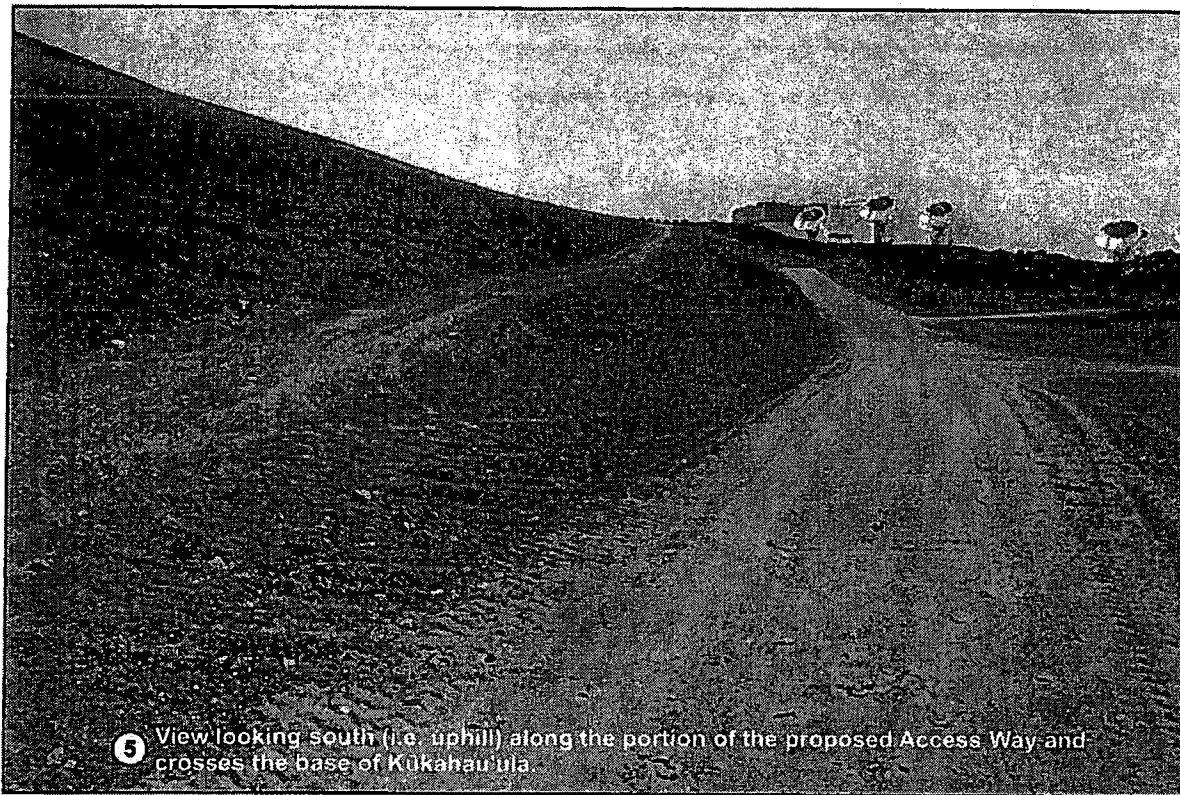


### Photographs of the Access Way

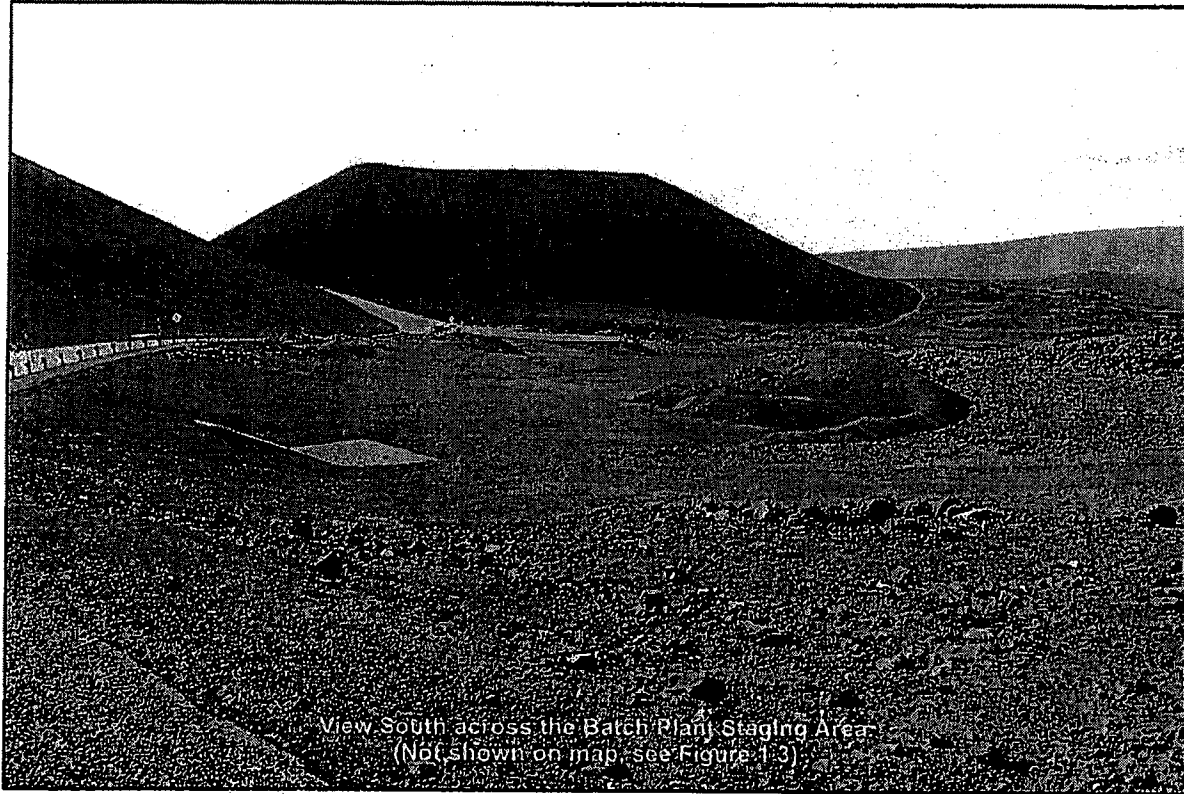


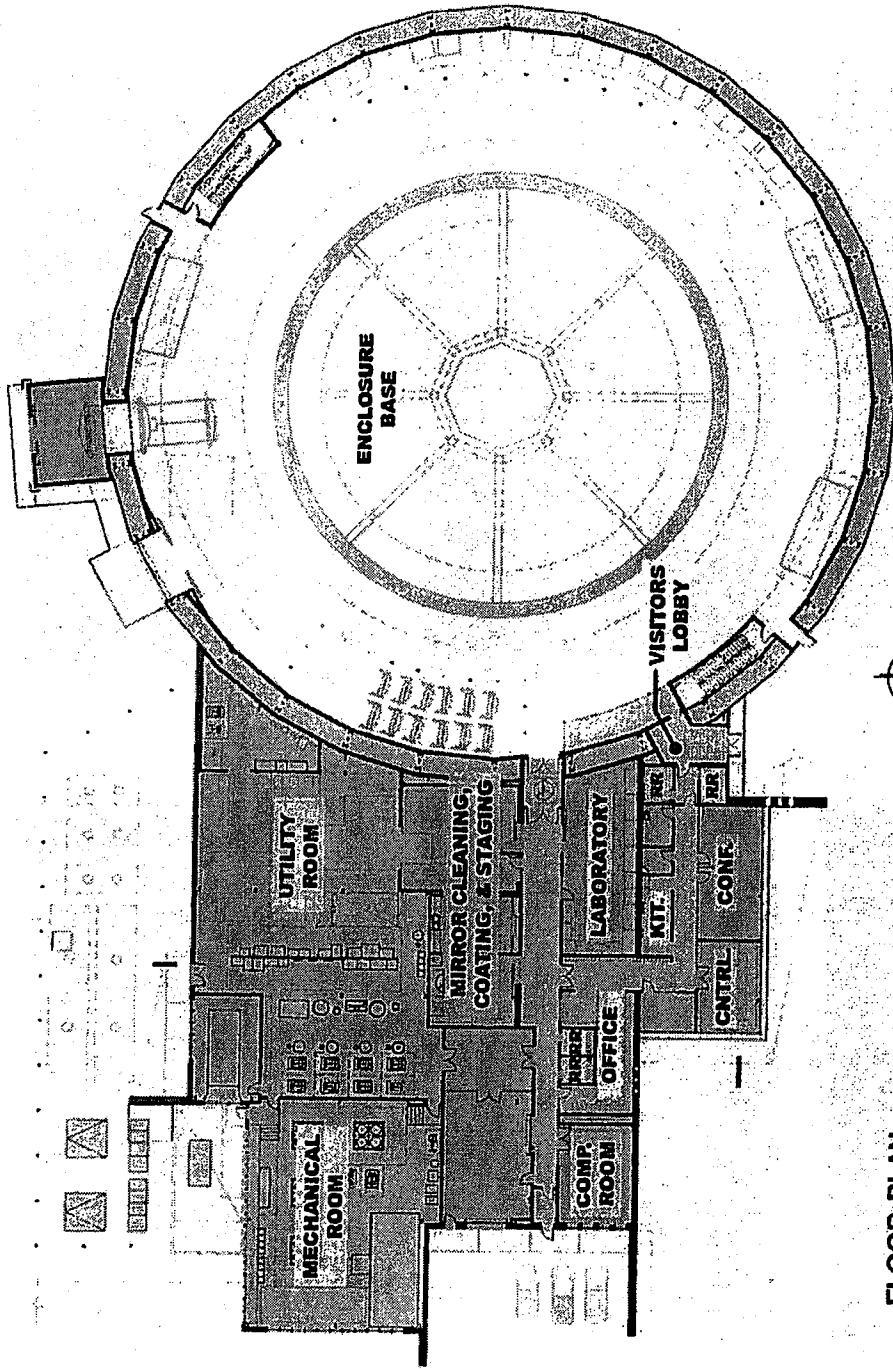


# Photographs of the Access Way and Hale Pohaku Substation



# Photograph of the Batch Plant Staging Area





**FLOOR PLAN**  
TMT - MAUNA KEA, HAWAII

THIRTY METER TELESCOPE  
DESIGN DEVELOPMENT SUBMITTAL  
FOR THE OFFICE OF MAUNULA KEA MANAGEMENT  
MAUNULA KEA, HAWAII



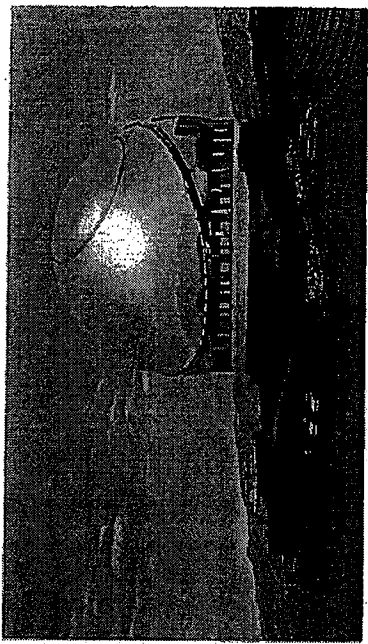
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Client	MAUNULA KEA, HAWAII
Architect	[Logo]
Scale	AS SHOWN
Date	10/20/09
Drawn By	[Name]
Checked By	[Name]
Project No.	[Number]
Sheet No.	[Number]
Scale	AS SHOWN

NO MODEL  
RENDERINGS  
SCALE  
GROSS  
AREA  
TOTAL AREA  
TOTAL VOLUME

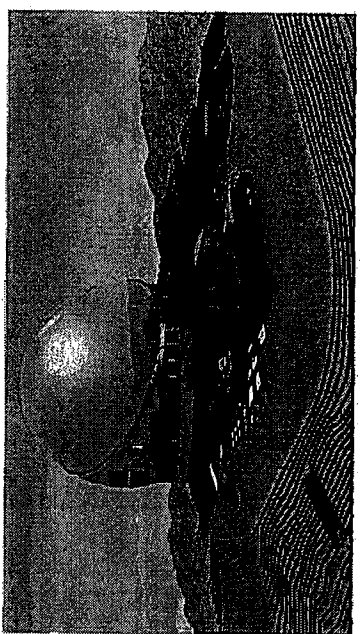
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RENDERED



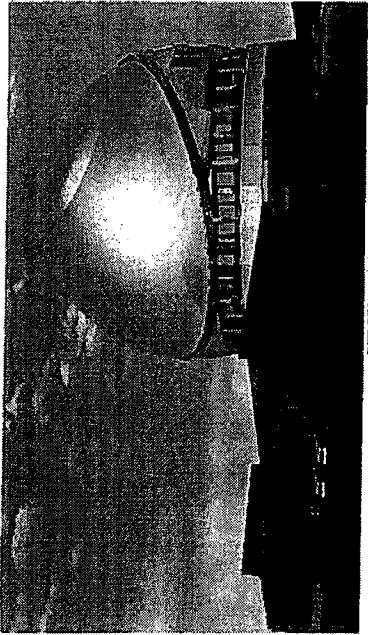
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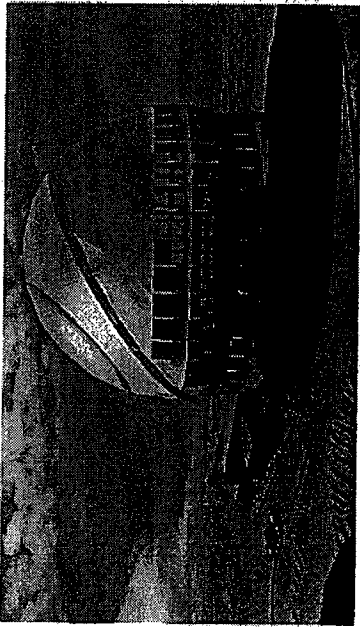
SOUTHWEST VIEW



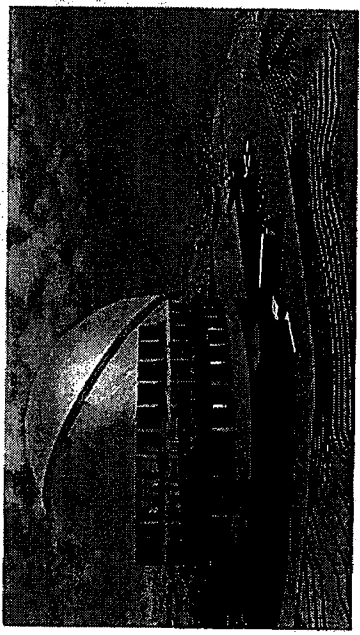
NORTHWEST VIEW



PERPECTIVE NO. 1

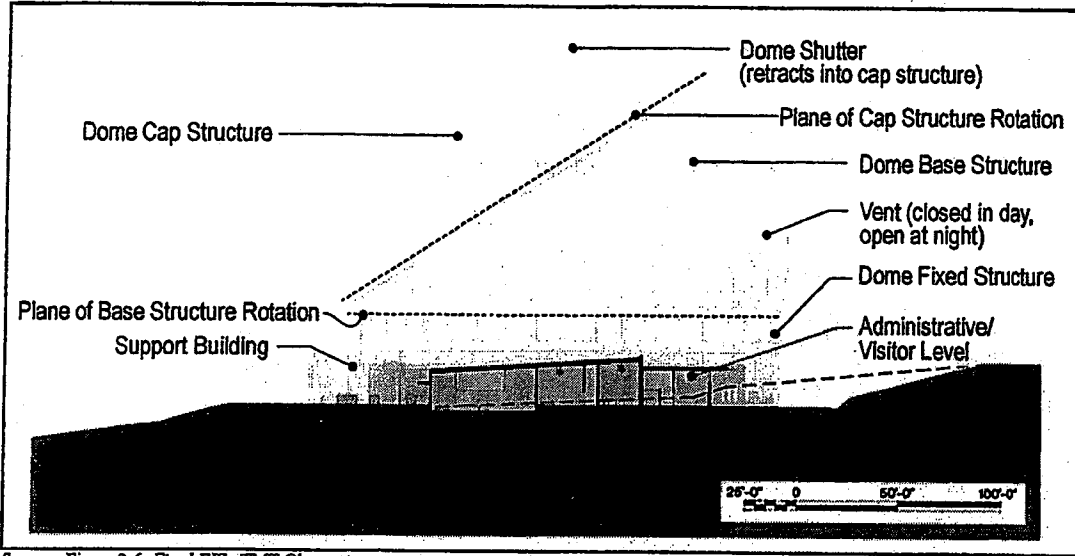


SOUTHEAST VIEW



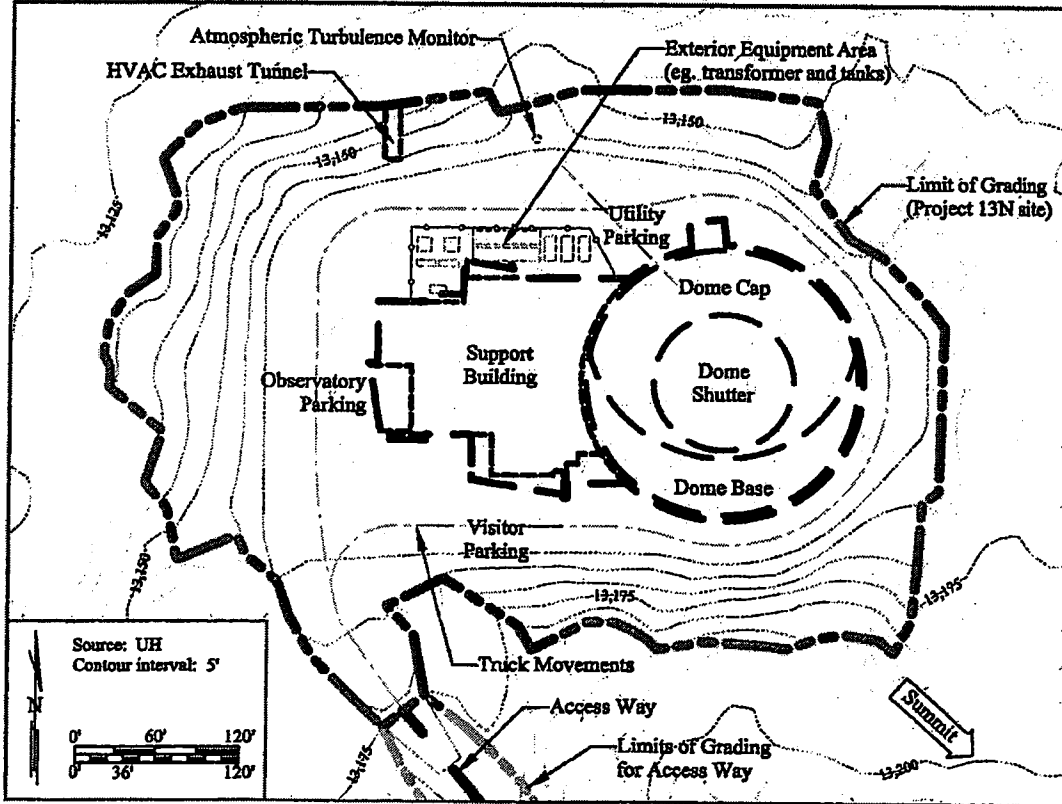
NORTHEAST VIEW

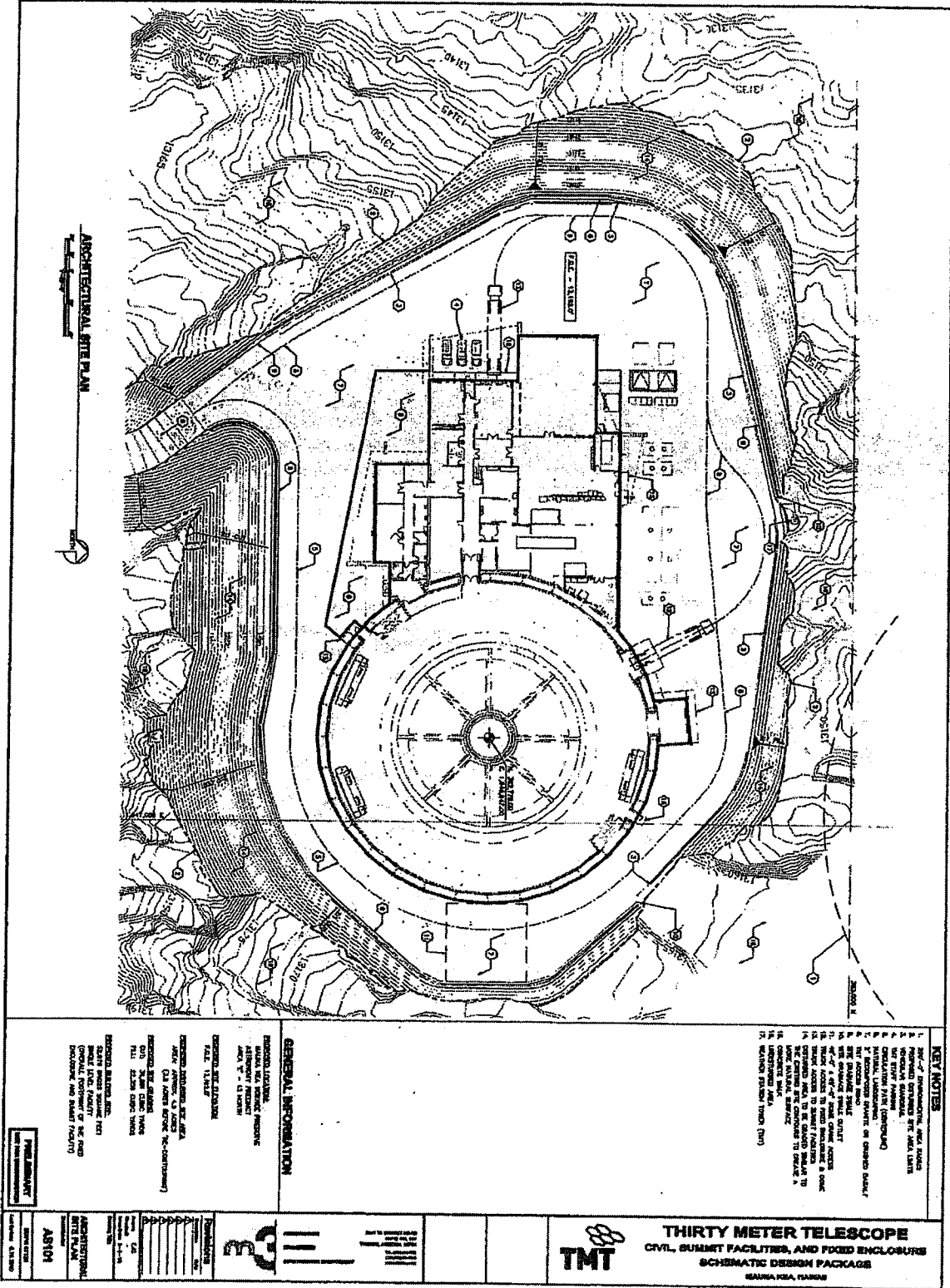
Figure 3-2: TMT Observatory Cross-Section



Source: Figure 2-6, Final EIS: TMT Observatory

Figure 3-3: TMT Observatory Plan View and Grading Plan





ARCHITECTURAL SITE PLAN

**KEY NOTES**

1. SEE GENERAL NOTES AND SPECIFICATIONS FOR DETAILED INFORMATION.
2. PROPOSED ELEVATIONS ARE SHOWN IN FEET AND INCHES.
3. SEE GENERAL NOTES FOR EXISTING AND PROPOSED UTILITY LINES.
4. SEE GENERAL NOTES FOR EXISTING AND PROPOSED ROADWAYS.
5. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION MATERIALS.
6. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION METHODS.
7. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION SCHEDULE.
8. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION COSTS.
9. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION RISKS.
10. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION SAFETY.
11. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION ENVIRONMENT.
12. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION CULTURE.
13. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION COMMUNITY.
14. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION ECONOMY.
15. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION SOCIETY.
16. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION POLITICS.
17. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION HISTORY.
18. SEE GENERAL NOTES FOR EXISTING AND PROPOSED CONSTRUCTION FUTURE.

**GENERAL INFORMATION**

**PROJECT LOCATION:**  
 MAUNA KEA VOLCANIC PEAK  
 MAUNA KEA, HAWAII  
 19.5° 45' N, 155° 28' W

**DESIGNED BY:**  
 TMT DESIGN GROUP, INC.  
 1000 KALANANAKU AVENUE, SUITE 1000  
 HONOLULU, HAWAII 96813

**ENGINEER:**  
 DR. JAMES W. BEYER, P.E.  
 1000 KALANANAKU AVENUE, SUITE 1000  
 HONOLULU, HAWAII 96813

**DATE:**  
 10/15/2010

**SCALE:**  
 1" = 100'

**PROJECT NUMBER:**  
 TMT-001

**REVISIONS:**

NO.	DATE	DESCRIPTION
1	10/15/2010	ISSUED FOR PERMITTING
2	10/15/2010	ISSUED FOR CONSTRUCTION
3	10/15/2010	ISSUED FOR OPERATION

**DESIGNED BY:**  
 TMT DESIGN GROUP, INC.  
 1000 KALANANAKU AVENUE, SUITE 1000  
 HONOLULU, HAWAII 96813

**ENGINEER:**  
 DR. JAMES W. BEYER, P.E.  
 1000 KALANANAKU AVENUE, SUITE 1000  
 HONOLULU, HAWAII 96813

**DATE:**  
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**SCALE:**  
 1" = 100'

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 TMT-001

**REVISIONS:**

NO.	DATE	DESCRIPTION
1	10/15/2010	ISSUED FOR PERMITTING
2	10/15/2010	ISSUED FOR CONSTRUCTION
3	10/15/2010	ISSUED FOR OPERATION

**TMT**

**THIRTY METER TELESCOPE**  
 CIVIL, SUMMIT FACILITIES, AND FIXED ENCLOSURE  
 SCHEMATIC DESIGN PACKAGE  
 MAUNA KEA, HAWAII





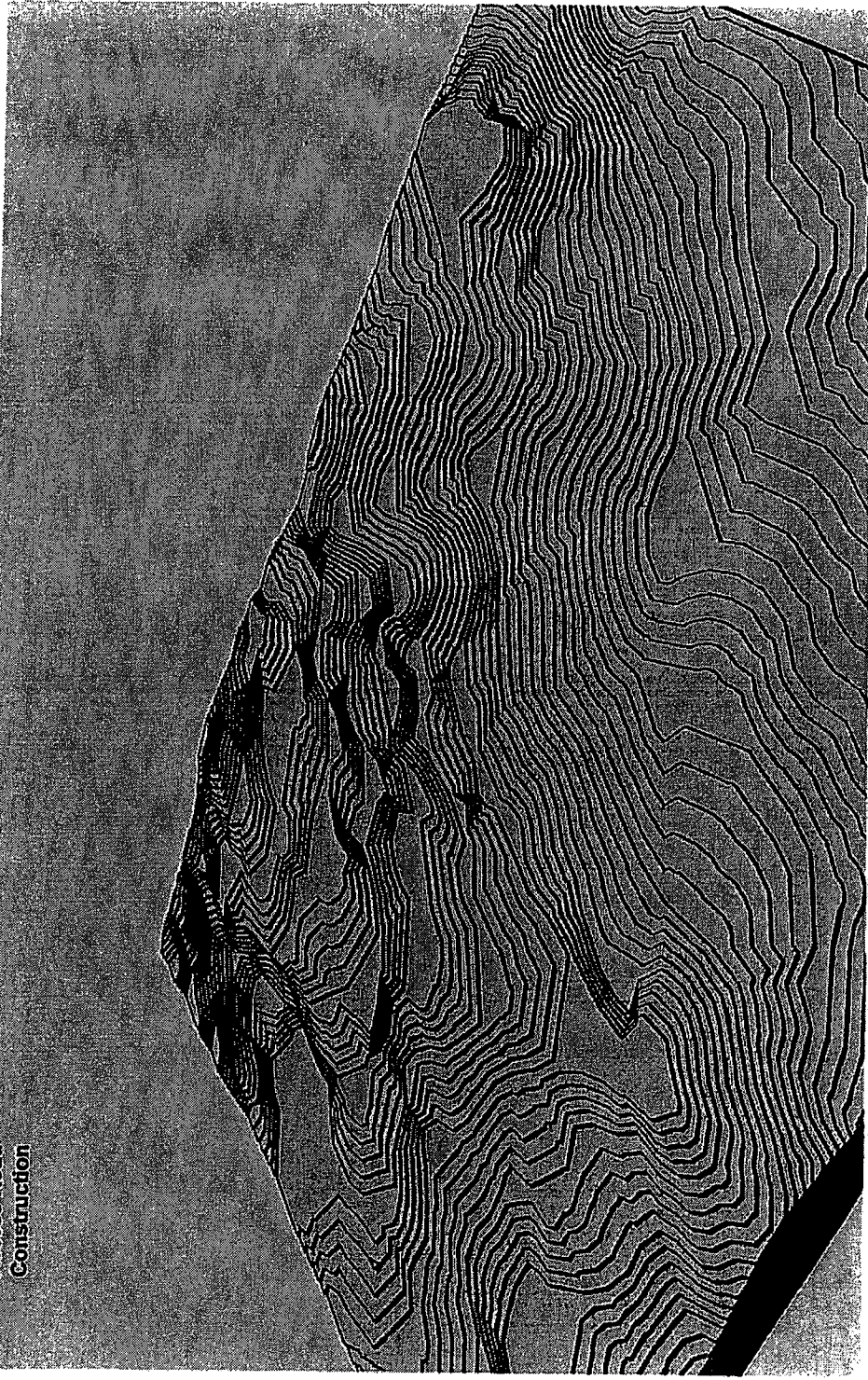
THIRTY METER TELESCOPE

# Construction Sequence Summit (Pre-Construction)



2011	2012	2013	2014	2015	2016	2017	2018	2019
1   2   3	3   4   1   2   3   4	1   2   3   4   1   2   3   4	1   2   3   4   1   2   3   4	1   2   3   4   1   2   3   4	1   2   3   4   1   2   3   4	1   2   3   4   1   2   3   4	1   2   3   4   1   2   3   4	1   2   3   4

Access Road  
Construction





THIRTY METER TELESCOPE

# Construction Sequence Rough Grading



2011	2012	2013	2014	2015	2016	2017	2018	2019
1   2   3	4   1   2   3   4	1   2   3   4	1   2   3   4	1   2   3   4	1   2   3   4	1   2   3   4	1   2   3   4	1   2   3   4





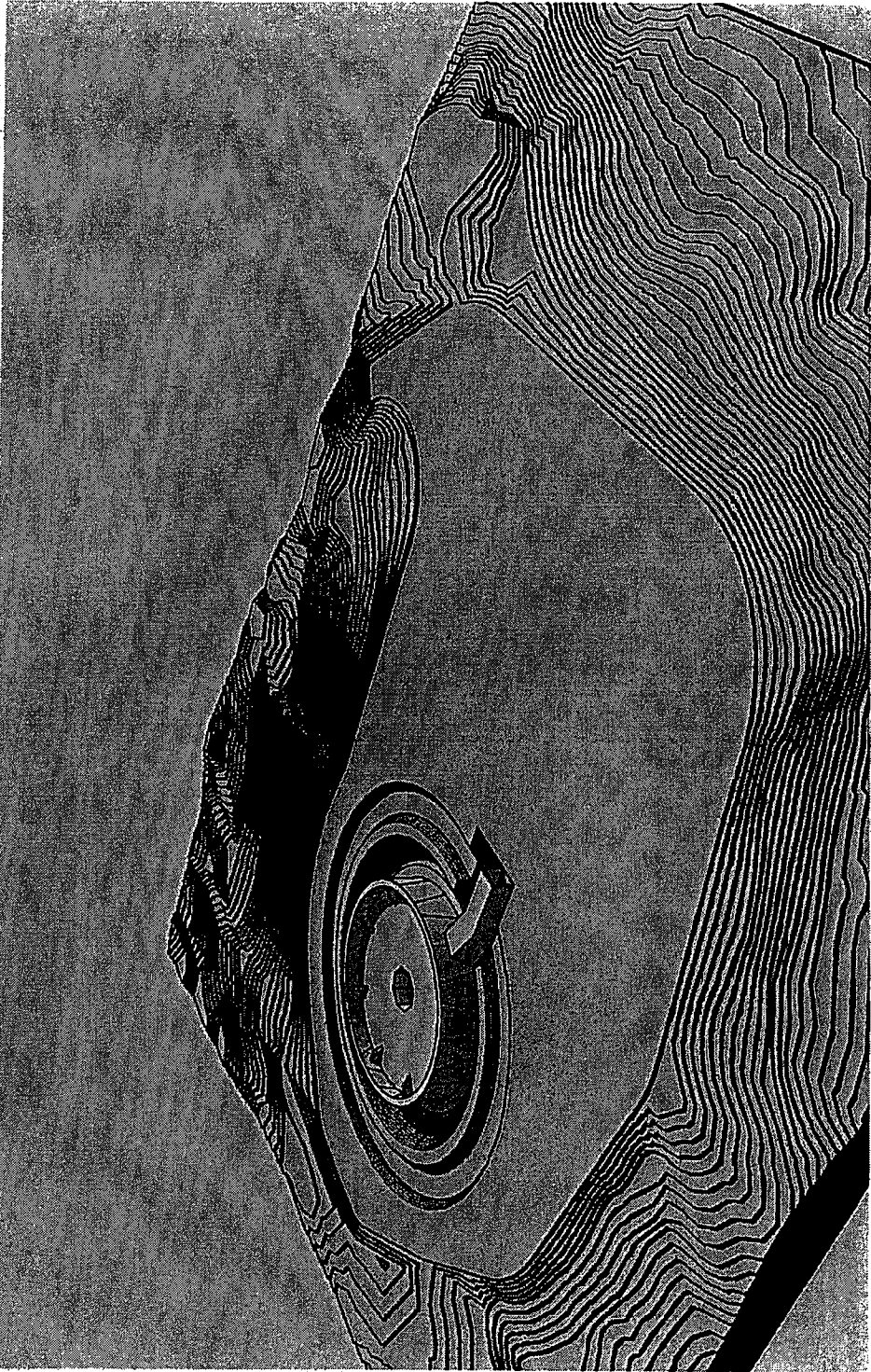


THIRTY METER TELESCOPE

# Construction Sequence Pier and Tunnel Concrete



2011	2012	2013	2014	2015	2016	2017	2018	2019
1	2	3	4	1	2	3	4	1
2	3	4	1	2	3	4	1	2
3	4	1	2	3	4	1	2	3
4	1	2	3	4	1	2	3	4



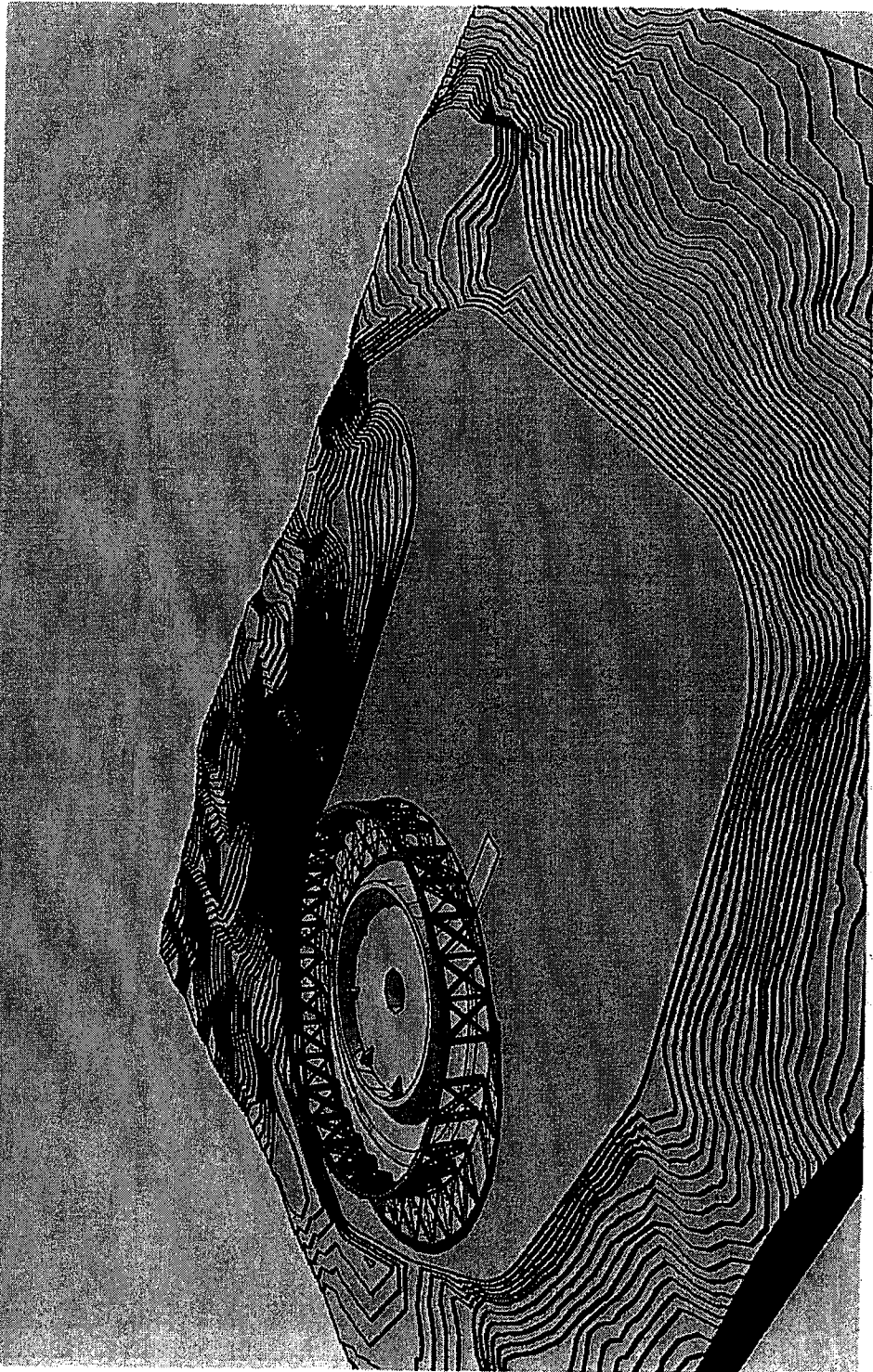


THIRTY METER TELESCOPE

# Construction Sequence Fixed Enclosure Structural Steel



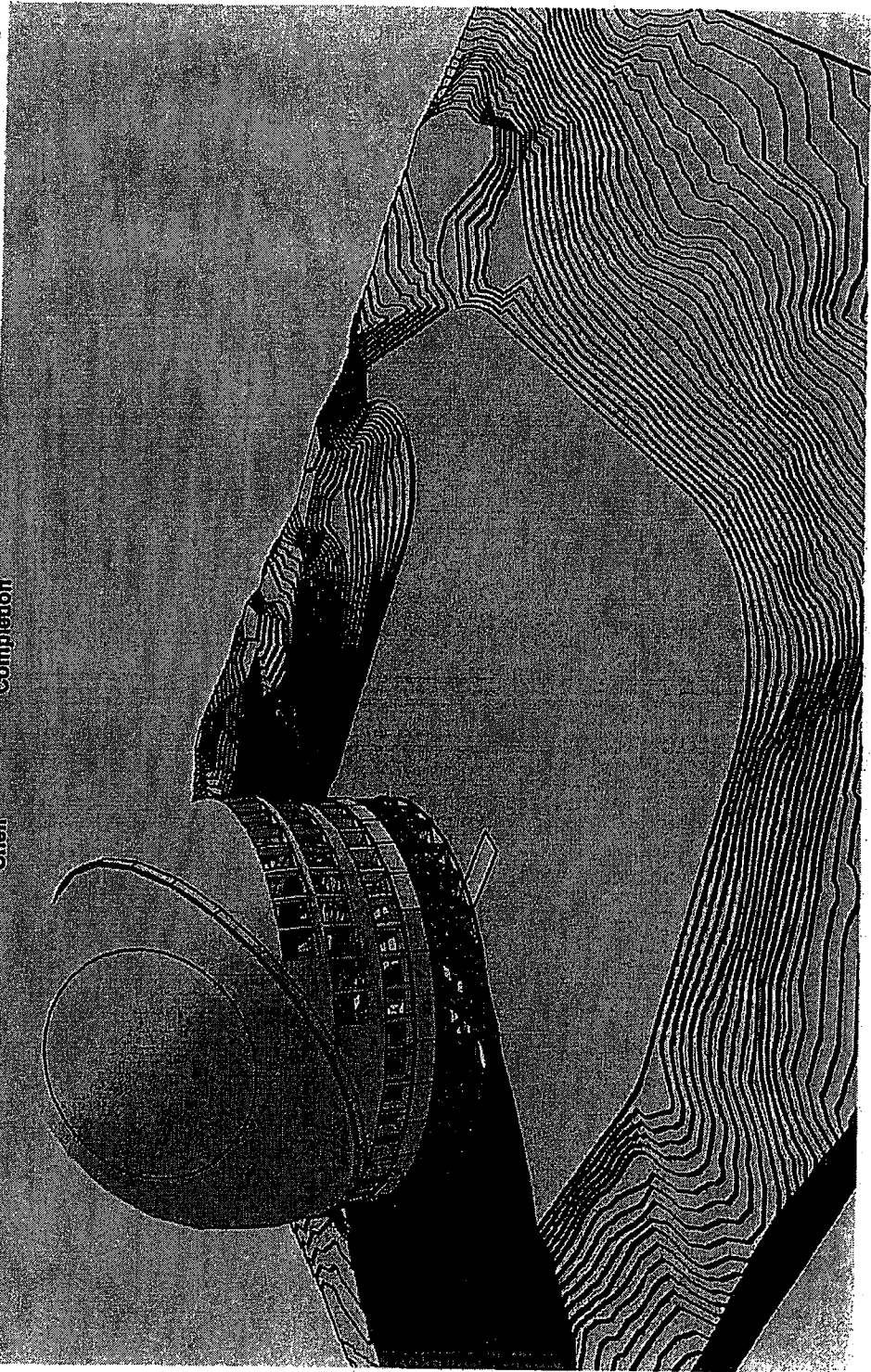
2011		2012		2013		2014		2015		2016		2017		2018		2019			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4





THIRTY METER TELESCOPE

# Construction Sequence Rotating Enclosure Erection







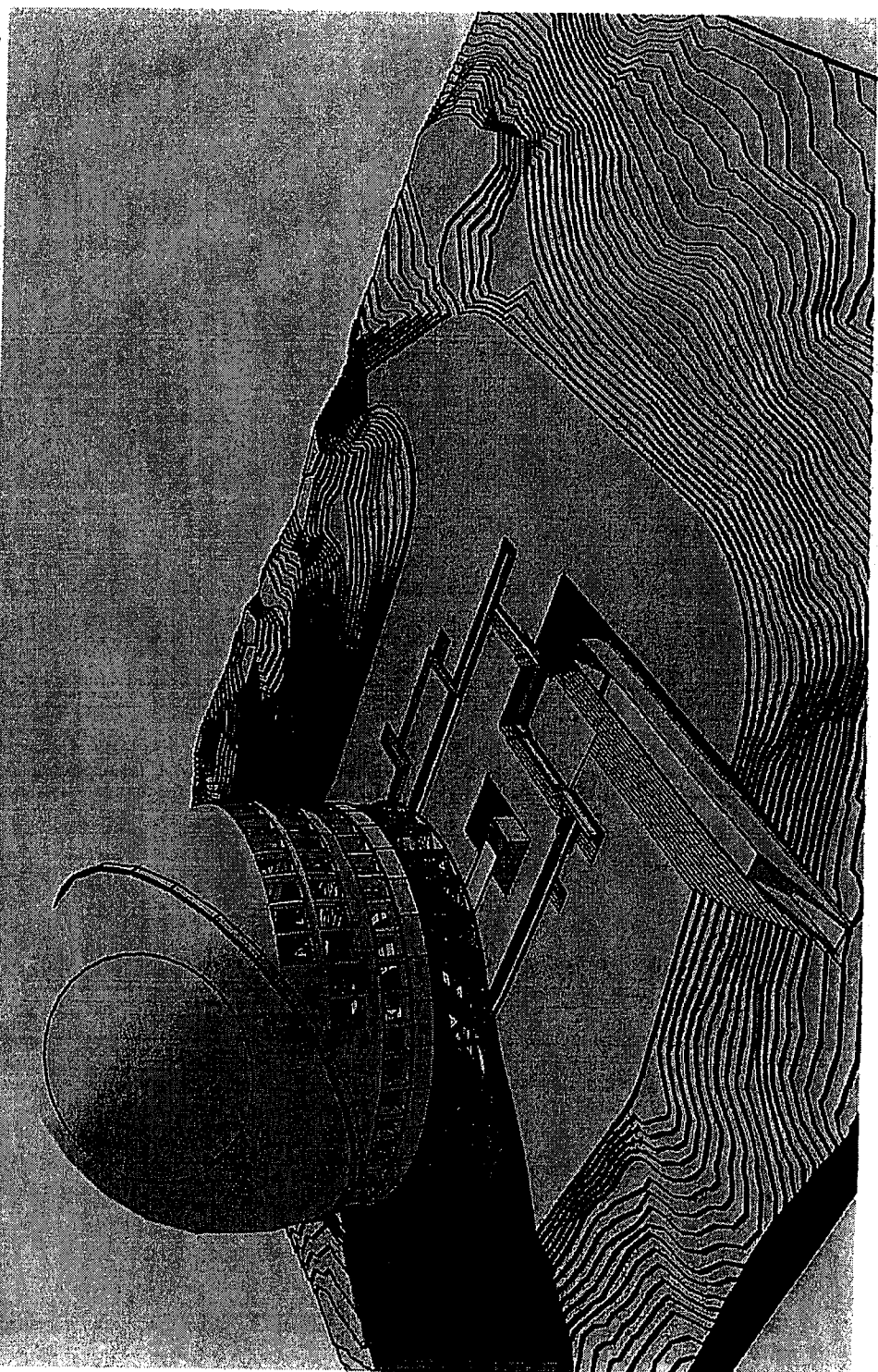
**TMT**

THIRTY METER TELESCOPE

# Construction Sequence Summit Facility Foundation & Tunnel



2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	2	3	4	1	2	3	4	1	2
1	2	3	4	1	2	3	4	1	2
1	2	3	4	1	2	3	4	1	2
1	2	3	4	1	2	3	4	1	2





# Construction Sequence Fixed Enclosure Wall Panels



2011	2012	2013	2014	2015	2016	2017	2018	2019
1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4





THIRTY METER TELESCOPE

# Construction Sequence Completion

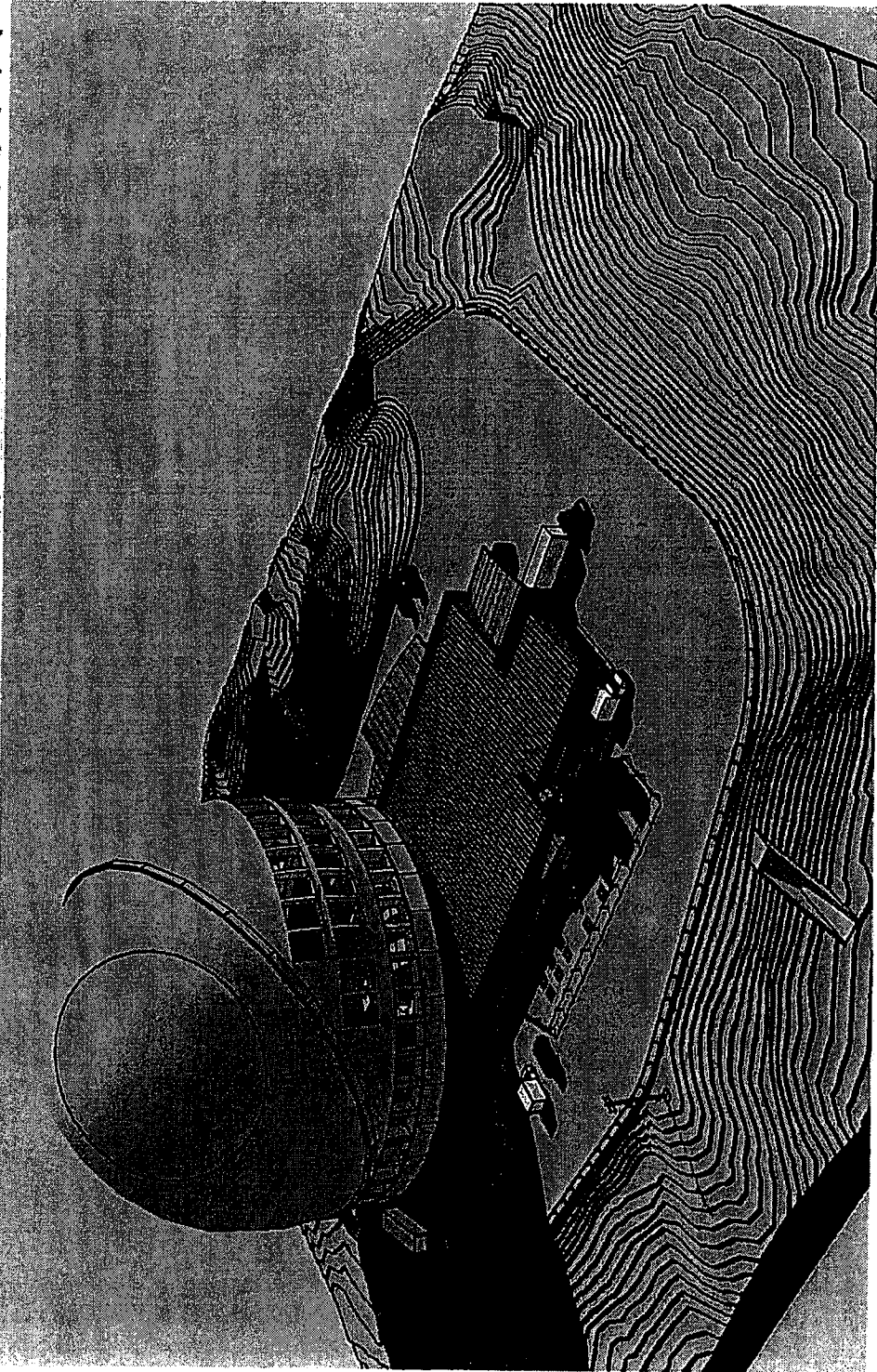
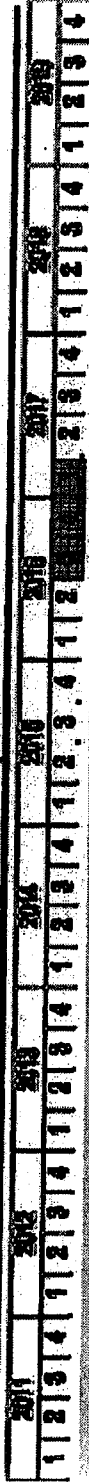
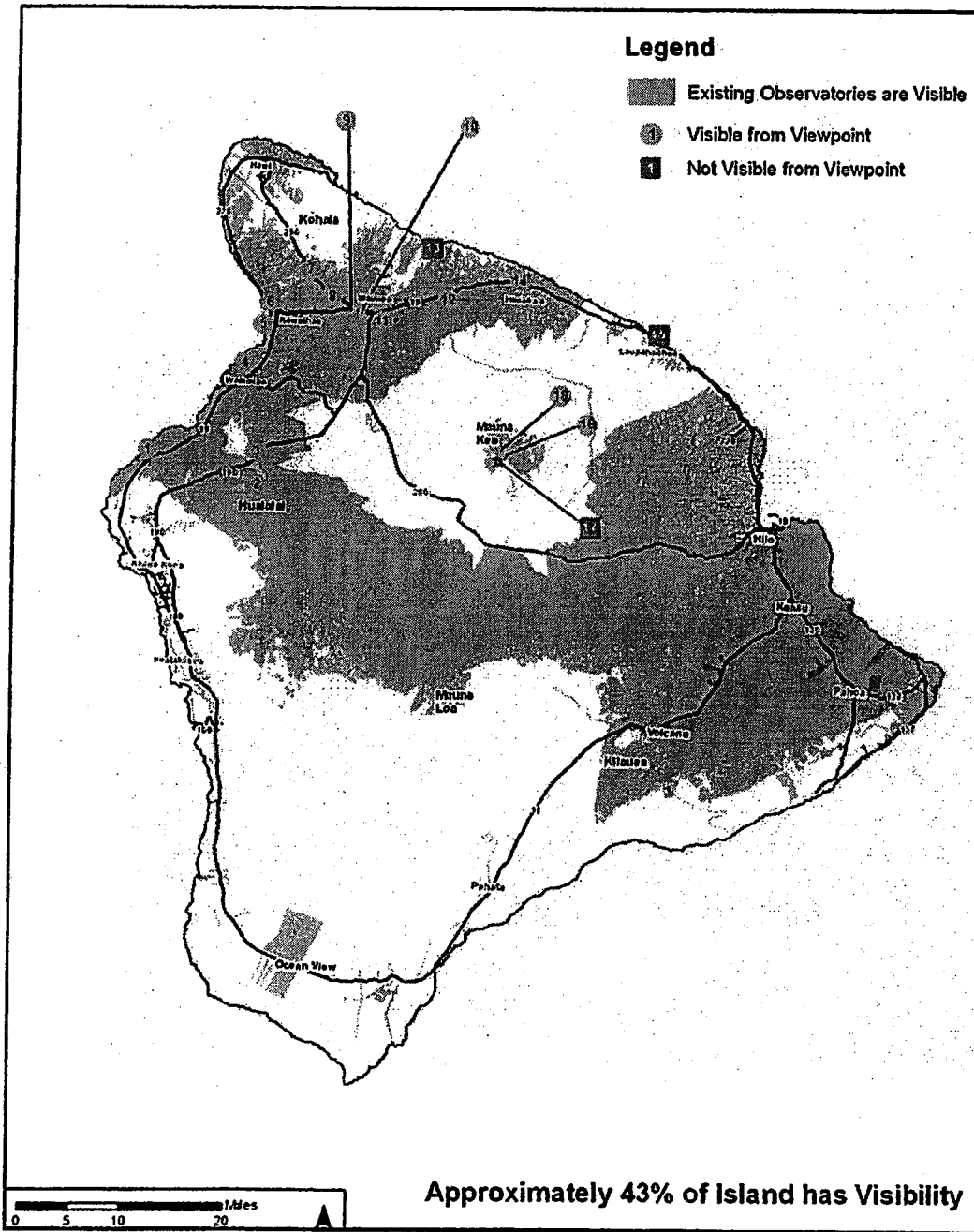


Figure 7.2: Viewshed of Existing Observatories on Mauna Kea

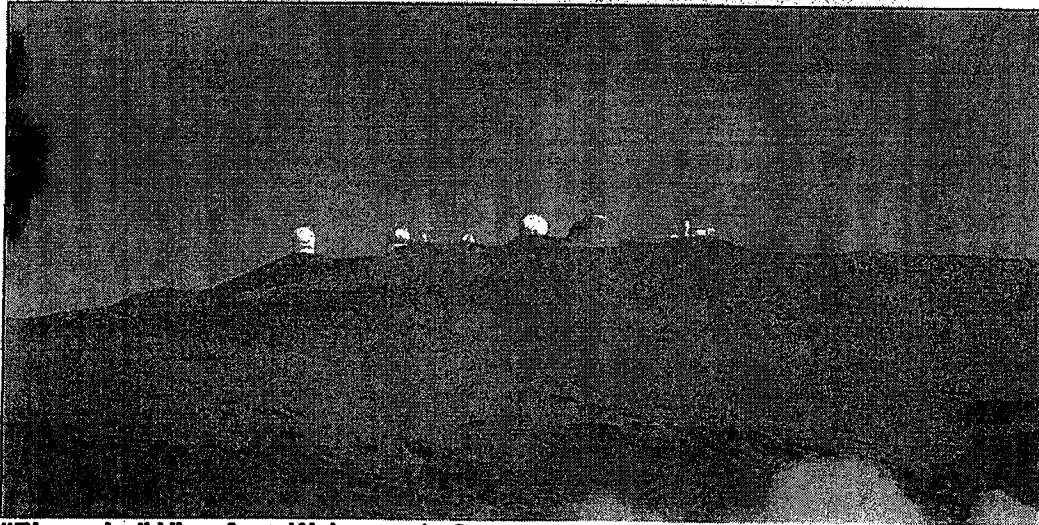


Source: Figure 3-8, *Final EIS for the Thirty Meter Telescope*.





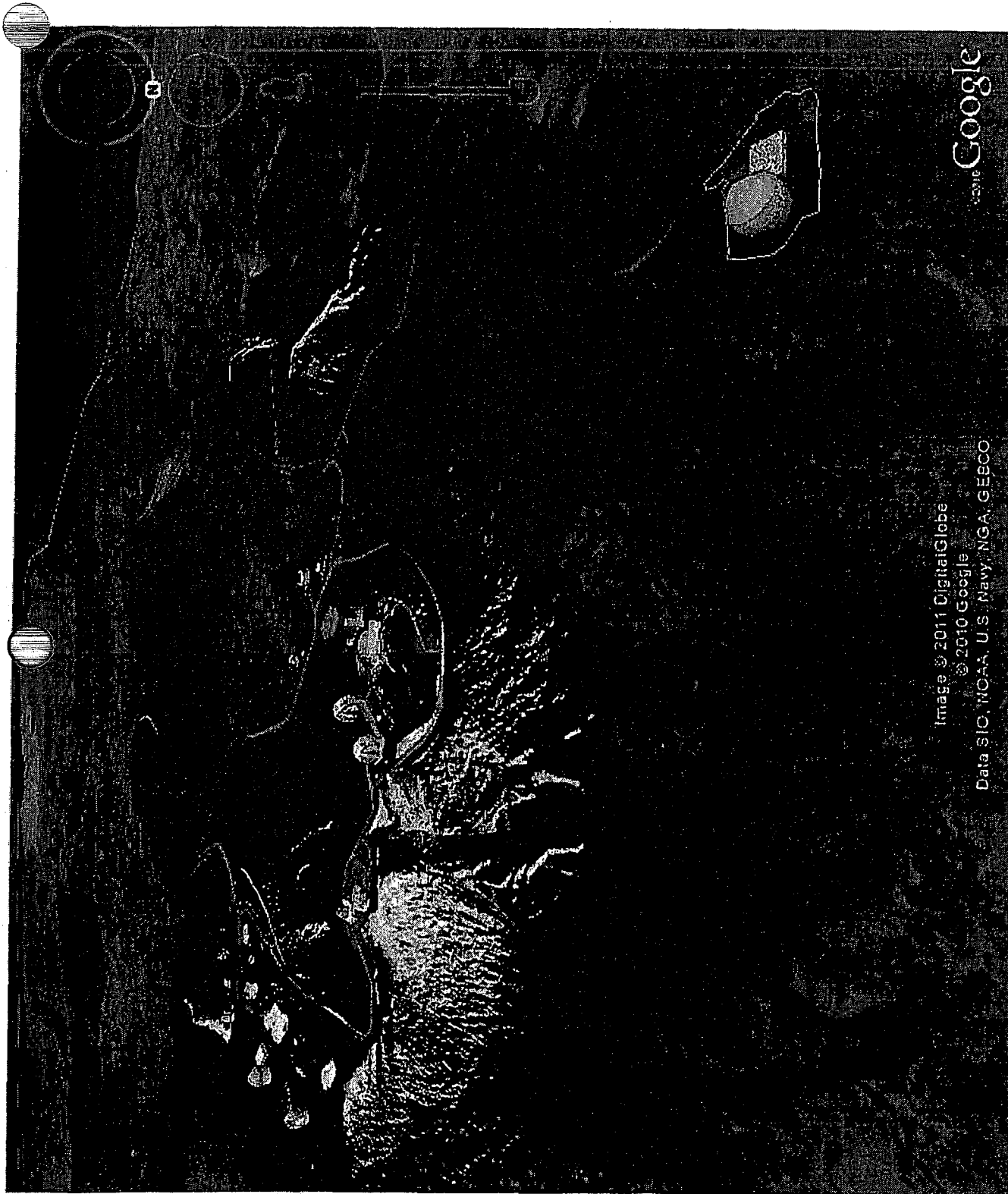
**Naked Eye View of Mauna Kea from Waimea**



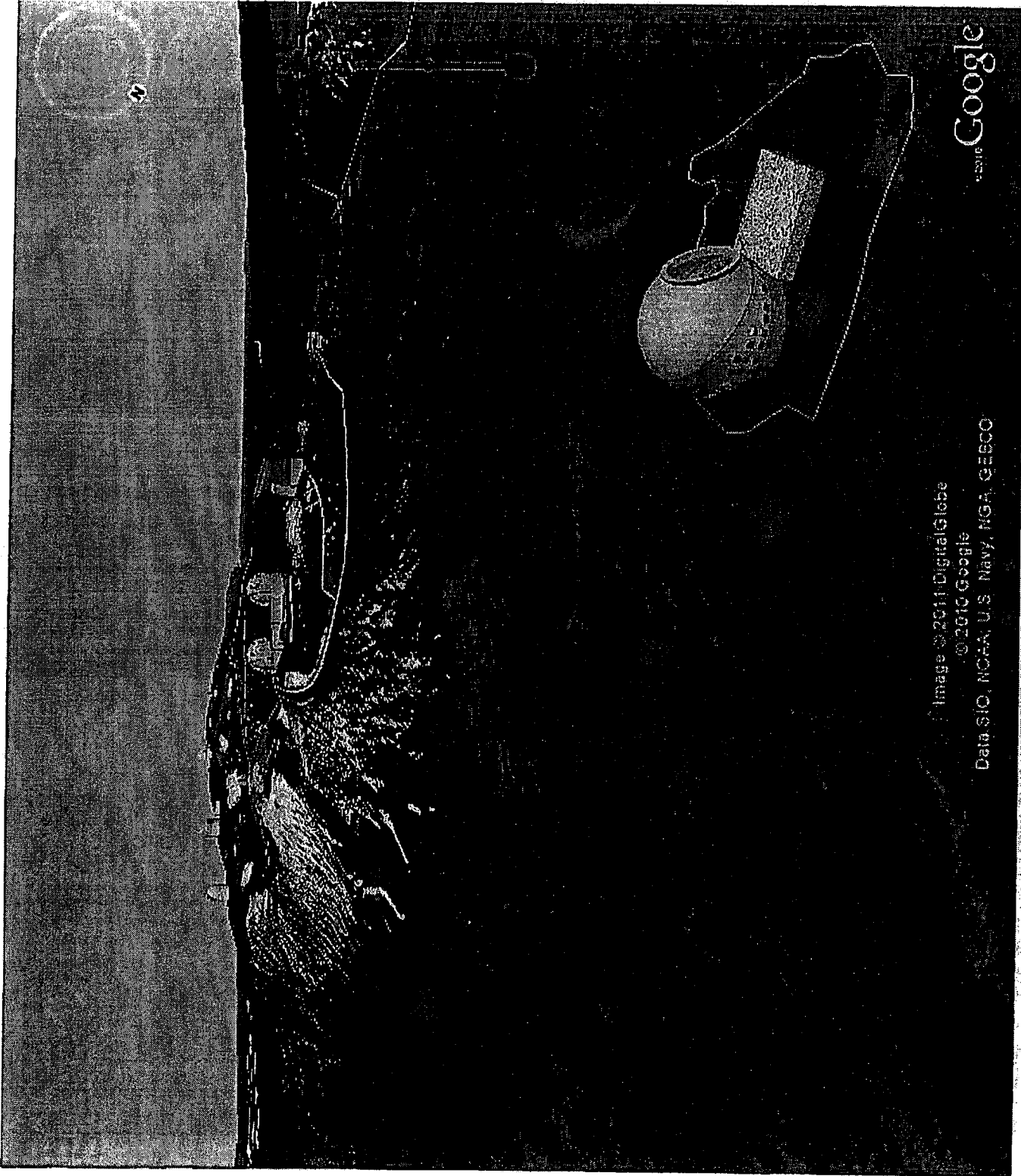
**"Binocular" View from Waimea w/o Snow**

Source: Figure 3-10, *Final EIS for the Thirty Meter Telescope*.

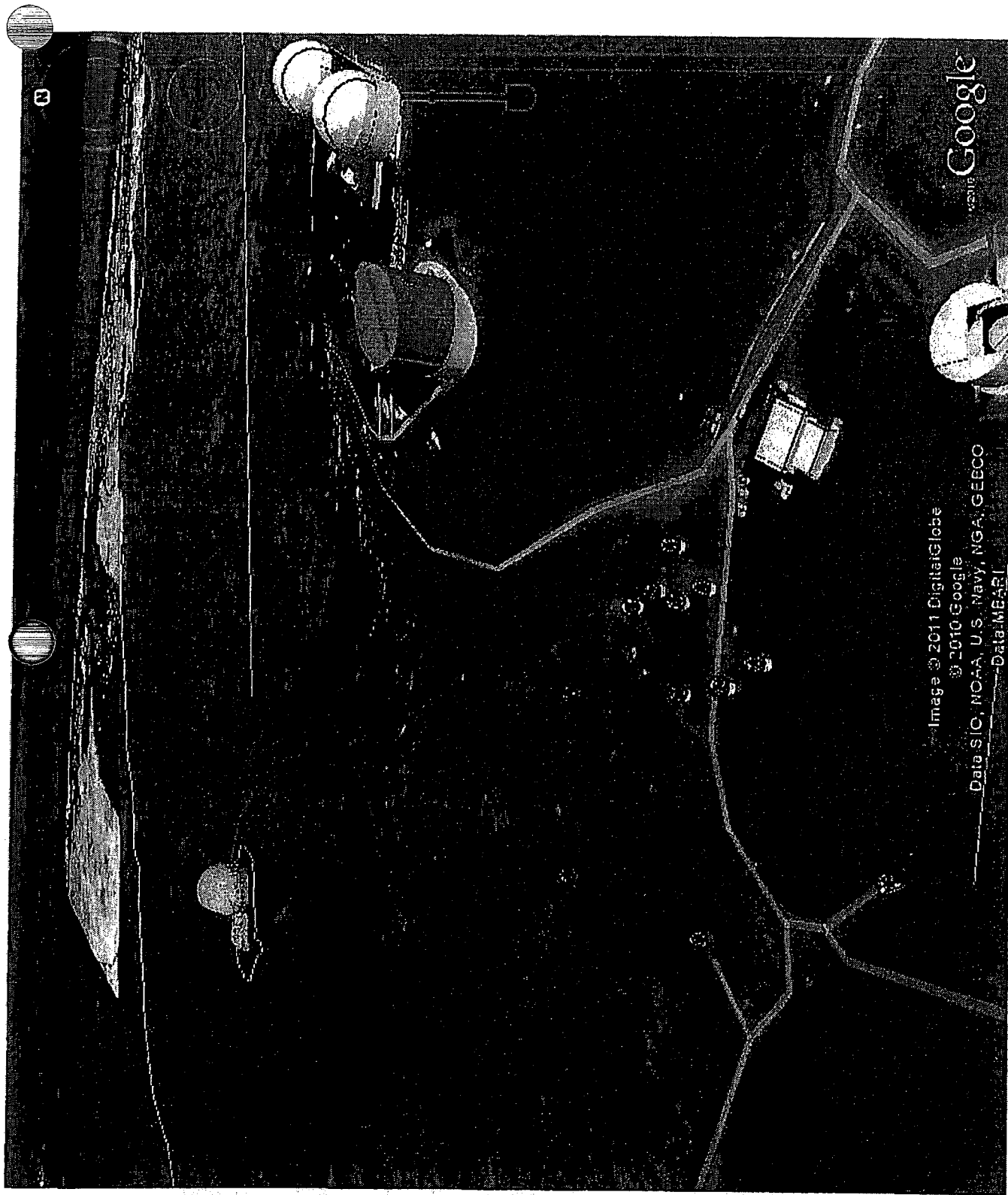




Overview of Observatories, TMT lower right



Overview of Observatories, TMT lower right



Aerial view from above "Submillimeter Valley," TMT upper left

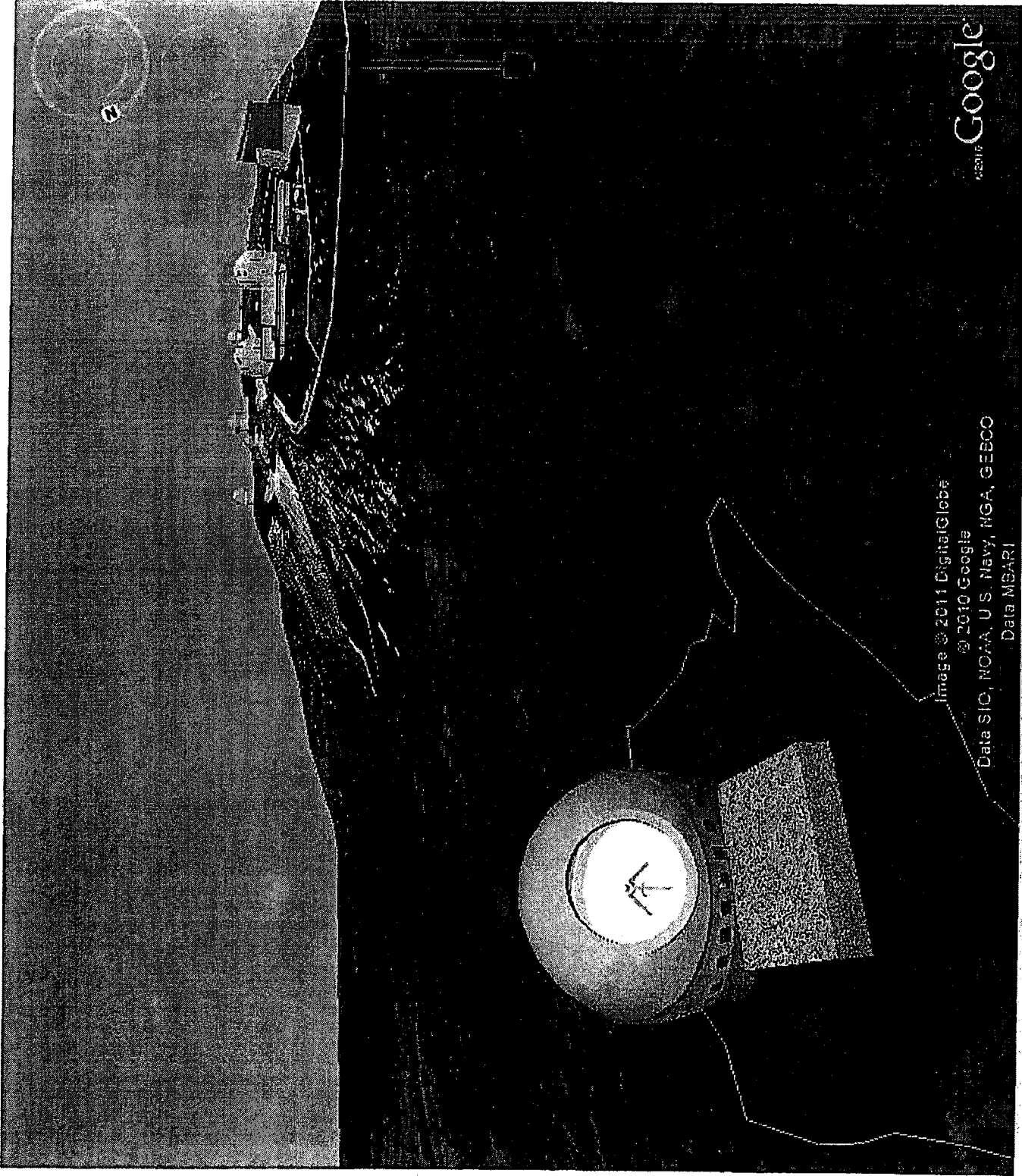


Image © 2011 DigitalGlobe  
© 2010 Google  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
Data MISRI

Google

Overview of Observatories, TMT lower left

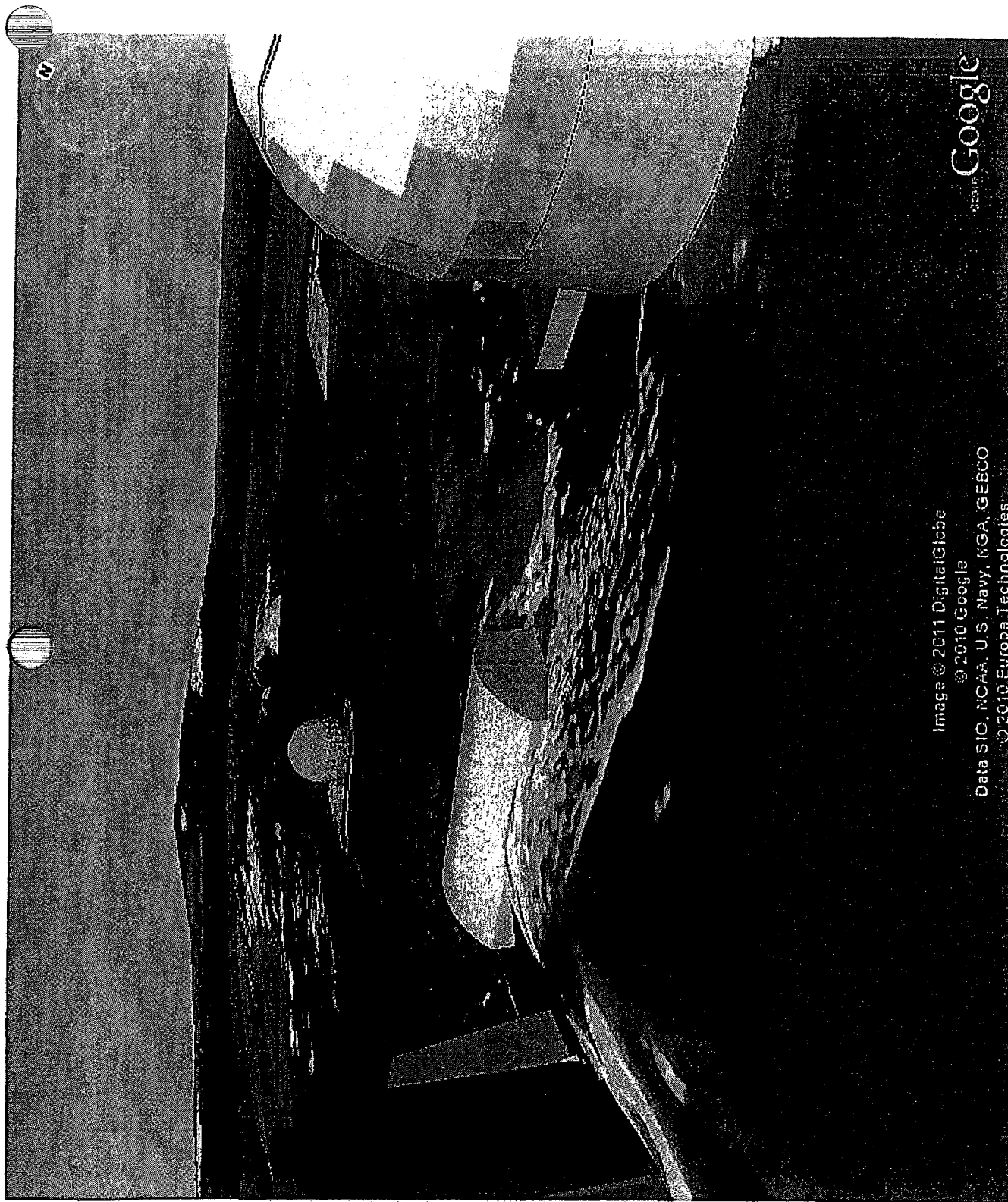


Image © 2011 DigitalGlobe

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Data SIO, NOAA, U.S. Navy, NGA, GEBCO

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TMT viewed from between Keck and Subaru

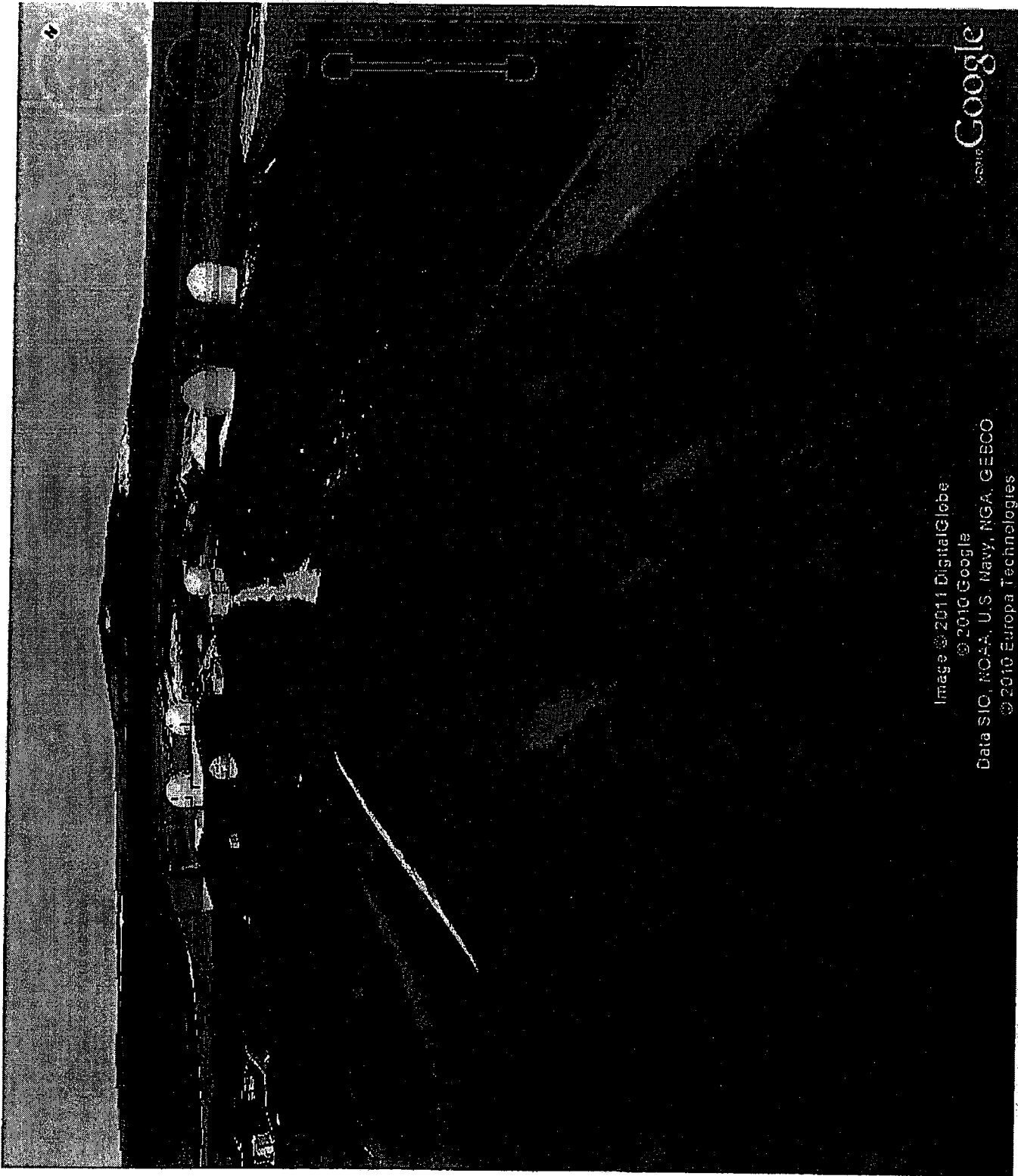


Image © 2011 DigitalGlobe

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Data SIO, NOAA, U.S. Navy, NGA, GEBCO

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Google

View from Puu Wekiu Summit, TMT behind ridgeline

Understanding and Protecting Mauna Kea's Resource

Native Hawaiian Cultural Resources

- CR-1 Develop policy of no restriction to UH Management Areas for Native Hawaiian traditional and customary practices, except where safety, resource management, cultural appropriateness, and legal compliance considerations may require reasonable restrictions. *To be developed by Kahu Ku Mauna, Mauna Kea Management Board (MKMB), and Hawaiian Cultural Committee, in consultation with families with historic connections Mauna Kea, cultural practitioners, and other Native Hawaiians.*
- CR-2 Support designation of the summit region of Mauna Kea as a Traditional Cultural Property.
- CR-3 Conduct education efforts to protect the cultural landscape.
- CR-4 Establish a process for on-going collection of data of information on traditional, contemporary, customary, practices. *Office of Mauna Kea Management (OMKM), in partnership with UH-Hilo and Hilo Community College to establish an oral history program.*
- CR-5 Development of guidelines for the appropriate placement and removal of offerings. *Train person to perform this function.*
- CR-6 Develop guidelines for the visitation of ancient shrines.
- CR-7 Kahu Ku Mauna shall take the lead in determining the appropriateness of constructing new Hawaii cultural features. *Kahu Ku Mauna, and/or the Hawaiian Cultural Committee, in consultation with families of lineal connections, kipuna, cultural practitioners, or native Hawaiian organizations, to develop protocol.*
- CR-8 Develop policy for the scattering of cremated human remains. *Consider Hawaii Volcanoes National Park model.*
- CR-9 Develop management policy for the cultural appropriateness of building ahu. *Kahu Ku Mauna, and/or the Hawaiian Cultural Committee, in consultation with families of lineal connections, kipuna, cultural practitioners, or native Hawaiian organizations, to develop protocol.*
- CR-10 Develop and implement a historic property-monitoring program.
- CR-11 Complete archaeological survey of the Summit Access Road under UH management.
- CR-12 Establish buffer zones around historic sites. *OMKM, Kahu Ku Mauna, DLNR (SHPD).*
- CR-13 Develop and implement a burial treatment plan. *Approval process recognized, but no one identified who would prepare the plan.*
- CR-14 Report unauthorized incursions into shrines or burials.

In addition to these Management Actions, the CMP recommends the adoption of all special conditions (where appropriate) previously approved by the BLNR on the Keck Outrigger Telescope Project. These conditions have been attached as Exhibit 5). Staff notes that no additional planning is required. Specific conditions were already

formulated under Keck Outrigger CDUP (reversed), but may be adopted by BLNR under the CMP.

#### Natural Resources

- NR-1 Limit threats to natural resources through management of permitted activities and uses.
- NR-2 Limit damage caused by invasive species through creation of an invasive species prevention and control program.
- NR-3 Maintain biological diversity.
- NR-4 Minimize barriers to species migration.
- NR-5 Manage ecosystems to allow for response to climate change.
- NR-6 Reduce threats to natural resources by educating stakeholders.
- NR-7 Delineate areas of high native diversity, unique communities, or unique geological features and consider protection from development.
- NR-8 Consider fencing areas of high native biodiversity to exclude feral ungulates.
- NR-9 Increase native plant diversity through an out planting program.
- NR-10 Incorporate mitigation plans into project planning and for new development.  
*Prepared by project applicants, but approved by DLNR/UH.*
- NR-11 Conduct habitat rehabilitation projects following unplanned disturbances.
- NR-12 Create restoration plans and conduct habitat restoration activities as needed.
- NR-13 Increase communication between stakeholders. *Recommends a Working Group.*
- NR-14 Utilize principles of adaptive management when developing programs and methodologies. Use feedback of annual or five-year reviews.
- NR-15 Conduct baseline inventories of high-priority resources, outlined in an inventory, monitoring, and research plan.
- NR-16 Conduct regular long-term monitoring, as outlined in an inventory, monitoring and research plan.
- NR-17 Conduct research to fill knowledge gaps that cannot be addressed through inventory and monitoring.
- NR-18 Develop a geo-spatial database off all known natural resources and their locations in the UH Management Areas.

#### Education and Outreach

- EO-1 Develop and implement education and outreach program.
- EO-2 Require orientation of users (e.g., visitors, employees, observatory staff, contractors, and commercial users).
- EO-3 Continue to develop and disseminate materials explaining importance of Mauna Kea. *OMKM.*
- EO-4 Develop and implement a signage plan.
- EO-5 Develop interpretive features such as self-guided cultural walks and volunteer-maintained native plant gardens. *OMKM/DLNR (SHPD/DOFAW).*
- EO-6 Engage in outreach and partnerships with schools. *OMKM, with public and private schools, and universities to develop educational programs.*



- EO-7 Continue to provide for opportunities for community members to provide input to cultural and natural resources management activities. *OMKM to expand efforts to ensure systematic input from the community. OMKM to maintain a list of interested individuals to be consulted when individual development projects are proposed or when other issues arise.*
- EO-8 Provide opportunities for community members to participate in stewardship activities.

#### Astronomy Resources

- AR-1 Operate the UH Management Areas to prohibit activities resulting in negative impacts to astronomical resources.
- AR-2 Prevent light pollution, radio frequency, and dust.

#### Managing Access, Activities and Uses

##### Activities and Uses

- ACT-1 Maintain but update the 1995 BLNR Approved Management Plan that directs public access and commercial activities within UH Management Areas. *Plan already in place and being implemented by OMKM and DLNR. Providing UH with rule-making authority would greatly enhance this effort.*
- ACT-2 Develop parking and visitor traffic plan.
- ACT-3 Maintain presence of interpretive and enforcement personnel at all times. *Could be facilitated if UH received rule-making authority.*
- ACT-4 Develop and maintain a policy that maintains prohibitions on off-road vehicle use. *OMKM/DLNR Working group.*
- ACT-5 Implement policies to reduce impacts of recreational hiking.
- ACT-6 Define and maintain snow play areas.
- ACT-7 Confine UH or other sponsored tours and stargazing to previously disturbed areas and parking areas.
- ACT-8 Coordinate with DLNR on a hunting policy within UH Management Areas. *UH and DLNR with hunting associations.*
- ACT-9 Maintain commercial tour permitting, and evaluate it annually.
- ACT-10 Ensure OMKM input on film permits.
- ACT-11 Seek statutory authority to regulate commercial activities in the UH Management Areas
- ACT-12 Ensure input by OMKM, MKMB, and Kahu Ku Mauna on all scientific research permits and establish reporting system.

##### Permitting and Enforcement

- P-1 Comply with all applicable federal, state, and local laws related to activities in the UH Management Areas.

- P-2 Strengthen CMP implementation by recommending to the BLNR that CMP conditions be included in any CDUP or other permit. *Suggest that applicable CMP provisions be approved by the BLNR as a condition of approval in any future CDUPs.*
- P-3 Obtain rule-making authority. *UH.*
- P-4 Educate management staff and all users of the mountain about all applicable rules and permit requirements.
- P-5 Continue coordinating with other agencies on enforcement needs.
- P-6 Establish a law enforcement presence at Mauna Kea. *Could be UH with rule-making authority, or DLNR (DOCARE).*
- P-7 Develop and implement protocol for oversight and compliance with CDUP conditions. *DLNR (OCCL) with assistance from OMKM.*
- P-8 Enforce conditions contained in commercial and Special Use Permits. *OMKM, MKMB, and Kahu Ku Mauna.*

#### Managing the Built Environment

##### Infrastructure and Maintenance

- IM-1 Develop and implement an Operations, Monitoring, and Management Plan (OMMP).
- IM-2 Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources. *OMKM and DLNR.*
- IM-3 Conduct historic preservation review for maintenance activities that will have an adverse effect on historic properties. *OMKM and DLNR (SHPD).*
- IM-4 Evaluate need for vehicle wash down station near Hale Pohaku.
- IM-5 Develop and implement a Debris Removal, Monitoring, and Prevention Plan.
- IM-6 Develop and implement an Erosion Inventory and Assessment Plan.
- IM-7 Prepare a plan to remove military wreckage from a remote area on the UH Management Area.
- IM-8 Assess feasibility of paving the Summit Access Road.
- IM-9 Evaluate need for additional parking lots, if necessary.
- IM-10 Evaluate need for additional public restroom facilities in the summit region and at Hale Pohaku.
- IM-11 Encourage existing facilities and new development to incorporate sustainable technologies into facility design and operations.
- IM-12 Conduct energy audits to identify energy use and system inefficiencies, and develop solutions to reduce energy usage.
- IM-13 Conduct feasibility assessment on developing locally-based alternative energy sources.
- IM-14 Encourage observatories to investigate options to reduce the use of hazardous materials.

##### Construction Guidelines

- C-1 Require independent construction monitor to have oversight on work at Mauna Kea. *DLNR (OCCL) and OMKM. Specific conditions already formulated under Keck Outrigger CDUP (reversed), but may be adopted by BLNR under the CMP.*
- C-2 Require BMPs. *Project proposer. DLNR (OCCL) and OMKM. Specific conditions already formulated under Keck Outrigger CDUP (reversed), but may be adopted by BLNR under the CMP.*
- C-3 Develop a rock removal plan prior to construction. *Project proposer.*
- C-4 Require contractors to provide information from construction activities to OMKM for input into OMKM databases. *OMKM.*
- C-5 Require site monitors (e.g., archaeologists, cultural resources specialist, entomologist) during construction, as determined by the appropriate agency. *Project proposer. Specific conditions already formulated under Keck Outrigger CDUP (reversed), but may be adopted by BLNR under the CMP.*
- C-6 Conduct required archaeological monitoring during construction projects per SHPD approved plan. *Project proposer with SHPD approval.*
- C-7 Education regarding historical and cultural significance. *OMKM in consultation with Kahu Ku Mauna or other Native Hawaiian groups, and approval by DLNR (SHPD).*
- C-8 Education regarding environment, ecology and natural resources.
- C-9 Inspection of construction materials. *OMKM under review by DLNR.*

#### Site Recycling, Decommissioning, Demolition, and Restoration<sup>1</sup>

- SR-1 Require observatories to develop plans to recycle or demolish facilities once their useful life ended. *Project Proposer.*
- SR-2 Require observatories to develop restoration plans in associating with decommissioning, to include an environmental cost-benefit analysis and a cultural element. *Project Proposer.*
- SR-3 Require any future observatories to consider site restoration during planning process and including provisions in subleases for funding of full restoration. *Project Proposer.*

#### Considering Future Land Use

- FLU-1 Follow design guidelines presented in the 2000 Master Plan. *OMKM and DLNR (OCCL).*
- FLU-2 Develop a map with land-use zones in the Astronomy Precinct based on updated inventories of cultural and natural resources, to delineate areas where future development will not be allowed and areas where future land use will be allowed,

<sup>1</sup> Author recommends that the guidelines developed under the 2000 Mauna Kea Master Plan be used in association with the CMP. The 2000 Master Plan established a set of guidelines for project review and design, to ensure that proposed projects conform to and implement the concepts, themes, development standards and guidelines set forth in the Master Plan. The University Board of Regents (BOR), not the BLNR, adopted the 2000 Master Plan. The BLNR is not being asked to adopt the 2000 Master Plan at this time.

but will require compliance with prerequisite studies or analysis prior to approval of a CDUP.

- FLU-3 Require cataloging of initial site conditions for use when conducting restoration. **OMKM.**
- FLU-4 Require project specific visual rendering of both pre- and post-project settings to facilitate analysis of Aeolian ecosystems. **Project Proposer.**
- FLU-5 Require airflow analysis on the design of structures to assess potential impact to Aeolian ecosystems. **Project Proposer.**
- FLU-6 Incorporate habitat mitigation plans into project planning processes. **Project Proposer.**
- FLU-7 Require use of close-contained zero-discharge waste systems for future development, if feasible. **Project Proposer.**

### Managing Operations

#### Operations and Implementation

- OI-1 Maintain OMKM, MKMB, and Kahu Ku Mauna in current roles, and MKSS providing operational and maintenance services.
- OI-2 Develop training plan for staff and volunteers.
- OI-3 Maintain and expand regular interaction and dialogue with stakeholders, community members, surrounding landowners, and the overseeing agencies to provide a coordinated approach to resource management.
- OI-4 Establish grievance procedures for OMKM to address issues as they arise. **OMKM.**
- OI-5 Update and implement emergency response plan. **OMKM.**

#### Monitoring, Evaluation and Updates

- MEU-1 Establish reporting system to ensure the MKMB, DLNR, and the public are informed of the results of management activities in a timely manner. **OMKM to prepare 1-year and 5-year progress reports.**
- MEU-2 Conduct regular updates of the CMP that reflect outcomes of the evaluation process, and that incorporate new information about resources. **OMKM.**
- MEU-2 Revise and update planning documents, including the master plan, leases, and subleases, so that they will clearly assign roles and responsibilities for managing Mauna Kea and reflect stewardship matters resolve with DLNR. **OMKM.**

### Management Plan Controls

This section essentially recommends the replacement and adoption of the controls established in the 1995 Revised Plan for UH Management Areas (BLNR, 1995), which

established controls for access to the mountain by the general public and commercial tours operations (**Exhibit 6**).

Table 2.1. Summary of Potential Effects and Mitigation Measures

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>Cultural Practices and Beliefs (<i>Final EIS</i> Section 3.2, page 3-8)</p>	<p>After considering the Project mitigation and implementation of CMP management actions, the Project is not anticipated to result in any substantial or significant adverse effect on the cultural practices of the surrounding community or State. The Project has been sited in an area removed from places of highest cultural concern including the Kūkahaū'ula traditional cultural property (TCP) and Lake Waiau. The Project will have little impact on the following cultural practices: (1) pilgrimage, prayer, shrine erection and offerings; (2) collection of water from Lake Waiau; (3) piko deposition; (4) scattering of cremation ashes; and (5) burial blessing. In addition, as the Access Way will overlay existing roads, the Project will have little impact on the integrity of cinder cones, including Kūkahaū'ula. Although the Project will have some visual impacts, the TMT Observatory and the Access Way will not be visible from areas of highest cultural concern including the summit of the Kūkahaū'ula TCP, Pu'u Līlinoe and Waiau.</p>	<p>CMP FLU-1: Follow design guidelines presented in the 2000 Master Plan.</p> <p>CMP FLU-1: Follow design guidelines presented in the 2000 Master Plan.</p> <p>CMP CR-3: Conduct educational efforts to generate public awareness about the importance of preserving the cultural landscape.</p> <p>CMP EO-1: Develop and implement education and outreach program.</p> <p>CMP EO-2: Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.</p>	<p>The proposed telescope is sited at the 13N site, within Area E, where it will not be visible from culturally sensitive locations, such as the summit of Kūkahaū'ula, Lake Waiau, and Pu'u Līlinoe.</p> <p>The Access Way has been designed to limit its effect on cultural resources. This has been done by limiting it to one lane (versus the two lanes used elsewhere) and following the same alignment as the existing 4-wheel drive road on the flank of Pu'u Hau'oki. In addition, coloring the pavement and guardrail to blend with the surroundings will reduce the potential effect on historic resources.</p> <p>A mandatory Cultural and Natural Resources Training Program will be implemented to educate employees to understand, respect, and honor Mauna Kea's cultural landscape and cultural practices.</p>	<p>In the context of the current summit region conditions and the view of those who believe cultural practices and astronomy can co-exist, compliance with applicable regulations and requirements together with the implementation of mitigation measures will lessen the potential Project impacts to ensure a level of impact that is less than significant.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd)                      Cultural Practices and Beliefs (Final EIS Section 3.2, page 3-8)</p>	<p>Same as on previous page.</p>	<p><b>CMP EO-3:</b> Continue to develop, update, and distribute educational materials.  <b>CMP EO-2:</b> Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.  <b>IM-2:</b> Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.  <b>CMP CR-3:</b> Conduct educational efforts to generate public awareness about the importance of preserving the cultural landscape.  <b>CMP EO-1:</b> Develop and implement education and outreach program.  <b>CMP EO-2:</b> Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.  <b>CMP EO-3:</b> Continue to develop, update, and distribute educational materials.</p>	<p>Same as on previous page</p> <p>The TMT project facilities will be furnished with items to provide a sense of place and acknowledge the cultural sensitivity and spiritual attributes of Mauna Kea.</p> <p>TMT project daytime activities will be minimized on up to four days per year identified by Kahu Kū Mauna.</p> <p>The TMT project's outreach staff will work with 'Imiloa and OMKM to develop exhibits for the Visitor Information Station (VIS) and 'Imiloa regarding the cultural and archaeological resources of Mauna Kea and support/fund programs specific to Hawaiian culture.</p>	<p>Same as on previous page.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd)                      Cultural Practices and Beliefs (Final EIS Section 3.2, page 3-8)</p>	<p>Same as on previous page.</p>	<p><b>CMP EO-6:</b> Engage in outreach and partnerships with schools, by collaborating with local experts, teachers, and university researchers, and by working with the 'Imiloa Astronomy Center of Hawai'i.</p> <p><b>CMP EO-7:</b> Continue and increase opportunities for community members to provide input to cultural and natural resources management activities on Mauna Kea, to ensure systematic input regarding planning, management, and operational decisions that affect natural resources, sacred materials or places, or other ethnographic resources with which they are associated.</p> <p><b>CMP EO-8:</b> Provide opportunities for community members to participate in stewardship activities.</p> <p><b>CMP OI-3:</b> Maintain and expand regular interaction and dialogue with stakeholders, community members, surrounding landowners, and overseeing agencies to provide a coordinated approach to resource management.</p>	<p>Same as on previous page.</p>	<p>Same as on previous page.</p>



FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>Historic Properties (Final EIS Section 3.3, page 3-40)</p>	<p>The Project will not have a substantial adverse effect on historic properties. The Project will not result in the loss of any historic properties within the Mauna Kea summit region. The physical impacts on the Kūkahau'ūla TCP will be minimal and will not rise to the level of significant. Although the TMT project will add a new structure to the Mauna Kea Summit Region Historic District, this structure will be sited in the Northern Plateau, which will make it not visible from a majority of views in the summit including views of greatest cultural concern.</p>	<p>CMP FLU-1: Follow design guidelines presented in the 2000 Master Plan.</p> <p>CMP FLU-1: Follow design guidelines presented in the 2000 Master Plan.</p> <p>CMP CR-3: Conduct educational efforts to generate public awareness about the importance of preserving the cultural landscape.</p> <p>CMP EO-1: Develop and implement education and outreach program.</p> <p>CMP EO-2: Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.</p>	<p>The Access Way has been designed to limit its effect on historic resources. This has been done by limiting it to one lane (versus the two lanes used elsewhere) and following the same alignment as the existing 4-wheel drive road on the flank of Pu'u Hau'oki. In addition, coloring the pavement and guardrail to blend with the surroundings will reduce the potential effect on historic resources.</p> <p>The TMT project will be sited in Area E at the 13N site where it will not be visible from culturally sensitive locations, such as the summit of Kūkahau'ūla, Lake Waiau, and Pu'u Lūlūnoe.</p> <p>A mandatory Cultural and Natural Resources Training Program will be implemented to educate employees to understand, respect, and honor Mauna Kea's cultural landscape and cultural practices.</p>	<p>The implementation of the treatment/mitigation measures will ensure Project will not result in significant impacts on any historic properties within the summit region.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd). Historic Properties (Final EIS Section 3.3, page 3-40)</p>	<p>Same as on previous page.</p>	<p><b>CMP EO-3:</b> Continue to develop, update, and distribute educational materials.  <b>IM-2:</b> Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.  <b>CMP CR-3:</b> Conduct educational efforts to generate public awareness about the importance of preserving the cultural landscape.  <b>CMP EO-1:</b> Develop and implement education and outreach program.  <b>CMP EO-2:</b> Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.  <b>CMP EO-3:</b> Continue to develop, update, and distribute educational materials.  <b>CMP EO-6:</b> Engage in outreach and partnerships with schools, by collaborating with local experts, teachers, and university researchers, and by working with the 'Imiloa Astronomy Center of Hawai'i.</p>	<p>Same as on previous page.                       TMT project daytime activities will be minimized on up to four days per year identified by Kahu Kh Mauna.                       The TMT project's outreach staff will work with 'Imiloa and OMKM to develop exhibits for the VIS and 'Imiloa regarding the cultural and archaeological resources of Mauna Kea and support/fund programs specific to Hawaiian culture.</p>	<p>Same as on previous page.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd)  Historic Properties  (Final EIS Section  3.3, page 3-40)</p>	<p>Same as on previous page.</p>	<p><b>CMP EO-7:</b> Continue and increase opportunities for community members to provide input to cultural and natural resources management activities on Mauna Kea, to ensure systematic input regarding planning, management, and operational decisions that affect natural resources, sacred materials or places, or other ethnographic resources with which they are associated.</p> <p><b>CMP EO-8:</b> Provide opportunities for community members to participate in stewardship activities.</p>	<p>Same as on previous page.</p>	<p>Same as on previous page.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>Biologic Resources (Final EIS Section 3.4, page 3-59)</p>	<p>Potential long-term impacts include displacement of existing species and habitat; dust generated by vehicle traffic along the unpaved Project areas; and paving approximately 1,600 feet of the Access Way. The Access Way will displace roughly 0.2 acre of wēkiu bug habitat on the lower slopes of Pu'u Hau'oki. The TMT project will displace roughly 6 acres of alpine stone desert lava flow habitat. Other Project areas have previously been disturbed. These impacts are all expected to be less than significant.</p>	<p>CMP NR-1: Limit threats to natural resources through management of permitted activities and uses.</p> <p>CMP NR-3: Maintain native plant and animal populations and biological diversity.</p> <p>CMP NR-1: Limit threats to natural resources through management of permitted activities and uses.</p> <p>CMP NR-6: Reduce threats to natural resources by educating stakeholders and the public about Mauna Kea's unique natural resources.</p> <p>CMP EO-1: Develop and implement education and outreach program.</p> <p>CMP EO-2: Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.</p> <p>CMP EO-3: Continue to develop, update, and distribute educational materials.</p>	<p>The Access Way has been designed to limit its effect on wēkiu bug habitat. This has been done by limiting it to one lane (versus the two lanes used elsewhere) and following the same alignment as the existing 4-wheel drive road on the flank of Pu'u Hau'oki. This limits the area of disturbance during construction and operation. In addition, paving this segment of the Access Way will reduce the potential effect on wēkiu bug habitat due to dust.</p> <p>A Cultural and Natural Resources Training Program and an Invasive Species Control Program will be implemented. These programs will educate employees regarding the status, condition, diversity, and protection afforded the natural resources present on the mountain.</p>	<p>Implementation of the identified mitigation measures and CMP management actions will ensure that impacts will be less than significant.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd)                      Biologic Resources                      (Final EIS Section                      3.4, page 3-59)</p>	<p>Same as on previous page.</p>	<p><b>CMP NR-6:</b> Reduce threats to natural resources by educating stakeholders and the public about Mauna Kea's unique natural resources.  <b>CMP EO-1:</b> Develop and implement education and outreach program.  <b>CMP EO-2:</b> Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.  <b>CMP EO-3:</b> Continue to develop, update, and distribute educational materials.  <b>CMP EO-6:</b> Engage in outreach and partnerships with schools, by collaborating with local experts, teachers, and university researchers, and by working with the 'Imiloa Astronomy Center of Hawaii'.</p>	<p>TMT project staff will work with OMKM and 'Imiloa to develop exhibits regarding natural resources.</p>	<p>Same as on previous page.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd)                      Biologic Resources                      (Final EIS Section                      3.4, page 3-59)</p>	<p>Same as on previous page.</p>	<p><b>CMP EO-7:</b> Continue and increase opportunities for community members to provide input to cultural and natural resources management activities on Mauna Kea, to ensure systematic input regarding planning, management, and operational decisions that affect natural resources, sacred materials or places, or other ethnographic resources with which they are associated.</p> <p><b>CMP EO-8:</b> Provide opportunities for community members to participate in stewardship activities.</p> <p><b>CMP OI-3:</b> Maintain and expand regular interaction and dialogue with stakeholders, community members, surrounding landowners, and overseeing agencies to provide a coordinated approach to resource management.</p> <p><b>CMP NR-1:</b> Limit threats to natural resources through management of permitted activities and uses.</p> <p><b>CMP NR-10:</b> Incorporate mitigation plans into project planning and conduct mitigation following new development.</p>	<p>Same as on previous page.</p> <p>A Ride-Sharing Program will be implemented to reduce traffic, dust, and noise in the summit region.</p> <p>Arthropod monitoring will be performed prior to, during, and for two years following construction in the area of the Access Way on the alpine cinder cone habitat.</p>	<p>Same as on previous page.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd) Biologic Resources (Final EIS Section 3.4, page 3-59)</p>	<p>Same as on previous page.</p>	<p>CMP NR-12: Create restoration plans and conduct habitat restoration activities, as needed.</p> <p>CMP NR-13: Increase communication, networking, and collaborative opportunities, to support management and protection of natural resources.</p>	<p>Work closely with OMKM to develop and implement a habitat restoration study.</p>	<p>Same as on previous page.</p>
<p>Visual and Aesthetic Resources (Final EIS Section 3.5, page 3-80)</p>	<p>The TMT project will be visible from 14 percent of the island area, restricted to the northern side of the island, including portions of Honoka'a, Waimea, and Waikoloa. Currently, from approximately 43 percent of the island area, at least one existing observatory is visible, with the Project that will increase by less than 1.2 percent of the island area. Residents in the TMT viewshed represent approximately 15.4 percent of the island's population. Others, including visitors and island residents that reside outside the viewshed, will be able to see the TMT project when they travel through and visit locations within the viewshed. The Project will not block or substantially obstruct the identified views and viewplanes of the mountain, thus the Project's visual impact will be less than significant.</p>	<p>CMP FLU-1: Follow design guidelines presented in the 2000 Master Plan.</p>	<p>The location of the TMT project is the primary impact avoidance measure, as it is north of and below the summit. The design of the observatory also mitigates the visual impact. The dome has been designed to fit very tightly around the telescope, and the telescope has been designed to be much shorter than usual. Also, the coating of the dome will be a reflective aluminum-like coating, which during the day reflects the sky and reduces the visibility of the structure.</p>	<p>Implementation of the identified mitigation measures and management actions will ensure that impacts will be less than significant.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>Geology, Soils, and Slope Stability (Final EIS Section 3.6, page 3-105)</p>	<p>Hawai'i is a seismically active area and the Project could be affected by earthquakes. Surface geologic structures present in the Project areas, such as lava flow morphology and glacial features, will unavoidably be removed. These geologic features are neither unique nor exceptional and better examples exist elsewhere on Mauna Kea. Associated impacts will be less than significant.</p>	<p><b>CMP NR-1:</b> Limit threats to natural resources through management of permitted activities and uses.  <b>CMP NR-6:</b> Reduce threats to natural resources by educating stakeholders and the public about Mauna Kea's unique natural resources.  <b>CMP EO-1:</b> Develop and implement education and outreach program.  <b>CMP EO-2:</b> Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.  <b>CMP EO-3:</b> Continue to develop, update, and distribute educational materials.</p>	<p>The Project will comply with all applicable seismic safety regulations and standards and will minimize the seismic risk to the telescope and equipment through extra design measures. Additional mitigation may include identifying noteworthy examples of glacial features near the Access Way, as well as working with OMKM and 'Imiloa to develop exhibits to reflect the natural resources of the MKSR.</p>	<p>Mitigation will further reduce the level of impact which will be less than significant prior to any mitigation.</p>
<p>Water Resources and Wastewater (Final EIS Section 3.7, page 3-115)</p>	<p>Potential impacts could occur from new impervious surfaces, additional consumption of fresh (potable) water, and additional wastewater discharges. However, due to design features and mandatory compliance with existing requirements and regulations, those impacts are expected to be less than significant.</p>	<p><b>CMP FLU-1:</b> Follow design guidelines presented in the 2000 Master Plan.  <b>CMP IM-11:</b> Encourage existing facilities and new development to incorporate sustainable technologies, energy efficient technologies, and LEED standards, whenever possible, into facility design and operations.</p>	<p>Compliance measures will include collecting and transporting all wastewater down the mountain for treatment; no wastewater will be released to subsurface in the summit area. Water efficient fixtures will be used and the Waste Minimization Plan (WMP) will also include audits of water use to reduce potable water use.</p>	<p>Project impacts are expected to be less than significant.</p>



FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd) Water Resources and Wastewater (Final EIS Section 3.7, page 3-115)</p> <p>Solid and Hazardous Waste and Material Management (Final EIS Section 3.8, page 3-124)</p>	<p>Same as on previous page.</p> <p>While the Project will result in additional generation of solid and hazardous wastes, the associated impacts are expected to be less than significant due to mandatory compliance with existing requirements and regulations.</p>	<p>CMP IM-14: Encourage observatories to investigate options to reduce the use of hazardous materials in telescope operations.</p> <p>CMP IM-1: Develop and implement an Operations Monitoring and Maintenance Plan.</p> <p>CMP IM-5: Develop and implement a Debris Removal, Monitoring and Prevention Plan.</p> <p>CMP IM-11: Encourage existing facilities and new development to incorporate sustainable technologies, energy efficient technologies, and LEED standards, whenever possible, into facility design and operations.</p> <p>CMP IM-14: Encourage observatories to investigate options to reduce the use of hazardous materials in telescope operations.</p>	<p>Same as on previous page.</p> <p>Regulatory compliance will include the implementation of a WMP and a Materials Storage/Waste Management Plan, including a Spill Prevention and Response Plan. No additional mitigation will be required.</p>	<p>Same as on previous page.</p> <p>Less than significant impact.</p>

EIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>Socioeconomic Conditions and Public Services Facilities (<i>Final EIS</i> Section 3.9, page 3-132)</p>	<p>The proposed TMT project effects in this area are expected to be beneficial and include job creation during Project construction, operation, and decommissioning. During operation, the Project will employ up to 140 full-time employees, and will create additional employment because the Project will contract with local companies for work and services. Project employees will purchase local goods and services, as well as pay local and state taxes, which would provide additional benefits to the community. TMT project employees' impacts on public services and facilities will be beneficial.</p>		<p>Employment opportunities will be filled locally to the greatest extent possible. In addition to its Public Information and Education Office, the TMT project will create a separate Community Outreach office with at least one full-time position dedicated to establishing and implementing the Workforce Pipeline Program and various mentoring and scholarship programs to maximize job opportunities for local residents. The TMT project operations budget will have funds specifically earmarked to provide financial support to workforce development programs, including curriculum and program development. The socioeconomic mitigation measures will ensure that the Project's future employees will include island residents.</p>	<p>Mitigation measures proposed will help maximize the level of beneficial impact.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>Land Use Plans, Policies, and Controls (<i>Final EIS</i> Section 3.10, page 3-141)</p>	<p>The proposed TMT project will be in compliance with all applicable land use plans, policies, and controls for the project type and location. Impacts are expected to be less than significant.</p>	<p><b>CMP IM-2:</b> Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.  <b>CMP EO-1:</b> Develop and implement education and outreach program.  <b>CMP EO-2:</b> Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.  <b>CMP EO-3:</b> Continue to develop, update, and distribute educational materials.  <b>CMP ACT-7:</b> Confine University or other sponsored tours and stargazing activities to previously disturbed ground surfaces and established parking areas.</p>	<p>Implementation of the Cultural and Natural Resources Training Plan is intended to reduce potential conflicts with current uses by cultural practitioners. The portion of the Access Way near or through the SMA area (approximately 1,600 feet) will be paved to reduce dust that could impact their operation. TMT project activities at Hale Pōhaku will not displace existing uses, including stargazing tours.</p>	<p>The level of impact is expected to be less than significant prior to any mitigation. Implementation of mitigation measures will further reduce the TMT project's impact.</p>
<p>Roadways and Traffic (<i>Final EIS</i> Section 3.11, page 3-164)</p>	<p>Expected TMT project traffic will not result in the level-of-service on the Mauna Kea Access Road to drop below level C and will not warrant additional road improvements. Impacts are expected to be less than significant.</p>	<p><b>CMP IM-2:</b> Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.</p>	<p>Mandatory participation in a Ride-Sharing Program using Project vehicles for TMT Observatory employees traveling beyond Hale Pōhaku will be implemented.</p>	<p>The level of impact is expected to be less than significant prior to any mitigation. Implementation of mitigation measures will further reduce the TMT project's impact.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>Power and Communications (<i>Final EIS</i> Section 3.12, page 3-169)</p>	<p>The proposed TMT project's electricity consumption will not significantly impact other facilities on the mountain or island-wide. HELCO has ample generation capacity to service the Project. The use of bandwidth for communications would not exceed the Project's allotment. Impacts are expected to be less than significant.</p>	<p><b>CMP IM-11:</b> Encourage existing facilities and new development to incorporate sustainable technologies, energy efficient technologies, and LEED standards, whenever possible, into facility design and operations. <b>CMP IM-12:</b> Conduct energy audits to identify energy use and system inefficiencies, and develop solutions to reduce energy usage.</p>	<p>Energy saving devices will be incorporated into TMT project facilities, plans including: solar hot water systems, solar panels on the Headquarters facility (photo voltaic power systems), energy efficient light fixtures, and efficient Energy Star rated appliances.</p>	<p>The level of impact is expected to be less than significant prior to any mitigation. Implementation of mitigation measures will further reduce the TMT project's impact.</p>
<p>Noise (<i>Final EIS</i> Section 3.13, page 3-173)</p>	<p>Noise associated with the TMT project will not detrimentally affect ambient noise levels or substantially degrade environmental quality in noise sensitive areas.</p>	<p><b>CMP FLU-1:</b> Follow design guidelines presented in the <i>2000 Master Plan</i>.</p>	<p>The TMT project will place HVAC equipment indoors, significantly reducing noise levels associated with the equipment. In addition, façade acoustical louvers and duct silencers will be used to further reduce the level of HVAC noise outside of the observatory. Mandatory participation in a Ride-Sharing Program for TMT Observatory employees traveling beyond Hale Pohaku will reduce transient vehicular noise.</p>	<p>The level of impact is expected to be less than significant prior to any mitigation. Implementation of mitigation measures will further reduce the TMT project's impact.</p>
<p>Climate, Meteorology, Air Quality, and Lighting (<i>Final EIS</i> Section 3.14, page 3-182)</p>	<p>Potential impacts related to dust and exhaust emissions from vehicular travel and emissions related to operation and maintenance activities will not substantially affect the existing air quality or climate. Sky illumination effects will be limited and not substantial. TMT project impacts are expected to be less than significant.</p>	<p><b>CMP IM-2:</b> Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.</p>	<p>Mandatory participation in a Ride-Sharing Program for TMT Observatory employees traveling beyond Hale Pohaku and paving of a portion of the Access Way will reduce the generation of dust in the summit region.</p>	<p>The level of impact is expected to be less than significant prior to any mitigation. Implementation of mitigation measures will further reduce the TMT project's impact.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>Construction and Decommissioning (<i>Final EIS</i> Section 3.15, page 3-188)</p>	<p>Through compliance with existing rules, regulations, and policies, TMT project construction is not expected to have a substantial adverse impact, as impacts will be temporary and less than significant.</p>	<p><b>CMP IM-2:</b> Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.  <b>CMP C-7:</b> Education regarding historical and cultural significance.  <b>CMP C-8:</b> Education regarding environment, ecology and natural resources.  <b>CMP EO-2:</b> Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.  <b>CMP EO-3:</b> Continue to develop, update, and distribute educational materials.  <b>CMP C-2:</b> Require use of Best Management Practices Plan for Construction Practices.  <b>CMP C-1:</b> Require an independent construction monitor who has oversight and authority to insure that all aspects of ground based work comply with protocols and permit requirements.</p>	<p>A Ride-Sharing Program all workers at the TMT Observatory site</p> <p>The Cultural and Natural Resources Training Program will require annual training of construction workers.</p> <p>Cultural and Archaeological Monitoring Plan</p>	<p>The level of impact is expected to be less than significant prior to any mitigation. Implementation of mitigation measures will further reduce the TMT project's impact.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd) Construction and Decommissioning (Final EIS Section 3.15, page 3-188)</p>	<p>Same as on previous page.</p>	<p><b>CMP C-5:</b> Require on-site monitors (e.g., archaeologist, cultural resources specialist, entomologist) during construction, as determined by the appropriate agency. <b>CMP C-6:</b> Conduct required archaeological monitoring during construction projects per SHPD approved plan. <b>CMP C-2:</b> Require use of Best Management Practices Plan for Construction Practices. <b>CMP C-9:</b> Inspection of construction materials.</p>	<p>Same as on previous page.</p>	<p>Same as on previous page.</p>
			<p>An Invasive Species Prevention and Control Program will be implemented with plans that include materials control and reduction, washing/cleaning, inspections, monitoring, control, and education/training.</p>	
		<p><b>CMP C-2:</b> Require use of Best Management Practices Plan for Construction Practices.</p>	<p>A Construction Best Management Practices (BMP) Plan will be implemented with measures to minimize land disturbance, appropriate manage materials and wastes, and respond to spills, among other measures.</p>	

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
<p>(Cont'd) Construction and Decommissioning (Final EIS Section 3.15, page 3-188)</p>	<p>Same as on previous page.</p>	<p>CMP C-2: Require use of Best Management Practices Plan for Construction Practices.</p> <p>CMP SR-1: Require observatories to develop plans to recycle or demolish facilities once their useful life has ended, in accordance with their sublease requirements, identifying all proposed actions.</p> <p>CMP SR-2: Require observatories to develop a restoration plan in association with decommissioning, to include an environmental cost-benefit analysis and a cultural assessment.</p>	<p>The TMT project will arrange for more frequent grading of the unpaved Mauna Kea Access Road in order to maintain it in good condition. The Project will endeavor to reduce noise in the vicinity of cultural practices. Connection to HELCO-supplied power will be sought early in the process to eliminate the need for generators, except for limited emergency use. In addition to the NPDES BMP plan that will require flagging of the planned limits of disturbance, the location of nearby property boundaries will be surveyed to ensure that the limits of disturbance do not encroach on neighboring parcels.</p> <p>The Project will comply with the Decommissioning Plan for Mauna Kea Observatories and will plan for the eventual decommissioning, deconstruction and site restoration of the TMT Observatory and portion of Access Way used exclusively for the TMT Observatory. The plans for decommissioning the Project are described in the TMT Management Plan..</p>	<p>Same as on previous page.</p>

FEIS Section	Impact Description	CMP Management Action	Project-Level Mitigation	Impact Level
(Cont'd) Construction and Decommissioning (Final EIS Section 3.15, page 176)	Same as on previous page.	CMP SR-3: Require any future observatories to consider site restoration during project planning and include provisions in subleases for funding of full restoration. CMP FLU-3: Require cataloguing of initial site conditions for use when conducting site restoration.	Same as on previous page.	Same as on previous page.



## 2010 Annual Report

### To the Board of Land and Natural Resources

### Status of the Development of the Comprehensive Management Plan's Management Actions

#### Status of the Development of Each Sub Plan

The University successfully completed the four sub plans described above, all of which were shared with the public in open house forums in Hilo, Waimea, and Kona. They were approved by the Mauna Kea Management Board, the volunteer, community-based advisory board, and the Board of Regents.

On March 25, 2010, the four sub plans were approved by the BLNR.

#### Status of the Development of Each [CMP] Management Action

The CMP contains 103 management actions categorized into four component plans which are further subdivided into sub-components (Table 1).

Table 1. CMP component plans.

CMP Section	Component Plan
7.1	Understanding and Protecting Mauna Kea's Resources
7.1.1	Native Hawaiian Cultural Resources
7.1.2	Natural Resources
7.1.3	Education and Outreach
7.1.4	Astronomy Resources
7.2	Managing Access and Use
7.2.1	Activities and Uses
7.2.2	Permitting and Enforcement
7.3	Managing the Built Environment
7.3.1	Infrastructure and Maintenance
7.3.2	Construction Guidelines
7.3.3	Site Recycling, Decommissioning, Demolition and Restoration
7.3.4	Considering Future Land Use
7.4	Managing Operations
7.4.1	Operations and Implementation
7.4.2	Monitoring, Evaluation, and Updates

Of the total number of management actions, 24 actions are currently under being implemented (ongoing), four (are completed, and 24 will be implemented on an as needed basis (see Appendix A). The latter are management actions that are primarily related to construction and decommissioning activities.

The remaining 51 actions were prioritized and assigned to a time category when they are planned for implementation: immediate (1 – 3 years); short term (4 – 6 years); mid-term (7-9 years); and long term (10+ years). Table 2 is a summary of the management actions implementation schedule by component

and subcomponent plans. Appendix B lists the implementation schedule for all the CMP management actions. Appendix C is a table listing the agency/agencies responsible for implementing the management actions.

**CMP Management Action Implementation Overview**

OMKM identified several priorities over the immediate and short terms:

- Research
- Monitoring
- Resources Management Programs
- Education, Training and Outreach
- Printed Materials & Public Forums

Table 2. Summary of the CMP implementation schedule showing the number of management actions arranged by component and subcomponent plan categories.

Component Plan	Implementation Schedule (as of 2010)						
	Ongoing	Immediate	Short-term	Mid-term	Long-term	Completed	As needed
<b>7.1: Understanding and Protecting Mauna Kea's Resources</b>							
7.1.1: Native Hawaiian Cultural Resources (14)	1	10	2			1	
7.1.2: Natural Resources (18)	2	5	3	3	2		3
7.1.3: Education and Outreach (8)	3	2		2	1		
7.1.4: Astronomy Resources (2)	2						
<b>7.2: Managing Access and Use</b>							
7.2.1: Activities and Uses (12)	7	2	2			1	
7.2.2: Permitting and Enforcement (8)	4	1				2	1
<b>7.3: Managing the Built Environment</b>							
7.3.1: Infrastructure and Maintenance (14)	1	4	3	3	2		1
7.3.2: Construction Guidelines (9)							9
7.3.3: Site Recycling, Decommissioning, Demolition & Restoration (3)							3
7.3.4: Considering Future Land Use (7)		1					6
<b>7.4: Managing Operations</b>							
7.4.1: Operations and Implementation (5)	4		1				
7.4.2: Monitoring, Evaluation, and Updates (3)		1	1				1
<b>7.5: 1995 Management Plan Controls (1)</b>							1
<b>Total</b>	<b>24</b>	<b>26</b>	<b>12</b>	<b>8</b>	<b>5</b>	<b>4</b>	<b>24</b>

**Research.** In order to protect and manage the resources, it is necessary to assess the status of the resources by first establishing baseline data. A top priority is the filling of resource data gaps. OMKM will:

- Initiate surveys and studies on flora and fauna, geology and hydrology, climate/weather and air quality, and erosion
- Initiate surveys of human activities and needs such as commercial tour capacity and fees, traffic and parking and public facilities
- Continue studies on the wekiu bug including habitat restoration.

**Monitoring.** Monitoring is an ongoing and long term priority for assessing the status of the resources over a period of time. Currently OMKM has baseline data on the archaeological resources and wekiu bug. Beginning in 2007 OMKM initiated surveys of arthropods at the mid-level facilities at Hale Pohaku and selected locations on the summit. Other planned monitoring activities include:

- Initiate monitoring of the archaeological resources
- Continue surveys of the wekiu bug and arthropods species
- Initiate monitoring of new categories of resources using data obtained during the baseline data gathering stage.

**Resources Management Programs.** Concurrent with the gathering of baseline information, is the need to implement several key resource management programs:

- Development of protocols and/or policies related to cultural practices, for example, the development of a burial treatment plan and collection of information of traditional, contemporary and customary practices
- Development of an invasive species control plan.
- Development of a wekiu bug management plan

**Education, Training and Outreach.** OMKM recognizes the need to formally educate and train management staff, stakeholders, well as the general public about the resources. One of the key tenets of the Public Access Plan is that "an informed public is best prepared to make good decisions and act responsibly." OMKM plans to:

- Initiate programs to educate stakeholders and management staff, and the general public.
- Develop and maintain a GIS and database programs.
- Update training and education efforts.
- Develop an outreach program.

**Printed Materials & Public Forums.** The education process and outreach efforts will include the development of educational materials, such as brochures, signage and vehicles for disseminating materials, including public forums.

- Develop and implement a signage program
- Develop and print brochures
- Hold public and/or town hall meetings, participate in public events



**Appendix A**

**Summary of Ongoing, Completed and As Needed  
Mauna Kea CMP Management Actions**

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**CMP Management Actions that are Ongoing, As Needed and Completed**

COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES			
		Implementation Schedule	Subplans
<b>NATIVE HAWAIIAN CULTURAL RESOURCES</b>			
<b>Historic Properties</b>			
CR-14	Immediately report any disturbance of a shrine or burial site to the rangers, DOCARE, Kahu Kū Mauna Council, and SHPD.	Ongoing	CRMP 4.3.1.6 PAP 2.5.1
CR-11	Complete an archaeological survey of the portions of the Summit Access Road corridor that are under UH management.	Completed	CRMP 4.3.7
COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES			
<b>NATURAL RESOURCES</b>			
<b>Inventory, Monitoring and Research</b>			
NR-16	Conduct regular long-term monitoring, as outlined in an inventory, monitoring, and research plan.	Ongoing	NRMP 4.1 PAP 6.4
NR-18	Develop geo-spatial database of all known natural resources and their locations in the UH Management Areas that can serve as baseline documentation against change and provide information essential for decision-making.	Ongoing	NRMP 4.1, 4.5
NR-10	Incorporate mitigation plans into project planning and conduct mitigation following new development.	As needed	NRMP 4.3
NR-11	Conduct habitat rehabilitation projects following unplanned disturbances.	As needed	NRMP 4.3
NR-12	Create restoration plans and conduct habitat restoration activities, as needed.	As needed	NRMP 4.3
COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES			
<b>EDUCATION AND OUTREACH</b>			
<b>Education</b>			
EO-3	Continue to develop, update, and distribute materials explaining important aspects of Mauna Kea.	Ongoing	NRMP 4.4 CRMP 4.3.3 PAP 6.1
<b>Outreach</b>			
EO-7	Continue and increase opportunities for community members to provide input to cultural and natural resources management activities on Mauna Kea, to ensure systematic input regarding planning, management, and operational decisions that affect natural resources, sacred materials or places, or other ethnographic resources with which they are associated.	Ongoing	NRMP 4.4.2 CRMP 5.3 PAP 5.2, 6.3, 6.8
EO-8	Provide opportunities for community members to participate in stewardship activities.	Ongoing	NRMP 4.4.2

		Implementation Schedule	Subplans
<b>ASTRONOMICAL RESOURCES</b>			
<b>Protection of Astronomical Resources</b>			
AR-1	Operate the UH Management Areas to prohibit activities resulting in negative impacts to astronomical resources.	Ongoing	PAP 5.1
AR-2	Prevent light pollution, radio frequency interference (RFI) and dust.	Ongoing	NRMP 4.2.3.2
<b>COMPONENT PLAN: MANAGING ACCESS AND USE</b>			
<b>ACTIVITIES AND USES</b>			
<b>General Management</b>			
ACT-3	Maintain a presence of interpretive and enforcement personnel on the mountain at all times to educate users, deter violations, and encourage adherence to restrictions.	Ongoing	NRMP 5.1.2 CRMP 4.1.1 PAP 4.2, 4.4, 4.5, 4.6, 5.2, 6.1, 6.2, 6.5, 6.6, 6.7
ACT-4	Develop and enforce a policy that maintains current prohibitions on off-road vehicle use in the UH Management Areas and that strengthens measures to prevent or deter vehicles from leaving established roads and designated parking areas.	Ongoing	NRMP 4.2.3.1 CRMP 4.1.2 PAP 2.5.1, 2.5.2, 2.6.3, 5.2, 6.3, 6.5
<b>Recreational</b>			
ACT-6	Define and maintain areas where snow-related activities can occur and confine activities to slopes that have a protective layer of snow.	Ongoing	NRMP 4.2.3.1 CRMP 4.2.3.2 PAP 3.3.5, 5.2, 6.1, 6.3, 6.4
ACT-7	Confine University or other sponsored tours and star-gazing activities to previously disturbed ground surfaces and established parking areas.	Ongoing	NRMP 6.2.3 CRMP 4.2.3.1 PAP 2.5.3, 2.6.2, 3.3.3, 5.2
<b>Commercial</b>			
ACT-9	Maintain commercial tour permitting process; evaluate and issue permits annually.	Ongoing	NRMP 3.1.4 PAP 2.5.3, 2.5.4, 3.3.3, 4.3, 5.2, 6.1, 6.7
ACT-10	Ensure OMKM input on permits for filming activities	Ongoing	NRMP 3.1.4.2 PAP 2.5.3, 3.3.3, 4.3, 6.1, 6.7
ACT-11	Seek statutory authority for the University to regulate commercial activities in the UH Management Areas.	Completed	NRMP 1.4.2.3
<b>Scientific Research</b>			
ACT-12	Ensure input by OMKM, MKMB, and Kahu Kū Mauna on all scientific research permits and establish system of reporting results of research to OMKM.	Ongoing	NRMP 4.2.3.1, 4.2.3.7, 4.2.3.9 CRMP 4.2.6



		Implementation Schedule	Subplans
<b>PERMITTING AND ENFORCEMENT</b>			
<b>Laws and Regulations</b>			
P-1	Comply with all applicable federal, state, and local laws, regulations, and permit conditions related to activities in the UH Management Areas.	Ongoing	NRMP 1.4.3 PAP 2.4, 2.5, 2.5.1, 2.5.2, 2.5.3, 5.1
P-2	Strengthen CMP implementation by recommending to the BLNR that the CMP conditions be included in any Conservation District Use Permit or other permit.	As needed	NRMP 1.4.3.2
P-3	Obtain statutory rule-making authority from the legislature, authorizing the University of Hawai'i to adopt administrative rules pursuant to Chapter 91 to implement and enforce the management actions.	Completed	NRMP 1.4.3.2
<b>Enforcement</b>			
P-5	Continue coordinating with other agencies on enforcement needs.	Ongoing	NRMP 5.1 PAP 4, 6.5
P-6	Obtain legal authority for establishing, and then establish, a law enforcement presence on the mountain that can enforce rules for the UH Management Areas on Mauna Kea.	Completed / As Needed	NRMP 1.4.2.3, 3.1.3.2, 5.1 PAP 4.4, 4.5, 4.6, 5.2, 6.5, 6.6
P-7	Develop and implement protocol for oversight and compliance with Conservation District Use Permits.	Ongoing	NRMP 1.4.2.3
P-8	Enforce conditions contained in commercial and Special Use permits.	Ongoing	NRMP 3.1.4 PAP 2.5.3, 3.3.3, 4.3, 4.5, 4.6, 6.5
<b>COMPONENT PLAN: MANAGING THE BUILT ENVIRONMENT</b>			
<b>INFRASTRUCTURE AND MAINTENANCE</b>			
<b>Routine Maintenance</b>			
IM-1	Develop and implement an OMMP.	Ongoing	
<b>Sustainable Technologies</b>			
IM-11	Encourage existing facilities and new development to incorporate sustainable technologies, energy efficient technologies, and LEED standards, whenever possible, into facility design and operations.	As needed	

COMPONENT PLAN: MANAGING THE BUILT ENVIRONMENT			
		Implementation	
		Schedule	Subplans
CONSTRUCTION GUIDELINES			
General Requirements			
C-1	Require an independent construction monitor who has oversight and authority to insure that all aspects of ground based work comply with protocols and permit requirements.	As needed	NRMP 3.2, 4.2
Best Management Practices			
C-2	Require use of Best Management Practices Plan for Construction Practices.	As needed	NRMP 4.2.3
C-3	Develop, prior to construction, a rock movement plan.	As needed	NRMP 4.2.3.1
C-4	Require contractors to provide information from construction activities to OMKM for input into OMKM information databases.	As needed	
C-5	Require on-site monitors (e.g., archaeologist, cultural resources specialist, entomologist) during construction, as determined by the appropriate agency.	As needed	CRMP 4.2.7
C-6	Conduct required archaeological monitoring during construction projects per SHPD approved plan.	As needed	CRMP 4.2.7
C-7	Education regarding historical and cultural significance	As needed	NRMP 4.4
C-8	Education regarding environment, ecology and natural resources	As needed	NRMP 4.4
C-9	Inspection of construction materials	As needed	NRMP 4.2.3.7
SITE RECYCLING, DECOMMISSIONING DEMOLITION AND RESTORATION			
Site Recycling, Decommissioning, Demolition, and Restoration			
SR-1	Require observatories to develop plans to recycle or demolish facilities once their useful life has ended, in accordance with their sublease requirements, identifying all proposed actions.	As needed	NRMP 4.3.3.4.1
SR-2	Require observatories to develop a restoration plan in association with decommissioning, to include an environmental cost-benefit analysis and a cultural assessment.	As needed	NRMP 4.3.3.4.1
SR-3	Require any future observatories to consider site restoration during project planning and include provisions in subleases for funding of full restoration.	As needed	NRMP 4.3.3.4.1

		Implementation Schedule	Subplans
<b>CONSIDERATION OF FUTURE LAND USE</b>			
<b>Facility Planning Guidelines</b>			
FLU-1	Follow design guidelines presented in the 2000 Master Plan.	As needed	NRMP 5.1.1
FLU-3	Require cataloguing of initial site conditions for use when conducting site restoration.	As needed	
FLU-4	Require project specific visual rendering of both pre- and post-project settings to facilitate analysis of potential impacts to view planes.	As needed	NRMP 4.1.4.11
FLU-5	Require an airflow analysis on the design of proposed structures to assess potential impacts to aeolian ecosystems.	As needed	NRMP 4.1.4.4
FLU-6	Incorporate habitat mitigation plans into project planning process.	As needed	NRMP 4.3.3.3
FLU-7	Require use of close-contained zero-discharge waste systems for any future development in the summit region, from portable toilets to observatory restrooms, if feasible.	As needed	NRMP 3.1.1.2.6
<b>COMPONENT PLAN: MANAGING OPERATIONS</b>			
<b>OPERATION AND IMPLEMENTATION OF THE CMP</b>			
<b>Management</b>			
OI-1	Maintain OMKM, MKMB, and Kahu Kū Mauna in current roles, with OMKM providing local management of the UH Management Areas, and MKSS providing operational and maintenance services.	Ongoing	
OI-2	Develop training plan for staff and volunteers.	Ongoing	NRMP 5.1 CRMP 5.2 PAP 5.1, 5.2, 6.1, 6.4, 6.5
OI-3	Maintain and expand regular interaction and dialogue with stakeholders, community members, surrounding landowners, and overseeing agencies to provide a coordinated approach to resource management.	Ongoing	NRMP 5.1 PAP 5.1
OI-5	Update and implement emergency response plan.	Ongoing	CRMP 4.1.6, 4.3.5 PAP 6.1, 6.4, 6.5, 6.7
<b>CMP MONITORING, EVALUATION AND UPDATES</b>			
<b>Management</b>			
MEU-3	Revise and update planning documents, including the master plan, leases, and subleases, so that they will clearly assign roles and responsibilities for managing Mauna Kea and reflect stewardship matters resolved with DLNR.	As needed	PAP 7



**Appendix B**

**Mauna Kea CMP Management Actions Implementation Schedule**

Note: In cases where an action continues after it is initially developed or implemented, the shading continues to denote ongoing activity.

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Management Action		Duration of Implementation					
Initiation of Action		Yr 1	Yr 2	Yr 3	Yrs 4-6	Yrs 7-9	Yrs 10+
<b>COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES</b>							
<b>NATIVE HAWAIIAN CULTURAL RESOURCES</b>							
<b>Management</b>							
CR-3	Conduct educational efforts to generate public awareness about the importance of preserving the cultural landscape.	Immediate					
CR-1	Kahu Kū Mauna shall work with families with lineal and historical connections to Mauna Kea, cultural practitioners, and other Native Hawaiian groups, including the Mauna Kea Management Board's Hawaiian Culture Committee, toward the development of appropriate procedures and protocols regarding cultural issues.	Immediate					
CR-2	Support application for designation of the summit region of Mauna Kea as a Traditional Cultural Property, per the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq. in consultation with the larger community.	Short-term					
<b>Cultural Practices</b>							
CR-4	Establish a process for ongoing collection of information on traditional, contemporary, and customary cultural practices.	Short-term					
CR-5	Develop and adopt guidelines for the culturally appropriate placement and removal of offerings	Immediate					
CR-7	Kahu Kū Mauna shall take the lead in determining the appropriateness of constructing new Hawaiian cultural features.	Immediate					
CR-8	Develop and adopt a management policy for the UH Management Areas on the scattering of cremated human remains.	Immediate					
CR-9	A management policy for the culturally appropriateness of building ahu or "stacking of rocks" will need to be developed by Kahu Kū Mauna who may consider similar policies adopted by Hawai'i Volcanoes National Park.	Immediate					
CR-6	Develop and adopt guidelines for the visitation and use of ancient shrines.	Immediate					
<b>Historic Properties</b>							

	Management Action	Initiation of Action	Duration of Implementation							
			Yr 1	Yr 2	Yr 3	Yrs 4-6	Yrs 7-9	Yrs 10+		
CR-14	Immediately report any disturbance of a shrine or burial site to the rangers, DOCARE, Kahu Kū Mauna Council, and SHPD.	Ongoing								
CR-10	Develop and implement a historic property monitoring program to systematically monitor the condition of the historic district and all historic properties, including cultural sites and burials.	Immediate								
CR-12	Consult with Kahu Kū Mauna about establishing buffers (preservation zones) around known historic sites in the Astronomy Precinct, to protect them from potential future development.	Immediate								
CR-13	Develop and implement a burial treatment plan for the UH Management Areas in consultation with Kahu Kū Mauna Council, MKMB's Hawaiian Culture Committee, the Hawai'i Island Burial Council, recognized lineal or cultural descendants, and SHPD.	Immediate								
CR-11	Complete an archaeological survey of the portions of the Summit Access Road corridor that are under UH management.	Completed	--	--	--	--	--	--	--	
<b>NATURAL RESOURCES</b>										
<b>Threat Prevention and Control</b>										
NR-6	Reduce threats to natural resources by educating stakeholders and the public about Mauna Kea's unique natural resources.	Immediate								
NR-2	Limit damage caused by invasive species through creation of an invasive species prevention and control program.	Immediate								
NR-1	Limit threats to natural resources through management of permitted activities and uses.	Short-term								
NR-3	Maintain native plant and animal populations and biological diversity.	Mid and Long-term								
NR-4	Minimize barriers to species migration, to help maintain populations and protect ecosystem processes and development.	Mid and Long-term								
NR-5	Manage ecosystems to allow for response to climate change.	Long-term								
<b>Ecosystem Protection, Enhancement, &amp; Restoration</b>										
NR-7	Delineate areas of high native diversity, unique communities, or unique geological features within the Astronomy Precinct and at Hale Pōhaku and consider protection from development.	Short and Mid-term								



	Management Action	Initiation of Action	Duration of Implementation							
			Yr 1	Yr 2	Yr 3	Yrs 4-6	Yrs 7-9	Yrs 10+		
NR-8	Consider fencing areas of high native biodiversity or populations of endangered species to keep out feral ungulates (applies to areas below 12,800 ft elevation).	Mid-term								
NR-9	Increase native plant density and diversity through an outplanting program.	Long-term								
NR-10	Incorporate mitigation plans into project planning and conduct mitigation following new development.	As needed								
NR-11	Conduct habitat rehabilitation projects following unplanned disturbances.	As needed								
NR-12	Create restoration plans and conduct habitat restoration activities, as needed.	As needed								
<b>Program Management</b>										
NR-13	Increase communication, networking, and collaborative opportunities to support management and protection of natural resources.	Immediate								
NR-14	Use the principles of adaptive management when developing programs and methodologies. Review programs annually and revise any component plans every five years, based on the results of the program review.	Short-term / As needed								
<b>Inventory, Monitoring and Research</b>										
NR-16	Conduct regular long-term monitoring, as outlined in an inventory, monitoring, and research plan.	Ongoing								
NR-18	Develop geo-spatial database of all known natural resources and their locations in the UH Management Areas that can serve as baseline documentation against change and provide information essential for decision-making.	Ongoing								
NR-15	Conduct baseline inventories of high-priority resources, as outlined in an inventory, monitoring, and research plan.	Immediate								
NR-17	Conduct research to fill knowledge gaps that cannot be addressed through inventory and monitoring.	Immediate								

Management Action		Duration of Implementation					
Initiation of Action		Yr 1	Yr 2	Yr 3	Yr 4-6	Yr 7-9	Yr 10+
<b>EDUCATION AND OUTREACH</b>							
<b>Program Development</b>							
EO-1	Develop and implement education and outreach program	Immediate and Short-term					
<b>Education</b>							
EO-3	Continue to develop, update, and distribute materials explaining important aspects of Mauna Kea.	Ongoing					
EO-4	Develop and implement a signage plan to improve signage throughout the UH Management Areas (interpretive, safety, rules, and regulations).	Immediate					
EO-5	Develop interpretive features such as self-guided cultural walks and volunteer-maintained native plant gardens.	Mid-term					
EO-6	Engage in outreach and partnerships with schools, by collaborating with local experts, teachers, and university researchers, and by working with the 'Imiloa Astronomy Center of Hawaii'.	Mid-term					
EO-2	Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.	Long-term					
<b>Outreach</b>							
EO-7	Continue and increase opportunities for community members to provide input to cultural and natural resources management activities on Mauna Kea, to ensure systematic input regarding planning, management, and operational decisions that affect natural resources, sacred materials or places, or other ethnographic resources with which they are associated.	Ongoing					
EO-8	Provide opportunities for community members to participate in stewardship activities.	Ongoing					
<b>ASTRONOMICAL RESOURCES</b>							
<b>Protection of Astronomical Resources</b>							
AR-1	Operate the UH Management Areas to prohibit activities resulting in negative impacts to astronomical resources.	Ongoing					
AR-2	Prevent light pollution, radio frequency interference (RFI) and dust.	Ongoing					

Management Action		Duration of Implementation					
Initiation of Action		Yr 1	Yr 2	Yr 3	Yrs 4-6	Yrs 7-9	Yrs 10+
<b>COMPONENT PLAN: MANAGING ACCESS AND USE</b>							
<b>ACTIVITIES AND USES</b>							
<b>General Management</b>							
ACT-1	Continue and update managed access policy of 1995 Management Plan.	Short-term					
ACT-2	Develop parking and visitor traffic plan.	Immediate					
ACT-3	Maintain a presence of interpretive and enforcement personnel on the mountain at all times to educate users, deter violations, and encourage adherence to restrictions.	Ongoing					
ACT-4	Develop and enforce a policy that maintains current prohibitions on off-road vehicle use in the UH Management Areas and that strengthens measures to prevent or deter vehicles from leaving established roads and designated parking areas.	Ongoing					
<b>Recreational</b>							
ACT-5	Implement policies to reduce impacts of recreational hiking	Short-term					
ACT-6	Define and maintain areas where snow-related activities can occur and confine activities to slopes that have a protective layer of snow.	Ongoing					
ACT-7	Confine University or other sponsored tours and star-gazing activities to previously disturbed ground surfaces and established parking areas.	Ongoing					
ACT-8	Coordinate with DLNR in the development of a policy regarding hunting in the UH Management Areas.	Immediate					
<b>Commercial</b>							
ACT-9	Maintain commercial tour permitting process; evaluate and issue permits annually.	Ongoing					
ACT-10	Ensure OMKM input on permits for filming activities	Ongoing					
ACT-11	Seek statutory authority for the University to regulate commercial activities in the UH Management Areas.	Completed					

Management Action		Duration of Implementation					
Initiation of Action		Yr 1	Yr 2	Yr 3	Yr 4-6	Yr 7-9	Yr 10+
<b>Scientific Research</b>							
ACT-12	Ensure input by OMKM, MKMB, and Kahu Kū Mauna on all scientific research permits and establish system of reporting results of research to OMKM.	Ongoing					
<b>PERMITTING AND ENFORCEMENT</b>							
<b>Laws and Regulations</b>							
P-1	Comply with all applicable federal, state, and local laws, regulations, and permit conditions related to activities in the UH Management Areas.	Ongoing					
P-2	Strengthen CMP implementation by recommending to the BLNR that the CMP conditions be included in any Conservation District Use Permit or other permit.	As needed					
P-3	Obtain statutory rule-making authority from the legislature, authorizing the University of Hawai'i to adopt administrative rules pursuant to Chapter 91 to implement and enforce the management actions.	Completed					
P-4	Educate management staff and users of the mountain about all applicable rules and permit requirements.	Immediate					
<b>Enforcement</b>							
P-5	Continue coordinating with other agencies on enforcement needs.	Ongoing					
P-6	Obtain legal authority for establishing, and then establish, a law enforcement presence on the mountain that can enforce rules for the UH Management Areas on Mauna Kea.	Completed - As needed					
P-7	Develop and implement protocol for oversight and compliance with Conservation District Use Permits.	Ongoing					
P-8	Enforce conditions contained in commercial and Special Use permits.	Ongoing					

Management Action		Initiation of Action		Duration of Implementation					
		Yr 1	Yr 2	Yr 3	Yr 4-6	Yr 7-9	Yr 10+		
<b>ROUTINE MAINTENANCE</b>									
<b>INFRASTRUCTURE AND MAINTENANCE</b>									
IM-1	Develop and implement an OMMP.								
IM-2	Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.								
IM-3	Conduct historic preservation review for maintenance activities that will have an adverse effect on historic properties.								
IM-4	Evaluate need for and feasibility of a vehicle wash station near Hale Pōhaku, and requiring that vehicles be cleaned.								
IM-5	Develop and implement a Debris Removal, Monitoring and Prevention Plan.								
IM-6	Develop and implement an erosion inventory and assessment plan.								
IM-7	Prepare a plan, in collaboration with the Department of Defense, to remove military wreckage from a remote area of the UH Management Areas, while ensuring protection of natural and cultural resources.								
<b>INFRASTRUCTURE</b>									
IM-8	Assess feasibility of paving the Summit Access Road.								
IM-9	Evaluate need for additional parking lots and vehicle pullouts and install if necessary.								
IM-10	Evaluate need for additional public restroom facilities in the summit region and at Hale Pōhaku, and install close-contained zero waste systems if necessary.								
<b>SUSTAINABLE TECHNOLOGIES</b>									
IM-11	Encourage existing facilities and new development to incorporate sustainable technologies, energy efficient technologies, and LEED standards, whenever possible, into facility design and operations.								
IM-12	Conduct energy audits to identify energy use and system inefficiencies, and develop solutions to reduce energy usage.								

Management Action	Initiation of Action	Duration of Implementation					
		Yr 1	Yr 2	Yr 3	Yrs 4-6	Yrs 7-9	Yrs 10+
IM-13 Conduct feasibility assessment, in consultation with Hawaii Electric Light Company, on developing locally-based alternative energy sources.	Mid-term						
IM-14 Encourage observatories to investigate options to reduce the use of hazardous materials in telescope operations.	Short-term						
<b>CONSTRUCTION GUIDELINES</b>							
<b>General Requirements</b>							
C-1 Require an independent construction monitor who has oversight and authority to insure that all aspects of ground based work comply with protocols and permit requirements.	As needed						
<b>Best Management Practices</b>							
C-2 Require use of Best Management Practices Plan for Construction Practices.	As needed						
C-3 Develop, prior to construction, a rock movement plan.	As needed						
C-4 Require contractors to provide information from construction activities to OMKM for input into OMKM information databases.	As needed						
C-5 Require on-site monitors (e.g., archaeologist, cultural resources specialist, entomologist) during construction, as determined by the appropriate agency.	As needed						
C-6 Conduct required archaeological monitoring during construction projects per SHPD approved plan.	As needed						
C-7 Education regarding historical and cultural significance	As needed						
C-8 Education regarding environment, ecology and natural resources	As needed						
C-9 Inspection of construction materials	As needed						
<b>SITE RECYCLING, DECOMMISSIONING, DEMOLITION AND RESTORATION</b>							
<b>Site Recycling, Decommissioning, Demolition, and Restoration</b>							
SR-1 Require observatories to develop plans to recycle or demolish facilities once their useful life has ended, in accordance with their sublease requirements, identifying all proposed actions.	As needed						



	Management Action	Initiation of Action	Duration of Implementation						
			Yr-1	Yr-2	Yr-3	4-5	7-9	10+	
SR-2	Require observatories to develop a restoration plan in association with decommissioning, to include an environmental cost-benefit analysis and a cultural assessment.	As needed							
SR-3	Require any future observatories to consider site restoration during project planning and include provisions in subleases for funding of full restoration.	As needed							
<b>CONSIDERATION OF FUTURE LAND USE</b>									
<b>Facility Planning Guidelines</b>									
FLU-1	Follow design guidelines presented in the 2000 Master Plan.	As needed							
FLU-2	Develop a map with land-use zones in the Astronomy Precinct based on updated inventories of cultural and natural resources, to delineate areas where future land use will not be allowed and areas where future land use will be allowed but will require compliance with prerequisite studies or analysis prior to approval of Conservation District Use Permit.	Immediate							
FLU-3	Require cataloguing of initial site conditions for use when conducting site restoration.	As needed							
FLU-4	Require project specific visual rendering of both pre- and post-project settings to facilitate analysis of potential impacts to view planes.	As needed							
FLU-5	Require an airflow analysis on the design of proposed structures to assess potential impacts to aeolian ecosystems.	As needed							
FLU-6	Incorporate habitat mitigation plans into project planning process.	As needed							
FLU-7	Require use of close-contained zero-discharge waste systems for any future development in the summit region, from portable toilets to observatory restrooms, if feasible.	As needed							

Management Action		Initiation of Action			Duration of Implementation				
		Yr 1	Yr 2	Yr 3	Yrs 4-6	Yrs 7-9	Yrs 10+		
<b>COMPONENT PLAN: MANAGING OPERATIONS</b>									
<b>OPERATION AND IMPLEMENTATION OF THE CMP</b>									
<b>Management</b>									
OI-1	Maintain OMKM, MKMB, and Kahu Kū Mauna in current roles, with OMKM providing local management of the UH Management Areas, and MKSS providing operational and maintenance services.	Ongoing							
OI-2	Develop training plan for staff and volunteers.	Ongoing							
OI-3	Maintain and expand regular interaction and dialogue with stakeholders, community members, surrounding landowners, and overseeing agencies to provide a coordinated approach to resource management.	Ongoing							
OI-4	Establish grievance procedures for OMKM, to address issues as they arise.	Short-term							
OI-5	Update and implement emergency response plan.	Ongoing							
<b>CMP MONITORING, EVALUATION AND UPDATES</b>									
<b>Management</b>									
MEU-1	Establish a reporting system to ensure that the MKMB, DLNR, and the public are informed of results of management activities in a timely manner.	Immediate							
MEU-2	Conduct regular updates of the CMP that reflect outcomes of the evaluation process, and that incorporate new information about resources.	Short-term / As needed							
MEU-3	Revise and update planning documents, including the master plan, leases, and subleases, so that they will clearly assign roles and responsibilities for managing Mauna Kea and reflect stewardship matters resolved with DLNR.	As needed							



**Appendix C**  
**Entities Responsible for Implementation**

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COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES		Responsible Entity
NATIVE HAWAIIAN CULTURAL RESOURCES		
Management		
CR-1	Kahu Kū Mauna shall work with families with lineal and historical connections to Mauna Kea, cultural practitioners, and other Native Hawaiian groups, including the Mauna Kea Management Board's Hawaiian Culture Committee, toward the development of appropriate procedures and protocols regarding cultural issues.	To be developed by Kahu Kū Mauna, Mauna Kea Management Board (MKMB), and Hawaiian Cultural Committee, in consultation with families with historic connections Mauna Kea, cultural practitioners, and other Native Hawaiians.
CR-2	Support application for designation of the summit region of Mauna Kea as a Traditional Cultural Property, per the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq. in consultation with the larger community.	OMKM
CR-3	Conduct educational efforts to generate public awareness about the importance of preserving the cultural landscape.	OMKM
Cultural Practices		
CR-4	Establish a process for ongoing collection of information on traditional, contemporary, and customary cultural practices.	OMKM, in partnership with UH-Hilo and Hilo Community College to establish an oral history program.
CR-5	Develop and adopt guidelines for the culturally appropriate placement and removal of offerings	Kahu Kū Mauna, and/or the Hawaiian Cultural Committee, in consultation with families of lineal connections, kūpuna, cultural practitioners, or Native Hawaiian organizations.
CR-6	Develop and adopt guidelines for the visitation and use of ancient shrines.	Kahu Kū Mauna, and/or the Hawaiian Cultural Committee, in consultation with families of lineal connections, kūpuna, cultural practitioners, or Native Hawaiian organizations.
CR-7	Kahu Kū Mauna shall take the lead in determining the appropriateness of constructing new Hawaiian cultural features.	Kahu Kū Mauna, and/or the Hawaiian Cultural Committee, in consultation with families of lineal connections, kūpuna, cultural practitioners, or Native Hawaiian organizations.

		Responsible Entity
CR-8	Develop and adopt a management policy for the UH Management Areas on the scattering of cremated human remains.	Kahu Kū Mauna, and/or the Hawaiian Cultural Committee, in consultation with families of lineal connections, kūpuna, cultural practitioners, or Native Hawaiian organizations.
CR-9	A management policy for the culturally appropriateness of building ahu or "stacking of rocks" will need to be developed by Kahu Kū Mauna who may consider similar policies adopted by Hawai'i Volcanoes National Park.	Kahu Kū Mauna, and/or the Hawaiian Cultural Committee, in consultation with families of lineal connections, kūpuna, cultural practitioners, or Native Hawaiian organizations.
<b>Historic Properties</b>		
CR-10	Develop and implement a historic property monitoring program to systematically monitor the condition of the historic district and all historic properties, including cultural sites and burials.	OMKM
CR-11	Complete an archaeological survey of the portions of the Summit Access Road corridor that are under UH management.	OMKM – completed by consultants
CR-12	Consult with Kahu Kū Mauna about establishing buffers (preservation zones) around known historic sites in the Astronomy Precinct, to protect them from potential future development.	OMKM, Kahu Kū Mauna, DLNR (SHPD)
CR-13	Develop and implement a burial treatment plan for the UH Management Areas in consultation with Kahu Kū Mauna Council, MKMB's Hawaiian Culture Committee, the Hawai'i Island Burial Council, recognized lineal or cultural descendants, and SHPD.	OMKM, with approval as indicated.
CR-14	Immediately report any disturbance of a shrine or burial site to the rangers, DOCARE, Kahu Kū Mauna Council, and SHPD.	OMKM, rangers, DOCARE, Kahu Kū Mauna Council, and SHPD.
<b>NATURAL RESOURCES</b>		
<b>Threat Prevention and Control</b>		
NR-1	Limit threats to natural resources through management of permitted activities and uses.	OMKM
NR-2	Limit damage caused by invasive species through creation of an invasive species prevention and control program.	OMKM
NR-3	Maintain native plant and animal populations and biological diversity.	OMKM
NR-4	Minimize barriers to species migration, to help maintain populations and protect ecosystem processes and development.	OMKM
NR-5	Manage ecosystems to allow for response to climate change.	OMKM

		Responsible Entity
NR-6	Reduce threats to natural resources by educating stakeholders and the public about Mauna Kea's unique natural resources.	OMKM
<b>Ecosystem Protection, Enhancement &amp; Restoration</b>		
NR-7	Delineate areas of high native diversity, unique communities, or unique geological features within the Astronomy Precinct and at Hale Pōhaku and consider protection from development.	OMKM
NR-8	Consider fencing areas of high native biodiversity or populations of endangered species to keep out feral ungulates (applies to areas below 12,800 ft elevation).	OMKM
NR-9	Increase native plant density and diversity through an outplanting program.	OMKM
NR-10	Incorporate mitigation plans into project planning and conduct mitigation following new development.	Prepared by project applicants; approved by UH and DLNR.
NR-11	Conduct habitat rehabilitation projects following unplanned disturbances.	As determined
NR-12	Create restoration plans and conduct habitat restoration activities, as needed.	OMKM
<b>Program Management</b>		
NR-13	Increase communication, networking, and collaborative opportunities, to support management and protection of natural resources.	OMKM; working group
NR-14	Use the principles of adaptive management when developing programs and methodologies. Review programs annually and revise any component plans every five years, based on the results of the program review.	OMKM
<b>Inventory, Monitoring and Research</b>		
NR-15	Conduct baseline inventories of high-priority resources, as outlined in an inventory, monitoring, and research plan.	OMKM
NR-16	Conduct regular long-term monitoring, as outlined in an inventory, monitoring, and research plan.	OMKM
NR-17	Conduct research to fill knowledge gaps that cannot be addressed through inventory and monitoring.	OMKM
NR-18	Develop geo-spatial database of all known natural resources and their locations in the UH Management Areas that can serve as baseline documentation against change and provide information essential for decision-making.	OMKM

Responsible Entity	
EDUCATION AND OUTREACH	
<b>Program Development</b>	
EO-1	Develop and implement education and outreach program OMKM
<b>Education</b>	
EO-2	Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users. OMKM
EO-3	Continue to develop, update, and distribute materials explaining important aspects of Mauna Kea. OMKM
EO-4	Develop and implement a signage plan to improve signage throughout the UH Management Areas (Interpretive, safety, rules and regulations). OMKM, with approval by DLNR
EO-5	Develop interpretive features such as self-guided cultural walks and volunteer-maintained native plant gardens. OMKM/DLNR (SHPD/DOFAW)
EO-6	Engage in outreach and partnerships with schools, by collaborating with local experts, teachers, and university researchers, and by working with the 'Imiloa Astronomy Center of Hawaii. OMKM, with public and private schools, and universities.
<b>Outreach</b>	
EO-7	Continue and increase opportunities for community members to provide input to cultural and natural resources management activities on Mauna Kea, to ensure systematic input regarding planning, management, and operational decisions that affect natural resources, sacred materials or places, or other ethnographic resources with which they are associated. OMKM
EO-8	Provide opportunities for community members to participate in stewardship activities. OMKM
<b>ASTRONOMICAL RESOURCES</b>	
<b>Protection of Astronomical Resources</b>	
AR-1	Operate the UH Management Areas to prohibit activities resulting in negative impacts to astronomical resources. OMKM
AR-2	Prevent light pollution, radio frequency interference (RFI) and dust. OMKM

Responsible Entity

COMPONENT PLAN: MANAGING ACCESS AND USE

ACTIVITIES AND USES

General Management		Responsible Entity
ACT-1	Continue and update managed access policy of 1995 Management Plan.	OMKM and DLNR
ACT-2	Develop parking and visitor traffic plan.	OMKM
ACT-3	Maintain a presence of interpretive and enforcement personnel on the mountain at all times to educate users, deter violations, and encourage adherence to restrictions.	OMKM
ACT-4	Develop and enforce a policy that maintains current prohibitions on off-road vehicle use in the UH Management Areas and that strengthens measures to prevent or deter vehicles from leaving established roads and designated parking areas.	OMKM/DLNR working group
<b>Recreational</b>		
ACT-5	Implement policies to reduce impacts of recreational hiking	OMKM
ACT-6	Define and maintain areas where snow-related activities can occur and confine activities to slopes that have a protective layer of snow.	OMKM
ACT-7	Confine University or other sponsored tours and star-gazing activities to previously disturbed ground surfaces and established parking areas.	OMKM
ACT-8	Coordinate with DLNR in the development of a policy regarding hunting in the UH Management Areas.	OMKM and DLNR with hunting associations.
<b>Commercial</b>		
ACT-9	Maintain commercial tour permitting process; evaluate and issue permits annually.	OMKM
ACT-10	Ensure OMKM input on permits for filming activities	OMKM
ACT-11	Seek statutory authority for the University to regulate commercial activities in the UH Management Areas.	UH/OMKM – completed
<b>Scientific Research</b>		
ACT-12	Ensure input by OMKM, MKMB, and Kahu Kū Mauna on all scientific research permits and establish system of reporting results of research to OMKM.	OMKM, MKMB, and Kahu Kū Mauna

PERMITTING AND ENFORCEMENT		Responsible Entity
<b>Laws and Regulations</b>		
P-1	Comply with all applicable federal, state, and local laws, regulations, and permit conditions related to activities in the UH Management Areas.	UH / OMKM
P-2	Strengthen CMP implementation by recommending to the BLNR that the CMP conditions be included in any Conservation District Use Permit or other permit.	OMKM / BLNR
P-3	Obtain statutory rule-making authority from the legislature, authorizing the University of Hawaii to adopt administrative rules pursuant to Chapter 91 to implement and enforce the management actions.	UH/OMKM - completed
P-4	Educate management staff and users of the mountain about all applicable rules and permit requirements.	OMKM
<b>Enforcement</b>		
P-5	Continue coordinating with other agencies on enforcement needs.	OMKM
P-6	Obtain legal authority for establishing, and then establish, a law enforcement presence on the mountain that can enforce rules for the UH Management Areas on Mauna Kea.	UH with rule-making authority, or DLNR (DOCARE)
P-7	Develop and implement protocol for oversight and compliance with Conservation District Use Permits.	DLNR (OCCL) with assistance from OMKM
P-8	Enforce conditions contained in commercial and Special Use permits.	OMKM, MKMB, and Kahu Kū Mauna



Responsible Entity

**COMPONENT PLAN: MANAGING THE BUILT ENVIRONMENT  
INFRASTRUCTURE AND MAINTENANCE**

<b>Routine Maintenance</b>		
IM-1	Develop and implement an OMMP.	OMKM
IM-2	Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.	OMKM and DLNR.
IM-3	Conduct historic preservation review for maintenance activities that will have an adverse effect on historic properties.	OMKM and DLNR (SHPD)
IM-4	Evaluate need for and feasibility of a vehicle wash station near Hale Pōhaku, and requiring that vehicles be cleaned.	OMKM
IM-5	Develop and implement a Debris Removal, Monitoring and Prevention Plan.	OMKM
IM-6	Develop and implement an erosion inventory and assessment plan.	OMKM
IM-7	Prepare a plan, in collaboration with the Department of Defense, to remove military wreckage from a remote area of the UH Management Areas, while ensuring protection of natural and cultural resources.	OMKM / Department of Defense
<b>Infrastructure</b>		
IM-8	Assess feasibility of paving the Summit Access Road.	OMKM
IM-9	Evaluate need for additional parking lots and vehicle pullouts and install if necessary.	OMKM
IM-10	Evaluate need for additional public restroom facilities in the summit region and at Hale Pōhaku, and install close-contained zero waste systems if necessary.	OMKM
<b>Sustainable Technologies</b>		
IM-11	Encourage existing facilities and new development to incorporate sustainable technologies, energy efficient technologies, and LEED standards, whenever possible, into facility design and operations.	OMKM
IM-12	Conduct energy audits to identify energy use and system inefficiencies, and develop solutions to reduce energy usage.	OMKM
IM-13	Conduct feasibility assessment, in consultation with Hawaii Electric Light Company, on developing locally-based alternative energy sources.	OMKM
IM-14	Encourage observatories to investigate options to reduce the use of hazardous materials in telescope operations.	OMKM

CONSTRUCTION GUIDELINES		Responsible Entity
<b>General Requirements</b>		
C-1	Require an independent construction monitor who has oversight and authority to insure that all aspects of ground based work comply with protocols and permit requirements.	DLNR (OCCL) and OMKM
<b>Best Management Practices</b>		
C-2	Require use of Best Management Practices Plan for Construction Practices.	Project proposer, DLNR (OCCL) and OMKM
C-3	Develop, prior to construction, a rock movement plan.	Project proposer
C-4	Require contractors to provide information from construction activities to OMKM for input into OMKM information databases.	OMKM
C-5	Require on-site monitors (e.g., archaeologist, cultural resources specialist, entomologists) during construction, as determined by the appropriate agency.	Project proposer
C-6	Conduct required archaeological monitoring during construction projects per SHPD approved plan.	Project proposer with DLNR (SHPD) approval
C-7	Education regarding historical and cultural significance	OMKM in consultation with Kahu Kū Mauna or other Native Hawaiian groups, and approval by DLNR (SHPD).
C-8	Education regarding environment, ecology and natural resources	OMKM
C-9	Inspection of construction materials	OMKM under review by DLNR.
<b>SITE RECYCLING, DECOMMISSIONING, DEMOLITION AND RESTORATION</b>		
<b>Site Recycling, Decommissioning, Demolition, and Restoration</b>		
SR-1	Require observatories to develop plans to recycle or demolish facilities once their useful life has ended, in accordance with their sublease requirements, identifying all proposed actions.	Project proposer
SR-2	Require observatories to develop a restoration plan in association with decommissioning, to include an environmental cost-benefit analysis and a cultural assessment.	Project proposer
SR-3	Require any future observatories to consider site restoration during project planning and include provisions in subleases for funding of full restoration.	Project proposer

Responsible Entity

**CONSIDERATION OF FUTURE LAND USE**

Facility Planning Guidelines		Responsible Entity
FLU-1	Follow design guidelines presented in the 2000 Master Plan.	OMKM and DLNR (OCCL)
FLU-2	Develop a map with land-use zones in the Astronomy Precinct based on updated inventories of cultural and natural resources, to delineate areas where future land use will not be allowed and areas where future land use will be allowed but will require compliance with prerequisite studies or analysis prior to approval of Conservation District Use Permit.	OMKM
FLU-3	Require cataloguing of initial site conditions for use when conducting site restoration.	OMKM, project proposer
FLU-4	Require project specific visual rendering of both pre- and post-project settings to facilitate analysis of potential impacts to view planes.	Project proposer
FLU-5	Require an airflow analysis on the design of proposed structures to assess potential impacts to aeolian ecosystems.	Project proposer
FLU-6	Incorporate habitat mitigation plans into project planning process.	Project proposer
FLU-7	Require use of close-contained zero-discharge waste systems for any future development in the summit region, from portable toilets to observatory restrooms, if feasible.	Project proposer

COMPONENT PLAN: MANAGING OPERATIONS		Responsible Entity
OPERATION AND IMPLEMENTATION OF THE CMP		
Management		
OI-1	Maintain OMKM, MKMB, and Kahu Kū Mauna in current roles, with OMKM providing local management of the UH Management Areas, and MKSS providing operational and maintenance services.	OMKM, MKMB, and Kahu Kū Mauna
OI-2	Develop training plan for staff and volunteers.	OMKM
OI-3	Maintain and expand regular interaction and dialogue with stakeholders, community members, surrounding landowners, and overseeing agencies to provide a coordinated approach to resource management.	OMKM
OI-4	Establish grievance procedures for OMKM, to address issues as they arise.	OMKM
OI-5	Update and implement emergency response plan.	OMKM
CMP MONITORING, EVALUATION AND UPDATES		
Management		
MEU-1	Establish a reporting system to ensure that the MKMB, DLNR, and the public are informed of results of management activities in a timely manner.	OMKM
MEU-2	Conduct regular updates of the CMP that reflect outcomes of the evaluation process, and that incorporate new information about resources.	OMKM
MEU-3	Revise and update planning documents, including the master plan, leases, and subleases, so that they will clearly assign roles and responsibilities for managing Mauna Kea and reflect stewardship matters resolved with DLNR.	OMKM

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

CONSERVATION  
 LANDS

2010 DEC -2 A 9:00  
 DEPARTMENT OF LAND &  
 NATURAL RESOURCES  
 STATE OF HAWAII  
 HRD10/3874E

November 18, 2010

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

**Re: Conservation District Use Application HA-3568  
 Proposed Thirty Meter Telescope  
 Mauna Kea, Island of Hawai'i**

Aloha e Samuel J. Lemmo,

The Office of Hawaiian Affairs (OHA) is in receipt of your October 14, 2010 request for comments on Conservation District Use Application (CDUA) HA-3568 for the proposed Thirty Meter Telescope project (project), submitted by the University of Hawai'i on behalf of the TMT Observatory Corporation.

The project area will be situated on 5 acres in the "13-North site" below the summit of Mauna Kea within the Mauna Kea Science Reserve. The project will also require: 1. a 3400-foot long "Access Way" which will consist of an improved road and underground utilities; 2. use of a 4 four acre staging area which will be used for a concrete batch plant and storing bulk materials; and 3. improvements and upgrades to Hawaiian Electric and Light Company equipment and transformers at the Hale Pōhaku substation.

OHA recognizes that the Board of Land and Natural Resources (BLNR) approved the Mauna Kea Comprehensive Management Plan (CMP) on April 9, 2009 and required four sub-plans which were approved on March 25, 2010. The Mauna Kea Science Reserve Master Plan was approved in 2000. Thus, a broad mitigation and management framework which attempts to address the overall impacts of development on Mauna Kea is now in place.

Governor Linda Lingle accepted the Final Environmental Impact Statement (FEIS) for the project on May 19, 2010. The CDUA contains many of the mitigation measures detailed within the FEIS.

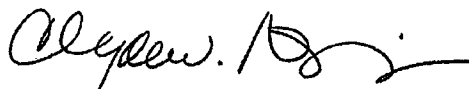
When viewed in totality, this project has the potential to contribute to developing a new paradigm for the extremely sensitive issue of development on Mauna Kea. We look forward to seeing this potential fully achieved.

Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands  
Department of Land and Natural Resources  
November 18, 2010  
Page 2 of 2

We applaud your commitment to hold public hearings to gather testimony on the CDUA. It is our understanding these public hearings are scheduled for December 2<sup>nd</sup> in Hilo and December 3<sup>rd</sup> in Kona. All thoughts and suggestions should be afforded appropriate consideration and if warranted, incorporated into additional conditions and mitigation measures within the CDUA prior to its submittal to the BLNR for final approval.

Thank you for the opportunity to provide comments. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,



Clyde W. Nāmu'o  
Chief Executive Officer

C: OHA- Board of Trustees  
OHA- East and West Hawai'i Community Outreach Coordinators

LINDA LINGLE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

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KAHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

MEMORANDUM

**TO:** Sam J. Lemmo, Administrator  
Office of Conservation and Coastal Lands

**FROM:** *for* Paul J. Conry, Administrator  
Division of Forestry and Wildlife *Paul J. Conry*

**RE:** CDUA Comments for the Thirty Meter Telescope

**DATE:** November 29, 2010

2010 NOV 29 P 3:38  
 DIVISION OF FORESTRY AND WILDLIFE  
 NATURAL RESOURCES  
 STATE OF HAWAII  
 OFFICE OF CONSERVATION AND COASTAL LANDS

Background:

On February 10, 1984 the BLNR approved Conservation District Use Application No. HA-8/23/84-1573 submitted by the University of Hawaii for the installation of permanent power and communication lines from the Saddle Road to the summit of Mauna Kea. On August 23, 1985 the BLNR further approved an easement to the University of Hawaii and HELCO to run portions of the power line through the Mauna Kea Ice Age Natural Area Reserve and Mauna Kea Forest Reserve (Attachment A). The August 23, 1985 BLNR recommendations included, among other items, B.1. that prior to any construction, the applicant shall obtain clearance or approval from the Natural Area Reserve System Commission (NARSC) for the portions of the corridor alignment which traverse through the Mauna Kea Ice Age Natural Area Reserve (NAR); and B.3. that the applicant shall be solely responsible for any survey and boundary stakeout of the demised premises.

The Natural Area Reserves System Commission approved the easement at its August 21, 1985 meeting with the condition that the requested 25 foot easement be reduced as much as possible to actually what is required for construction and to a still narrower width for maintenance (Attachment B). Additionally, it was stated that the University shall prevent vehicular access, except for maintenance work, along the easements by erecting natural and artificial barriers at Mauna Kea Access Road intersections. A memo dated November 7, 1985 from the University to the NARSC confirmed that a reduced easement corridor of 20 feet for construction and maintenance would be sufficient in the Mauna Kea Ice Age NAR (Attachment C). They also confirmed that they would place barricades at roadway intersections to prevent vehicular access into the utility easement corridor.

DOFAW Comments on CDUA for Mauna Kea Thirty Meter Telescope  
November 23, 2010  
Page 2

Current Status:

A map of the power line corridor was not included in the Draft EIS for the project. As requested by DLNR, the Final EIS and the CDUA documents do include a map of the corridor.

The CDUA for the TMT project states on page 1-14 that:

*"HELCO plans to upgrade the existing electrical service from the transformer compound near Hale Pohaku to the existing utility boxes across the road from the SMA Building (see figure 1.8). It will do this by replacing the existing wire conductors with new higher-capacity conductors in the existing underground conduits. The conduits are located approximately 50 feet west of the Mauna Kea Access Road for most of the distance to the summit area; one portion of the lower alignment follows a former access road alignment that is now in the Mauna Kea Ice Age NAR. Because existing pull boxes are available approximately every 300 feet along the conduit, no new ground disturbance will be needed for the upgrade, but HELCO will need to access the pull boxes to install the new cable. The University will consult with the DLNR to determine if there are any additional easement requirements in connection with these activities."*

Based on review of historical easement documents from Land Division and Division of Forestry and Wildlife, it does not appear that the approved easement corridor for the power line has been surveyed and recorded, as required by BLNR condition B.3 at its meeting August 23, 1985. Not knowing the actual alignment of the corridor makes it difficult to assess the potential impacts of the project, but it is clear that the power line passes through the Mauna Kea Ice Age Natural Area Reserve in more than one location.

Additionally, the corridor has not had substantial work of the type proposed in over 20 years. Erosion and settling of material has covered some of the pull boxes in the power line corridor and substantially reduced the appearance of the initial construction ground disturbance. We are concerned that access to some of the pull boxes will require substantial movement of material and improvements to the old access roads that may or may not fall within the 20 foot access corridor. Natural cinder movement has also occurred on the slopes of the Pu`u Hau Kea and the Pu`u at 11,000 feet just west of Parking Lot 1, where the power line conduit passes along their eastern slopes. Pu`u Hau Kea is known Wekiu bug habitat and there is the potential that the power line corridor has been re-populated with Wekiu bugs over the past 20 years.

The Archeological Inventory Survey (AIS) Report for the Mauna Kea Ice Age Natural Area Reserve is currently being compiled by Pacific Consulting Services, Inc. The document will outline all known archeological sites within their surveyed area of the Mauna Kea Ice Age NAR. Appendix A: The Draft Historic Mitigation Preservation Plan provided in the CDUA for the TMT states that no archeological monitor will be needed for the upgrade of the power lines (Page A-5). It is also stated on page A-10 that no direct mitigation measures are required for the electrical upgrade as "No-ground disturbance is required".

The terrain the conduit runs through in the Mauna Kea Ice Age Natural Area Reserve and Mauna Kea Forest Reserve is very steep and unstable in spots. Our understanding is that it will



take large heavy trucks, similar to the size of a fire engine, to pull the new lines into place. It is expected that heavy equipment such as bulldozers may be required. It is our understanding that HELCO and TMT have not completed engineering documents for the power lines, so until those are completed, it is difficult to assess the full impact of the power line improvement, but it appears that the improvement to the power lines will be a substantial undertaking.

Recommendations:

- 1) The formal land survey of the power line corridor easement must be completed following standard easement procedures of the DLNR- Land Division and to map and description standards of the Department of Accounting and General Services. Draft and final maps should be provided to the DLNR- Division of Forestry and Wildlife for comments and record keeping.
- 2) Surveys for Wekiu bugs and other invertebrates should be conducted along the easement corridor prior to any construction disturbance, particularly at Puu Hau Kea and at the Pu'u west of Parking Area 1 along the Mauna Kea Access Road where the corridor cuts through the Mauna Kea Ice Age NAR at roughly 11,000 feet elevation.
- 3) Prior to construction, HELCO and/or contractors working on the power lines will need to be held to the same project construction mitigation measures outlined in Section 4-2 of the CDUA.
- 4) Prior to construction, the Mauna Kea Ice Age NAR Archeological Inventory Survey Report should be reviewed to assess if any sites are within close proximity of the power line corridor. Construction monitors, including one with archeological expertise, should be provided.
- 4) Improvement to the power lines should use construction practices that will result in the lowest potential disturbance to the corridor. For example, using cranes staged on the Mauna Kea Access Road to access certain pull boxes without the need to drive "off-road".
- 5) The power line corridor should be restored back to its current condition after the line improvements have been completed to reduce the appearance of the corridor scar on the landscape.
- 5) If access and line improvement prove to be too difficult or impossible on the existing 20 foot wide corridor in the Mauna Kea Ice Age Natural Area Reserve or along the 25 foot corridor in the Mauna Kea Forest Reserve, consider re-routing those portions of the line to the Mauna Kea Access Road.

Additional Comments / Recommendations:

**Table 2.1. Summary of Potential Effects and Mitigation Measures**

p. 2-16: "Arthropod monitoring will be performed prior to, during, and or two years following construction in the area of the access way on the alpine cinder cone habitat."

DOFAW Comments on CDUA for Mauna Kea Thirty Meter Telescope  
 November 23, 2010  
 Page 4

The introduction of non-native species, specifically predators such as ants, is the greatest threat to the persistence of populations of native arthropods on Mauna Kea. It is imperative that general arthropod monitoring be performed on all alpine desert habitat affected by TMT construction (access ways, staging areas, and construction sites). The monitoring should be directed at finding incipient populations of alien invasive species across the environment which is being modified. Monitoring directed at Wekiu bugs specifically should also be conducted in all habitat types where Wekiu bugs have been known to occur, per standard survey protocols approved by the Office of Mauna Kea Management Wekiu bug Scientific Committee.

#### **2.4 Substantial Adverse Impact**

p. 2-6: "In addition, the portion of the Access Way which follows and goes over an existing single-lane, 4-wheel drive road on the flank of the Puu Hauoki cinder cone will result in a minor disturbance of the Kūkahau, ula Historic Property."

It should be noted here that the access way will alter, and destroy, known Type 3 Wekiu bug habitat (this is noted in the table, but not in the text).

#### **Table 4-1: Management Actions Detailed in the CMP and Subplans**

p. 4-3: NR-15 and NR-16 are currently labeled 'not applicable' to TMT project. The designations should be changed to 'indirect'. Per the definition of 'indirect': "TMT would need to be aware of and comply with the outcome of the implementation of management actions by the University in the future. Based on the outcome of the management actions, requirements affecting the TMT Project directly or indirectly may occur. As appropriate, TMT may need to adjust operations to comply with those outcomes at some time in the future. TMT may also wish to adopt measures in advance of some management actions to help achieve or support the desired outcome of the management action."

#### **4.1.2 Natural Resource Management**

p. 4-13: "In addition to this, TMT would monitor arthropod activity in the vicinity of the Access Way portion impacting sensitive, Type 3 Wekiu bug alpine cinder cone habitat. Monitoring will be performed prior to, during, and for at least two years after construction in this area."

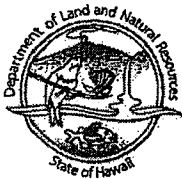
Again, it is imperative that general arthropod monitoring be performed not just on access ways and in known Wekiu bug habitats, but on all alpine desert habitat affected by TMT construction (access ways, staging areas, and construction sites). It is possible that the introduction of an alien invasive species may occur in any area impacted by the construction process, and such an invasion would ultimately impact the entire alpine ecosystem.

If there are any questions about the above comments please contact Lisa Hadway, NARS Program Manager, Hawaii Branch: Ph. (808) 974- 4216, email: [lhadway@dofawha.org](mailto:lhadway@dofawha.org).

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STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS  
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HONOLULU, HAWAII 96809

10 OCT 15 4 37 PM '10

ref: OCCLMC

CDUA HA-3568

MEMORANDUM:

OCT 14 2010

- To: DLNR
- Historic Preservation Division
  - Division of Forestry and Wildlife
  - DOFAW - Natural Areas Reserves
  - Land Division
  - Engineering
  - State Parks
  - County of Hawaii Planning
  - US Fish and Wildlife Service
  - Bishop Museum
  - Sierra Club Moku Loa Group

- UNIVERSITY OF HAWAII
- Institute for Astronomy
  - Hawaiian Studies
  - Environmental Center
  - Office of Mauna Kea Management
  - Kahu Kū Mauna

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- OTHER STATE
- DBEDT Energy Resources & Tech
  - DBEDT Planning Office
  - Department of Education
  - Office of Hawaiian Affairs
  - Department of Health

FROM: Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands

SUBJECT: REQUEST FOR COMMENTS - CONSERVATION DISTRICT USE APPLICATION HA-3568  
Thirty Meter Telescope

LOCATIONS: Mauna Kea Science Reserve, Ka'ohē Mauka, Hāmākua, Hawa'i, TMK (3) 4-4-015:009

Please find Conservation District Use Application (CDUA) HA-3568 for the University of Hawai'i at Hilo's proposed Thirty Meter Telescope (TMT) at Mauna Kea Science Reserve, Ka'ohē Mauka, Hāmākua, Hawa'i, TMK (3) 4-4-015:009. We would appreciate any comments your agency or division has on the application.

We have additional hard copies available at our office for review. The CDUA is also available on our website at <http://hawaii.gov/dlnr/occl/manuals-reports>. The Final EIS and associated ancillary documents were prepared under the supervision of the University of Hawai'i at Hilo, and were published in the May 8, 2010 edition of the *Environmental Notice*. It is available in OEQC's online library at <http://oeqc.doh.hawaii.gov>.

Please contact Michael Cain at 587-0048, should you have any questions on this matter. If no response is received by the suspense date of November 23, 2010, we will assume there are no comments.

( ) Comments Attached

() No Comments

  
Signature



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LAND DIVISION



2010 NOV 23 A 10:00



DEPARTMENT OF LAND AND NATURAL RESOURCES  
OFFICE OF CONSERVATION AND COASTAL LAND  
POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
PAUL J. CONRY  
ACTING FIRST DEPUTY  
LENORE N. OHYE  
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

ref: OCCLMC

CDUA HA-3568

MEMORANDUM:

OCT 14 2010

- To: DLNR
- Historic Preservation Division
  - Division of Forestry and Wildlife
  - DOFAW - Natural Areas Reserves
  - Land Division
  - Engineering
  - State Parks
  - County of Hawaii Planning
  - US Fish and Wildlife Service
  - Bishop Museum
  - Sierra Club Moku Loa Group

- UNIVERSITY OF HAWAII
- Institute for Astronomy
  - Hawaiian Studies
  - Environmental Conservation Management
  - Office of Mauna Kea Management
  - Kahu Kū Mauna

- OTHER STATE
- DBEDT Energy Resources & Tech
  - DBEDT Planning Office
  - Department of Education
  - Office of Hawaiian Affairs
  - Department of Health

FROM: Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands

SUBJECT: REQUEST FOR COMMENTS - CONSERVATION DISTRICT USE APPLICATION HA-3568  
Thirty Meter Telescope

LOCATIONS: Mauna Kea Science Reserve, Ka'ohē Mauka, Hāmākua, Hawa'i, TMK (3) 4-4-015:009

Please find Conservation District Use Application (CDUA) HA-3568 for the University of Hawai'i at Hilo's proposed Thirty Meter Telescope (TMT) at Mauna Kea Science Reserve, Ka'ohē Mauka, Hāmākua, Hawa'i, TMK (3) 4-4-015:009. We would appreciate any comments your agency or division has on the application.

We have additional hard copies available at our office for review. The CDUA is also available on our website at <http://hawaii.gov/dlnr/occl/manuals-reports>. The Final EIS and associated ancillary documents were prepared under the supervision of the University of Hawai'i at Hilo, and were published in the May 8, 2010 edition of the *Environmental Notice*. It is available in OEQC's online library at <http://oeqc.doh.hawaii.gov>.

Please contact Michael Cain at 587-0048, should you have any questions on this matter. If no response is received by the suspense date of November 23, 2010, we will assume there are no comments.

( ) Comments Attached

No Comments

Signature



LINDA LINGLE  
GOVERNOR OF HAWAII



RECEIVED  
CONSERVATION  
LAND RESOURCES



2010 NOV 16 A 9:24

RECEIVED  
LAND DIVISION

2010 NOV 16 A 9:11

LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

PAUL J. CONRY  
ACTING FIRST DEPUTY

LENORE N. OHYE  
ACTING DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
STATE OFFICE OF CONSERVATION AND COASTAL LANDS  
POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

ref: OCCLMC

CDUA HA-3568

MEMORANDUM:

OCT 14 2010

To: DLNR

- Historic Preservation Division
- Division of Forestry and Wildlife
- DOFAW - Natural Areas Reserves
- Land Division
- Engineering
- State Parks

UNIVERSITY OF HAWAII

- Institute for Astronomy
- Hawaiian Studies
- Environmental Center
- Office of Mauna Kea Management
- Kahu Kū Mauna

- County of Hawaii Planning
- US Fish and Wildlife Service
- Bishop Museum
- Sierra Club Moku Loa Group

OTHER STATE

- DBEDT Energy Resources & Tech
- DBEDT Planning Office
- Department of Education
- Office of Hawaiian Affairs
- Department of Health

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Office of Conservation and Coastal Lands

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Please contact Michael Cain at 587-0048, should you have any questions on this matter. If no response is received by the suspense date of November 23, 2010, we will assume there are no comments.

Comments Attached

No Comments

  
Signature

**DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION**

OCCL/Samuel J. Lemmo

Ref.: CDU Appl HA-3568, Thirty Meter Telescope, Mauna Kea Sci Res, Ka'ohē Mauka, Hamakua  
Hawaii.013

**COMMENTS**

- ( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone \_\_\_\_.
- (X) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The National Flood Insurance Program (NFIP) does not regulate developments within Zone X.
- ( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is \_\_\_\_.
- ( ) Please note that the project site must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- ( ) Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.
  - ( ) Mr. Carter Romero at (808) 961-8943 of the County of Hawaii, Department of Public Works.
  - ( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
  - ( ) Ms. Wynne Ushigome at (808) 241-4890 of the County of Kauai, Department of Public Works.
- ( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
  - (X) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments: \_\_\_\_\_

( ) Other: \_\_\_\_\_

Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed:   
CARTY S. CHANG, CHIEF ENGINEER

Date: 11/15/10



LINDA LINGLE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

LAURA E. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI  
FIRST DEPUTY

KEN C. KAWAHARA  
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  
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HISTORIC PRESERVATION  
KAHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

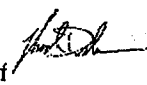
December 1, 2010

Log No. 2010.3499

Doc No. 1012TD02

MEMORANDUM

**TO:** Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands

**FROM:** Theresa K. Donham, Acting Archaeology Branch Chief 

**SUBJECT:** Chapter 6E-8 Historic Preservation Review -  
Conservation District Use Application, Thirty-Meter Telescope (HA-3568)  
Ka'ohē Ahupua'a, Hāmākua District, Island of Hawai'i  
TMK: (3) 4-4-015:009

Thank you for requesting comments on the subject application, which we received October 22, 2010. The proposed project will involve four locations within the Conservation District: an approximately five-acre observatory site (13N); an access road connecting the telescope site with existing roads; a batch plant staging area; and transformer upgrades at the Hale Pōhaku Substation.

Project-specific archaeological inventory survey reports have been completed for this project (Hammatt 2009), and drafts were reviewed by our office in 2009 (*Log 2009.2487, Doc 0907TD32; Log 2009.1564, Doc 0910TD14*). Subsequent to our review, revised reports have been submitted and are attached to the FEIS. In addition, the archaeological inventory survey of the Mauna Kea Science Reserve (McCoy et al. 2009) was completed and accepted by our office in 2009 (*Log 2009.4076, Doc 0912TD22*). We therefore believe that the information provided in the application regarding archaeological sites in the vicinity of the project area locations is correct and accurate.

We have previously reviewed and commented on the draft EIS for this project (memos dated June 26, 2009 and October 5, 2009; *Log 2009.1470, Doc 0910TD07*). In our prior comments, we indicated that the DEIS did not address or fully recognize the significance of the Mauna Kea Summit Region Historic District or the Kūkahau'ula TCP, both of which will be affected by the project. We note that the application documents recognize the Summit Region Historic District and the Kūkahau'ula TCP area, and mitigation measures are proposed that address impacts to cultural practices as well as visual and material impacts to the summit region. Proposed mitigation measures address project-specific as well as cumulative affects to the District and the TCP that have resulted from multiple observatories at the summit.

Attached to the application document is a Draft Historic Preservation Mitigation Plan (Appendix A), which summarizes the project area locations, known historic properties in the vicinity, and proposed direct and indirect mitigation measures for the project; general descriptions of the proposed archaeological and cultural monitoring are also included. The measures outlined in this plan are scattered throughout the CDUA application; we therefore request that the Appendix A Mitigation Plan be

Sam Lemmo  
December 1, 2010  
Page 2

specifically referenced in the approval correspondence to ensure that all of the proposed mitigation measures for impacts to historic properties are included as conditions for permit approval.

The Office of Mauna Kea Management (OMKM) has been in contact with our office for consultation regarding this project, and SHPD staff has conducted a site visit to Mauna Kea in connection with the TMT access road. We appreciate that OMKM has made the effort to include our office in meaningful consultation regarding project impacts and mitigation measures while the plans were being prepared.

We have no further comments at this time, with the assumption that the project will follow the Historic Preservation Mitigation Plan and other pertinent historic preservation planning documents associated with the Mauna Kea Science Reserve, such as the Cultural Resources Management Plan that is attached to the Comprehensive Management Plan. We look forward to receiving an Archaeological Monitoring Plan for review and approval prior to the onset of project construction.

Please contact me at (808-933-7653) or at [Theresa.K.Donham@hawaii.gov](mailto:Theresa.K.Donham@hawaii.gov) if you have any questions regarding this memo.

LINDA LINGLE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P.O. BOX 3378  
HONOLULU, HAWAII 96801-3378

CHIYOME L. FUKINO, M.D.  
DIRECTOR OF HEALTH

DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

2010 NOV -5 A 10:33

DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

In reply, please refer to:  
EMD / CWB

11006PJF.10

November 3, 2010

Mr. Samuel J. Lemmo  
Administrator  
Office of Conservation and Coastal Lands  
P.O. Box 621  
Honolulu, Hawaii 96809

Attention: Mr. Michael Cain  
Office of Conservation and Coastal Lands

Dear Mr. Lemmo:

**SUBJECT: Conservation District Use Application HA-3568:  
Thirty Meter Telescope Project  
Mauna Kea Science Reserve  
Hamakua, Island of Hawaii, Hawaii  
TMKs: (3) 4-4-015:009**

The Department of Health, Clean Water Branch (CWB), has reviewed the subject document and offers these comments on your project.

Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at:  
<http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf>

1. Any project and its potential impacts to State waters must meet the following criteria:
  - a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
  - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

Mr. Samuel J. Lemmo  
November 3, 2010  
Page 2

10006PJF.10

- c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for an NPDES general permit coverage by submitting a Notice of Intent (NOI) form:
  - a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.
  - b. Construction dewatering effluent.

You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at:

<http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html>.

3. For types of wastewater not listed in Item No. 2 above or wastewater discharging into Class 1 or Class AA waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at:  
<http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html>.
4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 Water Quality Certification are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of \$25,000 per day per violation.

Mr. Samuel J. Lemmo  
November 3, 2010  
Page 3

10006PJF.10

If you have any questions, please visit our website at:  
<http://www.hawaii.gov/health/environmental/water/cleanwater/index.html>, or contact the  
Engineering Section, CWB, at (808) 586-4309.

Sincerely,



ALEC WONG, P.E., CHIEF  
Clean Water Branch

JF:ml

c: DOH-EPO #I-3390 [via email only]



To: Sam Lemmo, Administrator  
Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
P.O. Box 621  
Honolulu, Hawai'i 96809

2010 NOV 23

DEPARTMENT OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

From: Mauna Kea Anaina Hou, et al  
c/o Ms. Kealoha Pisciotta  
P.O. Box 5864  
Hilo, Hawai'i 96720  
808.968.7660

2010 NOV 23 A 9 03  
DEPARTMENT OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

7  
AUDIT  
SECTION

DATE: November 22, 2010

RE: The University of Hawai'i and the Thirty Meter Telescope Observatory  
Corporation's Conservation District Use Application (CDUA HA-3568)

**Testimony in Opposition  
To the TMT Project Conservation District Use Application**

Submitted by  
Mauna Kea Anaina Hou, The Royal Order of Kamehameha I,  
Sierra Club and Clarence Kukauakahi Ching

Aloha

Mauna Kea Anaina Hou, represented by Ms. Kealoha Pisciotta, The Royal Order of Kamehameha I, Moku o Mamalahoa, Heiau Māmalahoa Helu Elua, represented by Ali'i Sir Paul K. Neves K.G.C.K. Kalaimoku, Sierra Club represented by Ms. Deborah J. Ward, and individual Native Hawaiian Practitioner Clarence Kukauakahi Ching, are dedicated to preserving and protecting Native Hawaiian Traditional and Customary cultural and religious rights and the natural resources of Mauna Kea.

Mauna Kea Anaina Hou, The Royal Order of Kamehameha I, Sierra Club and individual practitioner Clarence Kukauakahi Ching have been actively involved in legislative and legal action for the protection and conservation of Mauna Kea since 1995. We successfully promoted two legislative audits that reviewed 30 years of mismanagement on Mauna Kea at the hands of the Department of Land and Natural Resources and the University of Hawai'i. The State Auditor found that the cultural and natural resources of Mauna Kea have suffered at the expense of unregulated astronomy development. We also participated in successful litigation in both federal and state courts against the University (UH) and State of Hawai'i

(BLNR), The University of California (UC), Caltech, and NASA.

We are opposed to the TMT project and the Conservation District Use Application (CDUA) submitted to BLNR for approval. There is no legal justification for more development on Mauna Kea, therefore there is no justification for considering this CDUA document for this project. The Mauna Kea conservation district is still in need of a genuine Comprehensive Management Plan (CMP) that ensures the protection of all the cultural and natural resources of Mauna Kea.

**JUDICIAL NOTICE:** The University of Hawai'i's CMP is currently under review by the Intermediate Court of Appeals (ICA). We are Plaintiff's in the case before the ICA, challenging the adequacy and legality of the UH CMP. All final decision made by BLNR are subject to judicial review including the BLNR recent approval of the UH CMP. Submitting a CDUA knowing the ICA is reviewing the CMP burdens and prejudices the public and the parties defending their case in the ICA. This is improper and we therefore request that our rights be reserved to further comment on the TMT CDUA.

We must formally request that BLNR deny this CDUA until the ICA has rendered a verdict of the legal question before the court. To ignore judicial review is to violate the people's due process rights. We must also make a formal request for a contested case hearing on the TMT CDUA prior to the approval of the TMT CDUA as BLNR's regulations require.

We submit for the record the following objections to the TMT CDUA:

## **OBJECTIONS**

### **1. The TMT will, in fact, desecrate Mauna Kea**

We object and take exception to the recent public assertion made by the TMT staff and Board members claiming the TMT project will not desecrate Mauna Kea. The TMT staff do not have the expertise to make such claims. Uneducated claims prior to a comprehensive review are foregone conclusions that courts have repeatedly rejected.

Furthermore, Mauna Kea's cultural and religious significance is well documented in oral and written historical archives, as well as in legislative and court records. Since "time immemorial," Mauna Kea has been and continues to be held in reverence by the Hawaiian people as a Wahi Pana and Wahi Kapu. Mauna Kea is revered in the same way that other religions revere churches, temples, synagogues, and mosques.



protected public trust activity.

## 2. The Intermediate Court of Appeals is reviewing the Mauna Kea case

Again, the Mauna Kea case challenging the adequacy and legality of the University's CMP is pending in the Intermediate Court Appeals. We provide the following JUDICIAL NOTICE. The UH CMP may be overturn so the TMT project should not be moving forward and the BLNR should not be processing a telescope project CDUA for Mauna Kea until the court has rendered a verdict in the case, as this ignores the judicial process, violates due process and prejudices the parties.

## 3. BLNR has not fulfilled the court order issued by Judge Hara

Judge Hara's decision and order found the following:

- (1) Pursuant to 183C of Hawai'i Revived Statutes, the purpose of the State's Conservation Districts is conservation;
- (2) The resource that needs to be conserved is the entire summit area of Mauna Kea and not just the development area;
- (3) The UH 2000 Master Plan is NOT, (A), an approved plan pursuant to BLNR rules and regulations and (B), is Not a comprehensive plan as contemplated by the rules and regulations.
- (4) BLNR erred in issuing a permit to the NASA Outrigger Telescope Project, allowing piecemeal development proposals without having completed a Comprehensive Management Plan for the entire summit of Mauna Kea.

Unless and until Judge Hara's ruling is overturned, it is a matter of law that must be followed. Judge Hara ordered the BLNR to prepare and approve a Comprehensive Management Plan and the UH CMP is being challenged in the ICA, and may be overturned. The TMT should not be moving forward in contravention of the law. **We incorporate by reference** the state case Mauna Kea et al., v. BLNR, Civil No. 04-1-397, into the record.

## 4. BLNR must comply with Hawai'i Supreme Court orders and instructions

BLNR has a non-transferable fiduciary duty to protect Native Hawaiian rights and resources. The Supreme Court of Hawai'i has provided all state agencies with instructions to fulfill their duty. Expressly barring delegation of their duties to a sub-entity like the UH or a third party like Ku'iwalu. **The TMT should not be moving in contravention of the State Supreme Court orders and instructions.**

The upper regions of Mauna Kea reside in Wao Akua, the realm of the Akua-Creator. It is the burial ground of the most sacred of our ancestors. It is considered the Temple of the Supreme Being and is acknowledged as such in many oral and written histories throughout Polynesia. It is home of Na Akua (the Divine Deities), Na 'Aumakua (the Divine Ancestors), and the meeting place of Papa (Earth Mother) and Wakea (Sky Father) who are considered to be the progenitors of the Hawaiian People. It is where the Sky and Earth separated to form the Great-Expanse-of-Space and the Heavenly Realms. Lake Waiau is considered (among other things) to be the doorway into the Po (i.e., the mystical realm of the ancestors). Mauna Kea in every respect represents the zenith of the Native Hawaiian people's ancestral ties to the process of creation itself.

The ceremonies and practices on Mauna Kea (practiced nowhere else) formed the basis of the navigational knowledge that allowed Hawaiians to navigate over ten million square miles of the Pacific Ocean millennia before modern science and before Captain Cook ever set eyes on Hawai'i Nei. Hawaiian navigation is both a cultural and scientific contribution, not only to Hawai'i but also to the world and the global knowledge base.

Because of the unique elevation and conditions at the summit of Mauna Kea, there are a number of traditional and customary cultural and religious practices conducted on Mauna Kea that are conducted nowhere else on earth. Mauna Kea is also home to some of the most unique, rare and fragile plant and animal species in the world. These include the U'au (dark rumped petrel), Palila bird, Wēkiu bug, and Silversword. Many of the species found on Mauna Kea are considered threatened and/or endangered. They are also found only on Mauna Kea and nowhere else on earth.

The summit lands are designated conservation lands not only because of their unique cultural, historic, geological, and climatic features, but also because they are watershed lands. Mauna Kea is the principle aquifer for the island of Hawai'i. If these waters are contaminated, they can no longer be used for ceremonies, healing, and/or for drinking.

Mauna Kea's highly protected status as a National Landmark, a National Historic District, and a State Conservation District are because of these unique, rare and fragile features. These natural resources are part of the public trust recognized in Hawai'i's Admission Act, the Hawai'i State Constitution, and in the judicially recognized public trust duties and responsibilities of the State. By comparison, the development of astronomy facilities, however valuable they may be in their own right, are not afforded this level of reverence and protection by our society. Unlike the summit district and the practices related to it, construction of astronomy facilities is not mentioned in any state statute or the constitution. It is not a

We incorporate by reference the Hawai'i Supreme Court case *Kapa'akai O Ka Aina v. Land Use Commission*, 94 Hawai'i 1, 7 P. 3rd 1068 (2000), to be fully integrated into the record.<sup>1</sup> (see also relevant section in the following footnotes).

**5. The TMT will have significant, adverse and substantial impact on the cultural and natural resources of Mauna Kea**

In 2003, a federal lawsuit involving UC-Caltech and NASA compelled NASA to complete the first EIS ever conducted on Mauna Kea since 1968; and found "the cumulative impact the past, present and reasonably foreseeable astronomy developments have resulted in significant, adverse and substantial impacts to the cultural and natural resources of Mauna Kea."

We incorporated by reference the entire NASA Federal Environmental Impact Statement (EIS) and accompanying court records *OHA v. Sean O'Keefe, Civil. No. 02-00227 SOM/BMK filed July 15, 2003* to be integrated into any and all TMT environmental review documents

Furthermore, BLNR may not issue permits to projects that have adverse and significant impact to the natural and cultural resources. BLNR rules and regulations prohibit the approval of development projects in Conservation Districts that have "adverse and significant" impacts to the cultural and natural resources.

BLNR rules under HAR §13-5-30(c)(4) clearly state:

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

The TMT should not be moving forward if the State could never legally grant a permit to build in the conservation district.

We incorporate by reference the relevant section of BLNR rules and regulations,

<sup>1</sup> In *Kapa'akai O Ka Aina v. Land Use Commission*, 94 Hawai'i 1, 7 P. 3rd 1068 (2000), the court made two critical rulings. In *Kapa'akai*, the Land Use Commission (LUC) failed to meet its duty to protect native Hawaiian traditional and customary practices when the LUC reclassified land from Conservation to Urban without independently assessing: (1) identity and scope of the 'valued cultural, historical, or natural resources' in the petition area, including the extent to which traditional and customary rights are exercised in the petition area; (2) the extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist (*Kapa'akai v. LUC*, 94 Haw. 1, 15). Second, the Supreme Court expressly rejected the claim by the private Ka'upulehu Development Company ("KD") that the LUC's duties had been fulfilled by the private developer's Resources Management Plan which attempted to address native Hawaiian cultural and religious practices. The Court rejected the LUC's purported "delegation" authority:

[T]his wholesale delegation of responsibility for the preservation and protection of native Hawaiian rights to KD, a private entity, however, was improper and missed the point... We hold that, insofar as the LUC allowed KD to direct the manner in which customary and traditional native Hawaiian practices would be preserved and protected by the proposed development—the LUC failed to satisfy its statutory and constitutional obligations. In delegating its duty to protect native Hawaiian rights, the LUC delegated a non-delegable duty and thereby acted in excess of its authority. (*Kapa'akai v. LUC*, 94 Haw. 1, 19)

including HAR §13-5-30, to be integrated into any and all TMT environmental review documents.<sup>2</sup> (See relevant sections in following footnotes).

#### **6. The University and International observatories are in material breach of the General Lease**

First, fair market rent has NOT been collected for the private, commercial use of public trust lands on Mauna Kea. The entire summit of Mauna Kea is section 5(f) public trust lands which is held "in trust" by the state for the Native Hawaiians and the general public. Hawai'i Admissions Act, section 5(f) and Haw. Rev. Stats §§171-17 and -18 require the state to collect fair market value lease rent and to deposit the funds from the use of section 5(f) lands in the public lands trust fund.

While public lands are often set aside to public agencies for their own use at no cost, any subsequent transfer of an interest to third parties outside the Hawai'i government is subject to the fiduciary obligation to obtain fair market rent. Current lease agreements between UH, DLNR, and the foreign governments and corporations that operate telescopes on the summit seek only one dollar (\$1.00) per year in rent. This is unlawful and constitutes a breach of the general lease.

**We incorporate by reference** Haw. Rev. Statutes 171-17 and -18 and related public trust documents cited into the record.

Secondly, the legal limits on the number and size of the observatories have already been exceeded. In the 1980's BLNR prepared and approved the 1983-85 management plan which limited the number of telescope allowed in Mauna Kea's Conservation District to thirteen (13), that is eleven (11) major and two (2) minor telescope facilities. There is no new plan that extends the telescope limits beyond the 13 established that has been adopted by BLNR.

The 1983-85 BLNR plan limited not just the number of facilities but the size of each facility. No telescope could exceed 125 feet in height and diameter. The telescope limits were established based on the best available science relating to the protection of the natural and cultural resources. The BLNR has categorically allowed UH to violate the telescope limits with the construction of the Gemini

<sup>2</sup> In evaluating the merits of a proposed land use, the department of the board shall apply the following criteria: (1) The proposed land use is consistent with the purpose of the Conservation district; (2) The proposed land use is consistent with the objectives of the sub-zone of the land on which the use will occur; (3) The proposed land use complies with the provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management," where applicable; (4) The proposed land use will not cause substantial adverse impacts 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; (6) The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable; (7) The subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and (8) The proposed land use will not be materially detrimental to the public health, safety and welfare.

North Telescope, Very Large Array (VLBA) and the Smithsonian Telescope Array (consisting of over 24 telescope pads and support buildings spread over a half mile area ). The TMT will also violate these limits. The TMT should not be moving forward if it will exceed legal limits on the telescopes allowed on Mauna Kea. **We incorporate by reference** the 1983-85 Mauna Kea Science Reserve Complex Development Plan documents into the record.

### 7. Complying with State and Federal Law

The TMT has not conducted federal level environmental or historic preservation reviews, as required by law. At the TMT Public E/AEIS Scoping meetings held in Keaukaha, on Hawai'i Island, TMT representatives expressly stated that the TMT would only be conducting a state level E/AEIS pursuant to HRS Chapter 343. The reasons offered for this were that the TMT project had no public funds associated with the project. The TMT claims are not true. The TMT project has in fact received substantial federal funds from the National Science Foundation; constituting a major federal undertaking pursuant to National Environmental Policy Act (NEPA) and the National Historic Preservation Act. Please see NSF website. The TMT therefore must complete a federal EIS and Section 106 for the TMT project.

Please see

<http://www.bigislandvideonews.com/maunakea/20081020dawson.htm>, for TMT representative comments cited above.

The University of Hawai'i (UH) has also recently received substantial federal funds for the astronomy under the University Affiliated Research Center (UARC), constituting a major federal undertaking. The University therefore is acting in a federal capacity and must comply with all federal law, including NEPA and NHPA.

The National Science Foundation has given the TMT Corporation substantial federal fund constituting a federal undertaking.

State law under **HRS §343-5(2) (f)** clearly states;

**Whenever an action is subject to both the National Environmental Policy Act of 1969(Public Law 91-190) and the requirements of this chapter...agencies shall cooperate in fulfilling these requirements so that one document shall comply with all applicable laws.**

### 8. The Life Of The TMT Extends 23 Years Beyond The General Lease

The TMT application and EIS claims the TMT will begin seven years of construction in 2011 and will have an expected design life of 50 years at which time it will be decommissioned. The General Lease issued by the State to the University in 1968 ends in the year 2033. If the life of the TMT is 50 years, it means the TMT is

requesting the use of Mauna Kea 23 years beyond the term of the lease. The General Lease requires that in the year 2033 all facilities must be decommissioned and the land must be returned to its original state.

We object to any telescope to continue its existence beyond the 2033 lease termination.

**We incorporate by reference the Mauna Kea Science Reserve General Lease No.S-4191 into the record.**

### **9. The TMT is big but it's not the biggest...actually**

The TMT is big but it will not be the biggest telescope on earth, as the TMT claims. The world's biggest telescope is called the European Extremely Large Telescope (E-ELT) that is being built in Cerro Armazones, Chile. The E-ELT is substantially bigger than the TMT, coming in at a stunning 42 meters as compared to the TMT's mere 30 meters. That is a big difference in size and seeing capability. The E-ELT is scheduled to be collecting first light by the year 2018. The TMT is supposed to obtain first light in 2018 also, that means the TMT will out matched before it even opens.

Arguably, the TMT is not technically necessary since the E-ELT is already moving ahead. The TMT proponents argue the TMT is needed because it will provide northern sky coverage that the E-ELT cannot. What does it matter what hemisphere the test for telescope size is actually conducted? There is no rational reason to destroy the sacred and delicate landscape of Mauna Kea for a redundant project, such as the TMT. The tests for size can be accomplished by the larger E-ELT.

Extinction is a real possibility for a number of species living on Mauna Kea that can be found nowhere else on earth. Extinction is an unacceptable risk in this day and age. Extinction is forever! It's hard to rationalize the astronomer's claim that the TMT will help discover the origins of life while they continue to argue for compromising the endangered life forms here on Mauna Kea ... here on planet earth.

### **CONCLUSION**

The people of Hawai'i have been actively opposing more development and destruction on Mauna Kea since the lease was first issued in 1968. People marched at the State Capitol in the 70's and 80's to show they did not want astronomy to take over the mountain. We are only the latest individuals and organizations that have been engaged in the struggle. We have been engaged in legal battles since the UC-Caltech announced that they would be building the four (4) – six (6) Outrigger Telescopes in 1995. To be clear, while it may seem like the TMT are "new people"

to the issue, in actuality the TMT is fully backed by UC and CalTech, which are same institutions that proposed the previous improperly approved telescope project.

We have spent all of these years turning out to testify, bringing our Kupuna out to the hearings, who were too frail to come out—one hearing after another. We did this because our Kupuna told us it was the aloha thing to do, since they believed, if the scientist understood how important Mauna Kea was to the people they would understand why no more development is the better thing to do. Eventually we were forced to file lawsuits in federal and state courts—which the people won (our Kupuna won). But our Kupuna also told us that litigation is the path to be taken when dialog fails.

We spent over 3 hours explaining what we have outlined here to both Mr. Chameau, President of Caltech and Mr. Yang, Chairman of the TMT Board. We have spent this time in the spirit of our Kupuna, hoping they would see the delicate nature of Mauna Kea and would wish not to further aggravate these problems. It is clear that our good faith dialog has fallen on deaf ears once again.

We will continue to stand firm in our work to protect the sacred things of Mauna Kea. We will honor our Kupuna who kept these things so that we might live. The sacred things are that bless us and give us life today. We will stand by our Kupuna who have always raised the standard of Aloha. Aloha Mauna Kea and Aloha Ke 'Akua, Na 'Akua, Na 'Aumakua!

In Aloha we remain,

Ali'i Sir Paul K. Neves of the Royal Order of Kamehameha I, Moku o Mamalahoa Heiau Mamalahoa Helu Elua

Ms. Kealoha Pisciotta of Mauna Kea Anaina Hou

Mr. Clarence Kukauakahi Ching, individual Hawaiian Practitioner

Ms. Deborah J. Ward of Sierra Club, Moku Loa Group







**KAHEA**

THE HAWAIIAN-ENVIRONMENTAL ALLIANCE

RECEIVED  
OFFICE OF CONSERVATION AND COASTAL LANDS

2010 NOV 24 A 11: 00

S. Michael Cain  
Office of Conservation and Coastal Lands  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

November 23, 2010

Re: CDUA HA 3568 for the Thirty Meter Telescope

PROTECTING

NATIVE HAWAIIAN

CUSTOMARY &

TRADITIONAL RIGHTS



AND OUR FRAGILE

ENVIRONMENT

Aloha pumehana Mr. Cain,

Mahalo for accepting our comments in strong opposition to the Conservation District Use Permit requested by the Thirty Meter Telescope Observatory Corporation (TMT) for construction of yet another telescope in the conservation district on the summit of Mauna Kea. Because the TMT will add to the already substantial, adverse and significant impact of telescopes on this sacred mountain, which the law does not allow, the staff recommendation to the Board on this application must be deny.

KAHEA is a community-based network of nearly 10,000 kupuna, cultural practitioners, resource users, educators, and concerned residents working to protect the unique natural and cultural resources of Hawai'i nei.

We look forward to receiving the Department's responses to our comments and questions.

**I. TMT contributes to the substantial, adverse and significant impact of telescopes**

By all accounts, the Thirty Meter Telescope will be an imposing human-made structure on the sacred summit of Mauna Kea. Although, to be clear, it is not largest ground-based telescope to be

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www.KAHEA.org  
kahea-alliance@hawaii.ir.com

KAHEA: the Hawaiian-Environmental Alliance is a non-profit 501(c)3 working to protect the unique natural and cultural resources of the Hawaiian Islands. KAHEA translates to english "the call."

built,<sup>1</sup> it will be more than 18-stories tall and more than 50,000 square feet; larger than anything that is currently on the summit. Proponents propose to construct this monstrosity on the last undisturbed plateau left on the summit. It would be a new, massive addition to the already 30+ telescope-related structures on the summit.<sup>2</sup>

The effects of telescope construction on Mauna Kea has been evaluated through multiple environmental assessments since 2005. All of them have concluded that the cumulative impact of past, present, and reasonably foreseeable telescope construction has had and will continue to have a substantial, adverse, and significant impact on the conservation district of Mauna Kea. In the 2005 federal EIS on the Keck Outrigger telescopes, NASA noted:

*"Future activities on the summit of Mauna Kea would continue the **substantial adverse impact on cultural resources**. No area at or near the summit is assumed to be devoid of archaeological properties, including the slopes surrounding the pu'u, which can be indirectly affected by development on the pu'u. Grading and removal of earth for new structures or roads, infrastructural redevelopment, or other observatory projects could adversely affect these resources."<sup>3</sup>*

Even with considerable mitigation, NASA concluded:

*... some reasonably foreseeable future projects will have an unavoidable adverse impact on cultural resources. In particular, **projects proposed for previously undisturbed areas (such as TMT) have greater potential for altering topographical contours and disturbing archaeological sites and human burials**. In addition, any project involving construction of an above-ground structure has the potential to affect viewplanes."<sup>4</sup>*

Given the conclusion of previous environmental reviews, the TMT could not avoid concluding that:

*"From a cumulative perspective, the **impact on cultural resources has been and would continue to be substantial, adverse and significant**. The cumulative impact to geological resources in the Astronomy Precinct has been substantial, adverse, and significant, primarily related to modifications of cinder cone morphology. The cumulative impact to the alpine shrublands and grasslands and mamane subalpine woodlands has also been substantial, adverse, and significant, primarily due to grazing*

<sup>1</sup>That distinction goes to the 42-meter European Extremely Large Telescope currently under construction in Chile. See, [www.eso.org](http://www.eso.org).

<sup>2</sup>Table 3.7 "Present and Proposes(sic) Uses," TMT Management Plan, page 3-15.

<sup>3</sup>NASA Keck Outrigger EIS, 2005, page. 4-73 (emphasis added).

<sup>4</sup>NASA Keck Outrigger EIS, 2005, page. 4-73 (emphasis added).

*hoofed animals. The magnitude of significance of cumulative impact to the alpine stone desert ecosystem is not yet fully determined.*<sup>5</sup>

The TMT attempts to suggest that its contribution to this negative impact would be minimal and should therefore be ignored. But the reality is, the cumulative impact of past telescope construction on the summit cannot be circumvented. Any additional construction -- no matter how minor or mitigated -- will contribute to the on-going substantial, adverse, and significant negative consequences suffered in this unique and fragile environment. Such consequences are not allowed.

## **II. Substantial, adverse impacts are not permitted in the conservation district**

The regulations implementing Hawai'i's conservation district protections are clear. To issue a permit for a land use in the conservation district, the applicant must demonstrate that:

*"The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region."*<sup>6</sup>

This means that given the conclusions of the TMT EIS, CDUA, and Management Plan, the Department cannot legally grant the TMT a permit to build in the conservation district, no matter how well it mitigates its negative impacts.

In its application for a permit, the TMT ignores this requirement, along with four others, that must be satisfied before a conservation district use permit can be granted. These additional requirements include ensuring that:

- the land use is **"compatible with the locality and surrounding areas [and] appropriate to the physical conditions and capabilities of the specific parcel,"**
- **"existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon**
- **"subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and"**
- the land use **"will not be materially detrimental to the public health, safety and welfare."**<sup>7</sup>

<sup>5</sup>TMT Management Plan, page 3-12. Similar statements are found in the FEIS and CDUA for the TMT project.

<sup>6</sup>Hawai'i Administrative Rules §13-5-30(c)(4)

<sup>7</sup>HAR §13-5-30(c)(5), (6), (7), and (8).

Not surprisingly, instead of admitting that it is unable to satisfy these requirements, the TMT opted to simply ignore them in their application.

We have repeatedly highlighted that while the Department and Board are obligated by law to protect the natural and cultural resources of the conservation district, and the traditional, customary, and religious Native Hawaiian practices that are dependent upon them, there is no legal protection for or inherent right to build telescopes in the conservation district. It is a privilege to do business on public land in the conservation district; a privilege reserved for those land uses that can demonstrate no substantial adverse harm to the public's resources. TMT cannot meet this burden and thus cannot be granted this construction permit.

### III. TMT is offensive

The TMT's analysis of the consequences of building such a massive structure in such a pristine place are offensive. Despite the findings of every EIS evaluating telescopes on Mauna Kea, the TMT CDUA concludes that:

*"while the introduced elements associated with existing observatories may have had an effect on the perceived quality of the observances conducted, or may have caused some practitioners to conduct their observances further away from the vicinity of the observatories, there is no evidence suggesting that the presence of the existing observatories has prevented or impacted those practices."*<sup>8</sup>

Astronomy facilities on the summit do prevent and impact cultural practice, *ipso facto*, that people are forced to hunt the summit for a quiet space with an uninterrupted viewplane in order to worship. The TMT's conclusion that construction of yet another massive telescope will not contribute to the undermining of traditional, customary and religious practice on the summit is like saying construction of a football stadium at the Vatican will not interfere with Catholic worship because there will probably be some pews left that can still see the stained glass windows. This is offensive. Who is the TMT to uproot our piko, disturb our burial grounds, alter the profile of our summit, and say it does not matter? This is not the kind of business that should be granted the privilege of doing business on Hawai'i's public trust conservation lands.

### IV. Flawed process and conflicts of interest plague summit management

Since 1968, the University's presence on Mauna Kea has been fraught with issues of abuse, misuse, disingenuous process, and conflicts of interest. Despite their claim that they have found a new paradigm, we can see that these issues continue today. For example:

---

<sup>8</sup>TMT CDUA page 4-7 (emphasis added).

### **A. Management Plan and Subplans Not Finalized**

As the TMT acknowledges, a comprehensive management plan is a necessary prerequisite for the approval of any activity in the Mauna Kea conservation district. Both the CMP and subplans drafted by the University are currently undergoing legal review. The CMP is at the Intermediate Court of Appeals. The subplans, mandated as a condition to the adoption of the CMP, have been formally contested. The Department has yet to take action on our request for a contested case hearing on the subplans. It is wholly improper for the University to advance this permit application given these pending legal questions.

### **B. TMT Agrees Management Plan is Not Comprehensive**

One of our many challenges to the University's most recent version of a management plan is that it is not comprehensive. It appears that the TMT agrees. In its site-specific management plan, the TMT states "it should be noted that the CMP and subplans only apply to UH's managed lands on Mauna Kea and do not apply to all of Mauna Kea."<sup>9</sup> If the University's "Comprehensive Management Plan" does not address the management needs of the conservation district encompassing the entire summit of Mauna Kea, then it is not comprehensive.<sup>10</sup> If this plan is not comprehensive, then new applications for land uses cannot be authorized under it.

### **C. The University Serves Conflicting Interests**

On one side of the table, the University asserts itself as the objective land manager and enforcer of management activities on the summit of Mauna Kea. It hires 100% of the staff at the Office of Mauna Kea Management. It appoints 100% of the members on the Mauna Kea Management Board and the cultural advisory group, Kahu Ku Mauna. It holds meetings and makes decisions about the management of resources on the summit.<sup>11</sup>

Then, at the same time, on the other side of the table, the University sits with the corporations and foreign governments seeking permission to exploit the conservation lands on the summit. The University facilitates and benefits from this ongoing exploitation of summit resources. Just as one example of the University's perverse incentive to encourage construction on the summit, the TMT repeatedly highlights throughout the

<sup>9</sup>TMT CDUA management Plan page 1-1

<sup>10</sup>For a definition of comprehensive, please see Mauna Kea et al. v. BLNR, Civil No. 04-1-397 (2007).

<sup>11</sup>It is our contention that the BLNR has improperly delegated this authority to the University, per the Supreme Court's ruling in Kapa'akai O Ka Aina v. Land Use Commission, 94 Hawai'i 1, 7 P. 3rd 1068 (2000). The BLNR's failure to provide any meaningful oversight of the University's actions on the summit of Mauna Kea has created this conflict of interest.

CDUA and management plan that in order to construct the telescope the TMT corporation will make sublease payments directly to the University.<sup>12</sup>

#### V. Significant questions remain unanswered

The TMT CDUA is not complete. At a minimum, the following questions should be answered and a new CDUA released for public comment before this process proceeds.

It is our understanding the University of Hawai'i is submitting this application "on behalf of the Thirty Meter Telescope Observatory Corporation."<sup>13</sup> Why? TMT is the actual applicant. The TMT will hold the sublease, the TMT will be responsible for compliance with all expectations and conditions on the CDUP, the sublease, etc., so it should be TMT, not UH, applying for this privilege to build.

How does the University rationalize serving the conflicting roles of "applicant" and "manager" in this situation? What safeguards are in place to prevent events similar to the previous violations of CDUP conditions and state law by observatories?<sup>14</sup>

What is the carrying capacity of the summit? It is possible that the TMT is one too many telescopes? The 1983/85 Management Plan for Mauna Kea limited construction on the summit to only 2 minor and 11 major telescopes, less than 125 feet tall, based on the best available science. This limit was carried forward to the 1995 management plan because it made no mention of a limit or carrying capacity. Since the University's new "CMP" fails to mention any kind of limit on construction in this conservation district, it seems reasonable to rely on this limit again, until there is some scientific basis for changing.

How many telescopes are currently on the summit? On page 1-5 of the application, TMT indicated there are 13 telescopes. On page 1-3, TMT said there are 12 telescopes. On page 1-4, they said 11. Just FYI, we counted the structures indicated on figure 3-7 in the TMT management plan, entitled "Site Plan showing Existing and Proposes(sic) Uses," at least 32 telescope-related structures are indicated there.

<sup>12</sup>TMT CDUA, page 2-1.

<sup>13</sup>TMT CDUA page 1-5.

<sup>14</sup>For the record, we note the repeated testimony of the University in response to the \$12 million transaction between University of California and Yale University for telescope time on Mauna Kea, where University of Hawai'i representatives stated that they have no idea what goes on inside the observatories. See, Testimony of Jim Gaines, Vice Chancellor of Research, University of Hawai'i, Hearing before House Committee on Higher Education, HB 1174, Act 132, SLH 2009.

How big is the TMT? On the first page of the CDUA, TMT said 8.7 acres. On page 1-11, TMT said 5 acres. On the architectural site plan (they forgot to put a page number on it), it says "4.5 acres (3.9 acres before "re-contouring")."

Kahu Ku Mauna was allowed to identify four days for cultural practice where the TMT would "minimize daytime activities." Why did Kahu Ku Mauna only get four days? What about the many other important religious observances, such as Makahiki, funeral services, and other events where peace and quiet are prerequisite?

What is the operational noise level, in dBA, of the TMT? Considerable verbiage is given in the CDUA and EIS to how quiet the TMT will be, but an actual measurement of likely decibels created by this project is never given.

The TMT mentions taking all the trash produced by the construction and use of this massive telescope to "an approved landfill or other waste disposal facility" on Hawai'i Island. Where are these facilities located? The small county dumps on Hawai'i are only allowed to accept: "Household refuse, residential do-it-yourself construction and demolition not exceeding 4 feet in length, soft compactable bulky items (mattresses, stuffed chairs, and couches) and residential self-hauled green waste."<sup>15</sup>

Where would the TMT dispose of the toxic chemical wash wastewater produced weekly by mirror maintenance? What is in that water?

How does the TMT manage to "not cause substantial adverse impact to existing natural resources within the surrounding area, community or region?"

How could the TMT ever "be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels?"

How can the TMT be built and "the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon?"

If the University holds a lease for "one observatory" on Mauna Kea, then how can it be that more than 13 subleases have been issued for telescopes on the summit when the law requires that "subdivision of land will not be utilized to increase the intensity of land uses in the conservation district?"

<sup>15</sup>[http://co.hawaii.hi.us/env\\_mng/swm/SW%20Informational%20Sheet.pdf](http://co.hawaii.hi.us/env_mng/swm/SW%20Informational%20Sheet.pdf)

How can the TMT ensure it "will not be materially detrimental to the public health, safety and welfare" when it will be hauling chemical wastewater and hazardous waste down to the county dump?

What is the decommissioning plan for the TMT? This should be an element of the CDUP and left for future negotiation.

Did the TMT commit to begin decommissioning by 2028, per the requirements of the University's management plan?

Did the TMT commit to fully restore the northern plateau by 2033, when the University's lease for one observatory" expires? Hope so.

Does the TMT hope to stay pass the expiration of the University's lease in 2033? <sup>16</sup>

Mahalo,



Miwa Tamanaha  
Executive Director



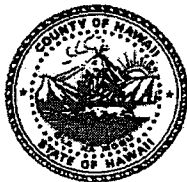
Marti Townsend  
Program Director

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<sup>16</sup>The TMT's stated decommissioning plan is: "The project will comply with the Decommissioning Plan, a sub plan of the CMP. This provides a detailed methodology for planning the removal of the TMT Observatory and the Access Way exclusively used to access the TMT Observatory at the appropriate time." TMT MP pg. A-9. "The level of restoration to be performed by TMT would be negotiated between TMT, the University, and DLNR according to the TMT sublease terms and CDUP. Site restoration activities may involve using cinder or materials similar to the surroundings either to fill holes or reconstruct topography. ..." TMT MP pg. 4-44. This is not a plan to decommission, this is a plan to consider whether to decommission and to what extent.



William P. Kenoi  
Mayor



BJ Leithead Todd  
Director

Margaret K. Masunaga  
Deputy

# County of Hawai'i

## PLANNING DEPARTMENT

Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawai'i 96720  
Phone (808) 961-8288 • Fax (808) 961-8742

November 15, 2010

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

2010 NOV 18 A 11:51  
DEPT. OF LAND & NATURAL RESOURCES  
STATE OF HAWAII  
CONSERVATION LANDS

Dear Mr. Lemmo;

**SUBJECT: Conservation District Use Permit Application**  
**Project: Thirty Meter Telescope**  
**TMK: (3) 4-4-015:009; Mauna Kea Science Reserve Ka'ohē Mauka, Hāmākua, Hawai'i**

This is in response to your request for comments on the above referenced application.

We have reviewed the subject Conservation District Use Application (HA-3568) for the proposed Thirty Meter Telescope (TMT) at the Mauna Kea Science Reserve and have no objections to the proposed use.

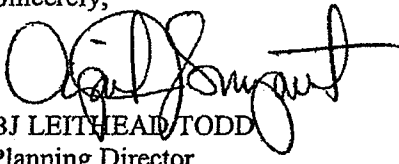
The project site is located in the State Land Use Conservation District. There is no County zoning for the project site. In addition, according to the County of Hawai'i General Plan 2005 (amended December 2006), it is designated as Conservation in the Land Use Pattern Allocation Guide. Although the entire island of Hawai'i is within the Coastal Zone Management Area, the subject area is not located within the Special Management Area.

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

Mr. Samuel J. Lemmo  
Administrator  
Office of Conservation and Coastal Land  
Department of Land and Natural Resources  
November 16, 2010  
Page 2

We have no further comments to offer at this time. If you have any questions, please feel free to contact Bethany Morrison of our office at (808) 961-8138.

Sincerely,

  
BJ LEITHEAD TODD  
Planning Director

BJM:cs  
P:\wpwin60\Bethany\General Zoning Inquiries\CDUA Thirty Meter Telescope.doc

November 30, 2010

TO: Board of Land & Natural Resources  
 c/o Department of Land & Natural Resources, State of Hawai'i  
 1151 Punchbowl Street, Room 103, Honolulu, HI 96813

FR: E. Kalani Flores, Assistant Professor, Hawai'i Community College  
 B. Pualani Case, 'Ike Hawai'i Resource Teacher, Waimea Middle School  
 & 'Ohana  
 P.O. Box 6918, Kamuela, HI 96743

RE: CDUA HA-3568 for the proposed Thirty Meter Telescope (TMT) at the  
 Mauna Kea Science Reserve, Kaohe Mauka, Hamakua, Hawaii, TMK (3) 4-4-015:009

**A Conservation District Use Permit (HA-3568) for the proposed Thirty Meter Telescope (TMT) should not be granted at this time for the following reasons.**

**The TMT Final Environmental Impact Statement (FEIS) is an incomplete document as it has failed to consider and/or disclose the adverse impacts upon the ancestral *akua* (gods, goddesses, deities) and spirits connected to the summit of Mauna a Wākea.**

**Thus, without this disclosure and consultation, this FEIS is incomplete and deficient. As such, this permit should not be approved at this time.**

In the times of our ancestors, prior to structures being constructed, one would consult with individuals who specialized in protocols associated with the selection of such sites. In addition, consultation and direct communication between intermediaries and those of the ancestral realm associated with those places was an essential and integral part of the process so as not to create a physical and/or spiritual disturbance, disconnection, or imbalance between man and his *akua*, and between man and his environment. We charge that this process of consultation with those recognized as the ancestral *akua* and spirits of Mauna a Wākea has not been done by the applicant. As such, this FEIS is incomplete.

In the TMT FEIS document, there are numerous references regarding the ancestral *akua* and spirits along with their connections to the sacred landscape on the summit of this mountain. An example of this type of reference is noted below.

The origins of Maunakea and its central place in Hawaiian genealogy and cultural geography are told in mele (poems, chants) and mo'olelo (stories, traditions). Native Hawaiian traditions state that ancestral *akua* (gods, goddesses, deities) reside within the mountain summit area. Several natural features in the summit region are named for, or associated with, Hawaiian *akua*; these associations indicate the importance of Maunakea as a sacred landscape. Each part of the mountain contributes to the integrity of the overall cultural, historical, and spiritual setting (TMT FEIS, page 3-11).

Despite these acknowledgements, this FEIS does not provide a critical assessment of the adverse impacts upon these ancestral *akua* and spirits. Likewise, the Comprehensive Management Plan of Mauna Kea (2009) and the Mauna Kea Science Reserve Master Plan (2000) that are referenced in this document are also incomplete and deficient for these same reasons.

We acknowledge that a number of consultants have been paid to ensure a comprehensive FEIS. However, nowhere in these documents has it been cited that consultation has occurred directly with these ancestral *akua* and spirits or indirectly through individuals with the ability to connect with them. Although this cultural perspective might seem difficult to grasp by those unfamiliar with these traditional practices, we offer the following testimony on behalf of those who have asked us to present their concerns regarding this project and past development on the summit of Mauna a Wākea. This was done through individuals who have the ability and gift to interact and communicate with such ancestral *akua* and spirits.

Mo'oinanea, nature spirit and guardian of the body of water named Lake Waiau, has been a significant figure in both oral and written traditions. As she has not been previously consulted regarding this and other projects on this sacred mountain, we bring forth her expressed concerns.

Most significantly, with construction at the summit of Mauna a Wākea, you will obstruct the *piko* on the top of this mountain and block the *piko*/portal to connect with Akua (Creator) and 'Aumākua (Ancestors). Do you realize that this is a major portal for the life forces that flow into this island?

As a result of this construction, do you take responsibility for the manner in which our weather patterns will be affected on the mountain and surrounding areas? In addition, do you take responsibility for the impacts of the proposed construction of that immensity on an area once pristine, still the purest, the most sacred of all of Hawai'i? Such actions will bring much change, none of which will be positive for the health and well being of this island and all of us.

It may be difficult to perceive that this is still the home and domain of those whom our ancestors believed in, those who regulated the weather, and those who safeguarded the heavens and the earth. You propose to build on the home of Mo'oinanea and all those who dwell on the summit, causing obstruction and disturbance under the guise of scientific and educational opportunities. Other spirits on Mauna a Wākea are manifested in the elements, such as the dew, the frost, the snow, the winds. Those who exist on this sacred mountain are severely disrespected with this notion that they do not matter in this decision. What would happen if they were displaced or forced to move off of the mountain? We pose this question and so do they. In conclusion, we echo what our *kūpuna* once said, "*Iā 'oe ka hewa*" (If you proceed, you are responsible).

Furthermore, prior to considering this permit, the BLNR should conduct a site visit to examine the actual scale of this proposed massive construction project on the summit. The applicant should erect a temporary framework of pvc pipes or like materials that provides an actual depiction of the proposed TMT and associated structures and infrastructure on the proposed site. It will provide a realistic perspective of the cumulative environmental impacts this proposed project will have upon the ancestral *akua* and spirits on Mauna a Wākea and its resources. It will substantiate that these impacts will be substantial, significant, and adverse.

12/07/2010



Cliff Souza  
<maulkava@yahoo.com>  
12/03/2010 08:06 PM

To stephen.m.cain@hawaii.gov  
cc  
bcc  
Subject 30 meter telescope

History:  This message has been forwarded.

Aloha Stephen,

10-3-10

I would like to voice my opposition to the construction of the 30 meter telescope.

One reason being they are not providing access for the Fire Dept.'s fire engine. Also they are not providing a water supply for the Fire Dept for structures.

Over 10 years ago 4 men died and numerous workers were injured in a fire at the Subaru telescope. The fire could not be put out because they had no fire engines on hand. No fire engines reached the fire scene because access was not provided. Prior to that fire there were no fire extinguishers available to extinguish that fire. No fire access or water were available for these 2 fires.

In prior years I have inquired at the Building & Fire Dept. about the lack of fire engine access and water supply for fire department responses.

I feel the Building and Fire Dept.'s are negligent in allowing these structures without fire engine access and water supply. I do not allow construction until fire protection is provided.

Cliff Souza  
808-959-5282

12/07/2010



DLNR.CO.PublicDLNR/DLNR  
/StateHIUS

12/03/2010 10:42 AM

To Stephen M Cain/DLNR/StateHIUS@StateHIUS

cc

bcc

Subject Fw: TMT Binder

testimony

--- Forwarded by DLNR.CO.PublicDLNR/DLNR/StateHIUS on 12/03/2010 10:42 AM ---



Matt Binder  
<mattbinder@earthlink.net>

12/03/2010 08:04 AM

To dlnr@hawaii.gov

cc

Subject TMT

To Whom It May Concern,

I am submitting this comment in support of the TMT.

As a science teacher I am thrilled at the opportunity for breakthrough research coming from the top of our island.

As a former board member of the Sierra Club on the Big Island, I am well aware of the environmental and cultural issues that have been presented by my former organization. However, I disagree with Sierra Club on both accounts.

Environmentally, all the telescopes on Mauna Kea together take up a tiny fraction of the summit area. They can hardly be blamed for any problems the wekiu bug is having.

The cultural issues are more complicated. My understanding of Hawaiian culture is that they held all land as sacred. But that didn't stop them from utilizing the land for beneficial purposes. I have always been amazed at ancient Hawaiian culture and their incredible abilities in exploration and navigation. I believe that ancient Hawaiians would have welcomed an innovative astronomical device to their island as long as it was operated with sensitivity to cultural norms.

As with any proposed development, the benefits must be compared to the risks. And while I have opposed many development projects in the Kona area because the benefits of a new resort did not outweigh the problems of inadequate infrastructure, in the case of TMT I see great benefits and very little risk.

Thank you,

Matt Binder  
Kealakekua

November 30, 2010

TO: Board of Land & Natural Resources  
 c/o Department of Land & Natural Resources, State of Hawai'i  
 1151 Punchbowl Street, Room 103, Honolulu, HI 96813

FR: E. Kalani Flores, Assistant Professor, Hawai'i Community College  
 B. Pualani Case, 'Ike Hawai'i Resource Teacher, Waimea Middle School  
 & 'Ohana  
 P.O. Box 6918, Kamuela, HI 96743

RE: CDUA HA-3568 for the proposed Thirty Meter Telescope (TMT) at the  
 Mauna Kea Science Reserve, Kahohe Mauka, Hamakua, Hawaii, TMK (3) 4-4-015:009

**A Conservation District Use Permit (HA-3568) for the proposed Thirty Meter Telescope (TMT) should not be granted at this time for the following reasons.**

**The TMT Final Environmental Impact Statement (FEIS) is an incomplete document as it has failed to consider and/or disclose the adverse impacts upon the ancestral *akua* (gods, goddesses, deities) and spirits connected to the summit of Mauna a Wākea.**

**Thus, without this disclosure and consultation, this FEIS is incomplete and deficient. As such, this permit should not be approved at this time.**

In the times of our ancestors, prior to structures being constructed, one would consult with individuals who specialized in protocols associated with the selection of such sites. In addition, consultation and direct communication between intermediaries and those of the ancestral realm associated with those places was an essential and integral part of the process so as not to create a physical and/or spiritual disturbance, disconnection, or imbalance between man and his *akua*, and between man and his environment. We charge that this process of consultation with those recognized as the ancestral *akua* and spirits of Mauna a Wākea has not been done by the applicant. As such, this FEIS is incomplete.

In the TMT FEIS document, there are numerous references regarding the ancestral *akua* and spirits along with their connections to the sacred landscape on the summit of this mountain. An example of this type of reference is noted below.

The origins of Maunakea and its central place in Hawaiian genealogy and cultural geography are told in mele (poems, chants) and mo'olelo (stories, traditions). Native Hawaiian traditions state that ancestral *akua* (gods, goddesses, deities) reside within the mountain summit area. Several natural features in the summit region are named for, or associated with, Hawaiian *akua*; these associations indicate the importance of Maunakea as a sacred landscape. Each part of the mountain contributes to the integrity of the overall cultural, historical, and spiritual setting (TMT FEIS, page 3-11).

Despite these acknowledgements, this FEIS does not provide a critical assessment of the adverse impacts upon these ancestral *akua* and spirits. Likewise, the Comprehensive Management Plan of Mauna Kea (2009) and the Mauna Kea Science Reserve Master Plan (2000) that are referenced in this document are also incomplete and deficient for these same reasons.

We acknowledge that a number of consultants have been paid to ensure a comprehensive FEIS. However, nowhere in these documents has it been cited that consultation has occurred directly with these ancestral *akua* and spirits or indirectly through individuals with the ability to connect with them. Although this cultural perspective might seem difficult to grasp by those unfamiliar with these traditional practices, we offer the following testimony on behalf of those who have asked us to present their concerns regarding this project and past development on the summit of Mauna a Wākea. This was done through individuals who have the ability and gift to interact and communicate with such ancestral *akua* and spirits.

Mo'oinanea, nature spirit and guardian of the body of water named Lake Waiau, has been a significant figure in both oral and written traditions. As she has not been previously consulted regarding this and other projects on this sacred mountain, we bring forth her expressed concerns.

Most significantly, with construction at the summit of Mauna a Wākea, you will obstruct the *piko* on the top of this mountain and block the *piko*/portal to connect with Akua (Creator) and 'Aumākua (Ancestors). Do you realize that this is a major portal for the life forces that flow into this island?

As a result of this construction, do you take responsibility for the manner in which our weather patterns will be affected on the mountain and surrounding areas? In addition, do you take responsibility for the impacts of the proposed construction of that immensity on an area once pristine, still the purest, the most sacred of all of Hawai'i? Such actions will bring much change, none of which will be positive for the health and well being of this island and all of us.

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Furthermore, prior to considering this permit, the BLNR should conduct a site visit to examine the actual scale of this proposed massive construction project on the summit. The applicant should erect a temporary framework of pvc pipes or like materials that provides an actual depiction of the proposed TMT and associated structures and infrastructure on the proposed site. It will provide a realistic perspective of the cumulative environmental impacts this proposed project will have upon the ancestral *akua* and spirits on Mauna a Wākea and its resources. It will substantiate that these impacts will be substantial, significant, and adverse.



**Tom Peek**

P.O. Box 1030 Volcano Hawai'i 96785  
(808) 985-8973 www.tompeek.net

**Comments at DLNR hearing regarding the Thirty Meter Telescope CDUA  
December 2, 2010 – Hilo, Hawai'i**

Aloha.

My name is Tom Peek. For almost a decade, starting in 1988, I was a guide for the Mauna Kea observatories. Through my various visitor programs, I served as a public liaison with what back then was primarily a Big Island and Hawai'i audience.

As part of my public outreach duties—and because I had graduate education and professional experience in environmental and natural resource policy at the University of Minnesota—my boss, Tom Krieger, asked me to review the UH and DLNR planning documents governing the science reserve.

**Inadequate Management Plans**

Even then the inadequacies of the joint DLNR-UH management arrangement were apparent, and the planning documents—mostly contract work done for UH by Group 70 International—were shortsighted, inadequate and obviously written to serve the interests of astronomy. At Tom's request, I wrote up my conclusions, which he and I then shared in Honolulu with IfA's Associate Director.

Then I went back to sharing the wonders of astronomy and the mountain. But I continued to pay attention to management issues, and eventually grew concerned when the telescope limits agreed to by UH and DLNR in 1983 were sidestepped to accommodate the Smithsonian submillimeter array and subsequent telescopes.

**The Auditor's Complaints**

So I was not surprised when in 1998 a legislative audit sharply criticized both DLNR and UH for their management of the conservation district—with its harshest criticism laid on DLNR, the regulatory agency charged with protecting and preserving Mauna Kea's environmental and cultural resources. The audit's detailed critique went well beyond what I had tried to communicate to my superiors at IfA a decade earlier. Quoting the audit:

*“As a Conservation District, Mauna Kea has special protections through the department's permitting and other administrative processes . . . However, failure to sufficiently enforce requirements and lack of action has resulted in the inadequate protection of state resources . . . The Department of Land and Natural Resources, in its role as landlord, should have overseen the university's activities and enforced permit conditions and regulations in protecting the State's interests.” (pp. 31 and 35)*

The list of specific DLNR failures was breathtaking—all illustrating the Auditor's conclusion that DLNR (along with UH) had “failed to develop and implement adequate controls to balance the environmental concerns with astronomy development.” (p.15)

*T. Peek Comments at DLNR hearing regarding TMT's CDUA- 2  
December 2, 2010*

### **Another Critical Audit**

A follow-up audit, in 2005, found that many of those problems still existed, including the fundamental DLNR problem that has plagued the mountain's management from the beginning right up until today:

"The department has not embraced its role as landowner. In recent years, the department has passively allowed the university to fulfill the department's role as landowner. As a result departmental management plans and its monitoring and enforcement efforts have been thought of as subordinate to what the lessee—or, the university—would do . . . The department has also failed to fully embrace its role as landowner with respect to commercial permits." (pp. 29-30)

To reverse this "lax attitude", the Auditor urged the department to write its own comprehensive management plan for the mountaintop:

"The department is required to prepare a comprehensive management plan for areas in the reserves system and is empowered to enforce the laws, rules, and regulations applying to the reserves." (p.32)

As to how to pay for this, the Auditor went on to say, "the Board of Land and Natural Resources may impose administrative fines, fees and costs, and bring legal action to recover those fees and costs." (p.32)

### **Who's the problem?**

It's interesting for me to testify today before one of the key DLNR planners from those earlier years of mismanagement—Mr. Sam Lemmo—perhaps THE key staff person overseeing astronomy facilities on Mauna Kea for many of those years.

I was always curious as to whether you, Mr. Lemmo, simply didn't understand the planning and management issues and responsibilities to which you had been assigned or whether undue pressure had been placed on you by IfA Director Donald Hall and other UH officials or by your own DLNR superiors, including influential Land Board members. Or perhaps pressure had come from Hawai'i's Congressional Delegation and other political elites, or from the construction industry, for whom the Mauna Kea observatories represented lucrative financial opportunities.

### **An Opportunity for Reform**

Whatever your answer, it seems to me that this is a new time, with a new Governor and DLNR chief, and a changed political climate in which conscientious public servants can do much to improve the operation and reputation of DLNR. It's a time when DLNR could reassert its

*T. Peek Comments at DLNR hearing regarding TMT's CDUA- 3  
December 2, 2010*

regulatory role and finally protect and preserve the unique cultural and environmental resources of Mauna Kea.

Unfortunately, some false steps have already been taken, including the current Land Board's acceptance of a fundamentally flawed and inadequate comprehensive management plan written by UH, and DLNR's failure—at least thus far—to require the Thirty Meter Telescope (TMT) Corporation to submit a completed federal EIS because of the millions in federal funding it has received (and expects to receive) from the National Science Foundation.

But there's still time for DLNR to change course and do the right thing—thereby avoiding yet another negative audit that will reinforce the widespread perception that this agency doesn't work on behalf of the public. I sincerely hope that you and your DLNR colleagues will seize this opportunity and give the new DLNR Director and the Land Board the kind of advice and professional support that will enable them to do the right thing too.

Thank you for allowing me to share my perspective with you and your agency. Mahalo.




Nov. 29, 2010

To:

Sam Lemmo, OCCL Administrator  
P.O. Box 621  
Honolulu HI 96809

From:

Fred D. Stone, Ph.D.,   
PO Box 1430, Kurtistown, HI. 96760

[fred@hawaii.edu](mailto:fred@hawaii.edu)

Concerning: Public Hearing on the TMT CDUA.

I have been involved with efforts to protect Mauna Kea's fragile and unique environment since 1981, when I assisted with the arthropod survey as part of the natural resource inventory that became part of the 1983/85 Management Plan. In 1995, when it was clear that the UH IFA was not making any effort to follow the measures of the 1983 Plan to reduce environmental damage, I wrote a report on the damage that was occurring. From 2003-6 I was an expert witness in the contested case hearings on the Keck Outrigger Telescopes, through which a court appeal determined that a Comprehensive Management Plan of Mauna Kea Summit area was necessary.

Mr. Lemmo, I appreciate your willingness to conduct this meeting to gather information on which to base your recommendations. However, it must also be made clear that this meeting does not replace the public hearing required by the BLNR when it considers the TMT CDUA.

1. It is a violation of the State Administrative Rules for the BLNR to consider the TMT CDUA at this time. Your role, Mr. Lemmo, in fulfilling your responsibilities to DLNR and to the UH and the TMT consortium, should be to inform them of the rules that have been and continue to be broken by this illegal action. To do otherwise makes you a party to the failure of the DLNR to follow its own rules.

The relevant rule is HAR § 13-5-39 "[w]here required, management plans shall be submitted with the board permit application . . ." which states that in a conservation subzone used for Astronomy, a CDUA must be submitted under a Board approved Comprehensive Management Plan. While it is true that the UH CMP was erroneously approved by the BLNR on April 9, 2009, several members of the public called for a contested case hearing at that time. The DLNR Chair, Laura Thielen, failed to follow HAR §§ 13-5-30, 39 and 40. Instead of honoring the right of the public to a contested case hearing, this was denied. An initial court decision was not based on full information, and the Appellants appealed this decision to the Intermediate Court of Appeals. This appeal is still pending, and therefore the UH CMP is still under litigation.

The UH CMP has many problems that need to be dealt with through the proper and legal procedures set up to give citizens input into decisions affecting use and management of natural

and cultural resources within conservation districts. The contested case hearing is one of these procedures.

If the BLNR goes ahead with consideration of the TMT CDUA before the Intermediate Court of Appeals decision, they are continuing to subvert the DLNR administrative rules. I sincerely hope that you, Mr. Lemmo, will fulfill your duties and inform the BLNR, the UH and the TMT Consortium of the importance of withholding further consideration of the TMT CDUA until the Appellants are afforded their constitutional rights to a contested case hearing on the UH CMP.

2. Throughout the TMT CDUA, the UH CMP is referred to as the "Mauna Kea CMP". This implies that the CMP includes areas outside the UH leases, such as the Natural Area Reserves and land adjacent to the Hale Pohaku site. It should be made clear to the UH applicants that they DO NOT have a right to use land in the Ice Age Natural Area Reserve. For example, utility trenches should not be built in the NAR. Management of the Ice Age NAR is the responsibility of the DLNR. The UH CMP is not a Comprehensive Management Plan for Mauna Kea, in that it includes ONLY the land leased to the UH.

3. Telescope construction, including the TMT, is NOT included in the UH CMP in a comprehensive manner. Although one of the sub plans deals with decommissioning, there is NO sub plan for construction. The UH CMP refers this back to the 2000 Master Plan, which is not a BLNR approved plan. At the BLNR hearing on April 9, 2009, you, Mr. Lemmo, answered the question about whether the UH CMP included the 2000 Master Plan by stating "Absolutely not, the CMP does not incorporate the 2000 Master Plan and shouldn't be construed that way."

Page 1-6 of the TMT CDUA, states:

"Management Action FLU-1 in the recently adopted CMP states that future facility planning should follow the guidelines presented in the University of Hawai'i *Mauna Kea Science Reserve Master Plan*, referred to as the *2000 Master Plan* (University of Hawaii, 2000)."

The UH CMP and the TMT CDUA refer repeatedly to the 2000 Master Plan whenever referring to telescope construction. If the 2000 Master Plan is included in the UH CMP, then the UH is required to go through the process of getting the 2000 Master Plan approved by the BLNR, with the necessary environmental impact assessments, CDUA's and public input as required by the Hawai'i Administrative Rules.

4. There has been no Federal EA or EIS conducted concurrently with the State EIS on the proposed TMT construction. Federal NSF funds were used for the planning phase of the TMT, but NO Federal EA or EIS was done, even though the plans are the basis for the TMT construction, If the development is approved by BLNR, and it is determined that it is using Federal sources of funds, such as the anticipated NSF grants, then failure to conduct a Federal EIS will be grounds for a lawsuit, as in the case of OHA vs. the Keck Outrigger Telescope project. In that case, the 2005 NASA FEIS found that substantial, adverse and significant impacts had occurred. It is a subversion of the NEPA process to state prior to a Federal EIS

that there will NOT be substantial, adverse and significant impacts. The proposed major telescope construction, including all the infrastructure of roads, batch plant staging areas, cable trenches, energy supplies, toxic waste removal, increased traffic, etc. will add substantially to the incremental environmental impact on the Mauna Kea summit area.

The Decommissioning Sub Plan on p. 31 states that if additional telescopes are constructed, ALL applicable environmental analyses, permits, subleases and approvals will be carried out. For the UH to now submit a CDUA for the TMT in the absence of a Federal EA or EIS is a violation of the own stated intention of conducting all applicable environmental analyses.

#### 5. Limit on number of telescopes

The only BLNR approved document limiting telescope construction on Mauna Kea is the 1983/85 Mauna Kea Science Reserve Complex Management Plan. The proposed TMT exceeds the restriction on the number of telescopes on Mauna Kea. The number currently allowed under the 1983 Management Plan is 13, with 11 major and two minor. The TMT CDUA lists 14 telescopes on page 1-5. In fact, the TMT is the 15<sup>th</sup> telescope. In other places, the TMT CDUA lists fewer telescopes, under the assumption that some existing telescopes will be decommissioned "or recycled" by the time the TMT is built. These hypothetical scenarios should not be acceptable as part of the CDUA. If any telescopes are currently slated for decommissioning, the plans should be submitted and approved by the BLNR PRIOR to acceptance of the TMT CDUA.

6. Lease from the State to UH terminates in 2033. It does not make sense for BLNR to approve a billion dollar telescope project, with a 50 year lifetime, that has only 10 to 15 years of effective use before it is decommissioned. However, the UH CMP Decommissioning Sub Plan states that unless there is an extension of the current lease, all telescopes will be removed by 2033, in accordance with the current lease agreement. If, in fact, a new lease is a requirement to make the TMT project viable, then this should be included in the CDUA. I hope, Mr. Lemmo, that the BLNR is aware that approval of the TMT CDUA will not imply an automatic extension of the current lease.

Page 136 states:

"The building and operation of the TMT Observatory on Mauna Kea will require a sublease of the area from the University. The sublease will be subject to approval first by the TMT Board and University of Hawai'i Board of Regents (UH BOR) followed by approval by BLNR."

Why is this new proposed sublease to TMT not included with the CDUA? What are the terms and conditions of the new lease? Does it extend beyond 2033, the length of the current lease? Is the new lease based on fair-market value, and does it include the payment due to OHA for use of Ceded Lands?

Cost estimates for carrying out proposed mitigation measures, sources of funds, and a detailed budget should be included as part of the TMT CDUA. The costs should be included in the

overall construction and operation budget of the proposed telescope. Without a commitment to pay for the necessary mitigation measures, there is no guarantee that they will be carried out.

Under the current system of a \$1 per year lease, it is up to the individual telescope projects to voluntarily offer mitigation funds. For example, the TMT project has offered \$2.5 million for Native Hawaiian education. If this represents a portion of the true value to the TMT project, then it should be part of a lease agreement. Otherwise, it becomes a threat "Either you approve the project, or you don't get the money". The State of Hawai'i should be saying "Either you pay the fair market value of the Astronomy use of Ceded and Conservation lands, or you don't get to use them". 2.5 million dollars is only  $\frac{1}{4}$  of one percent of the billion dollar projected cost of the TMT, an insignificant amount. Shouldn't the State and the DLNR be charging a more substantial percent of this major project?

7. Baseline inventories followed by regular monitoring of plant and animal species need to be done at Hale Pohaku, the road corridors, the staging sites, and the telescope site itself. Monitoring needs to be done over the proposed lifetime of the telescope, not for only a period of two years following completion of construction.

On page 164 of the TMT CDUA, NR-15 states "Conduct baseline inventories of high-priority resources, as outlined in an inventory, monitoring, and research plan" NOT APPLICABLE

NR-16 states "Conduct regular long-term monitoring, as outlined in an inventory, monitoring, and research plan." NOT APPLICABLE

These essential inventory and monitoring activities should not be excluded from the TMT CDUA. To do so makes the natural resource management plan ineffective.



November 20, 2010

Sam Lemmo  
Office of Conservation and Coastal Lands, Planning Secretary  
State of Hawaii DLNR  
P.O. Box 621  
Honolulu HI 96809

RE: CDUA HA-3568  
The University of Hawaii and the Thirty Meter Telescope Observatory Corporation's  
Conservation District Use Application

My name is Deborah J. Ward. I was appointed to the Office of Mauna Kea Management's Environment Committee in December, 2000, and I remain the one of the longest sitting members, ten years later. At the time of my appointment, I was a member of the UH Faculty at the College of Tropical Agriculture and Human Resources (CTAHR) Natural Resources and Environmental Management Department, and I have since retired.

The University of Hawaii states repeatedly that they have changed their ways since the Legislative Auditor found twice that the management of the natural and cultural resources of Mauna Kea is seriously lacking. The University cites the work of the OMKM Environment Committee (EC), among others, as an example of the change in practice. I believe that actions of the University demonstrate just the opposite.

As a member of the Environment Committee since the year 2000, I chaired a team of scientists to provide an outline of inventories and monitoring strategies needed in order to assess the ecosystem health and ongoing impacts of telescope development. The recommendations, made in 2001-2, were ignored by OMKM and the MKMB. In 2005-6, the EC reconvened, and several teams of scientists made management recommendations on subjects including native flora and fauna, alien species, hydrology, geology, and management strategies. It became clear that to the committee members that an expanded planning document to assist in the prioritization of management strategies could improve the potential for resource protection. The committee and OMKM staff contracted with SRGII to develop a natural resource management plan. The Natural Resource Management Plan (NRMP) promulgated in 2007-9 by the EC calls for a number of studies to be carried out before any further development could be considered.

At the same time, OMKM had convened a wekiu bug (*Nysius wekiukola*) committee, which included Fred Stone and Frank Howarth, two of the scientists who recorded multiple thousands of the organisms unique to the Mauna Kea summit, in 1982, while conducting studies that led to an EIS, and subsequently to the recommendations in the Mauna Kea Science Reserve Complex Management Plan approved by the BLNR in 1985. After a precipitous decline in observed wekiu numbers, the wekiu bug was considered for listing as an Endangered Species, and had been Category 1 (highest eligibility for listing). Negotiations between OMKM and USFWS have led to a downlisting of the wekiu bug status, but recovery efforts are ill-defined.

In 2006, Circuit Court Judge Glenn Hara ruled that the DLNR rules allow no further telescope development without a comprehensive management plan to address multiple

uses. As is the practice on most state conservation lands, the DLNR should have initiated, directed, and overseen the development of this document, but did not do so.

Instead of developing a plan under the supervision of DLNR, the UH hired the public relations firm Kuliwala to develop a comprehensive management plan (UHCMP). The EC expected that the NRMP already underway would be an integral part of the management plan, but its members were in for a shock. When the UHCMP was submitted for MKMB review (and subsequently to BLNR) the NRMP had been expunged without explanation. Only one courageous member of the MKMB, a member of the EC, objected when the document was reviewed by the MKMB. When the UHCMP came before the BLNR, the public strenuously objected to the absence of natural resource protections, and numerous other egregious omissions and inconsistencies. BLNR noted that the UHCMP was incomplete, and required development of a natural resource sub-plan, along with other sub-plans addressing cultural resource issues, public access, and decommissioning of telescopes. Both the incomplete UH CMP and the sub-plans were approved by the BLNR in spite of requests for contested case hearings by parties whose rights, duties and privileges would be impacted by actions outlined in the UHCMP. The cases remain under review by the Intermediate Court of Appeals, and as a result, the UHCMP and sub-plans should not be construed as actionable for the purposes of further development.

The NRMP specifies high priority studies which have yet to be conducted, and the Environment Committee has **NOT** *once* met since the NRMP was reviewed in February 2009, before inclusion in the CMP as a sub-plan. Shibal

The NRMP states 4.1-1 that

*A baseline inventory, or initial survey, establishes the current status of the area under management at the beginning of a natural resources management program. Many of the decisions and paths taken by the management program will follow from the results of the baseline inventory. Monitoring begins after the completion of the baseline inventory and tracks selected resources over time. Decisions on what resources to monitor over the long term will be based on the results of the baseline inventory and the objectives of the management program. At this writing, a baseline natural resources inventory has not been completed for the UH Management Areas on Mauna Kea (Mauna Kea Science Reserve, the Access Road, and Hale Pohaku), but a cultural resources (archeological) inventory has (McCoy et al. 2009).*

You should know, Sam, that the 1983 MKSRCDP contained language calling for inventory and monitoring of flora and fauna. The OMKM Environment Committee has called for the same since 2001. How is it that the University has ignored its own management plans for more than 25 years, and yet, when they apply for yet another billion dollar project, this inventory work is not yet complete?

Excerpts for the CDUA conveniently absolve the TMT proposers from critical aspects of the CMP:

***CMP Subplans Management Action Applicability to TMT Project: Section 4***

**NR-15 NRMP 4.1 Conduct baseline inventories of high-priority resources, as outlined in an inventory, monitoring, and research plan. Not Applicable.**

**NR-16 NRMP 4.1, PAP 6.4**

**Conduct regular long-term monitoring, as outlined in an inventory, monitoring, and research plan. Not Applicable**

NR-17 NRMP 4.1.2.3 Conduct research to fill knowledge gaps that cannot be addressed through inventory and monitoring. Not Applicable

NR-18 NRMP 4.1, 4.5 Develop geo-spatial database of all known natural resources and their locations in the UH Management Areas that can serve as baseline documentation against change and provide information essential for decision-making. Not Applicable

EO-7 NRMP 4.4.2, CRMP 5.3, PAP 5.2, 6.3, 6.8

Continue and increase opportunities for community members to provide input to cultural and natural resources management activities on Mauna Kea, to ensure systematic input regarding planning, management, and operational decisions that affect natural resources, sacred materials or places, or other ethnographic resources with which they are associated. Not Applicable

The NRMP states:

*Inventory, monitoring, and research efforts targeted at gathering information to guide management decisions should, initially, focus on filling identified information gaps. Because an inordinate amount of time, money, and effort would be needed to inventory and monitor all the natural resources at the UH Management Areas, successful inventory and monitoring programs must focus on a subset of the natural resources present.... In the case of this Natural Resources Management Plan (NRMP), inventory, monitoring, and research efforts will focus on 1) native species (or communities) of concern, 2) important or unique physical features, 3) stressors that are known or suspected to impact native species and communities (e.g., invasive species, human use, soil erosion), and 4) basic properties and processes of ecosystem health (e.g., water quality).*

Just as an example, I cite the lack of plant inventory and monitoring, designated as a high priority in the NRMP.:

*1.4.6 Plants 1.4.6.1 Data Gaps No quantitative studies of plant communities have been conducted at Hale Pōhaku, the Summit Access Road, or MKSR. Several qualitative (presence/absence) surveys have been conducted at Hale Pōhaku (Gerrish 1979; Char 1985, 1990, 1999a; Pacific Analytics 2004) and MKSR (Smith et al. 1982; Char 1999b), but all were limited in scope or area covered. The last surveys that involved more than a brief examination of field conditions were conducted at Hale Pōhaku in 1990 and at MKSR in 1982. Smith et al. (1982) surveyed only the plant species found above 13,000 ft (3,960 m) and only in areas considered for future telescope construction (as described in the 1982 Master Plan). No botanical surveys of any sort have been conducted along the Summit Access Road between Hale Pōhaku and MKSR.*

*.1.4.6.2 Baseline Inventory Priority: High (T&E species, invasive species, māmane woodlands, alpine stone desert); Medium (subalpine and alpine shrublands and grasslands)*

*.1.4.6.3 Monitoring Priority: High (T&E species, invasive species, māmane woodlands, alpine stone desert); Medium (subalpine and alpine shrublands and grasslands)*

*1.4.6.4.2 Invasive Plant Research Priority: High*

The University has never fulfilled its commitment to carry out this provision in 25 years prior to the initiation of the NRMP, and no plans in place to do so now, two years after it was written.

The University proposes new developments on a regular basis, but continues to fail in its responsibilities. You must recommend denial of this newest application.

Deborah Ward  
Member, Environment Committee  
P. O. Box 918, Kurtistown HI 96760



Sierra Club Testimony before DLNR Staff on TMT CDUA  
December 2, 2010 by Nelson Ho, Chair Moku Loa Group, Hawaii Chapter

This CDUA is legally deficient. The BLNR is being presented with insufficient information to make an informed decision. I will focus on just two major flaws that are in the documents now before you.

The first is the unresolved issue of how long this proposed facility will stay on Mauna Kea. The TMT application and EIS claims the TMT will begin seven years of construction in 2011 and will have an expected design life of 50 years after which, it will be decommissioned. UH General Lease No.S-4191 issued by the State to the University in 1968 ends in the year 2033. If the life of the TMT is 50 years, it means the TMT is requesting the use of Mauna Kea 23 years beyond the term of the lease. This contradiction must be resolved before the CDUA is decided upon.

There is insufficient disclosure of a major, new policy change in the management of Mauna Kea. No one has proposed a new lease and no information on this is in the record that will be before the Board. Sierra Club is party to a lawsuit over the deficient CMP accompanying this CDUA request and we have not been notified that there are or have been any discussions regarding any aspect of the UH General Lease.

The BLNR should not allow UH to front for the TMT with this CDUA. They have two conflicting missions - insuring the presence of telescopes on the mountain forever and managing the natural and cultural resources of the summit. Leaving the decisions to them insures results like \$1.00 a year for DLNR to fulfill your management mandates on Mauna Kea.

Without a Board discussion on the lease options, it's hard to discuss imposing conditions on the TMT or the other facilities that will surely follow it up the mountain. If the CDUA were to go through this way, the discussion on monetary requirements and "community benefits package" are merely anomalous handouts.

When the Board takes up this CDUA draft they will be deliberating on a broad policy shift for the mountain - they could be approving of major, heavy industrial activity continuing forever on the mountain. That kind of policy change should not be left to a "sub lease discussion" far removed from this decision. To have NO notice to the BLNR that this is an important ramification of this CDUA, is a fatal flaw in this draft.

Secondly, DLNR has its own procedures and rules to insure that Hawaiian cultural rights are preserved on state land. SC is concerned that you will be violating them if you approve this deficient CDUA. Who is the Kahu Ku Mauna and can they determine the cultural rights and practices for all Hawaiians AND the public on Mauna Kea?

Sierra Club objects to the issuance of any CDUA until these major policy changes are fully on the record before the BLNR and resolved.



December 3, 2010

TO: Sam Lemo
State of Hawaii Department of Land and Natural Resources
Office of Conservation and Coastal Lands

FROM: Kona-Kohala Chamber of Commerce

SUBJECT: Support for TMT File No: CDUA HA-3568
Aloha,

My name is Vivian Landrum, President/CEO of the Kona-Kohala Chamber of Commerce (KKCC). KKCC represents over 540 business members and is the leading business advocacy organization on the west side of Hawai'i Island. KKCC also actively works to enhance the environment, unique lifestyle and quality of life in West Hawai'i for both residents and visitor alike.

KKCC wishes to express our full support for the Thirty Meter Telescope. This venture will create exciting educational opportunities for our children; support our local economy with much-needed jobs, not only with short-term construction, but also long-term high tech positions.

TMT will bring economic opportunities to our island, with these opportunities spreading out to the entire State. The construction phase alone will employ hundreds of local workers and could last for up to ten years. The project operations will require engineers, administration, project management, financial, information technology and service technicians. This will bring a much-needed boost to our local economy.

Opportunities for educational connections between our local community and the TMT are boundless. Support for, and the opportunity for participation in, STEM studies would be tremendous. This next-generation world-class telescope will raise our reputation as an outstanding destination for both visitors and residents alike.

Opponents of the project have voiced their concerns. We believe TMT has met these concerns by adequately addressing the overall design and physical placement of the telescope. The project's commitment to proper environmental stewardship and sustainable practices for the operations of the telescope is commendable. While cultural concerns need to be recognized and addressed, it is felt there is a place for both science and culture to coexist on Mauna Kea.

The Kona Kohala Chamber of Commerce supports the Thirty Meter Telescope project. Let's continue to move this project forward.

Mahalo,

Vivian Landrum
President/CEO

Personal comments. Daughter grad Kealahou 2008
Mainland college - Degree in astro physics.
Due to minimum # of jobs here at her home
She is living in Houston - working for NASA.
Would love to see employment opportunities
here on Hawaii Island that keep our children here.



The Pacific Resource  
**PARTNERSHIP**



December 3, 2010

Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
P.O. Box 621  
Honolulu, Hawaii 96809

RE: CDUA HA-3568 for the proposed Thirty Meter Telescope (TMT) at the Mauna Kea Science Reserve, Kaohe Mauka, Hamakua, Hawaii, TMK (3) 4-4-015:009

Aloha:

My name is C. Mike Kido, External Affairs of The Pacific Resource Partnership (PRP) a labor-management consortium representing over 240 union signatory contractors and the Hawaii Carpenters Union. The Pacific Resource Partnership strongly supports TMT and its plans to construct a new thirty meter telescope at the top of Mauna Kea.



The Thirty Meter Telescope (TMT) at Mauna Kea, has the potential to become an "industry standard" with regard to the comprehensive approach that was taken in planning this project. TMT has demonstrated its respect and reverence for the sanctity of this location by going to great lengths to help ensure that its presence atop Mauna Kea will have as little impact on the mountain top as possible. The Construction Plan as part of the Conservation District Use Permit application is well thought out and will serve as a strong guide in complying with mitigation measures outlined in the Final EIS. From a conscious effort to reduce hazardous materials, such as avoiding the use of "spun mercury" in the design of the telescope, taking measures to help prevent the spread of invasive species to the summit, to the placement of telescope in a location that is the least likely to disturb native wildlife habitats and sacred sites. This project is one of the most comprehensive of its kind, taking into consideration the various types of impacts a project of this size will have on the environment and the community.

This project will not only benefit the worldwide scientific community as a whole, but will also serve to directly benefit those of Native Hawaiian ancestry, residents of the Big Island, and most importantly, will create work for numbers of unemployed construction workers on the Big Island helping them to provide for their families during these tough economic times.

The global economic recession, tightening national credit markets, and stagnating local economies have played a large part in affecting the lives of our local people. Tourism on the neighbor islands has taken the hardest hit due to the global and national economic conditions.



1001 Bishop Street • Suite 1501 • Honolulu, Hawaii 96813  
Tel (808) 528-5557 • Fax (808) 528-0421 • www.prp-hawaii.com

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According to DBEDT, total wage and salary jobs in the accommodation and food service sectors fell by 2.6% and 1.0% respectively through September 2010 year-to-date. Hotel occupancy rates increased slightly by 2.0%, and UHERO estimated an increase in visitor spending by 15% through September 2010; however it is important to note that these figures are compared to significantly low levels experienced during 2009.


According to UHERO, Hawaii County's unemployment rate through September 2010 was 9.9%. Construction and Mining jobs continued to be hit the hardest as jobs declined by 15.2% through September 2010. The pipeline of construction work generated from the Federal and State stimulus plans continue to provide some relief, however the considerable fallout from the private sector continues to hamper the overall health of the construction industry.

Additionally, the Hawaii Carpenters Union, Local 745 reports that 69% of their Hilo members and 91% of their Kona members are currently unemployed.

**Benefits from this Project:**

- Estimated project costs may exceed \$1 billion – potential for federal money to be infused into the State's and County's economy creating both direct and indirect local jobs.
- Due to the highly sophisticated and technical nature of the project, certain construction material and equipment that is available in Hawaii will be procured locally, supporting local vendors and suppliers.
- Along with construction workers, positions that need to be filled include: administrative and financial services, software and information technology engineering, mechanical engineering, and installation and service technicians. The project will provide varied job opportunities that cover a wide variety of skill sets and knowledge base.
- Skilled trade employees include: carpenters, steelworkers, electricians, plumbers; heavy equipment operators, laborers, supervisors, shipping and trucking service workers, caterers, paramedics, security personnel, and vehicle mechanics.
  - Construction crew personnel are expected to receive Union wages
  - Estimated 50-60 workers would be required at the TMT observatory construction site alone; during certain phases, up to 100 workers
- Housing and support services will be provided to certain construction personnel if they choose to take advantage of such a facility.



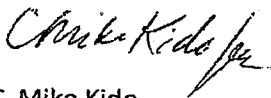


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Aside from the benefits to the worldwide and local communities affected by this project, we feel that TMT is a critical component for helping to bolster an already depressed economy on the Big Island of Hawaii by creating jobs that will put local construction workers back to work.

Thank you very much for this opportunity to comment on this project.

Respectfully yours,



C. Mike Kido  
External Affairs

Department of Land and Natural Resources  
 Office of Conservation and Coastal Lands  
 December 3, 2010  
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## Notes:

## DBEDT (as of September 2010)

- Hawaii county unemployment rate: 9.9% YTD; a 0.2% increase from 2009 YTD
- Total Natural Resources, Mining, and Construction jobs decreased 15.4% compared to 2009 YTD
- General excise and use tax revenues fell by 6.4% compared to 2009 YTD
- Private building permits up by 14.4% compared to 2009 YTD

**ACTUAL AND FORECAST OF KEY ECONOMIC INDICATORS FOR HAWAII: 2008 TO 2013**

Economic Indicators	Actual			Forecast		
	2008	2009	2010	2011	2012	2013
Visitor expenditures (million dollars)	11,398	9,993	11,470	12,439	13,393	14,401
Personal income (million dollars)	54,612	54,495	55,969	57,747	59,768	62,039
Total wage & salary jobs (thousands)	625.4	597.7	595.3	601.9	609.3	617.2
<b>Annual Percentage Change</b>						
Visitor expenditures	-11.0	-12.3	14.8	8.4	7.7	7.5
Personal income	4.0	-0.2	2.7	3.2	3.5	3.8
Total wage & salary jobs	-1.0	-4.4	-0.4	1.1	1.2	1.3

Source: DBEDT – Outlook for the Economy, 4<sup>th</sup> Quarter 2010

[http://hawaii.gov/dbedt/info/economic/data\\_reports/qser/outlook-economy](http://hawaii.gov/dbedt/info/economic/data_reports/qser/outlook-economy)

## HCU

- Hilo: 69% of active members are unemployed
- Kona: 91% of active members are unemployed

**Hugh Y. Ono, P.E.**  
**455 Ekela Street**  
**Hilo, HI 96720**  
**Ph: 808-959-1342 E-mail: [hono@ssfm.com](mailto:hono@ssfm.com)**

**Chair and Members**

**Testimony: File No. CDUA HA 3568:**  
**University of Hawaii at Hilo**

**As a citizen of Hawaii County, I support and encourage approval of the CDUA for the 30 MM TMT Telescope.**

**This proposal has already received community support and will be compatible with the other telescopes and activities on Mauna Kea.**



ROBERTA CHU  
478 Kipuni Street  
Hilo, HI 96702

November 17, 2010

Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
PO Box 621  
Honolulu, Hawai'i 96809

RE: University of Hawaii at Hilo Cдуа HA-3568

Dear Sirs,

My name is Roberta Chu and I am a resident of Hilo. I was born and raised in Hilo, left for college, lived in Los Angeles, CA then returned to Hilo in 1994. I am commenting on Permit Cдуа HA-3568 and would like to receive notice of the determination on this application.

I have been a supporter of UH Hilo's Comprehensive Management Plan for Mauna Kea, the Thirty Meter Telescope's Environmental Impact Statement and believe that the Conservation District Use Application submitted by the University of Hawaii at Hilo for the Thirty Meter Telescope project is comprehensive and includes a well thought out management plan of the project. The application properly addresses environmental and cultural mediation steps necessary to build a project of this magnitude. I believe that the Board of Land and Natural Resources should approve the application and issue a permit for the project to begin construction.

I believe that there has been a necessary paradigm shift in how development is handled on Mauna Kea. It cannot be at all costs, rather, must create a balance between advancing science while respecting the environment and culture. TMT has shown it is committed to this island community through efforts made in improving STEM education opportunities for our children and educating local students for the jobs that will be available when the telescope attains first light.

The funding of a \$1 million per year at the time of construction throughout the duration of the ground lease is a testament of TMT's commitment to Hawaii Island. We need this application to be approved so the project can succeed, bring the best of astronomy to the best viewing place on this earth and provide hope for our island's future generations.

I urge the Board of Land and Natural Resources to approve this Conservation District Use Permit.

Sincerely,



Roberta Chu  
an Individual and Past Chair of Hawaii Island Economic Development Board



Hearing for Thirty Meter Telescope (TMT) Conservation District Use Application (CDUA)  
 Thursday, December 2, 2010, Hawai'i County Council room, Hilo  
 comments by Cory Harden, PO Box 10265, Hilo, Hawai'i 96721  
[mh@interpac.net](mailto:mh@interpac.net) 808-968-8965

The eyes looking up forget to look down. The eyes search the stars for the origin of life. But the feet trample what evolved from that origin, and trample what shows us how to revere and live in harmony with all life.

We're told it's about culture and science co-existing. But largely it's about making the illegal occupier of Hawai'i, the United States, world astronomy's top dog.

When the Mauna Kea Management Board (all UH-appointed) was told last month that their Environmental Committee hadn't met for one year, they basically said "ho-hum."

The Board of Land and Natural Resources wrongly delegated protection responsibilities to UH. UH's mandate and expertise is advancing knowledge, not protecting mountains. Studies document how UH-supervised observatories have caused serious impacts to Mauna Kea.

UH only charges \$1 a year rent. This violates the law for public trust lands, which calls for fair market rent, deposited to a public lands trust fund. TMT's sublease payments wouldn't go to any fund, but to UH—giving UH reason to protect TMT, not Mauna Kea.

Before TMT, or any new telescope footprints, are considered, we need a vision for Mauna Kea, developed by the whole community. This vision should balance conflicting interests, not favor UH and observatories like UH's so-called "Comprehensive Management Plan" (CMP).

TMT would violate the law. The law requires that conservation land uses DO NOT "cause substantial adverse impact to existing natural resources" and DO preserve or improve on "existing physical and environmental aspects". But TMT wants a pristine plateau for the biggest observatory ever on the mountain—rising over 18 stories, covering over 50,000 square feet. TMT describes this as adding "a visual element to the Northern Plateau".

TMT says there is no evidence that observatories have impacted cultural practices. So no cultural practices would be impacted if TMT built on Mount Fuji?

TMT says essentially that impacts to Mauna Kea are already severe, and TMT won't make it much worse.

Will TMT begin decommissioning just ten years after it's built? It would have to, under UH "CMP" requirements regarding lease expiration in 2033.

What if TMT is built following UH's "CMP"--then the Intermediate Court of Appeals, which is now reviewing the "CMP", rules it is inadequate?

TMT's Conservation District Use Application should be denied, and BLNR should help develop a true Comprehensive Management Plan that ends the trampling of Mauna Kea.



Testimony in favor of a CDUP for TMT

My name is Richard Ha. I am a native Hawaiian farmer. Together with 66 workers, our family farms banana and hydroponic vegetables on 600 fee simple acres at Pepeekeo.

First of all, I want to aloha all the folks like Kealoha, Ku Ching, The Sierra Club, Paul Neves, the Royal Order, the Kanaka Council and others who have worked tirelessly on behalf of Mauna Kea. It is true that in modern Hawaiian history, the culture has given, given, given and the economy has taken, taken, taken. And, I appreciate the passion the folks feel about enough is enough. Kala Mai. But, I think that together we can accomplish turning the economy in favor of the culture. But, it is complicated and difficult and will take trust and understanding from all of us.

The world has changed forever. I attended three Peak Oil conferences and it is now the general consensus that we have hit Peak Oil, the point which we will not be able to increase oil production any more. In fact, oil supplies will be declining. Lloyds of London issued a white paper in June they are advising their business clients to be ready for \$200 oil by 2013. This will mean that the tourist industry will be devastated. Gas will cost \$7 per gallon and electricity and water will increase by two and a half times.

People will be even more pressured than before. Social service programs will not have money. County and State government will cut back even more. Those on the lowest rungs of the economic ladder will be the first to get their lights turned off, too often they will be Hawaiians. People are right now getting laid off from jobs. It is very frightening and we can do something about it. **I can say without a shred of a doubt that Hawaiians are overwhelmingly in favor of the TMT.**

When I first heard that the Thirty Meter Telescope (TMT) was interested in coming to Mauna Kea, I volunteered to be on the Hawai'i Island Economic Development Board's TMT committee. If it was going to happen, I wanted to have a hand in making sure it was done right.

At the time, I was just a banana farmer minding my own business. But, it was clear to me that I needed to learn about the Hawaiian culture and the effect on the Hawaiian people, whose views on Mauna Kea were deeply rooted. That led me to Keaukaha, the oldest Hawaiian Homes community on the Big Island and the Keaukaha elementary School the center of the social structure. Lehua Veincent was principal of the school.

I thought that I had a reasonable plan of action when I asked Kumu Lehua what he thought about asking the TMT folks to give Keaukaha Students five full ride scholarships to the best schools in the nation. He looked at me and in a gentle way he asked; "and what about the rest"? I could feel my ears getting red. Indeed, what about the rest? That was a lesson I will never forget.

The TMT folks engaged HIEDB to do community outreach and we did that for about a year when they decided to engage the University of Hawaii at Manoa directly. But, having met and liked the folks in the community I continued to talk story with Kumu Lehua and then Patrick Kahawaiola'a, the President of the Keaukaha Community Association. Occasionally, I would drop by and give the kupuna bananas or tomatoes—whatever was in oversupply.

One day, I asked Kumu Lehua where the students go on excursion. He told me that they do not go on regular excursions, instead they walk around the community because they did not have enough money for the bus. I thought that everybody went on excursions. Here we were in Keaukaha, the most Hawaiian of Hawaiian communities, looking up at Mauna Kea where there were millions of dollars of telescopes on the mountain and the kids could not go on excursion because they could not afford the bus—I was speechless.

I thought, "this no can". I called my friend Duane Kanuha and we came up with the idea that we would start an adopt-a-class program. It would be designed like the adopt a child program one saw on TV, where for \$25 or so, one could adopt a child and the child would send a note and photos, showing how his/her life improved. We decided to set \$600 as the amount it would take to adopt-a-class so they could go on excursion. Three hundred dollars would go toward the bus and three hundred would go toward entry fees for Imiloa the world class Hawaiian science and culture museum—should the teachers want to take the kids there.

We went and told the community the story and they responded. In four months, we had all the classes from K-6 adopted, both semesters. And they started to all go on excursions.  
<http://hahaha.hamakuasprings.com/2007/11/adopted-class-e.html>.

Chef Alan Wong was one of the first to get involved in the adopt-a-class program. One day he called me and said, "I want to talk to the class I adopted" This led to him giving a class to the 6<sup>th</sup> graders.  
<http://hahaha.hamakuasprings.com/2008/03/chapter-3---kea.html>. Leslie Lang wrote about it—

*The principal of the school told me they never get people of such celebrity speaking to, and inspiring, their kids. Richard says that one of the teachers told him, too, that no one comes to Keaukaha Elementary to tell the kids they too can do it. He says the teacher had tears in her eyes when she told him that.*

*It was really an incredible morning.*

The Gordon & Betty Moore Foundation heard about our Adopt-A-Class project and they took the idea island wide. They were going to sponsor half of all students on the island to visit 'Imiloa Astronomy Center, but then the bus company heard about it and offered such a huge discount that they were able to offer it to every student on the island, in every public, private and charter school.

In the one year that the TMT disengaged with Big Island folks, the feeling in the community was overwhelming that the TMT would be going to Chile. The TMT had not found any success when dealing directly with the UH. But, Dr Henry Yang, the Chancellor of UC Santa Barbara, the new President of the TMT Corporation wanted to assess the situation for himself. So, he came with his friend Dr Jean Lou Chameau, the President of Cal Tech University to visit the island.

I was there at that meeting. Dr Yang asked what I thought and I told him that it would take a lot of work and they would have to talk to the community directly. Henry was a people person. By the end of the meeting I could tell that he was the kind of person one could do business with on a handshake.

He and Jean Lou visited the Big Island at least 15 times and because of the relationship I had built up in the Keaukaha Community with the adopt-a-class project I was able to bring them to community meetings with the real grass root folks. To their credit they agreed to meet with even the most strident activists on the island.

They visited Keaukaha Elementary School four times. Can you imagine, the president of the TMT and the president of Cal Tech visiting Keaukaha schools so many times, that they had become a fixture, as in; "eh, where you guys going now? Come, come-- go eat".

And, the relationship and trust grew. Henry and Jean Lou started to understand that the lowest common denominator that folks on all sides of the issue could agree on was—keiki education. So, one of the foundation pieces they agreed on first was to commit \$1 million per year for keiki education. It was to start as soon as the construction permit was issued, through the construction period and the life of the TMT. This was estimated to be 58 years. Imagine, \$58 million dollars for the education of keiki on the Big Island.

The TMT is applying now for the construction permit. If it is approved and we get the \$58 million dollars for keiki education, it will be largely because people cared about people and sent the kids on excursion just because it was the right thing to do.

Just in the last few years the world has changed, world oil supplies are declining and people will be losing their jobs. When oil prices rise we could see the destruction of our tourist industry. There could be social upheaval. But, we on the Big Island have the gifts of Mauna Kea and geothermal to help us thorough the coming trying times

In Viet Nam we lived by the code; "we all come back or no one comes back". Do we dare to trust each other again?

In modern times, the culture gave, gave, gave, and the economy took, took, took. Can we do astronomy on Mauna Kea and utilize indigenous geothermal energy at the same time for the benefit of our people---- who occupy the lowest rungs of the economic ladder? We have a unique opportunity for change where we can utilize these gifts so the economy can give, give, give and the culture can receive, receive, receive. Do we dare to trust? Can we believe in taking care of each other again? Can we take the new path to a brighter tomorrow?

Native Hawaiians are overwhelmingly in favor of the TMT. Just like the voyagers who traveled to Hawaii from the south. Can we imagine a better tomorrow. If we can, we will see the rebirth of the Aloha spirit. And, the Aloha spirit is what will carry us through the changing tomorrows.

My Pop, used to tell me; "get thousand reasons why no can. I only looking for the one reason why--CAN"!!

Richard



Kukauakahi (Clarence Ching)  
 Second Supplemental Testimony in Opposition to CDUA HA-3568 (TMT)  
 Board of Land and Natural Resources  
 Kailua-Kona, Hawai'i  
 December 3, 2010

This submission is to supplement testimony that I have previously caused to be placed on the record. My opposition to the project continues. And I reiterate my request for a contested case hearing.

Looking at the following:

### 1.2 OVERVIEW OF THE PROPOSED USE

On behalf of the TMT Observatory Corporation, the University of Hawai'i is seeking a Conservation District Use Permit (CDUP) from the State of Hawai'i Board of Land and Natural Resources (BLNR) that will allow the construction, operation, and eventual decommissioning of the Thirty Meter Telescope (TMT) Observatory.

The transaction appears to be one in which u.h. (a party) applies to BLNR for TMT Observatory Corporation (a third party) to construct (and eventually decommission) the TMT Observatory.

This transaction brings up the important and interesting legal principle of privity.

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From Wikipedia, the free encyclopedia:

The doctrine of privity in contract law provides that a contract cannot confer rights or impose obligations arising under it on any person or agent except the parties to it.

The premise is that only parties to contracts should be able to sue to enforce their rights or claim damages as such. However, the doctrine has proven problematic due to its implications upon contracts made for the benefit of third parties who are unable to enforce the obligations of the contracting parties.

---

Under this definition - BLNR would have privity with u.h., but not with TMT. This doesn't say whether or not u.h. has privity with TMT. However, it can probably be assumed that it does. The fact, one way or the other isn't disclosed in the CDUA - but it should. If there is no privity between BLNR/DLNR and TMT - there may well be many loose strings that could cause future potential problems.

For instance - if there are any screwups committed by TMT - How does BLNR/DLNR place any kind of liability on TMT (if there is no privity between the two)? Or, is it intended that u.h. be responsible to BLNR/DLNR for any screwups that TMT commits

on the mountain? Whether u.h. would be liable for such a situation isn't clear, and it should. Or, Is it that u.h. is TMT's agent? Or is there some other kind of relationship that we have no knowledge about?

Responsibility should be placed where responsibility is. The relationships acquiesced to by this CDUP could create dangerous hurdles for BLNR/DLNR and has an odoriferous smell. At the very least, a document outlining the privity that exists between u.h. and TMT should be part of the CDUA. Therefore, unless such documentation is submitted, this CDUA should be denied.

Furthermore, at:

#### 7.2.2 VISIBILITY OF THE TMT OBSERVATORY

The results of the viewshed analysis conducted for the proposed project concluded that it would be potentially visible from roughly 14 percent of the island area, as summarized in Table 7.3 and depicted in Figure 7.3. One or more of the existing observatories is visible from nearly all of this area. According to 2000 U.S. Census data, approximately 15 percent of Hawai,i's population, or 23,000 people, live within the viewshed of the TMT Observatory.

While the occurrence of possible negative visual impacts is probably intended to be minimized - as "only" 15 percent of the island's population is supposedly affected by viewing from the subject areas - the inferential conclusion is probably that the effect has therefore been mitigated - The fact remains that this proportion of the island's population is affected 100% by having the TMT in sight at all times of the day. I'm sure that the failure to characterize this effect on the affected populace is unintentional.

However, whether intentional or not - my personal views of the mountain from where I live in Waimea will be 100% affected. Interestingly, as it happens, images of the mountain, complete with observatories, often linger in my mind even while I'm not directly observing the mountain. The general result is that the effect happens - and it happens at all times of the day AND night. It even carries over into dreamtime.

On the other hand, the following situation must be further addressed:

#### 7.2.3 TMT OBSERVATORY DOME FINISH

The finish for the TMT Observatory dome will be a reflective aluminum-like finish, similar to that of the Subaru observatory. The use of a reflective aluminum-like finish was based on the following considerations (1) visibility of the dome, (2) optimum performance of the observatory,

and (3) reduced need of cooling air within the dome during the day. When considering the visibility of the dome, the aluminum-like exterior finish was selected over white and brown because the aluminum-like finish reflects the colors of the sky and ground, which helps the dome blend into its setting and reduces the visual impact whether the summit is bare or covered in snow.

This discussion may be partially true at certain times of the day, but, for other times, it is pure speculation.

The Subaru is totally illuminated and shines like a lighthouse by the gleaming sun at sunrise and sunset. I suspect that a TMT with the same or similar exterior finish would do the same. This adds insult to an already intolerable situation. It seems that cost considerations for cooling has been allowed to trump otherwise overwhelming negative visual concerns.

If the TMT is permitted, its exterior finish should not be the aluminum-like exterior that is suggested here.

A most important issue that must be raised is about TMT Observatory Corporation which, in the CDUA, is described as "a private non-profit corporation that will be responsible for constructing the TMT project and for managing its operations." There is no additional, especially financial, information about this entity - and financial information about any participating corporate entity is most important.

However, remember, it is University of Hawaii- Hilo (UH-Hilo) that is the Applicant.

So, Who is TMT Observatory Corporation? And What is its relationship, legal or otherwise, to UH-Hilo? If the permit is eventually granted, and the party supposedly responsible (TMT Observatory Corporation) does not perform, Who then becomes the party that will be legally responsible for guaranteeing that the project is completed and operated according to the intent of the CDUA?

For instance, there is no relevant information about TMT Observatory Corporation and its legal relationship to UH-Hilo, the Applicant, or its ability to adequately build the observatory that is being applied for. What is its financial ability or history? What is its operational history?: Has it participated and completed similar projects during its existence? Who are its financial backers?

There is no copy of TMT Observatory Corporation's Profit and Loss or Assets and Debts statements. Such documentation is absolutely necessary to be part of the record - so responsible decisions on whether to grant or deny the CDUA can be made. How else can responsible decisions be made on projects of this size and importance?.

For example, Does TMT Observatory Corporation have the total funding in hand necessary to construct and complete (and even de-commission when necessary) the applied for project? Is TMT Observatory Corporation ready and willing to perform? Where are the assurances that the Project will be completed as represented so that the State of Hawaii (and the people of Hawai'i), if the project fails, will not have a white elephant on its hands.

If TMT Observatory Corporation fails to have the credit ability to complete the project, are there individuals or institutions connected to the corporation who will give their personal/institutional guarantees for completion to happen?

So, at the very least, it is necessary that financial statements to the financial fitness of this party (the corporation) be on the record. Ideally, the complete budgeted amount of the project should be deposited with an escrow agent - if only to prove that this CDUA is not a frivolous attempt to confuse the system. Or, if the quality of assurances is superior - a bond by a top-rated financial institution could be accepted.

With a bit of persistence, any individual or institution of any persuasion could submit a CDUA like this one. And it would be BLNR's/DLNR's obligation to verify that applicant's abilities.

Additionally, because of the present economic situation in the United States and the State of California (from whence the major players originate), even if total funding is available - in the 7 years proposed for construction - that that amount, because of a suggested super inflation on the horizon, may be insufficient to complete the project.

I suggest that the financial issues brought up here must all be responsibly addressed with answers adequate to make the intended project completion 100% probable.

It would be a total failure of the fiduciary responsibilities of the Board of Land and Natural Resources, without the necessary documents that is being called for, to grant this permit application. If such assurances aren't presented - this CDUA must be denied.

If one is familiar with banking feasibility studies regarding mining companies - something similar may be happening here. In the case of mining companies, they drill and drill to establish an economic resource. Then an accepted expert takes that information, organizes a business plan that has the probabilities to be successful. Such banking feasibility plan is used to raise money from investors and financial institutions so that operations can take place. If everything turns out as predicted, the mine makes money, the investors are rewarded and everyone is happy.

Could it be that in this case - that a CDUP could be used to raise necessary funds (that should be in place) but are not. For instance - such a CDUP could be used to convince the NSA to dedicate its budgeted approximately \$242 Million to this project's account. Or



- maybe this is the impetus needed for those observers (Japan, China and India) to become full partners in the venture.

However, if the total moneys required to complete construction are in escrow or bonded - using the CDUP to obtain any necessary funds would not be an issue.

DATED: Kailua-Kona, Hawai'I, December 3, 2010.

*Kukauakahi*  
Kukauakahi (Clarence Ching)





## Hawaii Island Chamber of Commerce

106 Kamehameha Avenue  
Hilo, Hawaii 96720  
Phone: (808) 935-7178  
Fax: (808) 961-4435  
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December 2, 2010

Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
1151 Punchbowl Street, Room 131  
Honolulu, Hawai'i 96813

Re: File No.: CDUA HA-3568

**2009-10 Board**

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Art Taniguchi  
Ron Terry  
Steve Ueda  
William Walter

The Hawaii Island Chamber of Commerce was founded in 1898 and celebrated its 112<sup>th</sup> anniversary this year. The Chamber represents both large and small businesses on Hawaii Island and has approximately 300 member businesses comprising more than 700 individual members. We provide leadership and advocacy for business, while also promoting economic well-being of our island community.

The Thirty Meter Telescope is one of the most important and significant projects for this island and our state. It will fuel economic growth by providing hundreds of construction jobs for the better part of a decade and will help to further diversify and grow our economy by providing our children the opportunity to utilize their scientific and technical talents without having to leave Hawaii.

It is estimated that 300 construction jobs will be created during the anticipated eight to ten year construction period with additional jobs created through the need of supplying materials and other services for this work. We anticipate that much of this will be purchased locally.

Once completed, the Project will employ up to 140 full-time employees and will create additional employment opportunities some of which have been realized through TMT's use of local companies for work and services already performed.

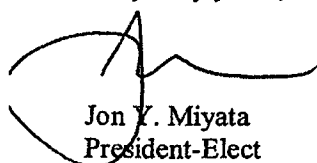
The sublease between the University of Hawaii and TMT will also provide benefits in the form of yet to be negotiated sublease rent and telescope viewing time for the University. Sublease rent will be used to assist in the management of Mauna Kea lands within the UH Management Area, something this community has wanted and supported through the approved University Comprehensive Management Plan.

Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
December 2, 2010  
Page 2


Having TMT here in Hawaii will contribute to furthering Hawaii's goal of diversifying our economy by focusing on more sustainable market areas such as science and technology. We envision TMT being a point of focus to our island by encouraging educational excellence that could form the basis for technology based, innovation driven opportunities in energy, agriculture, information technology and scientific research and support.

Our members also support the TMT's proposed use and believe it is consistent with astronomy facilities within the University Management Areas and will be operated in a manner that fulfills the objectives of the Conservation District Resource subzone. We strongly recommend that the Board of Land and Natural Resources approve the Conservation District Use Permit Application.

Very truly yours,



Jon Y. Miyata  
President-Elect




Aloha, my name is Nimr Tamimi, I am a lifelong resident of the Island of Hawaii. I am in support of your approval of TMT's Conservation District Use Application. As you already know from the application,

The Cumulative impacts from astronomy, road access, snow visitors, hunters, hikers is already here and has been for decades. TMT will not add to the impact already up on the mountain.

TMT is committed to proper environmental stewardship and the concept of sustainability planning for operations of the observatory.

TMT will maintain a trained biologist on site to monitor activities during earth movement.



TMT will develop an Invasive Species Prevention and Control Program.

TMT will monitor arthropods in the area of the Access Way prior to, during, and for two years after construction on the alpine cinder cone habitat.

To limit noise and dust, TMT will implement a Ride-Sharing Program, reducing number of vehicle trips between Hale Pohaku and the TMT site.

To lessen the visual impact on Maunakea, TMT design efforts will reduce its size, finish the support building and fixed structure exterior with a lava color, and finish the dome with a

reflective aluminum-like finish similar to the Subaru Observatory.

We have been fortunate enough to have firsthand experience working with the people at TMT, they have strictly followed their commitment to environmental stewardship and cultural training. As part of our orientation, we participated in formal classes and received an education on Maunakea and its cultural and environmental significance.

We were instructed as part of our surveying operation to leave no "foot print" on Maunakea, all markings needed to be removable and once we were done with the work, we were to leave the area as we found it. This resulted in a lot of extra cost for TMT.

The people at TMT have showed me that they practice what they preach and I believe that they will continue with this approach throughout this project.

Thank you very much for your time in allowing me this opportunity to speak and your efforts in reviewing this application. I hope that you find the application to your satisfaction and I hope that you will be able to support this application.

**Public Hearing on CDUA HA-3568 for the proposed Thirty Meter Telescope (TMT) at the Mauna Kea Science Reserve, Kahohe Mauka, Hamakua, Hawaii, TMK (3) 4-4-015:009**

Submitted Dec. 2, 2010 to:

- State Of Hawai'i Department Of Land & Natural Resources
- State Of Hawai'i Board Of Land & Natural Resources

To whom it may concern,

Mai ka loko i'a pulama 'o Hale o Lono i ka wahi kapu loa 'o Mauna a Wakea, welina me ke aloha. I come before you as a kia'i loko of Hale O Lono in the ocean community of Keaukaha, as an 'olapa hula of the Na'ope line and as an educator of 'opio in our public school system. I come forth with my kupuna in strong opposition of the proposed Thirty Meter Telescope atop Mauna Kea.

This proposed development concerns me deeply on many levels. Although my practices do not call for frequent venture into the wao akua that is Mauna Kea, the vitality of this essential realm greatly impacts my practices as well as those of my fellow practitioners. In kind, alteration to and desecration of Mauna Kea greatly hinders the training of next generation practitioners of all facets of Hawaiian cultural practice. Know that our indigenous practices are holistic practices that are inclusive of multiple environmental & spiritual realms. It is not only the ho'okele wa'a (navigators) and the kilo lani (astronomers/meteorologists) whose practice is impacted by this decision, the 'olapa hula (hula dancer), the la'au lapa'au (physician), the mahi'ai (farmer), the lawai'a (fisherman) and the po'e 'ulana (weaver) also bear the ramifications of your decision. Without practitioners and the necessary land base from which to practice, we have no practice, we have no culture; we have nothing to leave to our children and their children that make Hawai'i, Hawai'i.

As a student of science in both undergraduate & graduate studies, I understand the many benefits (intellectually & economically) that modern science can provide to this and future generations and the many avenues of inquiry yet to be traveled. However, the avenue of this TMT venture leaves nothing but cultural, spiritual & environmental decimation in its wake. The stakeholders whom you serve are not willing to pay that heavy a price for an implausible pledge of local economical

prosperity and an inflated promise of "new" knowledge that already exists in resources left to us by our kupuna. The very nature of science also involves the investigation of alternate means of discovery. Such is the case with TMT; there are alternatives to the use of such a sacred and culturally significant place that is Mauna a Wakea, alternatives that do not potentially destroy an entire culture of people.

As a science educator at a high school that focuses primarily on environmental stewardship, I must again advocate against this venture on behalf of my students who will inherit the environment that we leave for them, along with the irreversible ill-effects this venture will create. Once two stories of 'aina has been unearthed and thousands of feet of sacred ground has been demolished, there is no un-doing of those actions. The mountain is changed forever, the alignments are lost forever, the watershed is altered forever. By allowing this TMT venture to move forward, you as the agency charged with protecting and conserving our natural environment (now and for future generations), will bequeath to these students and their families an island absent of its focal point, absent of its most cherished kupuna, absent of its mana.

As a practitioner of Kanaloa and of Laka, of Ku and of Hina, and as an educator of young Hawaiians, I charge this public entity to truly consider the questions and concerns of this venture that are brought forth. I urge you to think carefully about the legacy of the land you leave behind to the people you serve. I implore you to deny the proposed development of the Thirty Meter Telescope atop Mauna Kea. Any decision to the contrary ensures the permanent demise of our most sacred kupuna and the obliteration of the irreplaceable natural world that is Hawai'i.

Me ke kuleana,



Roxane Kapuaimohalaikalani Stewart

*Kia'i Loko – Loko I'a 'O Hale O Lono*

*President of Hula Halau O Kou Lima Nani 'E, Inc.*

*B.A. - Marine Science, M.A. - Marine Resource Monitoring & Education*

*Secondary Science Teacher, Ke Ana La'ahana*

94 C W Kawaiilani St.  
Hilo, HI. 96720

Email: [rstewart99489@hawaii.rr.com](mailto:rstewart99489@hawaii.rr.com)






Aloha,

I'm Gene Leslie and serve as second vice president of the Association of Hawaiian Civic Clubs and President of Hawaii Island Council.

Our purpose is to be a strong voice at County, State and Federal levels. Our mission is to serve in advocacy of culture, health, economic development, education, social welfare and nationhood.

Every two years we hold a convention. This is an opportunity to generate support through Resolutions transmitted to the Governor, President of the Senate and the Speaker of the House of Representatives and the appropriate County Mayors.



In 2008, the Association of Hawaiian Civic Clubs passed two Resolutions in support of the Maunakea Comprehensive Management Plan and forwarded these to the appropriate bodies including the Board of Land and Natural Resources.

We continue to support the efforts of the Mauna Kea Management Board for responsible management for the UH management areas on Mauna Kea.

At our 2010 convention, our Mainland Council had been given misinformation about the CMP and Thirty Meter Telescope. We spoke with gentleness to the council on the positive forward progress our community has made in regard to the CMP and TMT. They questioned and listened and in the end, stood with us in continued support of the CMP and TMT.

Because of open and transparent dialog, we trust TMT in their commitment to be good stewards on Mauna Kea.

The TMT team are not cultural experts, they are builders of this highly anticipated observatory but they respect the sacred place that this mountain holds for us as Native Hawaiians.

If they are given a permit to build, it will be our responsibility as Native Hawaiians to work with TMT on cultural matters.

We wish this project all the best because of what it will bring to Hawaii – Science, education and jobs for our people.

The opportunity to have the world's most advanced telescope on Maunakea would please our kupuna. King Kalakaua certainly agreed. His foresight as a leader and bringing astronomy to Hawaii certainly serves as an example for all of us to follow.

Mahalo,

Gene Leslie



Office of Conservation and Coastal Management  
 Department of Land and Natural Resources  
 P.O. Box 621 Honolulu, Hawaii 96809

December 15, 2002

RECEIVED  
 CONSERVATION  
 LANDS  
 DEPT. OF LAND &  
 NATURAL RESOURCES  
 STATE OF HAWAII

Re: the Thirty Meter Telescope

I note that Jim Albertini has been writing to you opposing any further development on Mauna Kea. I have known Jim since 2004 when I moved here from San Diego County. We worked together for world peace for several years but Jim has other issues I do not agree with. Some five years ago he told me that when the natives took over I could apply for a green card if I wanted to stay. The final lines of his letter to you of December 2 indicate his true feeling. **Quoting Jim:** "What is truly needed to heal is to end the ongoing illegal U.S. Occupation of Hawaii. I am confident that a reinstated independent nation of Hawaii would never permit the desecration of its most sacred temple." Jim and his followers would drive a wedge between the peoples of Hawaii. I disagree – it is far better to unite people. I know one Hawaii cultural practitioner who would take the islands back to a pre-contact (by definition a stone-age and prehistoric) society. He sees no reason for a written language.

I can say much more on this subject, but not in this letter. I am a retired navy officer and a retired electronic engineer with wide ranging interests. I worked at Imiloa as a volunteer for some 600 hours and I have been active in various local organizations.

**I heartily endorse the TMT as a most desirable project for Mauna Kea – for Hilo and Hawaii -- and for the world. It is a win-win situation.** Please do not be deterred by those who fail to see that and would take the islands back to a time of human sacrifice and capital punishment for eating bananas – a time without a written language, autos, electricity, easy communication or transportation – a time without pizza or Spam.

See the attachment. I welcome the opportunity to write more on this subject.

Cordially, Gene Barber

*Gene Barber*

Attachment to my letter of December 12, 2010. Gene Barber

[Here is a letter from Kenneth R. Conklin of Kaneohe, Oahu as it appeared in the Hilo Tribune-Herald for July 6, 2006. Your comments are invited. You may visit the web site at your own risk.]

There's a lot of demagoguery about Mauna Kea from people using it as a pawn in their political power games, or demanding money for "lease rent." Shame on them! Telescopes generate no revenue -- they only serve the quest for knowledge, our sense of awe and wonder.

The spiritual essence of that sacred mountain is fulfilled precisely by doing astronomy there. Please see <http://tinyurl.com/4fhkx> for further analysis.

According to the creation story of Kumulipo, the primordial ancestor is Haloa. Haloa's father was Wakea (sky father). The ancient name of Mauna Kea was Mauna a Wakea -- Wakea's mountain. It's the best place to study the sky. Haloa's mother was Ho'ohokukalani (She Who Placed the Stars in the Sky.) There is no better way to worship Mother Ho' ohokukalani than to gaze upon her stars and to study them.

There's no better way to honor the ancestor-astronomers than by studying the stars from the one place in Hawaii that is closest to them.

Ancient Hawaiians did not hesitate to dig into the ground at the summit of Mauna Kea, and to use the area for technology -- there's still an ancient adz quarry there!

Poliahu continues to bestow her blessing (snow) equally upon all who go there regardless whether they pray through their mouths or through the eyepiece of a telescope.

**Vaughn G. T. Cook**  
 120 Pauahi Street, Suite 312  
 Hilo, Hawaii 96720  
 Ph. (808) 961-0406 Fax (808) 961-3815

2010 DEC -3 A 9: 28

DEPARTMENT OF LAND &  
 NATURAL RESOURCES  
 STATE OF HAWAII

December 2, 2010

VIA Facsimile (808) 587-0322  
 Department of Land and Natural Resources  
 Office of Conservation and Coastal Lands  
 P. O. Box 621  
 Honolulu, Hawai'i 96809

RE: Request for Approval of the THIRTY METER TELESCOPE's Conservation District Use Application, File No. CDUA HA-3568

Ladies and Gentlemen:

I appreciate your taking the time to travel to our community and listen to the testimony of the people who live and work here. This is an important issue to the people of the Big Island as well as to the people of the State of Hawaii.

I recommend that the above-referenced Conservation District Use Application ("CDUA") be approved. I was present at many of the previous meetings on the proposed Thirty Meter Telescope ("TMT") and offered testimony several times. I am pleased to see the progress that has been made since then and have confidence that the TMT will be a good steward of the mountain. I have come to know many of the people involved with this project and I am convinced that they are capable and responsible people of the highest integrity who have the best interest of the entire community at heart.

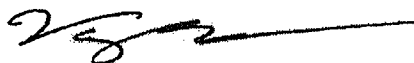
I am a fourth generation resident of the Big Island, born and raised in Hilo. I attended local schools and went to the mainland to further my education and career. When our second daughter was born, my wife and I made the decision to return to Hawaii so they could have the opportunity I had to grow up surrounded by our extended family in what we believe to be the best place to grow up and live. We take our children's education and future very seriously and believe that your approval of the CDUA and continued support for the TMT is essential to allowing the respectful use of the mountain as one of the best sites for genuine science in the world for the benefit of all residents of Hawaii. Without the CDUA approval and astronomy moving forward, the jobs which would allow our children to stay in Hawaii and support their families would disappear.

Thank you again for taking the time to come to our community to hear from the community. Please understand that the vast majority of the community understands what is at stake and strongly supports the TMT and astronomy community.

Department of Land and Natural Resources  
December 2, 2010  
Page 2

I thank you in advance for doing the right thing for Hawaii and our children by approving the TMT application and allowing the project to move forward.

Very truly yours,



VAUGHN G. T. COOK

From Jerry Chang -- State Representative, 2<sup>nd</sup> District

December 2, 2010

Testimony in support of the Maunakea TMT.

Aloha and thank you for the opportunity to offer comments on the proposed Thirty Meter Telescope. I support the project for the Mauna Kea location for the following reasons:

- Hawaii is fortunate to have one of the best geographical sites in the world for the study of astronomy. The state should take advantage of this asset to secure the Thirty Meter Telescope, which would be the largest optical/infrared telescope in the world.
- The Environmental Impact Statement (EIS) addresses plans to mitigate environmental concerns, and acknowledges the differing concerns on the impact on cultural resources. I believe these issues can be resolved satisfactorily given that the legislature just passed a measure in 2009, House Bill 1174, giving the University of Hawaii the authority to oversee management of the Mauna Kea lands.
- This bill, which the Governor signed into law as Act 132, allows the University to adopt rules to address and reconcile any conflicts on the mountain. The administrative rules governing public and commercial activities on Mauna Kea lands are necessary to provide effective protection of cultural and natural resources from certain public activities and to help ensure public health and safety. The bill sets the stage for the proper management of Mauna Kea in a way that is respectful to all of its users.
- In addition, I support the project because I believe it will bring much needed economic development to the Big Island. It will create highly skilled jobs for our young people interested in science. It will attract top scientists from around the world to work and live on the Big Island.

This is Hawaii's opportunity to show the world that we can, at once, support the advancement of science while preserving and respecting the host culture. Thank you for the opportunity to offer these comments.

## Malu `Aina Center For Non-violent Education & Action

P.O. Box AB Kurtistown, Hawaii 96760

Phone 808-966-7622

ja@interpac.net Visit us on the web at [www.malu-aina.org](http://www.malu-aina.org)

Office of Conservation and Coastal Management  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96809

December 2, 2010

Re: CDUA HA 3568 for the Thirty Meter Telescope

Our organization stands in strong opposition to the Conservation District Use Permit requested for the Thirty Meter Telescope on sacred Mauna Kea.

We recommend that the Board deny the permit request for the following reasons.

The current state of Mauna Kea represents a microcosm of our planet heading off the cliff of Global Warming due to over-development.

For our planet, the evidence is crystal clear that the present course of industrial development is heading for unprecedented catastrophe. But are we willing to seriously change the way we live, and the decisions we make day to day. Are we willing to put conservation before development?

On Mauna Kea --

1. We know that the cumulative impacts on Mauna Kea according to the 2005 EIS done by NASA are "substantial, adverse and significant" yet we still go forward with more building.
2. We know that No study has been done to assess the carrying capacity of the mountain for development.
3. We know that the University of Hawaii and its self appointed Mauna Kea Management Board are in a position of conflict of interest. The University benefits financially from telescope development yet it is suppose to be a management entity for conservation on the mountain. The record is clear: development trumps conservation. When will we learn? When will we reverse course and put conservation before development?

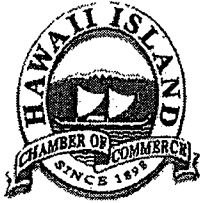
For our organization the bottom line is this. The host culture of Hawaii tells us that the summit of the mountain is the most sacred. In fact Mauna Kea and Mauna Loa are two of the most sacred sites in all the Pacific. Do we simply hear those words but have no understanding of their meaning? Or do we understand but disregard the meaning out of other concerns --science, prestige, money? In any case, to proceed with further development on Mauna Kea is desecration of the sacred. It is disrespectful. It is shameful. In the Judeo/Christian sense, it is sacrilegious. It is sinful. The irony is that looking into the heavens will be our downfall because we have not shown respect. If we want to be pono, the means we use must be in line with the end that we seek. It is time to live aloha -- the principles of non-violence in Hawaii and all around the world.

Deny this permit request. Mahalo.



James V. Albertini  
President





# Hawai'i Island Chamber of Commerce

117 Keawe Street, Suite 205  
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William Walter

December 2, 2010

To: Department of Land and Natural Resources, Office of  
Conservation and  
Coastal Lands

From: Mike Gleason, President  
Hawaii Island Chamber of Commerce

Aloha,

The Hawaii Island Chamber of Commerce has supported the Thirty Meter Telescope being built on Hawaii Island from the very beginning more than three years ago when they first came to the island to meet with the community.

We recognize and support the tremendous economic impact this project will have on our island for generations to come. Many needed jobs will be created, our workforce will develop new technical skills, our children's educational opportunities will improve, we will be THE destination for astronomy studies and much needed economic support will come to our local businesses.

We also recognize the great care the project has taken in designing TMT for Mauna Kea and the deep respect it has for the Native Hawaiian culture. TMT has worked hard to respect the cultural setting for this great observatory.

This opportunity comes at exactly the right time for our struggling local economy and we look forward to the excitement and economic uplifting the Thirty Meter Telescope Project will bring to our communities.

**Mahalo**



1206 Malawaina Place  
Hilo, Hawaii 96720  
December 2, 2010

Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
Honolulu, Hawaii

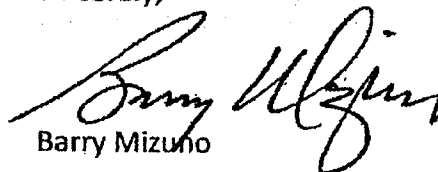
RE: File No.: CDUA HA-3568

I wish to offer comments in support of TMT's conservation district use application.

My wife and I are kamaaina and have lived in Hilo for many years. We raised our children on the Big Island and would hope that our grandchildren and all future generations would benefit from opportunities our mountain, Mauna Kea would bring. We believe that the TMT and any other projects on our Mountain must be developed in a responsible manner. We further believe that the current structure of oversight assures us that Mauna Kea will be protected.

Again, may we ask for your support and urge approval of the conservation district use application.

Sincerely,

  
Barry Mizuno

December 8, 2010

Department of Land and Natural Resources  
Office of Conservation and Coastal lands  
File No: CDUA HA - 3568

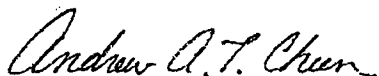
Re: TMT Conservation Use Permit

I am writing this letter in support of the TMT project receiving approval of its Conservation Use Permit. I believe that the Astronomy industry will provide opportunities for some of our best and brightest here on the Big Island to pursue a career in this field. The project will strengthen UH-Hilo and the Big Islands reputation as the world leader in Astronomy which will create positive synergy throughout the local community. I believe Astronomy to be a comparatively clean industry void of any waste or byproducts that you would find in manufacturing. Though construction will have to take place in order for the telescope to be built, the long term effects should be mitigated through the current strong leadership of the Mauna Kea Management Board.

I know that there is concern within the community regarding the desecration of Mauna Kea as well as being poorly managed by the University over the past several decades and those concerns are valid. I too am concerned that we do not repeat the same mistakes of the past. However, I feel that the benefits of this project far outweigh the risk that we may encounter. The only sure thing in this world is change and I am quite sure many of our Hawaiian ancestors recognized that fact. When the first Hawaiians set forth on these islands, they were looking for change in their own society. When the first missionaries came to the islands, I am sure many Hawaiians realized that change was inevitable as evidenced in our Ali'i accepting Christianity. Us Hawaiians were seafaring people using the stars to navigate and search out new worlds, taking many risk along the way. I cannot believe this is not what we, collectively as a people, would want, even at the risk of potentially desecrating the mountain even further. I truly believe our ancestors would see that supporting Astronomy is the right thing to do and now that we are wiser to what has happened in the past, we can be better stewards as we move forward.

Thank you for your time on this matter.

Sincerely,



Andrew A. T. Chun  
57A Hoaka Road  
Hilo, Hawaii 96720

To: Department of Land and Natural Resources, Office of Conservation and Coastal Lands

Re: Comments on TMT's Application for a Conservation District Use permit

Date: 12/3/2010

As an island resident, I support TNT's application for a permit.

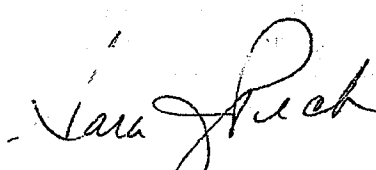
Our island economy and education could benefit from this project. TNT has already offered to provide funding for public school projects to expand students' understanding of the astronomy research carried out by these large, world class telescopes.

Over 15 years ago, I was ~~been~~ told by the CEOs of Apple, Intel and Sun that Hawaii Island is not considered as a potential location for their companies because we don't have the educational capacity to provide employees for technology industries.

I believe that, as the astronomy community expands, these facilities will attract highly trained astronomers and technicians who will provide community service by teaching seminars at UH Hilo and UH West Hawaii. Their interaction in our communities may inspire our island youth to seek higher education. Even now, some people hired by the astronomy community have been or will be trained here in Hawaii with our university system.

It is my understanding that TMT will collaborate with the other facilities that exist on Mauna Kea. (Keck, Canada-France-Hawaii Telescope and Subaru)

Thank You,  
Sara Peck  
PO Box 56  
Holualoa HI 96725



*P.S With amendments appropriate to meet environmental & cultural requirements.*

**NEWTON J. CHU**  
120 Pauahi Street, Suite 312  
Hilo, Hawaii 96720  
Ph. (808) 961-0406 Fax (808) 961-3815

December 2, 2010

Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
P. O. Box 621  
Honolulu, Hawai'i 96809

RE: Request for Approval of the THIRTY METER TELESCOPE's Conservation District Use Application, File No. Cдуа HA-3568

Ladies and Gentlemen:

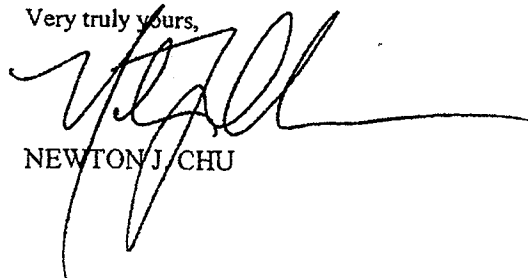
Thank you for taking the time to travel to our island and listen to the testimony of the community. This is an important issue to the people of the Big Island as well as to the people of the State of Hawaii.

I recommend that the above-referenced Conservation District Use Application be approved. I was present at many of the previous meetings on the proposed Thirty Meter Telescope ("TMT"). I am pleased to see the progress that has been made since then and have confidence that the TMT will be a good steward of the mountain. I have come to know many of the people involved with this project and I am convinced that they are capable and responsible people of the highest integrity who have the best interest of the entire community at heart.

I am the parent of a son who is a recent Hilo High graduate who is currently studying Astronomy on the mainland. His goal is to learn all he can about astronomy so that he can return to the Big Island and conduct research from Mauna Kea. He also plans to engage children throughout the world in the study of astronomy so that people of all nations can work together to learn from the skies above. As he states, "We are one earth and one sky, together we can work to save our planet." Without the TMT and astronomy moving forward, the jobs which would allow our children to stay in Hawaii and support their families would disappear.

Thank you again for taking the time to come to our community to hear from the community. Please understand that the vast majority of the community understands what is at stake and strongly supports the TMT and astronomy community. I thank you in advance for doing the right thing for Hawaii and our children by approving the TMT application and allowing the project to move forward.

Very truly yours,



NEWTON J. CHU

**Hugh Y. Ono, P.E.**  
**455 Ekela Street**  
**Hilo, HI 96720**  
**Ph: 808-959-1342 E-mail: [hono@ssfm.com](mailto:hono@ssfm.com)**

**Chair and Members**

**Testimony: File No. CDUA HA 3568:**  
**University of Hawaii at Hilo**

**As a citizen of Hawaii County, I support and encourage approval of the CDUA for the 30 MM TMT Telescope.**

**This proposal has already received community support and will be compatible with the other telescopes and activities on Mauna Kea.**

**Testimony  
In Support Of  
Conservation District Use Permit Application  
HA-3568  
for  
The Thirty Meter Telescope (TMT)**

David A. Byrne  
P.O. Box 263  
Volcano, HI 96785

Testifying as a private citizen and long time resident of Hawai'i

Date: Thursday December 2, 2010

Time: 6 pm

Place: Hawaii County Council Room  
25 Aupuni Street  
Hilo, Hawaii 96720

- My testimony is in **support** of the Conservation District Use Permit Application, HA-3568, for The Thirty Meter Telescope (TMT).
- My name is David A. Byrne and I am testifying as a private citizen and a long time resident of Hawai'i in support of the Conservation District Use Permit Application, HA-3568, for The Thirty Meter Telescope (TMT) Project.
- I believe that traditional culture, environmental concerns and astronomy can co-exist on Mauna Kea and potential impacts can be appropriately mitigated.
- I support this Conservation District Use Permit Application because it addresses all the principle issues associated with the installation and operation of the world class astronomical observatory of the 21st century. Appropriate mitigation measures are planned for all project phases. Significant programs and community partnerships are presented which will benefit all stakeholders and community members.
- The genius of our great Hawaiian/American island community is our ability to come together with mutual respect and resolve our differences in such a manner to achieve our combined community goals. This Conservation District Use Permit Application does so.
- I **support** this Conservation District Use Permit Application because I believe that we have achieve community consensus to maintain the cultural respect of this most sacred of all mountains while coexisting, in the positive sense, with the Astronomical community.
- Thank you very much for the opportunity to testify today.

TMTCDUATest1012021DAB

Stephen Yee  
PO Box 297  
Laupāhoehoe, HI 96764

November 30, 2010

Department of Land and Natural Resources  
Office of Conservation and Coastal Lands

Aloha:

In this time of economic need, the opportunities the TMT offers to this community cannot be missed. With the facility's culturally sensitive approach; it's promise of employment in construction and technical fields; our enhanced reputation as the world's premier astronomy center; and the vast influx of capital it will bring to the County will all provide for a positive socio-economic impact. Please add my voice to those urging approval of the Conservation District Use Permit. Yes! TMT.

Mahalo,





## Testimony for TMT HCC Meeting 12/02/2010

Inge Heyer, Chair of the Mauna Kea Observatories Outreach Committee (MKOOC)

*Aloha and Good Evening!*

My name is Inge Heyer, and I am the chair of the Mauna Kea Observatories Outreach Committee (MKOOC for short). We are the group of all Mauna Kea observatories outreach officers, who meet once a month to develop, plan and discuss community outreach activities.

I have been very impressed by the fact that the Thirty-Meter Telescope team has been an integral part of this effort since they first arrived here. Even before Mauna Kea was chosen as their site, TMT was engaged in local outreach efforts, supporting MKOOC's activities and running many of their own. With the worsening economy of recent years, it has been ever more difficult to obtain outside funding for our many educational endeavors, such as Journey Through The Universe, astronomy teacher training workshops, the Akamai Hawaii College Student Internships and the Hawaii Island and State Science Fairs. TMT has volunteered each time and helped these projects to survive, projects that are vital to foster science education and science literacy in our schools and the community.

TMT has made it clear that education, mentoring and internships, particularly in the STEM (Science-Technology-Engineering-Mathematics) disciplines is one of their top priorities, and their actions have shown beyond doubt that they mean it. Their commitment to the community and the education of our young people is clear. Beyond just making promises for the future, they have already stepped up and delivered.

I look forward to seeing great discoveries from the TMT and to the opportunities this offers for our students, teachers, and the greater Big Island community. *I therefore*  
~~Thank you.~~ *recommend approval of the TMT permit application.*

*Mahalo #, and thank you for the opportunity to speak.*

03 December 2010

Aloha,

My name is Jacqui Hoover. While I have the privilege of serving as the President of Hawaii Leeward Planning Conference and the Executive Director of Hawaii Island Economic Development Board, I come before you this evening to speak as a private citizen of Hawaiian descent, born, raised and residing on Hawaii Island and whose training and career includes planning and engineering.

The Thirty Meter Telescope (TMT) project is fully consistent with the purpose of the Conservation District. Astronomy facilities are an identified use in the Resource subzone, under an approved management plan. This means that astronomy facilities can be allowed, with proper management of the natural resources, in that subzone. TMT has a solid, in-depth management plan attached to this application and the Office of Mauna Kea Management (OMKM) also has an approved Comprehensive Management Plan (CMP) as required.

My family hails from Waipio Valley and our oral history and genealogy includes many references to Mauna Kea and Poliahu. We have been raised to be always respectful of our `aina and our kupuna. Simultaneously we strive to remain relevant in the 21<sup>st</sup> century.

In my career I have reviewed and commented on many management plans and land use applications. As can be expected, some are bad and some are good. In my review of the supporting plans for this application, I find them to be comprehensive in identifying and offering respectful mitigation for areas of concern.

My kupuna always thought and strategized in future tense – looking many generations forward. It is in keeping with this tradition, my education and training, and with the greatest respect for Mauna Kea and my kupuna that I support this conservation district use application.

Mahalo for this opportunity to speak in support of this CDUA.

## UNIVERSITY OF HAWAII AT HILO

UH Hilo Administration  
Office of the Chancellor

January 5, 2011

Mr. Sam Lemmo, Administrator  
Office of Conservation and Coastal Lands  
Department of Land and Natural Resources  
1151 Punchbowl Street, Room 131  
Honolulu, Hawai'i 96813

**Subject: Conservation District Use Application (CDUA HA-3568):  
Thirty Meter Telescope Project  
Tax Map Keys: 3/4-4-015:009 (portion), Mauna Kea Science Reserve, Hawai'i Island**

Dear Mr. Lemmo:

We are pleased to submit responses to comments the Department received on the Conservation District Use Application (CDUA HA-3568) for the Thirty Meter Telescope (TMT) Project. Those comments were from the following organizations and individuals:

- State Department of Health-Clean Water Branch;
- Engineering Division of Department of Land and Natural Resources;
- Mauna Kea Anaina Hou, et al.;
- KAHEA – The Hawaiian-Environmental Alliance;
- Division of Fish and Wildlife of Department of Land and Natural Resources;
- E. Kalani Flores and B. Pualani Case;
- Cliff Souza;
- Fred Stone;
- Tom Peek; and
- Deborah Ward.

To simplify your examination, we have reproduced the text of the comments in *italics* before each response.

Please note that some of those comment letters contain inaccuracies or present misinformation as fact. In a few cases these are relevant to the application, and in these instances we have identified and attempted to correct the errors. In the many instances where those inaccuracies and/or misstatements are not relevant or material to the consideration of the CDUA, we have not attempted to correct the record.

**Alec Wong, P.E., Chief - State Department of Health, Clean Water Branch**

**Comment:**

*Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: <http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf>.*

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Mr. Sam Lemmo  
January 5, 2011

**Response:** Thank you for noting that your review is based solely on the requirements of HAR Chapters 11-54 and 11-55. The applicant and the University understand that the proposed TMT Project ("Project") is subject to other regulations as well, and it is the applicant's intention to comply with all federal, state, and county rules and regulations, including those cited. The Project will be applying for a NPDES general construction permit prior to performing any construction activities within the Conservation District, or elsewhere.

**Carty S. Chang, Chief Engineer – DLNR, Engineering Division**

**Comment:**

*The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.*

**Response:** As indicated on page 3-120 of the Final EIS for the Project, the TMT Corporation estimates that the proposed TMT Observatory and Hilo Headquarters will consume approximately 480 gallons per day and 1,600 gallons per day, respectively. It will provide updated estimates of the Project's water demand to the DLNR Engineering Division, as requested, upon the Project obtaining a CDUP and completing any design modifications related to CDUP conditions that might affect water demand by the Project.

**Mauna Kea Anaina Hou, et al.**

**I. The TMT will, in fact, desecrate Mauna Kea**

**Comment 1.1:**

*We object and take exception to the recent public assertion made by the TMT staff and Board members claiming the TMT project will not desecrate Mauna Kea. The TMT staff do not have the expertise to make such claims. Uneducated claims prior to a comprehensive review are foregone conclusions that courts have repeatedly rejected.*

*Furthermore, Mauna Kea's cultural and religious significance is well documented in oral and written historical archives, as well as in legislative and court records. Since "time immemorial," Mauna Kea has been and continues to be held in reverence by the Hawaiian people as a Wahi Pana and Wahi Kapu. Mauna Kea is revered in the same way that other religions revere churches, temples, synagogues, and mosques.*

*The upper regions of Mauna Kea reside in Wao Akua, the realm of the Akua-Creator. It is the burial ground of the most sacred of our ancestors. It is considered the Temple of the Supreme Being and is acknowledged as such in many oral and written histories throughout Polynesia. It is home of Na Akua (the Divine Deities), Na 'Aumakua (the Divine Ancestors), and the meeting place of Papa (Earth Mother) and Wakea (Sky Father) who are considered to be the progenitors of the Hawaiian People. It is where the Sky and Earth separated to form the Great-Expanse-of-Space and the Heavenly Realms. Lake Waiau is considered (among other things) to be the doorway into the Po (i.e., the mystical realm of the ancestors). Mauna Kea in every respect represents the zenith of the Native Hawaiian people's ancestral ties to the process of creation itself.*

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*The ceremonies and practices on Mauna Kea (practiced nowhere else) formed the basis of the navigational knowledge that allowed Hawaiians to navigate over ten million square miles of the Pacific Ocean millennia before modern science and before Captain Cook ever set eyes on Hawaii Nei. Hawaiian navigation is both a cultural and scientific contribution, not only to Hawai'i but also to the world and the global knowledge base.*

**Response:** Beliefs, and the feelings that accompany them, are highly personal and subjective in nature. The EIS and CDUA for the Project disclose that the summit region of Mauna Kea is a spiritual and sacred place for Native Hawaiians, relying on qualified sources for this opinion. They also make it clear that for those who hold the opinion that any development or disturbance of Mauna Kea by someone other than a Native Hawaiian is significant and unmitigable, the Project's added impact on cultural resources will be viewed as significant. Mauna Kea Anaina Hou, et al. clearly fall into this group. By consulting with the holders of a broad variety of opinions about the Project and incorporating their feedback into its management of its leased land on Mauna Kea, UH believes the ongoing activities it has proposed will be beneficial to the mountain.

With specific reference to the TMT Project, the TMT Corporation has proposed on-site mitigation measures meant to reduce the effects of the TMT observatory construction. Examples of these include locating the observatory off the summit ridge (which is considered the most sacred area on Mauna Kea) and away from known historic properties and designing its Access Way so as to require a minimum of ground disturbance and alteration. It has also committed to additional measures (e.g., restoring the access road on Pu'u Poli'ahu). Extensive programs of archaeological and cultural monitoring, governed by plans to be approved by the State Historic Preservation Division, the Kahu Ku Mauna, and other appropriate entities, will also be in place to prevent damage during construction activity.

**Comment 1.2:**

*Because of the unique elevation and conditions at the summit of Mauna Kea, there are a number of traditional and customary cultural and religious practices conducted on Mauna Kea that are conducted nowhere else on earth. Mauna Kea is also home to some of the most unique, rare and fragile plant and animal species in the world. These include the U'au (dark rumped petrel), Palila bird, Wēkiu bug, and Silversword. Many of the species found on Mauna Kea are considered threatened and/or endangered. They are also found only on Mauna Kea and nowhere else on earth.*

**Response:** The FEIS and CDUA acknowledge the traditional and customary cultural and religious practices, as well as the special biological resources found on Mauna Kea. See, for example, Sections 3.1, 3.4, 3.5 of the FEIS and Section 2.2 of the Natural Resources Management Plan. The FEIS and the TMT Management Plan also describe the many measures that the TMT Corporation and the University are taking to protect these resources (see, for example, Sections 3.4.3 and 3.15.1 of the FEIS and Sections 4.2 and 4.3 of the TMT Management Plan). Finally, plans for the TMT Project include measures designed to avoid, minimize, and mitigate potential effects.

**Comment 1.3:**

*The summit lands are designated conservation lands not only because of their unique cultural, historic, geological, and climatic features, but also because they are watershed lands. Mauna Kea is the principle aquifer for the island of Hawai'i. If these waters are contaminated, they can no longer be used for ceremonies, healing, and/or for drinking.*

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**Response:** As a general point, the West Mauna Kea Aquifer that underlies the Project area is not the island's principal aquifer. In fact, the State Commission on Water Resource Management (CWRM) estimates that it accounts for only 1 percent of the total groundwater recharge that occurs on the island. Moreover, because of the very limited precipitation (rainfall and snowfall) that occurs in the summit, virtually none of the recharge to that West Mauna Kea Aquifer that does occur is in areas affected by the proposed Project. Instead, it takes place at lower elevations (especially in the 2,000' to 5,000' range) where rainfall is much higher (generally 100 inches per year or greater).

The physical changes to the ground that would be made as part of the proposed Project may actually increase recharge of the aquifer. This is because the drainage structures that would collect runoff from impermeable areas of the observatory and Access Way would concentrate the very small amount of rainfall and snow melt that does occur (estimated at less than 15 inches per year) into porous perimeter areas, potentially increasing the proportion that percolates to the water table rather than returning to the atmosphere through evaporation.

Similarly, there is no reason to believe that the proposed Project would contaminate groundwater recharge at the summit or otherwise reduce its suitability for ceremonial, healing, or drinking water use. The plans for the TMT Project include a zero-discharge wastewater system. All sanitary and washwaters will be collected in tanks, trucked off the mountain, treated and disposed of in approved facilities. To minimize the potential for an accidental spill while wastes are in transit down the mountain to the proper disposal site, no tank or containers being transported will be filled to the top. To further ensure the safe transport and disposal of hazardous waste, the Project will utilize only EPA-permitted and licensed contractors to transport hazardous wastes.

The TMT Observatory has been designed with features to prevent chemical spills that could potentially impact the environment. These features include using double walled tanks and piping with leak detection equipment where fuel and mirror washing wastewater is stored. Other pollution prevention measures include instituting a Waste Minimization Plan (WMP), implementing a Materials Storage/Waste Management Plan and component Spill Prevention and Response Plan (SPRP), mandatory training for all personnel handling hazardous materials and waste, and regular inspections of storage areas by a Safety and Health Officer.

**Comment 1.4:**

*Mauna Kea's highly protected status as a National Landmark, a National Historic District, and a State Conservation District are because of these unique, rare and fragile features. These natural resources are part of the public trust recognized in Hawai'i's Admission Act, the Hawai'i State Constitution, and in the judicially recognized public trust duties and responsibilities of the State. By comparison, the development of astronomy facilities, however valuable they may be in their own right, are not afforded this level of reverence and protection by our society. Unlike the summit district and the practices related to it, construction of astronomy facilities is not mentioned in any state statute or the constitution. It is not a protected public trust activity.*

**Response:** As stated in the EIS and CDUA, the Project, an astronomical observatory, is an identified use within the resource subzone (HAR 13-5-24) of a Conservation District (HRS 205-2), and consistent with the objectives of the resource subzone.

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II. The Intermediate Court of Appeals is reviewing the Mauna Kea case

Comment 2:

*Again, the Mauna Kea case challenging the adequacy and legality of the University's CMP is pending in the Intermediate Court Appeals. We provide the following JUDICIAL NOTICE. The UH CMP may be overturn so the TMT project should not be moving forward and the BLNR should not be processing a telescope project CDUA for Mauna Kea until the court has rendered a verdict in the case, as this ignores the judicial process, violates due process and prejudices the parties.*

**Response:** The CMP was approved by the BLNR on April 9, 2009, with conditions. The four sub-plans required by CMP approval conditions have become available as follows: the Natural Resources Management Plan (NRMP) was available in September 2009, the Cultural Resources Management Plan (CRMP) was available in October 2009, and the Decommissioning Plan (DP) and Public Access Plan (PAP) were made available in January 2010. All four sub-plans were approved by the Board of Land and Natural Resources (BLNR) on March 25, 2010. Certain individuals and organizations requested a contested case proceeding for the CMP approval. The BLNR denied the request since a contested case hearing was not required by law and those requesting it did not establish either a property interest in the CMP or that the CMP would affect property in which they possessed an interest. The Circuit Court of the Third Circuit confirmed this decision on January 27, 2010.

III. BLNR has not fulfilled the court order issued by Judge Hara

Comment 3:

*Judge Hara's decision and order found the following:*

- (1) Pursuant to 183C of Hawai'i Revived Statutes, the purpose of the State's Conservation Districts is conservation;*
- (2) The resource that needs to be conserved is the entire summit area of Mauna Kea and not just the development area;*
- (3) The UH 2000 Master Plan is NOT, (A), an approved plan pursuant to BLNR rules and regulations and (B), is Not a comprehensive plan as contemplated by the rules and regulations.*
- (4) BLNR erred in issuing a permit to the NASA Outrigger Telescope Project, allowing piecemeal development proposals without having completed a Comprehensive Management Plan for the entire summit of Mauna Kea.*

*Unless and until Judge Hara's ruling is overturned, it is a matter of law that must be followed. Judge Hara ordered the BLNR to prepare and approve a Comprehensive Management Plan and the UH CMP is being challenged in the ICA, and may be overturned. The TMT should not be moving forward in contravention of the law. We incorporate by reference the state case Mauna Kea et al., v. BLNR, Civil No. 04-1-397, into the record.*

**Response:** See response to Comment 2 above. UH believes that the CMP is a comprehensive management plan for the UH-managed area that satisfies Judge Hara's Decision and Order. As evidenced by its approval of the CMP, the Board of Land and Natural Resources concurs. The ICA case referenced in the comment is a challenge of the Board's decision to deny the request for a contested case

Page 6  
Mr. Sam Lemmo  
January 5, 2011

hearing on the CMP. The fact that the Board's decision to deny the contested case request is being challenged does not stay the Board's decision to approve the CMP.

**IV. BLNR must comply with Hawai'i Supreme Court orders and instructions**

**Comment 4:**

*BLNR has a non-transferable fiduciary duty to protect Native Hawaiian rights and resources. The Supreme Court of Hawai'i has provided all state agencies with instructions to fulfill their duty. Expressly barring delegation of their duties to a sub-entity like the UH or a third party like Ku'iwalu. The TMT should not be moving in contravention of the State Supreme Court orders and instructions.*

*We incorporate by reference the Hawai'i Supreme Court case *Kapa'akai O Ka Aina v. Land Use Commission*, 94 Hawai'i 1, 7 P. 3rd 1068 (2000), to be fully integrated into the record.<sup>1</sup> (see also relevant section in the following footnotes).*

**Response:** The processing of the CDUA is not in contravention of State Supreme Court orders and instructions. Putting aside that the statement misconstrues the Ka Pa'akai decision, the BLNR did not delegate its responsibilities to another party. The University of Hawai'i consulted the DLNR during preparation of the CMP. The BLNR then reviewed the CMP, listened to testimony concerning the CMP, and ultimately approved the CMP with conditions. One of those conditions is that implementation of the CMP remains subject to BLNR oversight.

**V. The TMT will have significant, adverse and substantial impact on the cultural and natural resources of Mauna Kea**

**Comment 5:**

*In 2003, a federal lawsuit involving UC-Caltech and NASA compelled NASA to complete the first EIS ever conducted on Mauna Kea since 1968; and found "the cumulative impact the past, present and reasonably foreseeable astronomy developments have resulted in significant, adverse and substantial impacts to the cultural and natural resources of Mauna Kea."*

*We incorporated by reference the entire NASA Federal Environmental Impact Statement (EIS) and accompanying court records *OHA v. Sean O'Keefe*, Civil. No. 02-00227 SOM/BMK filed July 15, 2003 to be integrated into any and all TMT environmental review documents.*

*Furthermore, BLNR may not issue permits to projects that have adverse and significant impact to the natural and cultural resources. BLNR rules and regulations prohibit the approval of development projects in Conservation Districts that have "adverse and significant" impacts to the cultural and natural resources.*

*BLNR rules under HAR §13-5-30(c)(4) clearly state:*

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

*The TMT should not be moving forward if the State could never legally grant a permit to build in the conservation district.*



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Mr. Sam Lemmo  
January 5, 2011

*We incorporate by reference the relevant section of BLNR rules and regulations, including HAR §13-5-30, to be integrated into any and all TMT environmental review documents.<sup>2</sup> (See relevant sections in following footnotes).*

**Response:** The federal lawsuit in 2003 did not instigate or directly require an EIS be completed for the Outrigger Telescopes Project. The Court remanded the EA and instructed NASA to reassess the cumulative impacts. Later that same year, NASA announced its voluntary decision to go beyond the Court's direction and began preparing an EIS. In addition, the *Outriggers EIS* was not the first EIS ever prepared for activities conducted on Mauna Kea. A number of State of Hawai'i Chapter 343 EIS documents had been prepared previously, including an EIS for the *1983 Science Reserve Complex Development Plan* and an *EIS for the 2000 Master Plan*. The *Outrigger EIS* was the second NEPA EIS prepared for an astronomy project on Mauna Kea (the CSO EIS dated August 1982 was the first).

The TMT EIS and CDUA indicate that the existing cumulative impact to certain resources is already adverse and significant and the Thirty Meter Telescope Project and other foreseeable actions would not significantly increase or reduce the existing level of cumulative impact. Resources that have been significantly and adversely impacted by past actions will continue to be significantly and adversely impacted should the Project proceed. Similarly, resources that have been impacted to a degree that is less than significant should the Project proceed. In both cases, the Project and other foreseeable actions would incrementally add to the cumulative impact on the various resources, but would not tip any characterized level of cumulative impact from significant to less than significant, or vice versa.

Uses with potential environmental impacts may be authorized in the Conservation District provided those impacts are disclosed in the EIS and are avoided, minimized, and mitigated to the extent practicable. As the Draft and Final EIS discuss in Section 3.16, past and current actions have resulted in substantial, significant, and adverse impacts to certain resources and those impacts would continue to be substantial, significant, and adverse if the Project proceeds. However, as outlined in Final EIS Sections 3.2 through 3.15, the TMT Project individually will not result in any significant and adverse impacts. Moreover, other activities that the University has committed to implement under the CMP are designed to reduce and/or mitigate the effects of activities that were initiated in the past.

## **VI. The University and International observatories are in material breach of the General Lease**

### **Comment 6.1:**

*First, fair market rent has NOT been collected for the private, commercial use of public trust lands on Mauna Kea. The entire summit of Mauna Kea is section 5(f) public trust lands which is held "in trust" by the state for the Native Hawaiians and the general public. Hawaii Admissions Act, section 5(f) and Haw. Rev. Stats §§171-17 and -18 require the state to collect fair market value lease rent and to deposit the funds from the use of section 5(f) lands in the public lands trust fund.*

*While public lands are often set aside to public agencies for their own use at no cost, any subsequent transfer of an interest to third parties outside the Hawai'i government is subject to the fiduciary obligation to obtain fair market rent. Current lease agreements between UH, DLNR, and the foreign governments and corporations that operate telescopes on the summit seek only one dollar (\$1.00) per year in rent. This is unlawful and constitutes a breach of the*

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*general lease. We incorporate by reference Haw. Rev. Statutes 171-17 and -18 and related public trust documents cited into the record.*

**Response:** While this comment does not pertain to the CDUA, we believe it is important to correct the record as it reflects a misunderstanding of the applicable law. State law (HRS §171-95) authorizes the BLNR to lease state land to government agencies at such rent and on such other terms and conditions as the BLNR may determine. It is common for BLNR to negotiate leases with nominal or no rent to governmental entities, including UH. The subleases for Mauna Kea observatories are also approved by BLNR as required by the lease, and the University anticipates that lease payments by the TMT Corporation will allow it to further enhance its management of the mountain's resources.

**Comment 6.2:**

*Secondly, the legal limits on the number and size of the observatories have already been exceeded. In the 1980's BLNR prepared and approved the 1983-85 management plan which limited the number of telescope allowed in Mauna Kea's Conservation District to thirteen (13), that is eleven (11) major and two (2) minor telescope facilities. There is no new plan that extends the telescope limits beyond the 13 established that has been adopted by BLNR.*

*The 1983-85 BLNR plan limited not just the number of facilities but the size of each facility. No telescope could exceed 125 feet in height and diameter. The telescope limits were established based on the best available science relating to the protection of the natural and cultural resources. The BLNR has categorically allowed UH to violate the telescope limits with the construction of the Gemini North Telescope, Very Large Array (VLBA) and the Smithsonian Telescope Array (consisting of over 24 telescope pads and support buildings spread over a half mile area). The TMT will also violate these limits. The TMT should not be moving forward if it will exceed legal limits on the telescopes allowed on Mauna Kea. We incorporate by reference the 1983-85 Mauna Kea Science Reserve Complex Development Plan documents into the record.*

**Response:** None of the plans that Mauna Kea Anaina Hou, et al. referenced remains in effect. Instead, they have been superseded by the 2000 Master Plan and the CMP and its sub-plans. Regardless of this fact, the following is provided to help understand and clarify the misconception concerning a limit on telescopes in the UH Management Area. Neither the number nor size of existing observatories on Mauna Kea exceeds "legal limits". In fact, there has never been a "legal" or BLNR-approved limit on the number of telescopes on Mauna Kea.

For a period of time, there was a UH plan limit but this no longer exists. In 1983, UH approved the *Mauna Kea Science Reserve Complex Development Plan (SRCDP)*. The *SRCDP* contained a UH-adopted limit of thirteen telescopes on Mauna Kea through the year 2000. UH adhered to that limit. The BLNR was aware of this aspect of the UH plan but did not adopt or approve it. The only portion of the *SRCDP* that was approved by BLNR was Chapter 7, the Management Plan, approved in 1985 as a UH/DLNR joint plan as part of CDUP HA-1573. The Management Plan did not address astronomy development or set any limit on such development.

In the year 2000, UH replaced the *SRCDP* with the *Mauna Kea Science Reserve Master Plan*, as the master plan for the UH Management Areas. The 2000 Master Plan does not contain a numerical limit on the number of telescopes. Moreover, as was the case for the *SRCDP*, the 2000 Master Plan has remained solely a UH plan and has not been adopted by BLNR. The UH/DLNR Management Plan approved in 1985 and revised in 1995 has now been superseded by the *Comprehensive Management Plan (CMP)*,

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approved by both UH and BLNR. Although the 2000 Master Plan restricts development to the 525-acre Astronomy Precinct, as a matter of UH policy, neither the 2000 Master Plan nor the CMP contain a limit on the number of observatories. The 2000 Master Plan and the Decommissioning Plan (a CMP sub-plan) do contain additional constraints on astronomy development and numerous conditions and guidelines for such development.

## VII. Complying with State and Federal Law

### Comment 7:

*The TMT has not conducted federal level environmental or historic preservation reviews, as required by law. At the TMT Public EA/EIS Scoping meetings held in Keaukaha, on Hawaii Island, TMT representatives expressly stated that the TMT would only be conducting a state level EA/EIS pursuant to HRS Chapter 343. The reasons offered for this were that the TMT project had no public funds associated with the project. The TMT claims are not true. The TMT project has in fact received substantial federal funds from the National Science Foundation, constituting a major federal undertaking pursuant to National Environmental Policy Act (NEPA) and the National Historic Preservation Act. Please see NSF website. The TMT therefore must complete a federal EIS and Section 106 for the TMT project.*

*Please see <http://www.biasiandvideonews.com/maunakea/20081020dawson.htm>, for TMT representative comments cited above.*

*The University of Hawai'i (UH) has also recently received substantial federal funds for the astronomy under the University Affiliated Research Center (UARC), constituting a major federal undertaking. The University therefore is acting in a federal capacity and must comply with all federal law, including NEPA and NHPA.*

*The National Science Foundation has given the TMT Corporation substantial federal fund constituting a federal undertaking.*

*State law under HRS §343-5(2) (f) clearly states;*

*Whenever an action is subject to both the National Environmental Policy Act of 1969(Public Law 91-190) and the requirements of this chapter...agencies shall cooperate in fulfilling these requirements so that one document shall comply with all applicable laws.*

**Response:** The obligation to evaluate and disclose environmental impacts under the National Environmental Policy Act (NEPA) is triggered when a federal agency proposes a major federal action that would significantly affect the environment. Neither the University of Hawaii at Hilo (UH Hilo) nor the TMT Observatory Corporation is a federal agency. Further, neither UH Hilo nor the TMT Observatory Corporation has received funding or pledges of financial support from any Federal agency for activities that will or may significantly affect the environment, and neither entity has applied for any federally-issued permit or license. Therefore, the United States' obligations under NEPA have not been triggered.

Similarly, Section 106 of the National Historic Preservation Act (NHPA) imposes obligations on federal agencies, not state or local agencies or private entities. The actions of the National Science Foundation (NSF) to date are not an "undertaking" as defined by Section 106 and, thus, Section 106 consultation requirements have not been triggered by NSF's actions.

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**VIII. The Life Of The TMT Extends 23 Years Beyond the General Lease**

**Comment 8:**

*The TMT application and EIS claims the TMT will begin seven years of construction in 2011 and will have an expected design life of 50 years at which time it will be decommissioned. The General Lease issued by the State to the University in 1968 ends in the year 2033. If the life of the TMT is 50 years, it means the TMT is requesting the use of Mauna Kea 23 years beyond the term of the lease. The General Lease requires that in the year 2033 all facilities must be decommissioned and the land must be returned to its original state.*

*We object to any telescope to continue its existence beyond the 2033 lease termination.*

*We incorporate by reference the Mauna Kea Science Reserve General Lease No.S-4191 into the record.*

**Response:** As it stands the presence (or absence) of observatories is a matter that will be decided by the State in accordance with applicable laws and regulations.

The FEIS and CDUA contain all of the information the State needs to act upon the pending CDUA for the TMT Project. For example, as stated in Section 2.7.4 of the EIS, TMT Corporation understands that decommissioning and site restoration requirements will be included in the sublease. Examples can be seen in Section 3.10.3 of the EIS, which states: "The current UH lease expires in 2033 and the TMT Observatory will be required to be decommissioned and restore the site at that time, unless a new lease is obtained from the BLNR." Additional information about the lease is provided in Section 3.10.3 of the EIS, which states: "It is very probable that TMT, along with the existing observatories, would request UH seek a lease extension beyond 2033."

It is not within the scope of this CDUA to speculate on the nature or outcome of those future lease negotiations, which would include a master lease negotiation between DLNR and UH and the subsequent sublease negotiation between UH and TMT. The Board of Land and Natural Resources must review and approve all new leases for State Land, including areas that will be needed for the proposed Project.

**IX. The TMT is big but not the biggest...actually**

**Comment 9:**

*The TMT is big but it will not be the biggest telescope on earth, as the TMT claims. The world's biggest telescope is called the European Extremely Large Telescope (E-ELT) that is being built in Cerro Armazones, Chile. The E-ELT is substantially bigger than the TMT, coming in at a stunning 42 meters as compared to the TMT's mere 30 meters. That is a big difference in size and seeing capability. The E-ELT is scheduled to be collecting first light by the year 2018. The TMT is supposed to obtain first light in 2018 also, that means the TMT will out matched before it even opens.*

*Arguably, the TMT is not technically necessary since the E-ELT is already moving ahead. The TMT proponents argue the TMT is needed because it will provide northern sky coverage that the E-ELT cannot. What does it matter what hemisphere the test for telescope size is actually conducted? There is no rational reason to destroy the sacred and delicate landscape of Mauna*

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*Kea for a redundant project, such as the TMT. The tests for size can be accomplished by the larger E-ELT.*

*Extinction is a real possibility for a number of species living on Mauna Kea that can be found nowhere else on earth. Extinction is an unacceptable risk in this day and age. Extinction is forever! It's hard to rationalize the astronomer's claim that the TMT will help discover the origins of life while they continue to argue for compromising the endangered life forms here on Mauna Kea ...here on planet earth.*

**Response:** First, neither the TMT Corporation nor the University have claimed that the TMT will be the biggest telescope on earth. The purposes of the Project are outlined in Section 2.2 of the EIS. The purposes of the Project are scientific in nature, not the construction of the biggest telescope in the world.

Second, your attempt to dismiss the importance of location is misguided. Section 4.1.1, page 4-3, of the Final EIS discusses how latitude factors into the location of an observatory and affects its usefulness. The section states:

*Objects in the sky that can be seen at an observatory are dependent on the latitude, or the location of the observatory with respect to the earth's equator. This affects the science and research that can be conducted. Most important is the availability of specific astronomical observation targets, such as planets, stars, galaxies, and clusters, seen at different latitudes. For example, the nearest dwarf galaxies to the Milky Way Galaxy, the Large and Small Magellanic Clouds, are only observable efficiently from south of the equator. On the other hand, the nearest large spiral galaxy similar to the Milky Way Galaxy, Messier 31, is best observed from north of the equator. Other astrophysical objects, like the Galactic Center, can be observed from either hemisphere.*

The possibility that there may be other telescopes of similar, or even larger, size in existence during the life of the TMT will not prevent the TMT from achieving its purposes or objectives, which are discussed in Section 2.2 and 2.3 of the EIS. A telescope does not become redundant as soon as a larger one is built. The 3- and 4-meter class telescopes present on Mauna Kea today continue to conduct world-class science and enable new discoveries despite the existence of 8- and 10-meter class telescopes.

#### **KAHEA – The Hawaiian-Environmental Alliance**

##### ***I. TMT Contributes to the substantial, adverse and significant impact of telescopes.***

###### **Comment 1:**

*The TMT attempts to suggest that its contribution to this negative impact would be minimal and should therefore be ignored. But the reality is, the cumulative impact of past telescope construction on the summit cannot be circumvented. Any additional construction -- no matter how minor or mitigated -- will contribute to the on-going substantial, adverse, and significant negative consequences suffered in this unique and fragile environment. Such consequences are not allowed.*

**Response:** The EIS and CDUA indicate that the existing cumulative impact to certain resources is already adverse and significant but conclude that the Thirty Meter Telescope Project, when considered in conjunction with other foreseeable actions, would not significantly increase or reduce the existing level of cumulative impact. Resources that have been significantly and adversely impacted by past actions will

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continue to be significantly and adversely impacted should the Project proceed. Similarly, resources that have been impacted to a degree that is currently characterized as less than significant would continue to be impacted to a degree that is less than significant should the Project proceed. In short, the Project in combination with other foreseeable actions implemented under the 2000 Master Plan and CMP would not tip any characterized level of cumulative impact from significant to less than significant, or vice versa.

As a matter of law, uses with potential environmental impacts may be authorized in the Conservation District provided those impacts are disclosed in the EIS and are avoided, minimized, and mitigated to the extent practicable. If this were not the case, no use or activity of any type would be permissible, which is not what the Conservation District Use Regulations state. As the Draft and Final EIS discuss in Section 3.16, past and current actions have resulted in substantial, significant, and adverse impacts to certain resources and those impacts would continue to be substantial, significant, and adverse if the Project proceeds. However, as outlined in Final EIS Sections 3.2 through 3.15, the TMT Project individually will not result in any significant and adverse impacts.

**II. Substantial, adverse impacts are not permitted in the conservation district.**

**Comment 2:**

*The regulations implementing Hawaii's conservation district protections are clear. To issue a permit for a land use in the conservation district, the applicant must demonstrate that:*

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

*This means that given the conclusions of the TMT EIS, CDUA, and Management Plan, the Department cannot legally grant the TMT a permit to build in the conservation district, no matter how well it mitigates its negative impacts.*

*In its application for a permit, the TMT ignores this requirement, along with four others, that must be satisfied before a conservation district use permit can be granted. These additional requirements include ensuring that:*

*- the land use is "compatible with the locality and surrounding areas [and] appropriate to the physical conditions and capabilities of the specific parcel," - "existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon;*

*- "subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and"*

*- the land use "will not be materially detrimental to the public health, safety and welfare."*

*Not surprisingly, instead of admitting that it is unable to satisfy these requirements, the TMT opted to simply ignore them in their application.*

*We have repeatedly highlighted that while the Department and Board are obligated by law to protect the natural and cultural resources of the conservation district, and the traditional, customary, and religious Native Hawaiian practices that are dependent upon them, there is no legal protection for or inherent right to build telescopes in the conservation district. It is a*

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*privilege to do business on public land in the conservation district; a privilege reserved for those land uses that can demonstrate no substantial adverse harm to the public's resources. TMT cannot meet this burden and thus cannot be granted this construction permit.*

**Response:** KAHEA's assertion that the Department cannot legally grant the TMT a permit to build in the Conservation District, no matter how well it mitigates its negative impacts, is incorrect. The proposed use is compatible with the locality and surrounding areas and with other uses within the UH Management area on Mauna Kea and with the numerous specific plans and regulations that have been prepared for those lands (including the CMP). It is also appropriate to the physical conditions and capabilities of the specific parcel. No subdivision of land is planned, and the land use will not be materially detrimental to the public health, safety and welfare.

As stated in the EIS and CDUA, the Project, an astronomical observatory, is an identified use within the resource subzone (HAR 13-5-24) of a Conservation District (HRS 205-2), and consistent with the objectives of the resource subzone. Virtually any use within the Conservation District has the potential to alter the existing environment (i.e., to cause environmental impacts), and the purpose of the Conservation District regulations is to provide a means of authorizing such uses if they are compatible with the overall values that the regulations seek to preserve.

### III. TMT is offensive

#### Comment 3:

*The TMT's analysis of the consequences of building such a massive structure in such a pristine place are offensive. Despite the findings of every EIS evaluating telescopes on Mauna Kea, the TMT CDUA concludes that:*

*"while the introduced elements associated with existing observatories may have had an effect on the perceived quality of the observances conducted, or may have caused some practitioners to conduct their observances further away from the vicinity of the observatories, there is no evidence suggesting that the presence of the existing observatories has prevented or impacted those practices."*

*Astronomy facilities on the summit do prevent and impact cultural practice, ipso facto, that people are forced to hunt the summit for a quiet space with an uninterrupted viewplane in order to worship. The TMT's conclusion that construction of yet another massive telescope will not contribute to the undermining of traditional, customary and religious practice on the summit is like saying construction of a football stadium at the Vatican will not interfere with Catholic worship because there will probably be some pews left that can still see the stained glass windows. This is offensive. Who is the TMT to uproot our piko, disturb our burial grounds, alter the profile of our summit, and say it does not matter? This is not the kind of business that should be granted the privilege of doing business on Hawai'i's public trust conservation lands.*

**Response:** KAHEA's belief that construction of the TMT is offensive is acknowledged. However, in deciding upon the CDUA the Board must consider a wide range of factors, and both UH and the TMT Corporation believe that the effect of constructing and operating the TMT Project in conjunction with the management activities that the University has pledged to implement under the CMP will result in a net benefit to the Conservation District. Specific mitigation measures have been developed to prevent or reduce, to the extent possible, actions or results that may be perceived as offensive by some.

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Specific on-site measures associated with the Project include the following:

- The TMT observatory structure is sited in a portion of the Northern Plateau that is more than 200 feet from all known historic properties and known or possible burials. As the EIS and CDUA disclose, there are 29 burials or possible burials within the 11,288-acre MKSR. None of those sites are within Area E, along the proposed Access Way, or in the Batch Plant Staging Area. Therefore, the Project will not impact any known or suspected burials in the MKSR.
- The visual effect of the observatory, including its visual impact from areas of cultural importance such as the summit of Kūkahau'ula, has been minimized through design steps such as reducing its size, finishing the support building and fixed structure exterior with a lava color, and finishing the dome with a reflective aluminum-like surface similar to that on the Subaru Observatory. The 13N site is also over a mile from and not visible from the summit of Kūkahau'ula, Pu'u Lili'inoe, and Lake Waiau.
- To avoid the disposal of wastewater in the summit region (the discharge of wastewater within the summit region has been identified as an impact on cultural resources), the Project will implement a zero discharge wastewater system at the TMT Observatory and will remove all wastewater generated from the mountain for treatment elsewhere in an approved treatment facility.
- Minimization measures are proposed for the Access Way that reduce the potential for both physical and visual impacts to the historic properties known to be in the vicinity. The Access Way that TMT has proposed is limited to a single-lane road (from a previous design of two-lanes) and follows an existing single-lane, 4-wheel drive road that was previously disturbed for access and testing of the 13N site in the 1960s. The portion of the Access Way within the boundaries of Kūkahau'ula will be paved in order to reduce dust. Additionally, the pavement and guardrail will be a reddish color that blends with the surrounding area.
- Utilities and electrical and communication lines, will be placed almost entirely beneath the paved roadway instead of on a different or parallel alignment that would cause more ground disturbance.
- Funding for the restoration of the closed access road on Pu'u Poliahu to its natural state (to the extent possible) will be provided.
- Existing HELCO pull-boxes and other utility boxes that are visually distracting or intrusive at the summit and other key locations visible from other portions of Kūkahau'ula will be camouflaged by treating them so as to blend into the natural environment to the extent feasible. The method of treatment will be determined through consultation with Kahu Kū Mauna and may include one of the following options: painting the concrete and metal lid to match the surrounding natural colors; or affixing stones and cinders from near the utility box to the concrete using epoxy.

Additional mitigation measures that will be implemented as part of the undertaking include the following:

- Detailed archaeological and cultural monitoring programs, each governed by an approved plan, will be implemented and enforced for the duration of the Project.
- All Project participants, including construction personnel, will undergo cultural sensitivity training. The training is designed to impart an understanding of Mauna Kea's cultural landscape, including cultural practices, historic properties, and their vulnerability to damage. The training will also provide guidance and information on respectful and sensitive behavior and activities while in the summit region.
- Construction best management practices (BMPs) will also be implemented to avoid potential disturbance of land beyond the planned limits of disturbance.
- During the construction phase, TMT representatives will meet with OMKM and Kahu Kū Mauna to identify cultural events that would be sensitive to construction noise in the vicinity of the TMT



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- Observatory site. On up to four days per year, to be identified by Kahu Kū Mauna, TMT will endeavor to reduce construction noise and activities in the vicinity of cultural practices.
- During the operational phase, TMT Observatory operations will be reduced to minimize daytime activities on up to four days in observance of Native Hawaiian cultural practices. TMT will work with OMKM and Kahu Kū Mauna to determine days on which TMT activities will be reduced. While the observatory will be operated during these periods, this measure will involve having only a skeleton crew at the observatory, minimizing vehicle traffic, reducing noise and prohibiting visitors to the TMT Observatory.
  - TMT will provide initial and then annual or as-needed tours of the TMT Observatory, with the Native Hawaiian community invited at least two weeks prior to the tour. Insofar as practicable, these tours will be scheduled on the days (up to four each year) on which cultural events are scheduled.

#### **IV. Flawed process and conflicts of interest plague summit management**

##### **Comment 4a:**

##### ***A. Management Plan and Subplans Not Finalized***

*As the TMT acknowledges, a comprehensive management plan is a necessary prerequisite for the approval of any activity in the Mauna Kea conservation district. Both the CMP and subplans drafted by the University are currently undergoing legal review. The CMP is at the Intermediate Court of Appeals. The subplans, mandated as a condition to the adoption of the CMP, have been formally contested. The Department has yet to take action on our request for a contested case hearing on the subplans. It is wholly improper for the University to advance this permit application given these pending legal questions.*

**Response:** Neither the CMP nor the subplans are "currently undergoing legal review". The CMP was approved by the BLNR on April 9, 2009, with conditions. The four sub-plans required by CMP approval conditions have become available as follows: the Natural Resources Management Plan (NRMP) was available in September 2009, the Cultural Resources Management Plan (CRMP) was available in October 2009, and the Decommissioning Plan (DP) and Public Access Plan (PAP) were made available in January 2010. All four sub plans were approved by the Board of Land and Natural Resources (BLNR) on March 25, 2010. Certain individuals and organizations requested a contested case proceeding for the CMP approval. The BLNR denied the request since a contested case hearing was not required by law and those requesting it did not establish a property interest in the CMP or that the CMP would affect property in which they possessed an interest. This decision was confirmed by the Circuit Court of the Third Circuit on January 27, 2010.

##### **Comment 4b:**

##### ***B. TMT Agrees Management Plan is Not Comprehensive***

*One of our many challenges to the University's most recent version of a management plan is that it is not comprehensive. It appears that the TMT agrees. In its site-specific management plan, the TMT states "it should be noted that the CMP and subplans only apply to UH's managed lands on Mauna Kea and do not apply to all of Mauna Kea." If the University's "Comprehensive Management Plan" does not address the management needs of the conservation district encompassing the entire summit of Mauna Kea, then it is not*

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*comprehensive. If this plan is not comprehensive, then new applications for land uses cannot be authorized under it.*

**Response:** The assertion that TMT agrees that the management plans are not comprehensive is completely incorrect. In fact, this comment suggests that the commenter misunderstands the scope of the University's CMP, which does include "...the entire summit of Mauna Kea". The management documents that the University and TMT Corporation have submitted in support of the CDUA fulfill the requirements for a 'Management Plan' for the entire parcel being considered for the siting of the TMT Observatory under the existing rules and regulations of the State Land Use Conservation District, and also satisfy the requirements for a 'Comprehensive Management Plan' under the proposed amendments to the above rules and regulations.

**Comment 4c:**

*C. The University Serves Conflicting Interests*

*On one side of the table, the University asserts itself as the objective land manager and enforcer of management activities on the summit of Mauna Kea. It hires 100% of the staff at the Office of Mauna Kea Management. It appoints 100% of the members on the Mauna Kea Management Board and the cultural advisory group, Kahu Ku Mauna. It holds meetings and makes decisions about the management of resources on the summit.*

*Then, at the same time, on the other side of the table, the University sits with the corporations and foreign governments seeking permission to exploit the conservation lands on the summit. The University facilitates and benefits from this ongoing exploitation of summit resources. Just as one example of the University's perverse incentive to encourage construction on the summit, the TMT repeatedly highlights throughout the CDUA and management plan that in order to construct the telescope the TMT corporation will make sublease payments directly to the University.*

**Response:** The proposed Project is in accordance with the approved CMP and sub-plans; it does not seek to advance University interests at the expense of other important values. The lease that the BLNR has issued to the University holds the University responsible for managing its lands in accordance with all applicable plans and regulations. Following through on its responsibilities, the Board of Regents established policy for managing its leased lands on Mauna Kea in the 2000 Mauna Kea Science Reserve Master Plan (Master Plan). The Master Plan calls for the establishment of the Office of Mauna Kea Management (OMKM) under the University of Hawaii at Hilo. This Office is dedicated solely to management of the University's managed lands on Mauna Kea. The Master Plan also calls for the establishment of a community-based management board (Mauna Kea Management Board [MKMB]) and a Native Hawaiian advisory council (Kahu Ku Mauna) to serve in advisory capacities to the UH Hilo Chancellor and OMKM on Mauna Kea management and cultural matters. All members of the MKMB and Kahu Kū Mauna are residents of the Island of Hawai'i and serve in a voluntary capacity.

It is not feasible or reasonable to have another entity which does not have the legal or fiscal responsibility and authority to carry out the University's lease's conditions to be put in charge of managing the University's lands. Pursuant to Act 132, all fees including sublease payments are to be deposited into the Mauna Kea lands special fund and are to be used for managing Mauna Kea lands.

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**V. Significant questions remain unanswered**

**Comment 5:**

*It is our understanding the University of Hawaii is submitting this application "on behalf of the Thirty Meter Telescope Observatory Corporation." Why? TMT is the actual applicant. The TMT will hold the sublease, the TMT will be responsible for compliance with all expectations and conditions on the CDUP, the sublease, etc., so it should be TMT, not UH, applying for this privilege to build.*

**Response:** UH was the proposing agency in the Chapter 343 EIS document and the one requesting the CDUP because it holds the lease on the State conservation land being considered for the TMT Observatory. UH is also the permittee and applicant of current Conservation District Use Permits (CDUPs) for the Mauna Kea Science Reserve (MKSR). The TMT Observatory Corporation has applied to UH through the Master Plan project review process, which includes public input and review, to develop the TMT within the UH leased area. UH approved the TMT Project through that process and, therefore, has applied for the CDUP.

**Comment 6:**

*How does the University rationalize serving the conflicting roles of "applicant" and "manager" in this situation? What safeguards are in place to prevent events similar to the previous violations of CDUP conditions and state law by observatories?*

**Response:** The University, through OMKM, takes its role as manager of its managed lands on Mauna Kea seriously. This role is subject to oversight by the Board of Regents and ultimately the BLNR.

Amongst the managerial tasks assigned to OMKM is ensuring compliance with the BLNR-approved Comprehensive Management Plan and sub-plans. Should the BLNR grant a permit for the TMT Project, and if there are conditions attached, OMKM will be responsible for ensuring compliance with those conditions as well.

Currently, Mauna Kea rangers conduct twice-yearly inspections of all observatories within the Mauna Kea Science Reserve. All non-compliance issues, as well as concerns not included in their CDUP (such as trash around their facilities) are reported directly to the Directors of the facilities for compliance follow up. Conservation and Resource Enforcement personnel are also responsible for monitoring activities on the mountain and work to ensure that conditions of approval and regulatory requirements are complied with.

**Comment 7:**

*What is the carrying capacity of the summit? It is possible that the TMT is one too many telescopes? The 1983/85 Management Plan for Mauna Kea limited construction on the summit to only 2 minor and 11 major telescopes, less than 125 feet tall, based on the best available science. This limit was carried forward to the 1995 management plan because it made no mention of a limit or carrying capacity. Since the University's new "CMP" fails to mention any kind of limit on construction in this conservation district, it seems reasonable to rely on this limit again, until there is some scientific basis for changing.*

**Response:** This topic is previously discussed in the response to MKAH's comment 6.2. As explained there, the 1985/1995 Management Plan that KAHEA referenced is no longer in effect. Instead, it has

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been superseded by the CMP and its subplans in accordance with court rulings. KAHEA's suggestion that the University reference the earlier documents is inappropriate and would subject the University to legal challenges.

As outlined in Section 8.1 of the Final EIS for the 2000 Master Plan, the carrying capacity of Mauna Kea for observatory development is large but difficult to define precisely. The existing 2000 Master Plan and CMP provide for observatory development to remain well under the carrying capacity of Mauna Kea; therefore, the carrying capacity is not a relevant point of discussion for the TMT Observatory CDUA and does not address the Project's potential impacts on the environment.

**Comment 8:**

*How many telescopes are currently on the summit? On page 1-5 of the application, TMT indicated there are 13 telescopes. On page 1-3, TMT said there are 12 telescopes. On page 1-4, they said 11. just FYI, we counted the structures indicated on figure 3-7 in the TMT management plan, entitled "Site Plan showing Existing and Proposes(sic) Uses," at least 32 telescope-related structures are indicated there.*

**Response:** As stated on page 1-5 of the CDUA, there are eleven observatories and one radio telescope on Mauna Kea. This count is based on the following definition:

*"An observatory includes the telescope(s), the dome(s) that contain the telescope(s), and the instrumentation and support facilities for the telescopes that fall under a common ownership."*

Various other documents have failed to differentiate between an observatory and a telescope or defined an observatory in a variety of different ways without consistency, and this accounts for most of the differences that you noted. We apologize for not having been clearer in the CDUA and accompanying documents, all references should have been to 11 observatories and one radio telescope.

**Comment 9:**

*How big is the TMT? On the first page of the CDUA, TMT said 8.7 acres. On page 1-11, TMT said 5 acres. On the architectural site plan (they forgot to put a page number on it), it says "4.5 acres (3.9 acres before "re-contouring")."*

**Response:** The 8.7-acres listed on the first page of the CDUA included land that would be used for the TMT telescope and the TMT Access Way. The 5-acre figure on page 1-11 was an approximate value (the text reads "roughly five acres") for the TMT site including the driveway. The 4.5-acre figure listed on the architectural site plan does not include land required for the driveway. In addition to these, the contractor for the TMT Project will re-use and then restore approximately 4 acres of land that has been used as a temporary construction staging area during work on previous projects within the Science Reserve.

In summary, the University is requesting permission for use of the following land areas within the Conservation District;

Long-term use	8.6 acres
Temporary use	4 acres
<b>Total use</b>	<b>12.6 acres</b>

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**Comment 10:**

*Kahu Ku Mauna was allowed to identify four days for cultural practice where the TMT would "minimize daytime activities." Why did Kahu Ku Mauna only get four days? What about the many other important religious observances, such as Makahiki, funeral services, and other events where peace and quiet are prerequisite?*

**Response:** SHPD suggested four days as an appropriate amount to set aside, and the University has used that figure in its planning. The EIS and CDUA do not suggest that the TMT Project or other groups or individuals will constrain cultural practices in the summit region. The Project will comply with applicable rules, regulations, and requirements - including the CMP - concerning cultural resources and practices. The CMP states, on page 7-7, that "Native Hawaiian traditional and customary practices shall not be restricted, except where safety, resource management, cultural appropriateness, and legal compliance considerations may require reasonable restrictions." This means that Native Hawaiians currently have access to the summit and surrounding areas to exercise their customary practices all year-round, that they will continue to have such access; and that TMT will minimize its operations activity for up to four days. These four days have not yet been identified by Kahu Kū Mauna.

**Comment 11:**

*What is the operational noise level, in dBA, of the TMT? Considerable verbiage is given in the CDUA and EIS to how quiet the TMT will be, but an actual measurement of likely decibels created by this project is never given.*

**Response:** Contrary to this comment, anticipated noise from operation of the TMT Observatory is quantified in Section 3.13.3 of the FEIS. In particular, Figure 3-36 depicts the area where noise from the loudest equipment at the facility (the HVAC system exhaust) would likely reach 55 dBA.

**Comment 12:**

*The TMT mentions taking all the trash produced by the construction and use of this massive telescope to "an approved landfill or other waste disposal facility" on Hawaii Island. Where are these facilities located? The small county dumps on Hawaii are only allowed to accept: "Household refuse, residential do-it-yourself construction and demolition not exceeding 4 feet in length, soft compactable bulky items (mattresses, stuffed chairs, and couches) and residential self-hauled green waste."*

**Response:** The County of Hawai'i operates two landfills. One is the relatively small South Hilo Sanitary Landfill; the other is the large West Hawai'i Sanitary Landfill in Pu'uanaulu. The County requires that commercial disposal be covered by a Landfill Disposal Permit, with applications available at the Department of Environmental Management office. Metal waste will be taken to appropriate recycling facilities in Hilo and Kona. We anticipate that most of the relatively limited volume of solid waste that will be generated will be transported to, and disposed of at, the West Hawai'i Sanitary Landfill.

**Comment 13:**

*Where would the TMT dispose of the toxic chemical wash wastewater produced weekly by mirror maintenance? What is in that water?*

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**Response:** As stated in Section 2.8.4 of the CDUA, the waste collected from the mirror washing process will be collected, removed, and transported off site for treatment and disposal. Mirror washing wastewater may possibly contain low concentrations of certain low-toxicity dissolved metallic compounds; it is not expected to be characterized as hazardous waste, but will be treated as such until test results confirm that it is not. Regardless of the outcome of the testing, the mirror washing wastewater will be handled, transported, and disposed of using procedures similar to those used for hazardous materials as detailed in Section 2.9.3 of the CDUA and Section 3.8 of the Final EIS.

At this time, it is not known exactly where the wastewater will be taken as the options available when the first wastewater is generated could be different than the currently available options. However, similar wastewater is generated at observatories today and is treated at the Hilo Wastewater Treatment Plant.

**Comment 14:**

*How does the TMT manage to "not cause substantial adverse impact to existing natural resources within the surrounding area, community or region?"*

**Response:** As stated in Section 2.4 of the CDUA, the existing natural resources and potential impacts of the TMT Project are detailed in the attached Final Environmental Impact Statement (FEIS) which was accepted by the Governor of the State of Hawai'i on May 19, 2010. The potential Project impacts were evaluated within the framework of the Project's compliance with all applicable rules, regulations and requirements; the evaluation assumed implementation of the mitigation measures that had been proposed and implementation of relevant CMP management actions.

The proposed Project will operate in accordance with the TMT Management Plan, CMP and its sub plans as well as other relevant rules, regulations and requirements. As documented in the Final EIS for the TMT Project, the mitigation measures and management actions proposed in the TMT Management Plan found in Exhibit B of this CDUA and summarized in Table 2.1 of the application together with broader management and mitigation actions implemented in accordance with the CMP and sub plans will prevent substantial adverse impact.

**Comment 15:**

*How could the TMT ever "be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels?"*

**Response:** As stated in Section 2.5 of the CDUA, the proposed use is situated within the Astronomy Precinct and within the Mauna Kea Science Reserve on Hawai'i Island. Specifically, the Project will be located in Area E (site 13N) in the Northern Plateau, which is outside of the Kūkahau'ula summit area. As the Astronomy Precinct is the site of many existing astronomical observatories, the TMT Project will be compatible with existing land uses. As detailed in this CDUA, locating the TMT Project in Area E will result in less than significant impact on historic properties, cultural practices and Native Hawaiian rights, as well as viewplanes, species habitat and existing facilities. In addition to this, locating the TMT Project in Area E avoids any substantial impact to any cinder cone on Mauna Kea, including Kūkahau'ula. The TMT Project's observatory dome will also be coated with a reflective aluminum-like finish which reflects the colors of the sky and ground, helping the dome to blend in with the surrounding setting. This is intended to mitigate the Project's visual impacts. Based on all of this, the proposed TMT Project is compatible with the locality and surrounding areas and to the physical conditions and capabilities of the area.

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**Comment 16:**

*How can the TMT be built and "the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon?"*

**Response:** As stated in Section 2.6 of the CDUA and other supporting documentation, the proposed TMT Project will be sited in Area E and will have a minimal physical impact on the summit area cinder cones. The TMT Project will not be visible from the summit of Mauna Kea or from Lake Waiau but will be visible from within the Northern Plateau as well as the northern ridge of Kūkahau'ula, where other astronomical facilities are located and are visible. Views from the northern ridge of Kūkahau'ula are presently dominated by other astronomical facilities including Subaru, Keck, and the Canada-France-Hawaii observatory. It should be noted that, due to the TMT Project's design, the TMT will be at a lower elevation and various changes have been made to the dome and support structure to minimize the Project's visibility. It will not block the view of Maui from the northern ridge. The Access Way for the Project incorporates design components that are intended to mitigate visual impacts, including the coloring of pavement (where used) to better blend with the surroundings. The Project, however, will still add a visual element to the Northern Plateau. From outside of the Mauna Kea summit area, the TMT Project will be visible to approximately 15 percent of the Hawai'i island population. This includes views from the town of Waimea and along portions of Highway 250. The Project will not substantially block or obstruct existing views of Mauna Kea from around the Island of Hawai'i. In the context of the existing observatories and the fact that the TMT Project will not obstruct existing views, its visual impact is less than significant. A visual impact analysis may be found in Section 3.5 of the Final EIS. Although the proposed TMT Project will add a new element to the Northern Plateau, no substantial change to the natural topography will occur.

**Comment 17:**

*If the University holds a lease for "one observatory" on Mauna Kea, then how can it be that more than 13 subleases have been issued for telescopes on the summit when the law requires that "subdivision of land will not be utilized to increase the intensity of land uses in the conservation district?"*

**Response:** The lease that the University holds does not limit astronomy use of the summit area to "one observatory". Moreover, as stated in Section 2.7 of the CDUA, the proposed TMT Project does not involve the subdivision of land.

**Comment 18:**

*How can the TMT ensure it "will not be materially detrimental to the public health, safety and welfare" when it will be hauling chemical wastewater and hazardous waste down to the county dump?*

**Response:** As stated in Section 2.8 of the CDUA, the proposed Project has been designed/will be operated in a manner that will preserve public health, safety, and welfare as established in the numerous design guidelines and government regulations to which it is subject. Additional information is provided in the FEIS. Both the CDUA and the FEIS make it clear that construction and operation of the TMT will not lead to "...hauling chemical wastewater and hazardous waste down to the County dump." On the contrary, such wastes will be transported to waste treatment and disposal facilities designed to handle them safely.

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**Comment 19:**

*What is the decommissioning plan for the TMT? This should be an element of the CDUP and left for future negotiation.*

**Response:** Decommissioning of the TMT Observatory is discussed in Section 2.7.4 the EIS and Section 4.5.2 of the TMT Management Plan. They provide that the TMT Observatory and the extent of the Access Way exclusively used to access the TMT Observatory will be dismantled and the site restored at the end of the TMT Observatory's life in compliance with the Decommissioning Plan for the Mauna Kea Observatories, a Sub-Plan of the Mauna Kea Comprehensive Management Plan. Deconstruction and site restoration efforts will be managed by TMT with oversight by OMKM. A process similar to the MKMB-approved Project Review Process will be established to review, guide, and recommend the disposition of a site, including site restoration. Reviewers will include OMKM, Kahu Ku Mauna, and the MKMB Environment Committee, with MKMB approval required.

The steps will include preparation of a Site Decommissioning Plan (SDP), a Notice of Intent (NOI), Environmental Due Diligence Review, a Site Deconstruction and Removal Plan (SDRP), and a Site Restoration Plan (SRP).

**Comment 20:**

*Did the TMT commit to begin decommissioning by 2028, per the requirements of the University's management plan?*

**Response:** As stated in Section 2.7.4 of the EIS, the TMT Corporation understands that decommissioning and site restoration requirements will be included in the sublease for use of the land on which facilities would be located. As the current UH lease expires in 2033, decommissioning and site restoration must start prior to that time, unless a new lease is obtained from the BLNR.

**Comment 21:**

*Did the TMT commit to fully restore the northern plateau by 2033, when the University's lease for one observatory" expires? Hope so.*

**Response:** See previous response.

**Comment 22:**

*Does the TMT hope to stay pass [sic] the expiration of the University's lease in 2033?*

**Response:** As discussed in Section 3.10.3 of the EIS, the University believes it is likely that TMT, along with the existing observatories, will request that UH ask the Board of Land and Natural Resources to extend the lease beyond 2033. It is not within the scope of this CDUA to speculate on the nature or outcome of those future lease negotiations, which would likely include both a master lease negotiation between DLNR and UH and the subsequent sublease negotiation between UH and TMT.



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**Paul J. Conry, Administrator – DOFAW**

**Comment 1:**

*The formal land Survey of the power line corridor easement must be completed following standard easement procedures of the DLNR-Land Division and to map and description standards of the DAGS. Draft and final maps should be provided to the DLNR-Division of Forestry and Wildlife for comments and record keeping.*

**Response:** The University will ensure that the survey will comply with DLNR – Land Division and Department of Accounting and General Services' standards and in accordance with the conditions contained in the grant of easement (including the Mauna Kea Ice Age Natural Area Reserve) that was approved by the BLNR in August 1985. The University will provide copies to DOFAW as requested.

**Comment 2:**

*Surveys of Wēkiu bugs and other invertebrates should be conducted along the easement corridor prior to any construction disturbance, particularly at Pu'u Hau Kea and at the Pu'u west of Parking Area 1 along the Mauna Kea Access Road where the corridor cuts through the Mauna Kea Ice Age NAR at roughly 11,000 feet elevation.*

**Response:** The Office of Mauna Kea Management (OMKM) will consult with the U.S. Fish and Wildlife Service and experts who are advising OMKM, including representatives from the DLNR, on surveys of the wekiu bug and invertebrates regarding surveys along the utility corridor, including Pu'u Hau Kea and the pu'u west of the Parking Area 1.

**Comment 3:**

*Prior to construction, HELCO and/or contractors working on the power lines will need to be held to the same project construction mitigation measures outlined in Section 4-2 of the CDUA.*

**Response:** The University will ensure applicable mitigation measures described in Section 4.2 of the CDUA will be implemented.

**Comment 4:**

*Prior to construction, the Mauna Kea Ice Age NAR Archeological Inventory Survey Report should be reviewed to assess if any sites are within close proximity of the power line corridor; construction monitors, including one with archeological expertise, should be provided.*

**Response:** The archaeological consultants surveyed this area for the Natural Area Reserves System. Based on their survey, they have concluded that there are no inventoried historic properties within 100 feet of the HELCO easement in the Mauna Kea Ice Age NAR.

**Comment 5:**

*Improvement to the power lines should use construction practices that will result in the lowest potential disturbance to the corridor. For, example, using cranes staged on the Mauna Kea Access Road to access certain pull boxes without the need to drive "off-road".*

**Response:** The University will review proposed construction practices, including the possible use of a crane to ensure minimal disturbance to the corridor.

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**Comment 6:**

*The power line corridor should be restored back to its current condition after the line improvements have been completed to reduce the appearance of the corridor scar on the landscape.*

**Response:** The construction contractor will be required to minimize the visual changes to land within the utility line right-of-way during utility upgrades. Any disturbance outside of the easement area will be restored to the extent possible. However, continuing maintenance access will be needed in order for the easement to function as a utility corridor and some evidence of the facilities, such as manholes or utility boxes, will remain.

**Comment 7:**

*If access and line improvement prove to be too difficult or impossible on the existing 20 foot wide corridor in the Mauna Kea Ice Are Natural Area Reserve or along the 25 foot corridor in the Mauna Kea Forest Reserve, consider re-routing those portions of the line to the Mauna Kea Access Road.*

**Response:** It is unlikely that the line improvements will prove too difficult along the existing corridor, but should this be the case, the University will consider re-routing as suggested if the additional (i.e., new) disturbance that re-routing would entail is acceptable to the Board of Land and Natural Resources.

**Comment 8:**

*Table 2.1. Summary of Potential Effects and Mitigation Measures*

*p. 2-16: "Arthropod monitoring will be performed prior to, during, and or two years following construction in the area of the access way on the alpine cinder cone habitat."*

*The introduction of non-native species, specifically predators such as ants, is the greatest threat to the persistence of populations of native arthropods on Mauna Kea. It is imperative that general arthropod monitoring be performed on all alpine desert habitat affected by TMT construction (access ways, staging areas, and construction sites). The monitoring should be directed at finding incipient populations of alien invasive species across the environment which is being modified. Monitoring directed at Wekiu bugs specifically should also be conducted in all habitat types where Wekiu bugs have been known to occur, per standard survey protocols approved by the Office of Mauna Kea Management Wekiu bug Scientific Committee.*

**Response:** The Invasive Species Prevention and Control Program calls for the type of monitoring for and eradication of invasive species that this comment suggests. The Office of Mauna Kea Management conducts annual surveys of the wēkiu bug and arthropods at Hale Pōhaku, summit batch plant and summit ridges, locations determined by scientists advising OMKM on wēkiu bug and arthropod matters.

**Comment 9:**

*2.4 Substantial Adverse Impact*

*p. 2-6: "In addition, the portion of the Access Way which follows and goes over an existing single-lane, 4-wheel drive road on the flank of the Puu Hauoki cinder cone will result in a minor disturbance of the Kūkaha 'ula Historic Property."*

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*It should be noted here that the access way will alter, and destroy, known Type 3 Wekiu bug habitat (this is noted in the table, but not in the text).*

**Response:** The comment is correct. As noted in Table 2.1, it will alter and destroy a small area (0.2 acre) of known Type 3 Wēkiu bug habitat. The text provided only general statements, with specifics being left to the extensive tabulation.

**Comment 10:**

*Table 4-1: Management Actions Detailed in the CMP and Subplans*

*p. 4-3: NR-15 and NR-16 are currently labeled 'not applicable' to TMT project. The designations should be changed to 'indirect'. Per the definition of 'indirect': "TMT would need to be aware of and comply with the outcome of the implementation of management actions by the University in the future. Based on the outcome of the management actions, requirements affecting the TMT Project directly or indirectly may occur. As appropriate, TMT may need to adjust operations to comply with those outcomes at some time in the future. TMT may also wish to adopt measures in advance of some management actions to help achieve or support the desired outcome of the management action."*

**Response:** The University understands the point you are making about the future, however, NR-15 and NR-16 call for inventories and monitoring to be performed by UH. They do not call for modifications to the management plans. Hence, we believe that "not applicable" is the better term.

As outlined in Chapter 5 of the TMT Management Plan, the TMT Management Plan will be updated every 5 years, as necessary, based on (a) updates to the Mauna Kea CMP; (b) based on strengths or weaknesses revealed through the monitoring and reporting program; (c) relevant new or modified laws, regulations, and policies; and (d) modifications to the operation of the TMT Observatory.

**Comment 11:**

*4.1.2 Natural Resource Management*

*p. 4-13: "In addition to this, TMT would monitor arthropod activity in the vicinity of the Access Way portion impacting sensitive, Type 3 Wekiu bug alpine cinder cone habitat. Monitoring will be performed prior to, during, and for at least two years after construction in this area."*

*Again, it is imperative that general arthropod monitoring be performed not just on access ways and in known Wekiu bug habitats, but on all alpine desert habitat affected by TMT construction (access ways, staging areas, and construction sites). It is possible that the introduction of an alien invasive species may occur in any area impacted by the construction process, and such an invasion would ultimately impact the entire alpine ecosystem.*

**Response:** The University shares your concern for careful monitoring of arthropods in the summit area of Mauna Kea. The existing Invasive Species Prevention and Control Program calls for the type of monitoring for and eradication of invasive species that this comment suggests. The Office of Mauna Kea Management conducts annual surveys of the wēkiu bug and arthropods at Hale Pōhaku, summit batch plant, and summit ridges, locations determined by scientists advising OMKM on wēkiu bug and arthropod matters.

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**E. Kalani Flores & B. Pualani Case**

**Comment:**

*A Conservation District Use Permit (HA-3568) for the proposed Thirty Meter Telescope should not be granted at this time for the following reasons:*

*The TMT Final Environmental Impact Statement (FEIS) is an incomplete document as it has failed to consider and/or disclose the adverse impacts upon the ancestral akua (gods, goddesses, deities) and spirits connected to the summit of Mauna a Wākea. Thus, without this disclosure and consultation, this FEIS is incomplete and deficient. As such, this permit should not be approved at this time.*

**Response:** We must respectfully disagree with your statement that the TMT Final Environmental Impact Statement (FEIS) is an incomplete document. The Governor of the State of Hawai'i accepted the document on May 19, 2010, and the time for legal challenge has passed.

While we cannot evaluate the statements attributed here to the akua, we would note that the FEIS and CDUA provide extensive consideration of the spiritual, religious, and cultural importance of Mauna Kea to a number of groups who have carried out traditional practices in the summit region. For example, an extensive Cultural Impact Assessment (CIA) can be found at Appendix D of the FEIS. In addition, the Executive Summary and Section 3 of Volume I of the FEIS contain detailed presentations on these topics as well as interviews with modern-day practitioners and other persons who have identified Mauna Kea as a locus for activities important to their cultural beliefs and practices.

**Cliff Souza**

**Comment:**

*I would like to voice my opposition to the construction of the 30 meter telescope.*

*One reason being they are not providing access for the Fire Dept.'s fire engine. Also they are not providing a water supply for fire fighting. These are required by the Fire Dept for structures.*

*Over 10 years ago 4 men died and numerous workers were injured in a fire at the Subaru telescope. The fire could not be extinguished by the fire extinguishers they had on hand. No fire engines reached the fire scene because access was not provided. Prior to that fire there was a fire at the Keck obsv. in which 18 fire extinguishers were unable to extinguish that fire. No fire access or water were available for these 2 fires.*

*In prior years I have inquired at the Building & Fire Dept. about the lack of fire engine access and water supply for fire fighting and received only inadequate responses.*

*I feel the Building and Fire Dept.'s are negligent in allowing these structures without fire engine access and water supply for fire fighting. I feel the DLNR should not allow construction until fire protection is provided.*

**Response:** The University shares your concern for fire protection on Mauna Kea. Fire trucks and personnel have unrestricted access to the Mauna Kea summit region. The roads, including the new TMT Access Way, allow for fire truck access to all developed areas in the Mauna Kea summit region. The

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response time for the County Fire Department is likely well over an hour due to the distance and road conditions. Therefore, UH and the observatories also have an agreement with the U.S. Army that allows its fire-fighting crew at the Pōhakuloa Training Area (PTA) to assist with fire emergencies. Unfortunately, even the crew from PTA would likely take 45 minutes to reach the summit region. That is why additional fire-detection/fire-suppression measures are discussed in the Project EIS and incorporated into the TMT Observatory's design.

As indicated in the FEIS, contractors working within the Conservation District will be responsible for producing and implementing a Fire Prevention and Response Plan that addresses fire risks during their activities. These plans will be prepared with the knowledge of long response times for County Fire Department or PTA fire fighting personnel to the Mauna Kea summit area. One aspect of the Fire Prevention and Response Plan will require contractors to notify the local fire department of activities and coordinate with them on a regular basis. Construction personnel will also be required to have cell phones or other communication equipment that provides coverage at the work site that can be used to contact the fire department immediately in the event of a fire. However, the risk of fire during construction will likely largely be managed through best management practices and procedures to avoid fire and extinguish fires with fire extinguishers. This is due to the lack of water storage during the construction period.

Once complete, the TMT Observatory will have two 25,000-gallon underground storage tanks for water storage as part of the fire suppression system. The tanks will be kept near full and their primary purpose will be fire suppression; water from the tanks can be used for manual fire fighting purposes and supply for the automatic fire sprinkler system within the Observatory. In addition, the computer room will be equipped with a gaseous fire suppression system. The Observatory will have an automatic fire detection system so that action can be taken immediately after a fire is initiated rather than after it has become well-established.

**Fred Stone, Ph.D.**

**Comment:**

*Throughout the TMT CDUA, the UH CMP is referred to as the "Mauna Kea CMP". This implies that the CMP includes areas outside the UH leases, such as the Natural Area Reserves and land adjacent to the Hale Pohaku site. It should be made clear to the UH applicants that they DO NOT have a right to use land in the Ice Age Natural Area Reserve. For example, utility trenches should not be built in the NAR. Management of the Ice Age NAR is the responsibility of the DLNR. The UH CMP is not a Comprehensive Management Plan for Mauna Kea, in that it includes ONLY the land leased to the UH.*

**Response:** At no point does the CDUA state or imply that the University can make commitments for land (e.g., the Natural Area Reserves) outside its control. Facilities related to astronomical use at the summit have been constructed within the *Ice Age Natural Area Reserve* only after obtaining the appropriate approvals.

**Tom Peek**

**Comment:**

*To reverse this "lax attitude", the Auditor urged the department to write its own comprehensive management plan for the mountaintop:*

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*"The Department is required to prepare a comprehensive management plan for areas in the reserves system and is empowered to enforce the laws, rules and regulations applying to the reserves." (p.32)*

**Response:** This statement by the State Auditor, found under the heading "*A comprehensive management plan for the Mauna Kea Ice Age Natural Area Reserve has yet to be developed*", clearly refers to the lack of a comprehensive management plan for the Ice Age Natural Areas Reserve (NAR). It does not refer to the Mauna Kea Science Reserve (MKSR), which is not part of the NAR.

**Deborah Ward**

**Comment:**

*OMKM had convened a wēkiu bug (Nysius wekiucola) committee, which included Fred Stone and Frank Howarth, two of the scientists who recorded multiple thousands of the organisms unique to the Mauna Kea summit, in 1982, while conducting studies that led to an EIS, and subsequently to the recommendations in the Mauna Kea Science Reserve Complex management Plan... . After a precipitous decline in observed wekiu [bug] numbers, the wēkiu bug was considered for listing as an Endangered Species, and had been Category 1 (highest eligibility for listing). Negotiations between OMKM and USFWS have led to a downlisting of the wekiu bug status, but recovery efforts are ill-defined."*

**Response:** The University shares Ms. Ward's continuing interest in the status of wēkiu bug populations on Mauna Kea and is working hard to ensure that its activities do not cause undue harm to the species. Before discussing this in more detail, however, UH would like to clarify a few points mentioned in her comment.

The U.S. Fish and Wildlife Service determined that the wēkiu bug is a candidate for federal protection. Candidates are not categorized as either threatened or endangered. They are only categorized by priority. The wēkiu bug priority is an 8; low in priority. The determination of endangered or threatened is made when the species is listed.

"Category 1" is a term that has not been used by the USFWS for over 10 years; when it was used it did not mean "highest eligibility for listing." What it meant is that there was not enough information to consider the species for listing. Thus, there has not been a downlisting of the wēkiu bug status because it was never listed. The USFWS has set the priority for listing at 8 due to the relatively low magnitude of the threats and the fact that threats did not occur throughout the species range. All candidate priority numbers are based on this type of threat assessment, not on negotiations.

Dr. Stone and Dr. Howarth participated in the 1982 survey of the wēkiu bug. During that survey multiple thousands of wēkiu bugs were not only recorded, but captured. In a subsequent survey there appeared to be many fewer wēkiu bugs. However, it is not certain whether this resulted from differences in natural environmental factors such as the amount of snow fall, the development of observatories, the trapping and removal of significantly large number of wēkiu bugs during the surveys, or a combination of these and other factors.

As for the TMT Project, it will not have a negative impact on the wēkiu bug, and TMT has agreed to work with OMKM on the development and implementation of a habitat restoration study. Depending on the results of this study, it could be used to support the design and implementation of a Habitat Restoration Plan in the future.