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STATE OF HAWAII



DIRECTOR
INSTITUTE FOR ASTRONOMY

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JAN 25 1989

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CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 621
HONOLULU, HAWAII 96809

JAN 24 1989

FILE: HA-8/10/88-2174
180-Day Exp. Date: 2/6/89
DOC.: 4989E

Dr. Donald N. B. Hall, Director
University of Hawaii Institute
for Astronomy
2680 Woodlawn Drive
Honolulu, Hawaii 96822

Dear Dr. Hall:

Subject: Conservation District Use Application for a
Very Long Baseline Array Facility (VLBA) at the
Mauna Kea Science Reserve, Hamakua District,
Hawaii

We are pleased to inform you that your Conservation District Use Application for a VLBA facility, spur road, and temporary batching site at the Mauna Kea Science Reserve was approved on January 13, 1989, subject to the following conditions:

1. Upon completion of construction, the skier's parking lot will be restored to its previous condition;
2. In the event the antenna facility is permanently closed or abandoned, buildings and above ground structures be removed and the area restored to its natural conditions;
3. The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and applicable parts of Section 13-2-21, Administrative Rules, as amended;
4. The State of Hawaii shall not be responsible for any loss, liability, claim or demand for property damage, property loss, or personal injury including death caused by or resulting from any act or omission of the applicant or its contractor in connection with its exercise of the privileges herein granted;
5. The applicant shall comply with all applicable Department of Health Administrative Rules;

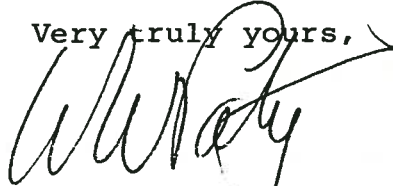
6. Before proceeding with any work authorized by the Board, the applicant shall submit four (4) copies of the construction plans and specifications to the Chairperson or his authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Three (3) of the copies will be returned to the applicant. Plan approval by the Chairperson does not infer approval required of other agencies. Compliance with Condition 3 remains the responsibility of the applicant;
7. Any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, and all work and construction must be completed within three (3) years of the approval of such use;
8. That failure to comply with any of these conditions shall render this Conservation District Land Use application null and void;
9. Other terms and conditions as prescribed by the Chairperson.

The Board also authorized a construction right-of-entry for this work.

Please acknowledge receipt of this permit, with the above noted conditions, by signing in the space provided below and returning a copy to us.

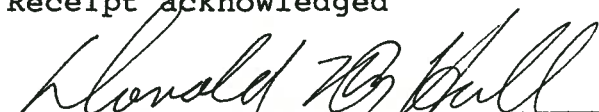
If there are any questions on these conditions, please contact our Office of Conservation and Environmental Affairs at 548-7837.

Very truly yours,



WILLIAM W. PATY

Receipt acknowledged


Applicant's Signature

2/14/89
Date

cc: Hawaii Land Agent
Marilyn Metz

DLNR
OCEA

90 FEB 16 PM 1:19

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
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BOARD OF LAND AND NATURAL RESOURCES

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AQUACULTURE DEVELOPMENT
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LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

FILE NO.: HA-8/10/88-2174
180-Day Exp. Date: 2/6/89
DOCUMENT NO.: 4849E

January 13, 1989

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

Gentlemen:

REGARDING: Conservation District Use Application for
a Very Long Baseline Array Facility at the
Mauna Kea Science Reserve, Hamakua
District, Hawaii

APPLICANT: University of Hawaii Institute for
Astronomy

LANDOWNER: State of Hawaii

LOCATION/
TMK: Mauna Kea Summit, Hawaii
4-4-15: 9

LOT SIZE/
USE: 11,214 acres
2 acres

SUBZONE/s: Protective/Resource

BACKGROUND:

The Board of Land and Natural Resources approved a 65-year lease (beginning January 1, 1968) to the University of Hawaii for all lands above the 12,000-foot elevation on Mauna Kea. The lease (G.L. 5-4191) refers to these lands as the Mauna Kea Science Reserve.

DESCRIPTION OF AREA/CURRENT USE:

There are, currently, nine telescope facilities within the Mauna Kea Science Reserve. In addition to these astronomical facilities, there are transmitters on the summit of Mauna Kea for the Volcano Observatory and the DLNR's Division of Forestry and Wildlife. The Forestry transmitter is used in case of forest fires, or other emergencies.

Mauna Kea is also used to conduct geological, meteorological, and biological studies. Recreational use of Mauna Kea includes skiing and snowplay during the winter season, hiking, sightseeing and photography.

ITEM H-3

The project site is between the 12,200- and 12,400-foot elevation of the Mauna Kea Summit. It is within a flat plain in a low lying saddle between two cinder cones.

The proposed batching plant site is used as a skier's parking lot during the snow season.

PROPOSED USE:

The applicant proposes to sublease a portion of the Mauna Kea Science Reserve to the National Radio Astronomy Observatory for the construction and operation of a radio telescope facility and a 20-foot-wide, 2,600-feet-long, compacted-gravel access road from the Mauna Kea Observatory access road to the site.

The antenna would be an 82-foot diameter solid surface reflector mounted on wheels within a 50-foot diameter concrete ring (Exhibit 7). The maximum height of the antenna would be 95 feet above ground. The antenna would be painted white to minimize thermally induced distortions.

About one acre of the proposed site would be enclosed by a seven-foot high chain link fence. The antenna, a control building, an emergency generator, a propane fuel tank, a tower with weather instruments and miscellaneous concrete pads for equipment would be built within this area (Exhibit 5).

The site would require potable water, sewer, telephone and electric services. The water would be stored in a 2,000-gallon tank buried just outside of the fenced area. The sewer services would be provided by a cesspool also outside of the fenced area. Electrical and telephone lines would be buried parallel to the proposed spur road to the site.

The antenna is scheduled to be operational by early 1991. It would be remotely-operated 24 hours a day. Maintenance and other routine duties would be provided by two to four technicians who would work a regular 40-hour week.

The antenna would be a passive instrument; it would not transmit or radiate any radio frequency energy.

In the event the antenna facility is permanently closed or abandoned, buildings and above-ground structures would be removed and the area in use returned to its natural condition.

The applicant also proposes to use a 30,000 square foot site commonly known as the "skier's parking lot" for a concrete batching plant during construction of the facility (Exhibit 3). This area is within the Natural Area Reserve and within the Protective Subzone. Use of this site for the batching plant was approved in 1975 (CDUA HA-653). During the batching operation, aggregate and sacks of cement would be hauled to the batch plant site as required in preparation for scheduled concrete pours. On the scheduled pouring dates, the aggregate and cement would be proportionately mixed and transferred by ready mix trucks to the construction site at the summit. All units in the mixing operations will have self-contained power such as gasoline and diesel engines. Water would be stored on the batch plant site for mixing operations.

Upon cessation of operations, the batching plant equipment would be removed and the site restored to its natural condition.

SUMMARY OF COMMENTS:

The application was sent to the following agencies for review and comment: the County of Hawaii Planning Department; the State Department of Health, Department of Business and Economic Development, the Office of Environmental Quality Control, the Environmental Council, the Office of Hawaiian Affairs, Office of State Planning; and the Department of Land and Natural Resources, Divisions of Aquatic Resources, Forestry and Wildlife, State Parks/Outdoor Recreation/Historic Sites, Land Management, Conservation and Resources Enforcement, Water and Land Development, and the Natural Area Reserves System. Comments received are as follows:

County Planning Department

We have no objections to the VLBA facility being established as described.

With regard to the Special Management Area (SMA) aspect of this application, the project is outside the County's SMA, thus our SMA rules are not applicable in this case.

Office of State Planning

According to the Draft Environmental Impact Statement (DEIS), native Hawaiian flora and fauna, including rare plants and birds, inhabit the mountain slopes. Several of these species subsist nowhere else in the world.

The DEIS also indicates that indirect impacts to the environment could result from both the facility and the access road. Potential impacts include the disturbance and/or destruction of endemic flora and fauna habitat due to off-road vehicles and by the introduction of exotic species to the environment.

We agree with the applicant's mitigative measures which include, but are not limited to, confining construction activities to specified areas, prohibiting off-road vehicle use in the area, and complying with the management policies already established by the University of Hawaii for the preservation of resources within the Science Reserve Complex.

Forestry and Wildlife

Our main concerns are that it does not adversely affect/restrict our communications system, and our use of radios while working on Mauna Kea; and that it does not unduly restrict public use of the mountain.

Natural Area Reserves System

We question making available for the public a spur road that leads to a non-public use facility. Allowing public access on a gravel road turning off from the (to be) paved Summit Road will increase the temptation and opportunity for illegal

off-road driving. Enforcement of rules against off-road driving, the most serious enforcement problem on Mauna Kea, will be more difficult. We suggest that the antenna road be of restricted use in accord with the facility it leads to and a locked gate be placed where it starts from the Summit Road.

Historic Sites Section

The UH Institute of Astronomy's letter of October 13, 1988 (Exhibit 8) indicates that they have corrected the next inconsistencies and that the preservation plan condition will be worked out with our section. This plan is indeed now being worked on. Thus, we believe these measures are sufficiently addressing our concerns.

Hawaii District Land Agent

I have reviewed the application by the University of Hawaii, Institute of Astronomy for the Very Long Baseline Array facility and my only concern is its visibility and its long-term effect on the aesthetics of Mauna Kea. (See Exhibit 6.)

The Department of Health and our Divisions of Land Management, Water and Land Development, and Forestry and Wildlife had no objection to the proposal.

PUBLIC HEARING SUMMARY:

This application was presented in a public hearing before the Board of Land and Natural Resources on December 1, 1988 at Hilo, Hawaii. Concerns and questions raised are cited below.

Question: Why was the Governor the accepting authority for the Environmental Impact Statement?

Answer: (See analysis.)

Q: Is this facility part of the Mauna Kea Master Plan?

A: (See analysis.)

Q: Would the radio telescope interfere with other radio use on Mauna Kea?

A: No, the radio telescope merely receives signals. In fact, the concern of the applicant is that radio transmitters may interfere with this project.

Q: Would use of the skier's parking lot as a batching plant interfere with the skier's use of the lot?

A: (See analysis.)

Q: Could the applicants provide a photographic display of the aesthetic impact this project may have on Mauna Kea?

A: (See analysis.)

Q: Why was a supplemental EIS required for this project?

A: Under the Mauna Kea Master Plan, a supplemental EIS would be required for specific proposed sites.

Q: What is the purpose of this radio telescope?

A: It would be one of ten such radio telescopes built in the Northern, Western Hemisphere to be used simultaneously in

order to obtain extremely detailed radio pictures of objects in space. The ten radio telescopes would be able to simulate a single radio telescope with a six-thousand mile diameter. It would be used for research by national and international astronomers.

Q: Would the proposed Kau space facility affect this project?

A: Since the specific of the space facility has not been presented, it is not known at this time. However, the radio telescope is designed to avoid radio transmissions from such a facility.

Q: Where would the data be collected?

A: It would be collected near the geographic center of the ten radio telescope array - this is in Socorro, New Mexico.

Q: Is this proposal a long term project?

A: It is estimated as a 25-year project.

Q: Are all ten radio telescopes aimed at the same point in space?

A: Yes, at any given instant.

Q: Would the radio telescopes be able to track a space shuttle?

A: No, the antenna is not constructed to track such fast moving objects near the earth.

Q: Are there any priorities on research objective such as the big bang or extra terrestrial intelligence?

A: There is an agenda of worthwhile astronomical problems for this project. However, the criteria for this agenda is whether the proposed research is timely and can be done competently. It is important, currently, to understand quasars.

Q: How many research projects will be undertaken per year?

A: It would vary depending on the problem being studied. Some projects would take a relatively short amount of time while some may take years.

Q: Is this telescope different from the one that collapsed in England?

A: Yes, the 300-foot telescope was built to last five years but was used for 26 years.

Q: How long would the radio telescope operate per day?

A: It would operate 24 hours per day all year except for occasional maintenance and calibration.

Q: How many people would be involved with this project?

A: There may be between 800-1,200 individuals involved - graduate students, astronomers, geodesic scientists and others.

ANALYSIS:

Following review and acceptance of the application for processing, the applicant, by letter dated September 13, 1988 was notified that:

1. The proposed use is a conditional use in the Resource and Protective Subzones of the Conservation District according to Title 13, Chapter 2, Administrative Rules, as amended;
2. A public hearing pursuant to Chapter 183-41, Hawaii Revised Statutes, as amended, is required; and
3. In conformance with Title 11, Chapter 200 of the Administrative Rules, an Environmental Impact Statement (EIS) was determined to be required for the proposed action; and written clearance from the County of Hawaii regarding SMA requirements has been obtained.

The objective of the Protective subzone is to protect valuable resources in such designated areas as restricted watersheds; marine, plant or wildlife sanctuaries; significant historic, archaeological, geological, and volcanological features and sites; and other designated unique areas.

The objective of the Resource subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.

Section 13-2-21(b)(1) relating to standards requires all applications be reviewed in such a manner that the objective of the subzone is given primary consideration.

Under the 1977 Mauna Kea Plan, each new facility built on the summit of Mauna Kea must meet the following criteria:

Provide public benefit to the people of Hawaii in terms of employment sources, educational pursuit, overall economic development, etc.;

Demonstrate public necessity in terms of cooperative use of facilities and overall advancement of science and research;

Show evidence that Mauna Kea is the best site for such facility; and,

Be compatible with other uses of Mauna Kea and within the terms of the lease between the University of Hawaii and the Board of Land and Natural Resources.

The proposed Very Long Baseline Array (VLBA) facility meets all of these criteria. It would be part of a major project funded by the National Science Foundation for research by the national and international scientific community. The VLBA is designed to provide the highest quality radio images of remote astronomical objects by a ground based instrument. A VLBA facility in Hawaii is required to achieve the necessary high angular resolution (other VLBA facilities would be located across the country with the U. S. Virgin Islands at the other end of this array). Other sites within the State, such as Haleakala, Hualalai, and Mauna Loa, were considered, however, Mauna Kea was evaluated as the best site. Construction of this facility, estimated at \$1.5 million, would provide a small economic boon to the State and the County of Hawaii. The capabilities of the Mauna Kea Science Reserve would be enhanced by this project and may, in a minor way, contribute to the State's research and development industry. The proposed

project site was selected to be compatible with practically all existing uses of the area. The project would not interfere with or be interfered by existing radio transmitters. It would not be visible from most populated areas. Although it may be partially visible from areas such as Lelewai Point and portions of Waiakea Homestead (Exhibit 6), a 95-foot structure seen at a distance of 21 miles (closest visible point) would present an image comparable to a one-inch object seen at a distance of ten feet. Recreational uses would not be adversely affected by the project since there is seldomly sufficient snow in the area for skiing, it is a poor area for hunting and there are no established hiking trails in the vicinity. A gate would be built on the spur road to restrict off-road driving.

The University's 1983 long range development plan, the Science Reserve Complex Development Plan, proposed a total of thirteen telescope facilities within the Science Reserve by the year 2000. An intermediate altitude facility, such as this proposal, was not considered by that plan. According to that plan, there would be still four sites for possible future projects. However, Arizona was recently selected as the site for one of these projects. The total number of facilities on Mauna Kea by the year 2000 may still be thirteen if this project is approved.

An Environmental Impact Statement was required for this project since it would be federally funded. The EIS was prepared prior to the filing of this Conservation District Use Application. Under this circumstance, the Governor is the accepting authority of the EIS. The Final EIS for this project was accepted on November 2, 1988.

The concerns expressed by the Natural Area Reserves System and Forestry and Wildlife were addressed in the letter referred to by our Historic Sites Section (Exhibit 8).

The proposed concrete batch plant site was established for that purpose under CDUA HA-653 in 1975. Since that time, the site has been used as the batch plant site for other projects on Mauna Kea. There would be no permanent impact to the area by its use as a batch plant site for this project. The area is large enough, 30,000 square feet, to accommodate the batch plant and parking for occasional skiers. (Under a previous CDUA, only 20,000 square feet was used for the batch plant.)

Therefore, Staff recommends that:

RECOMMENDATION:

The Board of Land and Natural Resources approve this application for a VLBA facility, spur road, and temporary batching site at the Mauna Kea Science Reserve subject to the following conditions:

1. Upon completion of construction, the skier's parking lot will be restored to its previous condition;
2. In the event the antenna facility is permanently closed or abandoned, buildings and above ground structures be removed and the area restored to its natural conditions;

3. The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and applicable parts of Section 13-2-21, Administrative Rules, as amended;
4. The State of Hawaii shall not be responsible for any loss, liability, claim or demand for property damage, property loss, or personal injury including death caused by or resulting from any act or omission of the applicant or its contractor in connection with its exercise of the privileges herein granted;
5. The applicant shall comply with all applicable Department of Health Administrative Rules;
6. Before proceeding with any work authorized by the Board, the applicant shall submit four (4) copies of the construction 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 (3) of the copies will be returned to the applicant. Plan approval by the Chairperson does not infer approval required of other agencies. Compliance with Condition 3 remains the responsibility of the applicant;
7. Any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, and all work and construction must be completed within three (3) years of the approval of such use;
8. That failure to comply with any of these conditions shall render this Conservation District Land Use application null and void; and
9. Other terms and conditions as prescribed by the Chairperson.

Respectfully submitted,

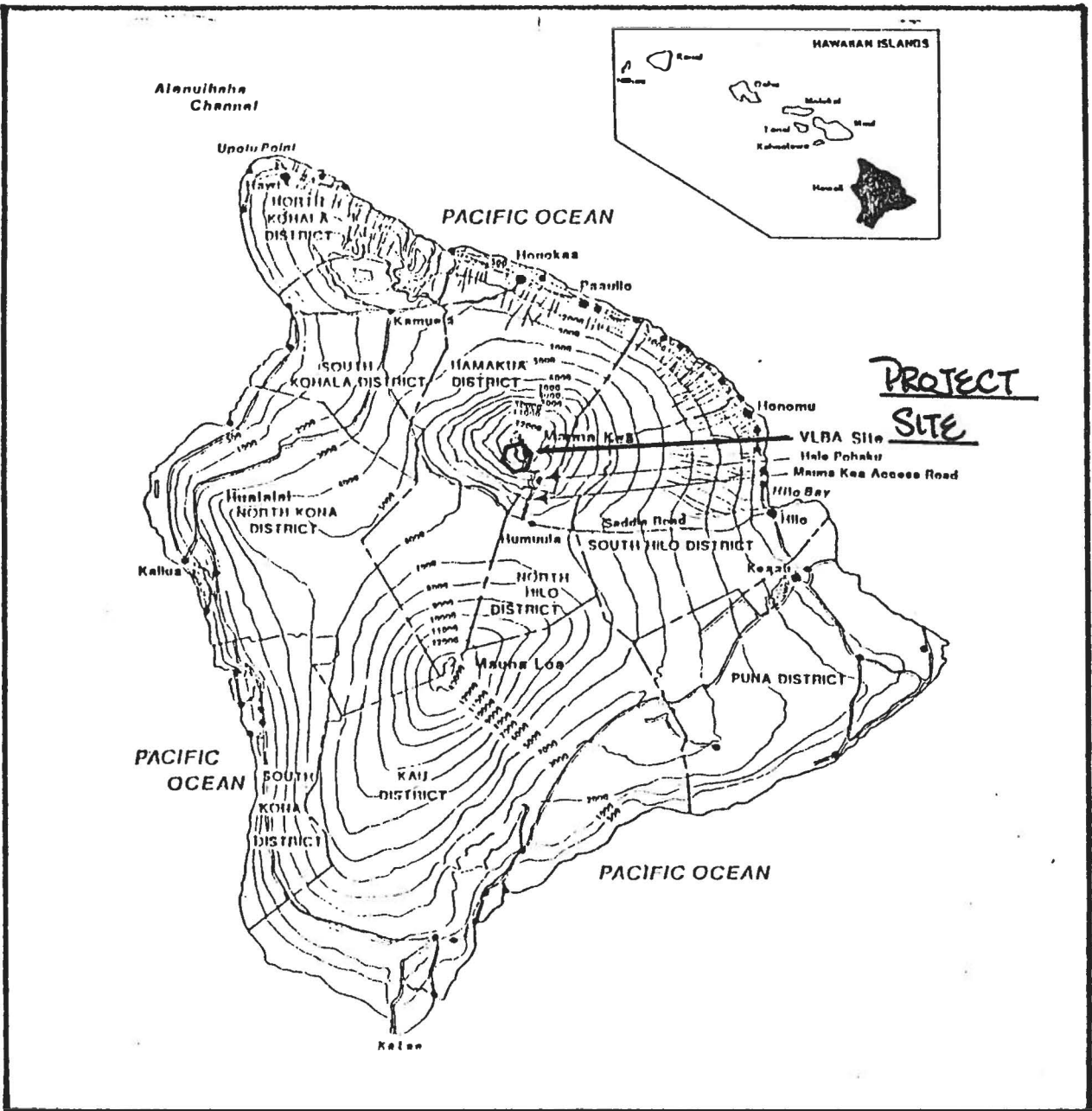

DON HORIUCHI
Staff Planner

Attachments

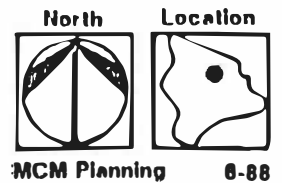
Approved for submittal:



WILLIAM W. PATY



The Region



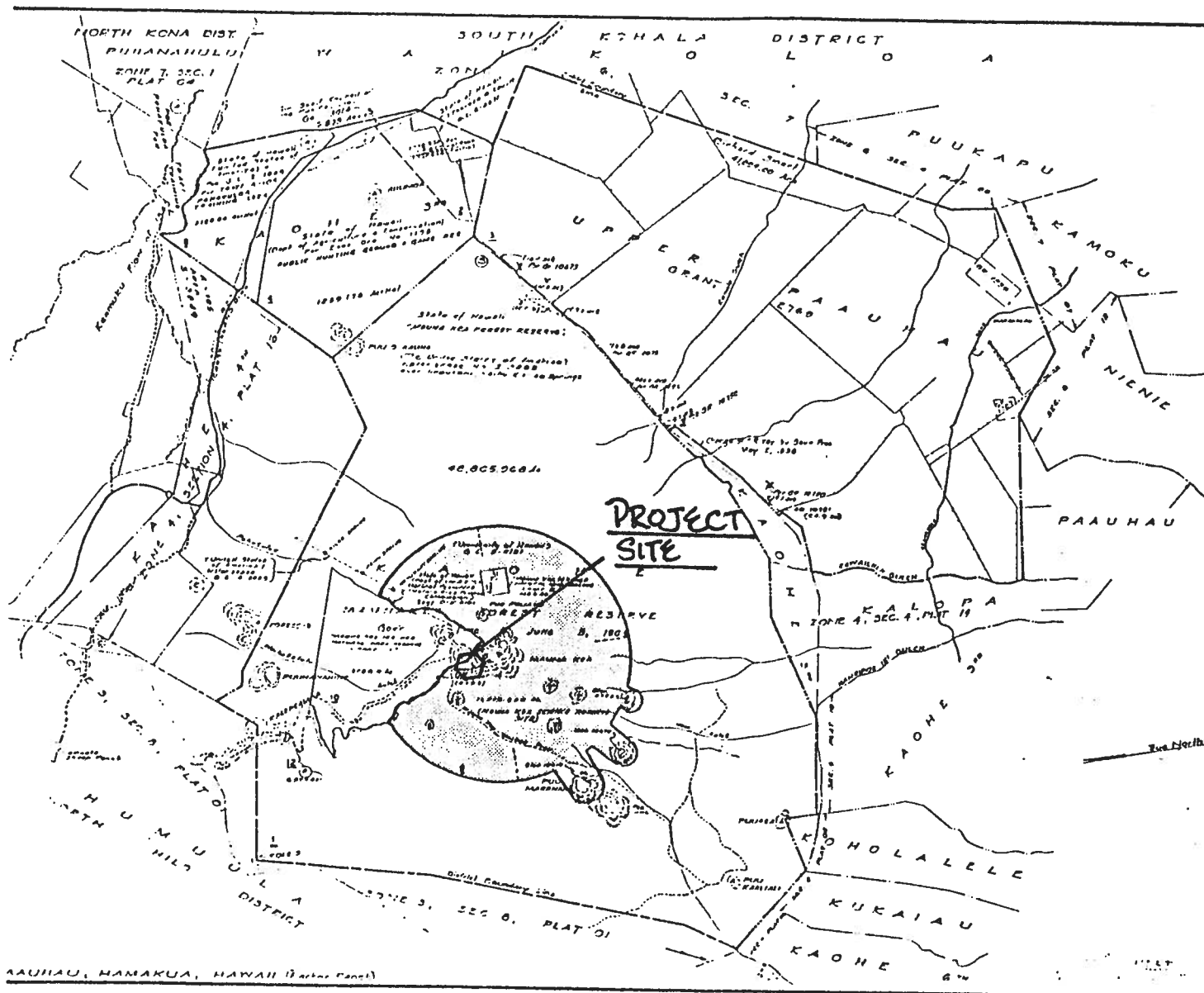
MCM Planning 8-88

Exhibit 1

CDUA no. HA-2174
 APPLICANT UH INSTITUTE FOR ASTRONOMY
 AGENT
 TMK 4-4-15: 09
 SCALE

SUBZONE PROTECTIVE
 RESOURCE
 LIMITED
 GENERAL
 PROJECT

NORTH



MAUNA KEA SCIENCE RESERVE

TAX MAP KEY
(4-4-15:09)



LOCATION





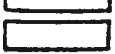

NORTH

MCM PLANNING

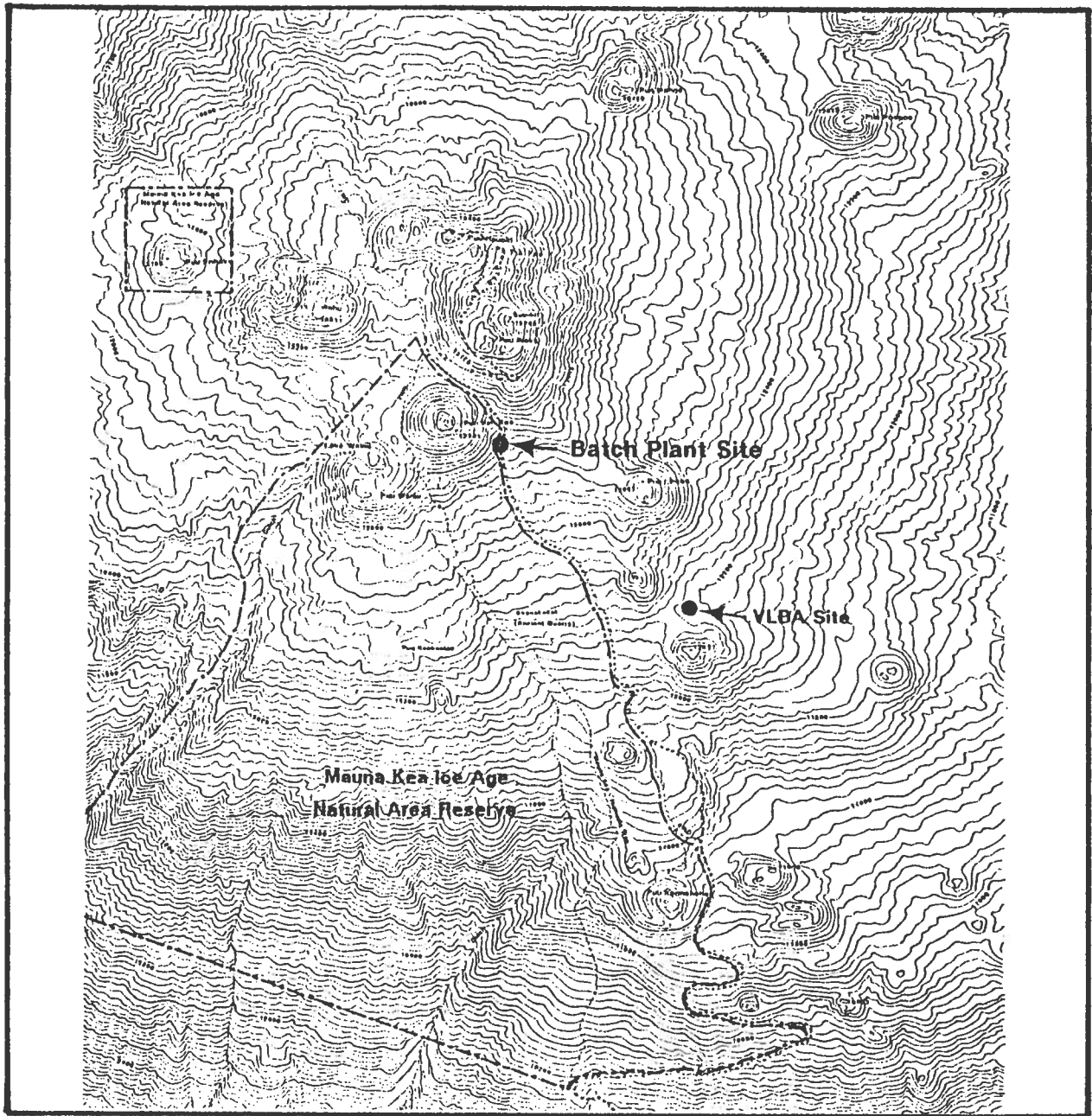
6/88

Exhibit 2

CDUA no. HA-2174
APPLICANT UH INSTITUTE FOR ASTRONOMY
AGENT
TMK 4-4-15: 09
SCALE

SUBZONE  PROTECTIVE
 RESOURCE
 LIMITED
 GENERAL PROJECT

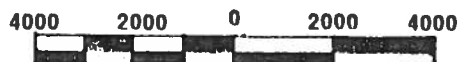
NORTH



LEGEND:

--- Reserve Boundary

Batch Plant Site



Scale in Feet

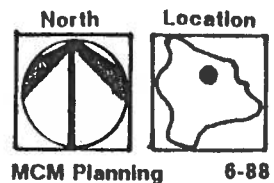




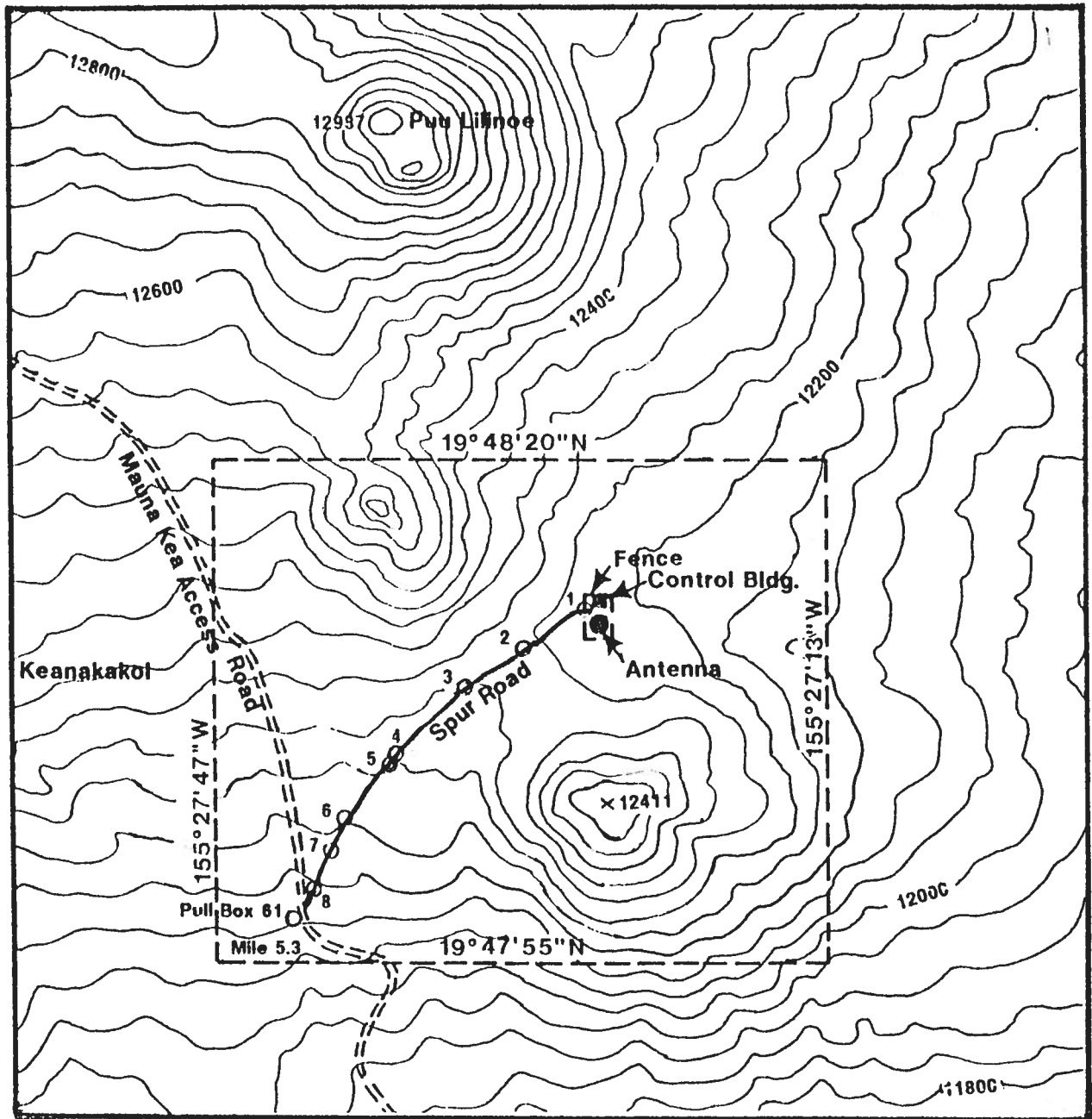


Exhibit 3

CDUA no. HA-2174
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SUBZONE  PROTECTIVE
 RESOURCE
 LIMITED
 GENERAL
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VLBA Site

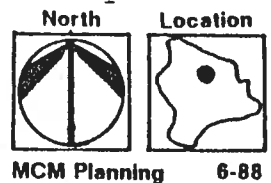
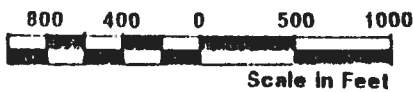




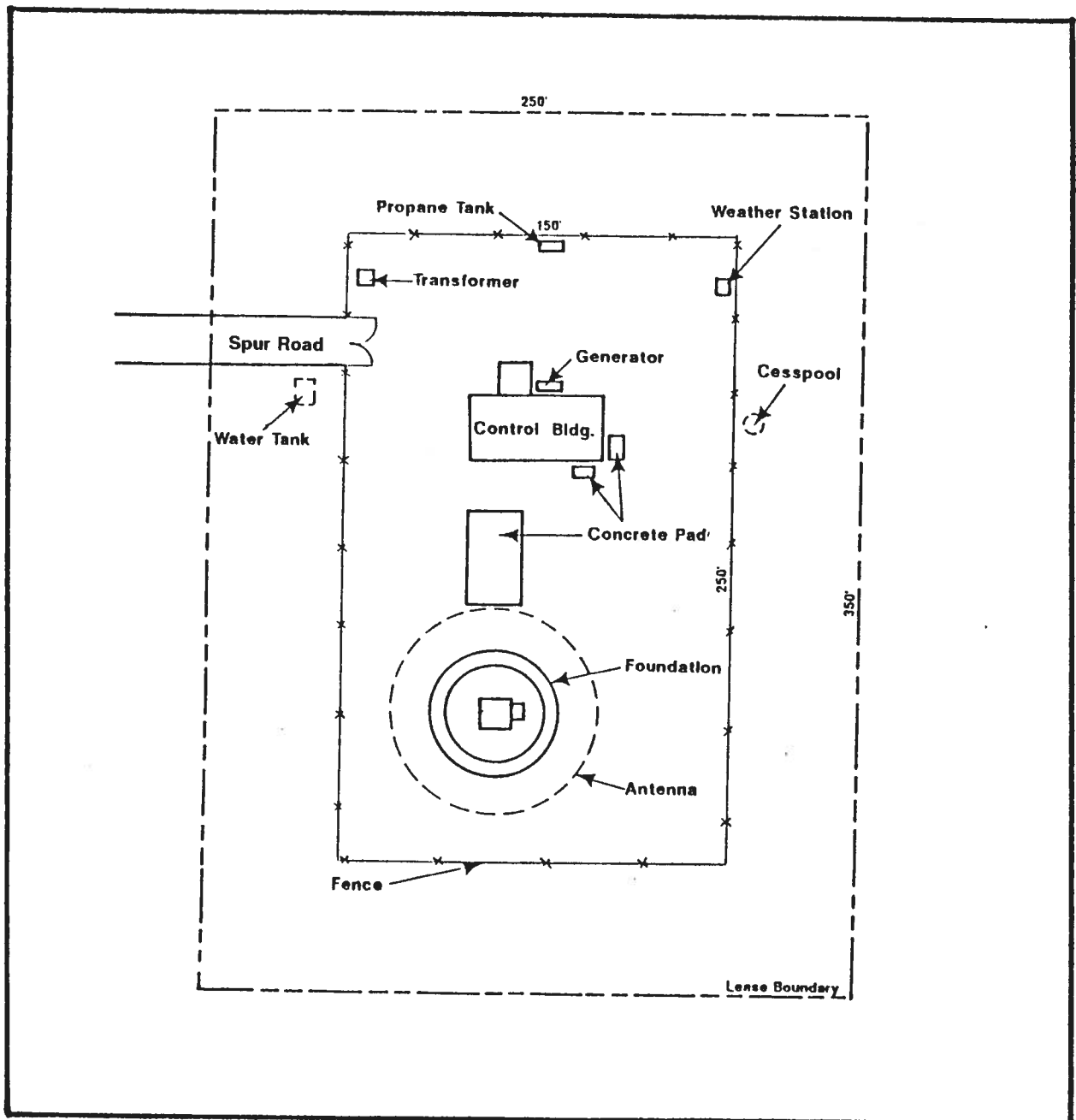


Exhibit 4

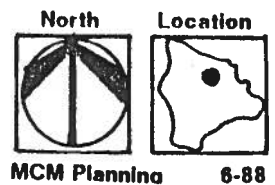
CDUA no. HA-2174
 APPLICANT UH INSTITUTE FOR ASTRONOMY
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 TMK 4-4-15: 09
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SUBZONE  PROTECTIVE
 RESOURCE
 LIMITED
 GENERAL
 PROJECT

NORTH



VLBA Site Plan

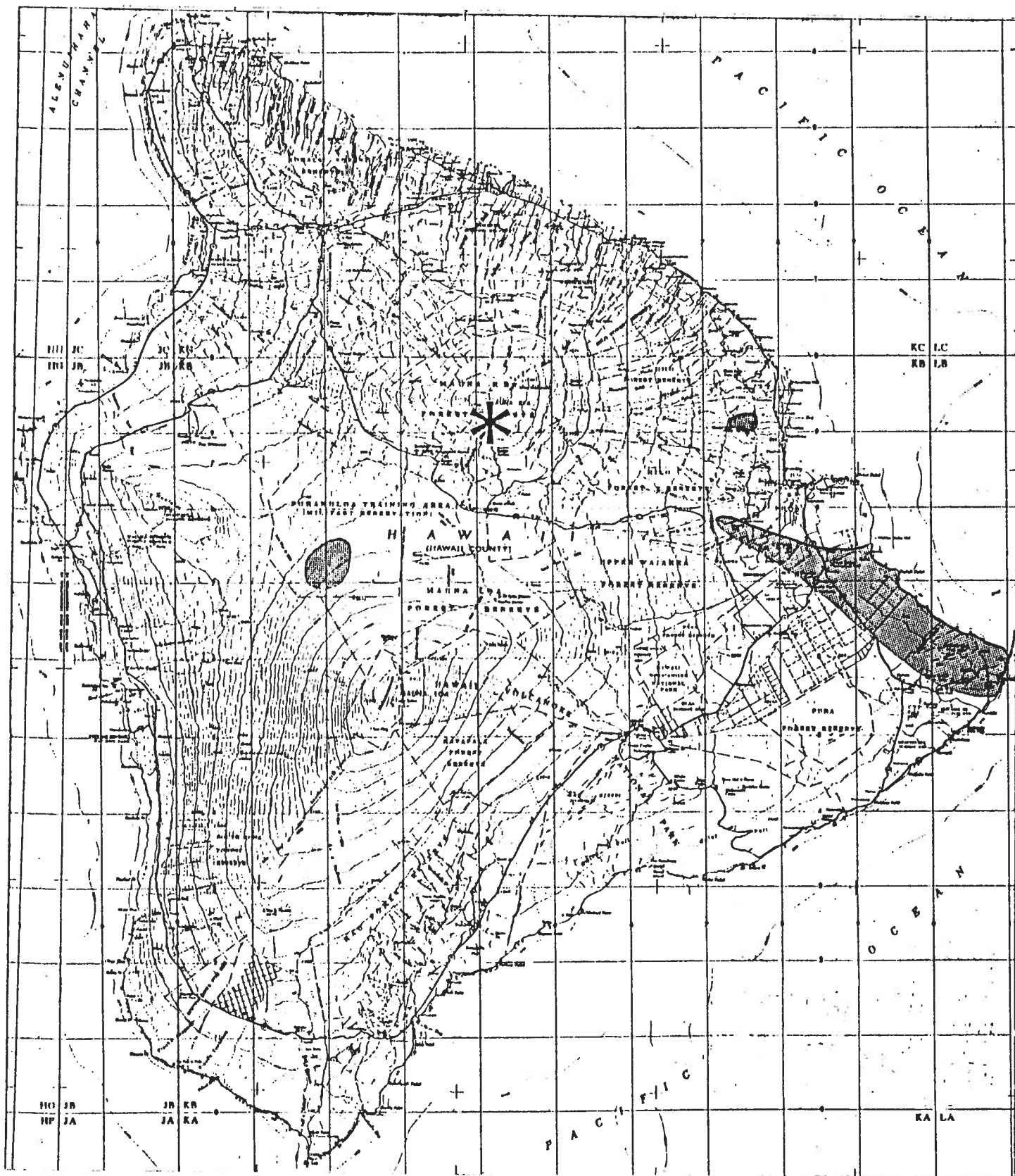


CDUA no. HA-2174
 APPLICANT UH INSTITUTE FOR ASTRONOMY
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 SCALE _____

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Exhibit 5

SUBZONE		PROTECTIVE
		RESOURCE
		LIMITED
		GENERAL PROJECT



LONG RANGE VISUAL IMPACT

LEGEND



SITE LOCATION



AREAS OF VISIBILITY

OF SELECTED VLBA SITE
AT 12,200' ELEVATION

0 5 10 15

SCALE IN MILES



NORTH

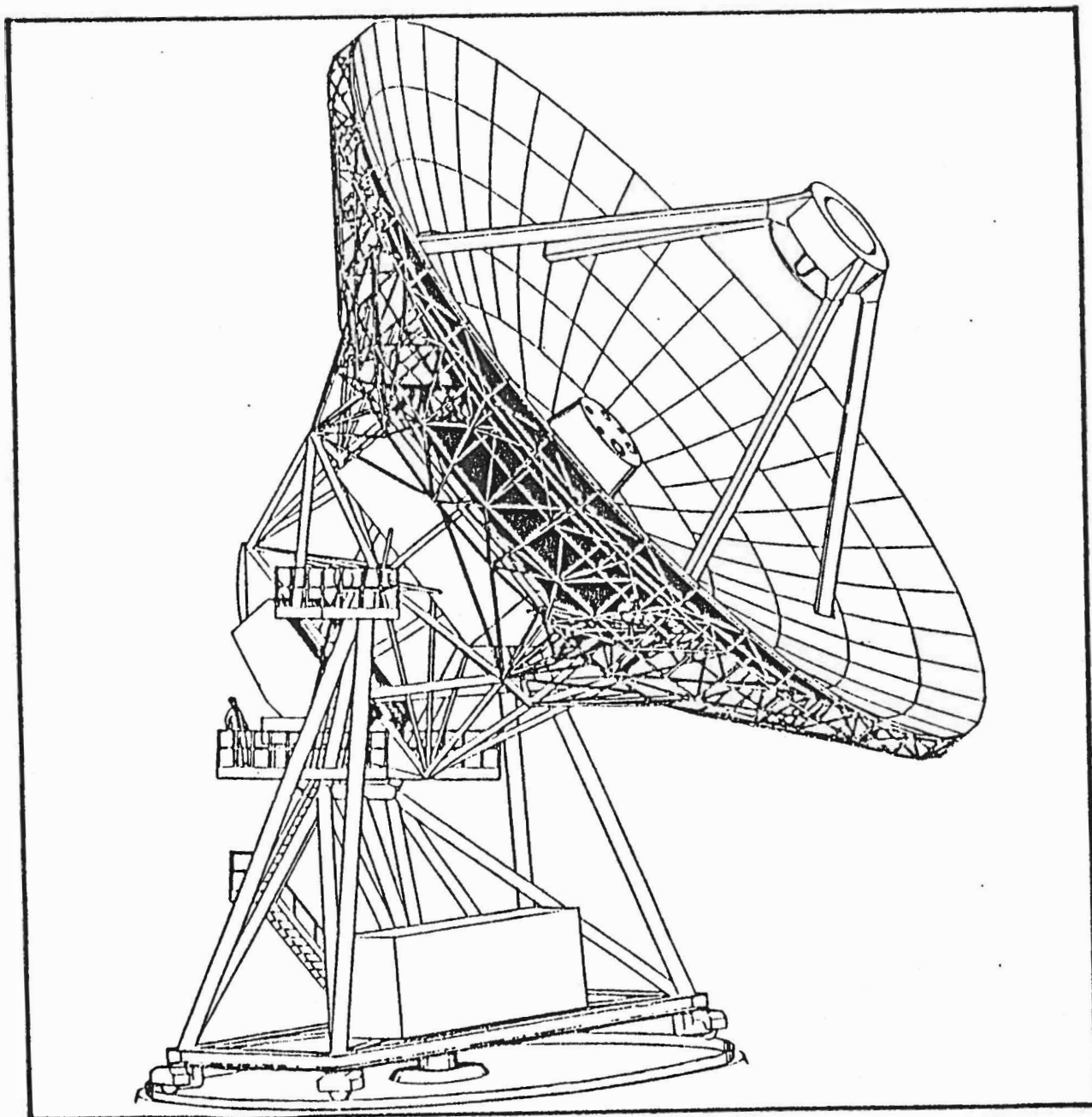
MCM PLANNING 6/88

CDUA no. HA-2174
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 AGENT _____
 TMK 4-4-15: 09
 SCALE _____

NORTH

Exhibit 6

SUBZONE		PROTECTIVE
		RESOURCE
		LIMITED
		GENERAL PROJECT



Typical Antenna

Exhibit 7



University of Hawaii at Manoa

Institute for Astronomy
2680 Woodlawn Drive • Honolulu, Hawaii 96822
Telex: 723-8459 • UHAST HR

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OCT 17 PM 3:11

DLNR
OCEA

Office of the Director

October 13, 1988

Mr. Donald Horiuchi
Office of Conservation and
Environmental Affairs
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Horiuchi:

Subject: Informal Response to Staff Comments on
Conservation District Use Application HA-2174:
National Radio Astronomy Observatory Very Long
Baseline Array Antenna at Mauna Kea, Hamakua
District, County of Hawaii, Tax Map Key:
4-4-15:9 (Por.)

As requested, the following responds to comments on the subject
Conservation District Use Application from the various
divisions of your Department:

DIVISION OF STATE PARKS, OUTDOOR RECREATION, AND HISTORIC SITES

The inconsistencies between the text of the Draft Supplemental
Environmental Impact Statement and the archaeological
consultant's report (Appendix C) have been corrected in the
Final SEIS. The text now states that all four sites are
significant in the general context of prehistoric religious and
economic use of the Mauna Kea summit region. The numbering in
the table has also been corrected.

We concur with the condition suggested by Dr. Ross Cordy.
Dr. Hallett Hammatt, consulting archaeologist for this project,
will work with Dr. Cordy to develop an acceptable preservation
plan. It is our intention to have an approved plan prior to
the Board vote on this CDUA.

Exhibit 8

Mr. Donald Horiuchi
October 13, 1988
Page 2

NATURAL AREA RESERVE SYSTEM

We share Mr. Lee's concern over public use of the Very Long Baseline Array access road and considered a gate in early discussions about this problem. In keeping with Department of Land and Natural Resource's policy of minimal restriction of access, however, signage and monitoring of usage were determined to be the most effective control measures at this time. If persistent problems occur, we will consult with your Department and, with your permission, if no other solution is available, we will install a gate.

FORESTRY AND WILDLIFE

Memorandum from Robert A. Merriam

There will be no impact of loss of communication on DLNR. It is the policy of the University to remove transmitters only after an alternative system with equivalent capabilities is installed.

See response to Natural Area Reserve System for discussion on gating the spur road.

Charles Wakida, District Forester

As stated in both the SEIS and the Cдуа, the site for the VLBA was selected because cinder cones shielded it from direct exposure to transmitters on Mauna Loa and elsewhere.

Transmitters will continue to be installed on the Island of Hawaii, except within the Mauna Kea Science Reserve. According to General Lease S-4191 between the University of Hawaii and the State of Hawaii, the boundaries of the Mauna Kea Science Reserve were drawn to provide a buffer zone to prevent the intrusion of activities inimical to the scientific complex. Electric or electronic installations (i.e., transmitters) were specifically identified as being inimical to the scientific objectives of the Reserve. The University is working with the Department to locate an alternative site or system for DLNR radio transmissions.

Ronald E. Bachman, District Wildlife Biologist

UH will post safety zone signs that comply with DLNR specifications. UH shall be responsible for maintenance of these signs.

Discussions have been held with the Deputy Director of DLNR regarding relocation of the Mauna Kea repeater. UH is supporting DLNR's request for funding for this relocation.

Mr. Donald Horiuchi
October 13, 1988
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DLNR-chartered helicopters and staff field researchers will be able to use transmitters in the Science Reserve on a case-by-case, as-required basis.

Sewage effluent at the VLBA site is estimated to be only 100 gallons per day. A cesspool will be the means of disposal if approved by the State Department of Health. No impact on the Hilo watershed is anticipated as the depth to ground water is expected to be hundreds or thousands of feet. The antenna site is extremely isolated, roughly 2 miles from and 3,000 feet higher than Hale Pohaku, the closest development downslope. Cesspools have been approved and are used at Hale Pohaku and at the summit with no reported impact on ground water quality.

UH will consult with the DLNR Division of Forestry and Wildlife before methods to restrict public access are instituted.

Sincerely,

d. Courie for D.N.B. Hall

Donald N. B. Hall
Director

DNBH:jec