FILE NO.: HA-3/27/92-2563
180-Day Exp. Date: 9/23/92
DOC. I.D.: 635

MAY 6 1992

Mr. Michael Bradley
Engineering Dept.
Hawaiian Electric Light Company
P.O. Box 1027
Hilo, Hawaii 96721-1027

Dear Mr. Bradley:

NOTICE OF ACCEPTANCE AND ENVIRONMENTAL DETERMINATION
Conservation District Use Application for
Telecommunication Tower
Keahole, North Kona, Hawaii

This acknowledges the receipt and acceptance for processing your application to develop a telecommunications tower.

According to your information, you propose to construct a 50 foot galvanized steel three legged self supporting microwave tower. The tower will have one 12 foot solid microwave antenna mounted at 45 feet. The tower and antenna will be painted a light gray in color.

The tower will provide the means for allowing required communications for protection of transmission lines, supervisory control of the site, data acquisition and voice.

After reviewing the application, we find that:

1. The proposed use is a conditional use within the General subzone of the Conservation District according to Administrative Rules, Title 15, Chapter 2, as amended;

2. No public hearing pursuant to Section 183-41, Hawaii Revised Statutes (HRS), as amended, will be required; and

3. In conformance with Title 11, Chapter 200, of the Administrative Rules, a negative declaration was determined for the proposed action.
As the applicant, please be advised that it will be your responsibility to comply with the provisions of Section 205A-29(b), Hawaii Revised Statutes, relating to Interim Coastal Zone Management (Special Management Area) requirements.

Negative action as required by law, on your application by the Board of Land and Natural Resources can be expected should you fail to obtain from the County thirty (30) days prior to the 180-day expiration date, as noted on the first page of this notice, one of the following:

1. A determination that the proposed development is outside the Special Management Area (SMA);

2. A determination that the proposed development is exempt from the provisions of the county ordinance and/or regulation specific to Section 205A-29(b), HRS; or

3. A Special Management Area (SMA) permit for the proposed development.

Pending action on your application by the Land Board in the near future, your cooperation and early response to the matters presented herein will be appreciated. Should you have any questions, feel free to contact Ed Haney of our Office of Conservation and Environmental Affairs staff at 587-0377.

Very truly yours,

[Signature]

WILLIAM W. PATY

Attachment (receipt)

cc: Hawaii Board Member
    Hawaii Land Agent
    Hawaii Planning Dept.
    DGH/DEBC/GHA/DSP/OIT
    DSF/Telecommunications Division
ENVIRONMENTAL ASSESSMENT
Keahole Microwave Tower Addition

1. APPLICANT

Hawaii Electric Light Company, Inc.
P. O. Box 1027
Hilo, Hawaii 96721-1027
Phone: 1-935-1171

2. APPROVING AGENCIES

Approval is being sought from the following four agencies:

1. State of Hawaii
   Department of Land and Natural Resources

2. State of Hawaii
   Department of Transportation
   Airports Division
   (height restriction only)

3. Federal Aviation Agency
   Western-Pacific Regional Office
   Air traffic Division AWP-530
   (height restriction only)

4. Federal Communications Commission
   (frequency and emission only)

3. AGENCIES CONSULTED

1. State of Hawaii
   Department of Land and Natural Resources

2. State of Hawaii
   Department of Transportation
   Airports Division

3. Federal Aviation Agency
   Western-Pacific Regional Office
   Air traffic Division AWP-530

4. Federal Communications Commission

5. Comsearch

6. UTC Corporation
4. PROJECT DESCRIPTION

LOCATION

The Keahole generating station supplies power to the Kona region on the Big Island during peak load periods or system outages. Electrical power plant and transmission switching station site is owned by Hawaii Electric Light Company, Inc. (HELCO). The land, 14.998 acres, is situated at Keahole, North Kona, Hawaii, identified by Tax Map Key 7-3-49-36. Please refer to Exhibit 1, Location Map - TMK 7-3-49:36 and Exhibit 2, Keahole Agricultural Park. The facility currently occupies 3.1 acres.

PURPOSE

The initial driving force for the communication system at HELCO was for Supervisory Control and Distribution Automation, (SCADA), and voice communication. Substation or Switching Station locations which only required individual channel requirements, use 450 MHZ radios and/or telephone lease lines. These links provide system information to the dispatch center at Hilo. They also provide island wide communications for the three Base Yards located at Hilo, Waimea and Kailua.

The HELCO power system lacks the stability that comes from having ties with neighboring utilities. The critical clearing times at some locations on the system are low enough to require 100 milli-second clearing times for the total line to prevent stability problems. HELCO is now aggressively improving its communications system to
Exhibit 2 Keahole Agricultural Park
(TMk 7-3-49)

- Existing residence
- Residence proposed
- Vacant

All other lots are being used for agricultural activities, or have been cleared and graded for agricultural use.

Source: DLNR - Hilo office

Scale: 1 inch = 500 feet
accommodate the new Protective Overreach Transfer Trip, (POTT) relaying scheme. The POTT scheme required a secure and reliable communication between switching stations for each transmission line so that the entire line can trip faster. The HELCO policy is to have a dedicated channel for each transmission line.

Five new microwave links are currently under various stages of installation which will terminate in two new switching stations and three existing switching stations of which one of them is the Keahole site.

HELCO's goal is to extend the microwave system to service all the remaining four switching stations. The stations are Keamuku, Kilauea, Kealia, and Puueo switching stations.

**PROPOSED ACTION**

To construct a 50 foot galvanized steel three legged self supporting microwave tower. The tower will have one 12 foot solid antenna for 1.85-1.99 GHz mounted at 45 feet. The antenna will be pointed 47.2 degrees based on true north. The antenna and tower will be light gray in color. Appendix A has the detailed construction plans of the tower.

The 120 channel Western Multiplex Two-2000 radio will be located within the existing control house that the tower is located next to.
SOCIO-ECONOMIC IMPACTS

The tower is one of the necessary elements in providing safer and more reliable electric service to the surrounding area. The tower will provide the means for allowing required communications for protection of the transmission lines, supervisory control of the site, data acquisition, and voice.

EXISTING ENVIRONMENTAL CHARACTERISTIC

The parcel is used for generation of electricity and a transmission switching station. Exhibit 3, Keahole Site Plan, shows the layout for the facility and keys the photos of the site which are shown on Exhibit 4. The 3.1 acre facility is completely enclosed by a chain link fence with one drive gate. The existing facilities consist of the following:

Generating Plant Area
- control house
- two switchgears
- six 2.75 MW diesel engine generators
- two fuel oil storage tanks
- control room for combustion turbine
- black start emergency diesel generator
- 14 MW combustion turbine (CT) with stack
- three water storage tanks for CT
- demineralizer for CT
- acid & caustic tanks for CT

Switching Station Area
- switchyard
- three transformers
- cesspool

The facility has paved and unpaved areas. The unpaved areas consist of a compacted gravel surface. The site is
Exhibit 3: KEAHOE SITE PLAN

ELEVATION SHOWN IN EXHIBIT 5

PHOTO KEY FOR EXHIBIT 4

Scale: 1 inch = 60 feet
1. Existing Fuel Oil tanks with Combustion Turbine and four Diesel Generators stacks.

2. AC pavement area with Control House, three Diesel Generators shown and 69 KV Switching Station in background

EXHIBIT 4A: Photos of Existing Generating Site
3. Frontal view of Control House. Tower to be placed between the middle and right side door.

4. Side view of Control House looking towards the Combustion Turbine and six Diesel Generators

EXHIBIT 4B: Photos of Existing Generating Site
relatively flat, with exception of a depressed berm area for the fuel oil storage tanks.

The unused portion of the 14.998 acre parcel is also predominately flat, and has been retained in its natural state, consisting of lava flows and clumps of vegetation of primarily grasses and low brush. There are some trees and shrubs along the fence on the Queen Kaahumanu Highway (west) side of the power plant, which partially screen the view of the Keahole facility from the highway.

NEW ENVIRONMENTAL CHARACTERISTIC
The only environmental characteristics that would change from the existing conditions are the Federal Aviation Administration (FAA) height restrictions, Federal Communications emission limitations and visual impacts.

5. DESCRIPTION OF AFFECTED ENVIRONMENT
EXISTING USE
The parcel is used for generation of electricity and a transmission switching station. The generation facility has six Electro Motive Division, EMD, high speed diesels rated at 2.75 MW each and one combustion turbine rated 14 MW. The stack heights for the EMD and the combustion turbine are 40 and 71 feet respectively above ground elevation. There are four 69,000 volt transmission lines that emanate from the parcel. The transmission lines use 70 and 75 foot poles.

TOPOGRAPHY AND SOILS
The facility has paved and unpaved areas. The unpaved areas
consist of a compacted gravel surface. The site is somewhat flat, with exception of ditches around the fuel oil storage area and along the mountain side of the switching station. The tower is to be placed in a level area that is paved.

FLORA AND FAUNA
The unused portion of the 14.998 acre parcel is also predominately flat, and has been retained in its natural state, consisting of lava flows and clumps of vegetation of primarily grasses and low brush. There are some trees and shrubs along the bottom half of the fencing on the Queen Kaahumanu Highway (West) side of the power plant, which partially screen the view of the Keahole facility from the highway.

DRAINAGE
No change is made to the existing site since it is currently paved and the area under the tower will be repaved.

HISTORICAL AND ARCHAEOLOGICAL
The State Historic Sites Office of DLNR reviewed the project area for the 1987 CDUA amendment (File No. HA-9/11/86-487A). They had no objections to that proposal because it was located with previously disturbed facilities area. There are no historical and archaeological impacts from the proposed action. The site has been previously graded under previous projects and is paved.
SURROUNDING LAND USE

The project site is surrounded by State lands. Lands to the north and east are vacant and consist of open lava flow areas with low grasses. The State Land Use District designation for this area is Conservation, General Subzone.

The Keahole Agricultural Park is located to the south and west of the subject property, and is designated Agricultural on the State Land Use District map. Most of lots are currently being used for some agricultural activities.

Kona Palisades, the closest residential subdivision, is about 4,800 feet southeast of the Keahole plant.

UTILITIES AND SERVICES
Electrical, telephone and water services are available.

6. PROBABLE IMPACTS

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES
There are no irreversible and irretrievable commitment of resources.

SHORT TERM
Anticipated short term impacts will be increased noise and dust levels during construction.

LONG TERM
The tower will provide safer and more reliable electric service to the surrounding area.
ALTERNATIVES TO THE PROPOSED ACTION

One alternative to the proposed action would be to construct landlines from adjacent facilities. This alternative would increase the project costs substantially and would make it unfeasible and impracticable.

7. MITIGATING MEASURES

Other than standard construction practices during excavation, no mitigating measures will be needed other than Federal Aviation Administration (FAA) height restrictions, Federal Communications emission limitations and visual impacts.

HEIGHT RESTRICTIONS

The proximity of the Keahole plant to the Keahole Airport requires that all construction be in accordance with FAA Airport Zoning Regulations. The FAA has set an "accepted height limitation" of 35 feet above the ground level at the project site that allows structures up to 35 feet high to be built without permitting. However, since the tower height is to be 50 feet tall, Helco must file a "Notice of Proposed Construction or Alteration" with the FAA and receive permission for the proposed action.

It seems probable that permission for the stack will be granted, particularly since the site is off to the side of the runways and primary flight paths. HELCO will meet all FAA and DOT requirements.
EMISSION LIMITATION

FCC has set a maximum emission level for private microwave user. The equipment has been purchased to comply with the FCC requirements.

VISUAL IMPACTS

The major visual vantage point of the project area is the Queen Kaahumanu Highway, over 750 feet to the west. Due to the diminishing effect of the distance and the partial screen provided by the existing vegetation and planted vegetation screen consisting of an Oleander hedge Wiliwili and Coconut trees, only the upper portions of the plant’s structures are visible. Exhibit 3 is a plot plan of the generation site with section "A-A" indicated. Exhibit 5 shows the elevation of the existing Combustion Turbine, the six diesels and the proposed microwave tower. The Photos showing the views of the project site are shown in Exhibit 6.

The VOG was quite heavy on the day that the Photos were taken. However, if the day was clear, the tan colored muffler supports would not have blended as well as the gray Combustion Turbine stack against the dark mountain backdrop. The lighter colored equipment when viewed from either the north or the south tended to blend better with the light sky. The proposed gray is a lighter gray than the existing exhaust stack and blend better. The tower should have a negligible visual impact.
SECTION A—A

EXHIBIT 5: ELEVATION OF THE PROPOSED 50 FT MICROWAVE TOWER, 71 FT COMBUSTION TURBINE, AND SIX 40 FT DIESEL GENERATORS
1. View to Keahole Power Plant from North East corner of property. (about 300 feet distance)

2. View to Keahole Power Plant from Queen Kaahumanu Highway North. (about 1700 feet distance)

EXHIBIT 6A: Photos of Existing Generating Site
3. View of Keahole Power Plant from Queen Kaahumanu Highway by airport entrance. (about 750 feet distance)

4. View of Keahole Power Plant from airport access road. (about 1600 feet distance)

EXHIBIT 6B: Photos of Existing Generating Site
6. View to Keahole Power Plant from Queen Kaahumanu Highway. (about 1000 feet distance)

7. View to Keahole Power Plant from Queen Kaahumanu Highway and Ka'imani drive. (about 2200 feet distance)

EXHIBIT 6C: Photos of Existing Generating Site
8. **DETERMINATION**
   In review of the probable impacts and mitigating measures, HELCO requests that this Environmental Assessment be identified as a Negative Declaration.

9. **REASONS SUPPORTING DETERMINATION**
   As shown in Exhibit 4B, Photo 3, the tower will be placed next to the existing paved area. The existing drainage of the site will not be affected. There are no historic or significant sites at this location. It seems probable that permission for the 50 foot tower will be granted by FAA and DOT, particularly since the site is off to the side of the runways and primary flight paths and over shadowed by the 71 foot Combustion Turbine Stack. The light gray color has been chosen to help blend with the sky background and the mountain backdrop. The younger coconut trees that have been planted, in time, will further help to disguise the facilities existence.

10. **AGENCIES TO BE CONSULTED IN THE PREPARATION OF THE EIS**
    Not required.
APPENDIX A
I. DESCRIPTION OF PARCEL

A. Existing structures/Use.

The Keahole generating station supplies power to the Kona region on the Big Island during peak load periods or system outages. The electrical power plant and transmission switching station site is owned by Hawaii Electric Light Company, Inc. (HELCO). The land, 14.998 acres, is situated at Keahole, North Kona, Hawaii, identified by Tax Map Key 7-3-49-36. Please refer to Exhibit 1, Location Map - TMK 7-3-49:36 and Exhibit 2, Keahole Agricultural Park. The facility currently occupies 3.1 acres.

The parcel is used for generation of electricity and a transmission switching station. Exhibit 3, Keahole Site Plan, shows the layout for the facility and keys the photos of the site which are shown on Exhibit 4. The 3.1 acre facility is completely enclosed by a chain link fence with one drive gate. The existing facilities consist of the following:

Generating Plant Area
- control house
- two switchgears
- six 2.75 MW diesel engine generators
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- control room for combustion turbine
- black start emergency diesel generator
- 14 MW combustion turbine (CT) with stack
- three water storage tanks for CT
- demineralizer for CT
- acid & caustic tanks for CT
Exhibit 2  Keahole Agricultural Park
(TMKG 7-3-49)

- Existing residence
- Residence proposed
- Vacant

All other lots are being used for agricultural activities, or have been cleared and graded for agricultural use.

Source: DLNR - Hi office

Scale: 1 inch = 500 feet
1. Existing Fuel Oil tanks with Combustion Turbine and four Diesel Generators stacks.

2. AC pavement area with Control House, three Diesel Generators shown and 69 KV Switching Station in background

EXHIBIT 4A: Photos of Existing Generating Site
3. Frontal view of Control House. Tower to be placed between the middle and right side door.

4. Side view of Control House looking towards the Combustion Turbine and six Diesel Generators

EXHIBIT 4B: Photos of Existing Generating Site
Switching Station Area
- switchyard
- three transformers
- cesspool

The facility has paved and unpaved areas. The unpaved areas consist of a compacted gravel surface. The site is relatively flat, with exception of a depressed berm area for the fuel oil storage tanks.

The unused portion of the 14.998 acre parcel is also predominately flat, and has been retained in its natural state, consisting of lava flows and clumps of vegetation of primarily grasses and low brush. There are some trees and shrubs along the fence on the Queen Kaahumanu Highway (west) side of the power plant, which partially screen the view of the Keahole facility from the highway.

B. Existing utilities.

Electrical, telephone and water services are available. The existing water service plan is shown on Exhibit 5.

No change in drainage is made to the existing site since it is currently paved and the area under the tower will be repaved.

C. Existing access.

The Keahole generating plant and switching station is located mauka of Keahole Airport, in North Kona on the Big Island. It is about 750 feet mauka of the Queen Kaahumanu Highway, and adjacent to the mauka boundary of
Exhibit 5: EXISTING WATER SERVICE AT KEAHOLE POWER PLANT

Scale: 1 Inch = 60 feet
the Keahole substation. (See Exhibit 6). Access to the site from the Queen Kaahumanu Highway is via an existing 16 foot wide paved roadway within a "non-exclusive easement for access and utility" on state lands on the north side of the site.

D. Vegetation
The unused portion of the 14.998 acre parcel is also predominately flat, and has been retained in its natural state, consisting of lava flows and clumps of vegetation of primarily grasses and low brush. There are some trees and shrubs along the bottom half of the fencing on the Queen Kaahumanu Highway (West) side of the power plant, which partially screen the view of the Keahole facility from the highway.

E. Topography.
The facility has paved and unpaved areas. The unpaved areas consist of a compacted gravel surface. The site is somewhat flat, with exception of ditches around the fuel oil storage area and along the mountain side of the switching station. The tower is to be placed in a level area that is paved.

F. Shoreline area.
There is no shoreline area.

G. Existing covenants, easements, restrictions.
The Keahole generation station property is subject to
Exhibit 6:
Keahole Generating Plant & Switching Station Site

TMK 7-3-49:36
14.998 acres

1" = 150'

Queen Kaahumanu Highway

Access Road
Access & Utility Easement

Existing Switching Station Area
Existing Generating Plant Area

Fence

Driveway

Keahole Substation

Property Line

II. Historic sites affected.
The State Historic Sites Office of DLNR reviewed the project area for the 1987 CDUA amendment (File No. HA-9/11/86-487A). They had no objections to that proposal because it was located with previously disturbed facilities area. There are no historical and archaeological impacts from the proposed action. The site has been previously graded under previous projects and is paved.

II. DESCRIPTION

A. Facility system master plan
The HELCO microwave system started out with five links of 120 channel Collins MS-218A radios in 1973 and is shown as Exhibit 7. The initial driving force for the communication system at HELCO was for Supervisory Control and Data Acquisition, SCADA and voice communication. Substation or Switching Station locations which only required individual channel requirements, use 450 MHz radios and/or telephone lease lines. These links provide system information to the dispatch center at Hilo. They also provide island wide communications for the three Base Yards located at Hilo, Waimea and Kailua.
HELCO M.W. SYSTEM LAYOUT

NOTE 1. — AZIMUTHS SHOWN FOR PASSIVE REPEATER
MUST BE VERIFIED IN FIELD.

C.R.C. SKETCH NO. SL-1
2-12-73

EXHIBIT 7: HELCO'S MICROWAVE SYSTEM IN 1973
In 1981, HELCO installed a link from Waimea to Honokaa via a passive reflector at Puu Kihe with 120 channel Collin MIR-6 radios. This installation was put in by the same driving force that was previously mentioned. The radio at Waimea is housed in the same existing building that was used in 1973. The existing switching station control house at Honokaa is used for the radio equipment.

The HELCO power system lacks the stability that comes from having ties with neighboring utilities. The critical clearing times at some locations on the system are low enough to require 100 milli-second clearing times for the total line. HELCO is now aggressively improving its communications system to accommodate the new Protective Overreach Transfer Trip, (POTT) relaying scheme. The POTT scheme required a secure and reliable communication between switching stations for each transmission line so the entire line can trip faster. The HELCO policy is to have a dedicated channel for each transmission line.

HELCO finished three microwave links emanating from Kaumana switching station in 1991. The far end terminals are Pohoiki Switching Station, Puna Power Plant, and the Hilo Hill 5 Power Plant. All the radios are Western Multiplex Two-2000. The two links form Kaumana to Hilo and Kaumana to Puna are 300 channels. The remaining link is 120 channels.
Five new microwave links are currently under various stages of installation which will terminate in two new switching stations and three existing switching stations of which one of them is the Keahole site. Exhibits 8 and 9 show the existing and near term microwave station and path locations and data. The station’s TMK are shown in Exhibit 9A.

Two of the original microwave links, Hilo to Humuula and Humuula to Kuehue are being replaced. New 300 channel Western Multiplex Two-2000 radios will be used.

HELCO’s goal is to extend the microwave system to service all the remaining four switching stations. The stations are Kamehameha, Kilauea, Kealia, and Puueo switching Stations.

The HELCO microwave system has a 300 channel back bone (Super-group 1 through 5) with 120 channel spurs (Super-group 1 and 2). The top three Super-groups have been reserved for T1 links and Super-group 1 has been separated between East and West Hawaii.

B. Detailed property master plan

The Keahole site will only have one microwave link terminating there. The site does not have any advantage in being able to extend links to other HELCO switching station locations. Keahole will have a 50 foot galvanized steel three legged self supporting microwave tower. The tower will have one 12 foot solid antenna
## EXHIBIT 9: HAWAII ELECTRIC LIGHT CO. AND COUNTY OF HAWAII MICROWAVE SYSTEM STATION AND PATH DATA

### STATION DATA

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<td>19° 00'10&quot;N</td>
<td>158° 59'30&quot;W</td>
<td>253.0</td>
<td>W 55</td>
</tr>
<tr>
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<td>231.0</td>
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</tr>
<tr>
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<td>W 306</td>
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<td>KALUA WAI</td>
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<td>W 55</td>
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<tr>
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### PATH DATA

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<tr>
<th>LOCATION NO. 1</th>
<th>FREQUENCY</th>
<th>DISTANCE</th>
<th>ELLIPTICITY</th>
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<tr>
<td>HIKILOKO</td>
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<td>158° 33'25&quot;W</td>
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<td>ITUKEI</td>
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</tr>
<tr>
<td>MANOA</td>
<td>19° 00'10&quot;N</td>
<td>158° 59'30&quot;W</td>
<td>253.0</td>
</tr>
<tr>
<td>KAPUHAU</td>
<td>19° 00'10&quot;N</td>
<td>158° 59'30&quot;W</td>
<td>231.0</td>
</tr>
<tr>
<td>KONUKA</td>
<td>19° 00'10&quot;N</td>
<td>158° 59'30&quot;W</td>
<td>255.0</td>
</tr>
<tr>
<td>KONUKA</td>
<td>19° 00'10&quot;N</td>
<td>158° 59'30&quot;W</td>
<td>255.0</td>
</tr>
<tr>
<td>KONUKA</td>
<td>19° 00'10&quot;N</td>
<td>158° 59'30&quot;W</td>
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</tr>
<tr>
<td>KONUKA</td>
<td>19° 00'10&quot;N</td>
<td>158° 59'30&quot;W</td>
<td>255.0</td>
</tr>
<tr>
<td>KONUKA</td>
<td>19° 00'10&quot;N</td>
<td>158° 59'30&quot;W</td>
<td>255.0</td>
</tr>
</tbody>
</table>

### NOTE

1. Bearings are based on true north and are calculated from location No. 1 to location No. 2.
2. Distances shown are the actual path distances and not ground distances.
3. All rurc paths have bilateral switching of transmitters and receivers.
4. The parabolic antennas and reflectors are listed by quantity, where more than one.
5. *All stations marked with asterisks are city and county of Hawaii microwave stations with multiple drops quoted and used by helix.
6. All microwave links shown are 2 GHz except the link from WAILOA to HIKILOKO which is 6 GHz.
7. *All paths and stations marked with brushes are city and county of Hawaii microwave paths and stations.
Note: The following PITT codes for the TMK's are from the 1991 edition of REDI Real Estate Information Service.

<table>
<thead>
<tr>
<th>Station Location</th>
<th>TMK</th>
<th>PITT</th>
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<tbody>
<tr>
<td>Kanoelehua</td>
<td>2-2-58-19</td>
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</tr>
<tr>
<td>Pepeekeo</td>
<td>2-8-07-58</td>
<td>500</td>
</tr>
<tr>
<td>Humuula</td>
<td>3-8-01-15</td>
<td>500</td>
</tr>
<tr>
<td>Huehue</td>
<td>7-2-02-13</td>
<td>500</td>
</tr>
<tr>
<td>Puu Hinakapoula</td>
<td>7-2-01-02</td>
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</tr>
<tr>
<td>Kailua</td>
<td>7-4-10-22</td>
<td>400</td>
</tr>
<tr>
<td>Waimea</td>
<td>6-6-01-16</td>
<td>400</td>
</tr>
<tr>
<td>Puu Kike</td>
<td>4-2-08-13</td>
<td>500</td>
</tr>
<tr>
<td>Honokaa</td>
<td>4-5-10-83</td>
<td>800</td>
</tr>
<tr>
<td>Punu Pwr Plt</td>
<td>1-6-03-83</td>
<td>500</td>
</tr>
<tr>
<td>Kaumana Sw Sta</td>
<td>2-5-5-124</td>
<td>800</td>
</tr>
<tr>
<td>Pohoiki Sw Sta</td>
<td>1-4-01-02</td>
<td>500</td>
</tr>
<tr>
<td>Poopocimo</td>
<td>7-2-03-03</td>
<td>500, 600</td>
</tr>
<tr>
<td>Nahaha</td>
<td>7-2-04-04</td>
<td>500, 600</td>
</tr>
<tr>
<td>Kealake</td>
<td>7-1-49-36</td>
<td>600</td>
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<tr>
<td>South Kohala</td>
<td>6-2-01-51</td>
<td>500</td>
</tr>
<tr>
<td>Maunalani</td>
<td>6-6-01-63</td>
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</tr>
<tr>
<td>Anaehoomalu</td>
<td>6-8-01-28</td>
<td>500</td>
</tr>
</tbody>
</table>

1 Parcel has not been subdivided - elevation is 440 feet
2 Parcel has not been subdivided - elevation is 1220 feet
3 Parcel has not been subdivided - elevation is 610 feet

### PITTCODES

(First digit) (Second digit) (Third digit)

<table>
<thead>
<tr>
<th>Property Classification</th>
<th>Agricultural Subclass</th>
<th>Governmental Land Subclass</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Residential</td>
<td>0 - None</td>
<td>0 - None</td>
</tr>
<tr>
<td>2 - Apartment</td>
<td>1 - Pineapple</td>
<td>1 - Federal</td>
</tr>
<tr>
<td>3 - Commercial</td>
<td>2 - Sugar Cane</td>
<td>2 - State</td>
</tr>
<tr>
<td>4 - Industrial</td>
<td>3 - Diversified</td>
<td>3 - County</td>
</tr>
<tr>
<td>5 - Agricultural &amp; Rural</td>
<td>4 - Pasture</td>
<td>4 - Hawaiian Homes</td>
</tr>
<tr>
<td>6 - Conservational</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 - Hotel &amp; Resort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 - Unimproved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential</td>
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<td></td>
</tr>
</tbody>
</table>

EXHIBIT 9A: HELCO MICROWAVE STATION TMK & PITT CODES
for 1.85-1.99 GHz mounted at 45 feet. The antenna will be pointed 47.2 degrees based on true north. The antenna and tower will be light gray in color. Appendix A has the detailed construction plans of the tower.

The 120 channel Western Multiplex Two-2000 radio will be located within the existing control house that the tower is located next to.

c. Mitigating Measures

Other than standard construction practices during excavation, no mitigating measures will be needed other than Federal Aviation Administration (FAA) height restrictions and visual impacts.

The proximity of the Keahole plant to the Keahole Airport requires that all construction be in accordance with FAA Airport Zoning Regulations. The FAA has set an "accepted height limitation" of 35 feet above the ground level at the project site that allows structures up to 35 feet high to be built without permitting. However, since the tower height is to be 50 feet tall, Helco must file a "Notice of Proposed Construction or Alteration" with the FAA and receive permission for the proposed action.

It seems probable that permission for the tower will be granted, particularly since the site is off to the side of the runways and primary flight paths. HELCO will
meet all FAA and DOT requirements.

The major visual vantage point of the project area is the Queen Kaahumanu Highway, over 750 feet to the west. Due to the diminishing effect of the distance and the partial screen provided by the existing vegetation and planted vegetation screen consisting of an Oleander hedge Wiliwili and Coconut trees, only the upper portions of the plant’s structures are visible. Exhibit 3 is a plot plan of the generation site with section "A-A" indicated. Exhibit 10 shows the elevation of the existing Combustion Turbine, the six diesels and the proposed microwave tower. The Photos showing the views of the project site are shown in Exhibit 11.

The VOG was quite heavy on the day that the Photos were taken. However, if the day was clear, the tan colored muffler supports would not have blended as well as the gray Combustion Turbine stack against the dark mountain backdrop. The lighter colored equipment when viewed from either the north of the south tended to blend better with the light sky. The proposed gray is a lighter gray than the existing exhaust stack. The tower should have a negligible visual impact.
SECTION A-A

EXHIBIT 10: ELEVATION OF THE PROPOSED 50 FT MICROWAVE TOWER, 71 FT COMBUSTION TURBINE, AND SIX 40 FT DIESEL GENERATORS
1. View to Keahole Power Plant from North East corner of property. (about 300 feet distance)

2. View to Keahole Power Plant from Queen Kaahumanu Highway North. (about 1700 feet distance)

EXHIBIT 11A: Photos of Existing Generating Site
3. View of Keahole Power Plant from Queen Kaahumanu Highway by airport entrance. (about 750 feet distance)

4. View of Keahole Power Plant from airport access road. (about 1600 feet distance)

EXHIBIT 11B: Photos of Existing Generating Site
6. View to Keahole Power Plant from Queen Kaahumanu Highway. (about 1000 feet distance)

7. View to Keahole Power Plant from Queen Kaahumanu Highway and Ka'imani drive. (about 2200 feet distance)

EXHIBIT 11C: Photos of Existing Generating Site
APPENDIX A