William P. Kenoi
Mayor

Warren H. W. Lee
Director

Brandon A. K. Gonzalez
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS

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February 19, 2016

Scott Glenn, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu HI 96813

Dear Mr. Glenn:

Subject: **Final Environmental Assessment and FONSI for Hawai'i County Radio Communication Site at Ocean View Fire Station, TMK 9-2-031:019, Ka'ū District, Island of Hawai'i**

With this letter, the County of Hawai'i, Department of Public Works, hereby transmits the final environmental assessment and finding of no significant impact (FEA-FONSI) for the Hawai'i County Radio Communication Site at Ocean View Fire Station project for publication in the next available edition of the Environmental Notice. We have enclosed the following:

- One paper copy of the Final EA;
- A CD containing the .pdf file for the EA and a WORD file with the OEQC Environmental Notice Publication Form; and
- A hardcopy of the OEQC publication form

Please contact David Yamamoto at 961-8466 if you have any questions.

Sincerely,

Warren H. W. Lee, P.E., Director
County of Hawai'i, Department of Public Works

Attach: As noted above

Cc: (w/o attach) Ron Terry, Ph.D, Project Environmental Consultant

July 2015 Revision

AGENCY ACTION SECTION 343-5(b), HRS PUBLICATION FORM

Project Name Hawai'i County Radio Communication Site at Ocean View Fire Station
HRS §343-5 Trigger(s) Use of County land and County funds
Island: Hawai'i
District: Ka'ū
TMK: (3rd) 9-2-031:019
Permits:

Hawai'i County Department of Public Works: Building Permit, Electrical Permit, Plumbing Permit, Grading Permit, and Drainage Approval
Hawai'i County Planning Department: Plan Approval
Hawai'i County Windward Planning Commission: Use Permit

Proposing/Determination Agency:

County of Hawai'i
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, Hawai'i 96720
David Yamamoto, 961-8466

Consultant:

Geometrician Associates
PO Box 396
Hilo HI 96721
Ron Terry Ph. (808) 969-7090 rterry@hawaii.rr.com

Status (check one only):

__DEA-AFNSI — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.

_x_FEA-FONSI — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__FEA-EISPN — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.

__Act 172-12 EISPN — Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.

__DEIS — The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS — The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23 Determination

The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.

__Section 11-200-27 Determination

The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page)**:**

The County of Hawai'i is upgrading its radio system. Certain areas of the island, including Ka'ū, currently have poor to no radio communications. Fire, Police, Emergency Medical Services and Civil Defense personnel are thus sometimes cut off from communication with headquarters and other personnel. During wildfire, tsunami, storms or other disaster events, conventional and public communications can be affected, placing an even greater need to insure operability and coverage of the County radio system. To rectify this situation in Ka'ū, the County proposes to construct a 130-foot tall radio tower equipped with one microwave dish and two 2-way radio antennas. The communication site will also have a communications shelter, emergency generator, fuel tank, and fencing. This will enable critical coverage of gap areas and improve overall County radio coverage in Ka'ū. The surface of the project site has been almost fully disturbed by grading and emplacement of infrastructure, and no rare, threatened or endangered plants species or archaeological sites are present. Minor visual impacts will occur. Mitigation measures will prevent impacts to endangered fauna and water quality. The location and low power output of the radio antenna ensure that no electromagnetic energy impacts will occur.

FINAL ENVIRONMENTAL ASSESSMENT

Hawai‘i County Radio Communication Site
At Ocean View Fire Station

TMK 9-2-031:019 (Ocean View Fire Station Site)
Ka‘ū District, Island of Hawai‘i, State of Hawai‘i

March 2016

Prepared for:
County of Hawai‘i
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, Hawai‘i 96720

FINAL ENVIRONMENTAL ASSESSMENT

Hawai‘i County Radio Communication Site at Ocean View Fire Station

TMK 9-2-031:019 (Ocean View Fire Station Site)
Ka‘ū District, Island of Hawai‘i, State of Hawai‘i

PROPOSING/
APPROVING AGENCY:

County of Hawai‘i
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, Hawai‘i 96720

CONSULTANT:

Geometrician Associates LLC
PO Box 396
Hilo, Hawai‘i 96721

CLASS OF ACTION:

Use of County Land
Use of County Funds

This document is prepared pursuant to:

The Hawai‘i Environmental Protection Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR).

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SUMMARY

The County of Hawai‘i is upgrading its radio system, which is used by various County agencies for emergency and other communications. Some components of the current radio system are outmoded and in need of repair. The County is undertaking a variety of coordinated actions to address this issue.

Limitations with the current coverage present mission safety issues for responding public safety agencies. Reliable and complete communications infrastructure is critical for effective mission operations, public safety and general government operations. With the current system, there are certain areas of the island with poor to no radio communications, particularly the Puna and Ka‘ū Districts. This means that Fire, Police, Emergency Medical Services and Civil Defense personnel are sometimes cut off from communication with headquarters and other personnel. During wildfire, tsunami, storms or other disaster events, all other conventional and public communications can be affected. This places an even greater need to insure operability and coverage of the County radio system.

To rectify this situation, the County is identifying suitable locations for new communication sites, preferably on County property in order to increase security, reduce cost and facilitate construction and use. Once a given site or site complex has been identified and it is determined that site control is feasible, the County is conducting environmental analysis. Currently, the County has determined that the Ocean View Fire Station is a suitable site. The County proposes to construct a 130-foot tall radio tower equipped with one microwave dish and two two-way radio antennas. The communication site will also have a communications shelter, emergency generator, fuel tank, and fencing. Tests have demonstrated that this will be a safe and effective location that offer lines of sight to other key facilities, which will enable critical coverage of gap areas and improve overall County radio coverage in Ka‘ū.

The surface of the project site has been almost fully disturbed by grading and emplacement of infrastructure, and no rare, threatened or endangered plants species or archaeological sites are present. Mitigation measures will prevent impact to endangered fauna and water quality. Minor visual impacts will occur. The location and low power output of the radio antenna ensure that no electromagnetic energy impacts will occur.

PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Project Location, Description and Purpose and Need

The County of Hawai‘i is upgrading its radio system, which is used by various County agencies for emergency and other communications. Some components of the current radio system are outmoded and in need of repair. The County is undertaking a variety of coordinated actions to address this issue. The Department of Public Works (DPW) is participating in the project and is coordinating the environmental assessment (EA).

According to Civil Defense Administrator Darryl Oliveira, limitations with the current coverage present mission safety issues for responding public safety agencies. Reliable and complete communications infrastructure is critical for effective mission operations, public safety and general government operations. With the current system, there are certain areas of the island with poor to no radio communications, particularly the Puna and Ka‘ū Districts. This means that Fire, Police and Civil Defense personnel are sometimes cut off from communication with headquarters and other personnel. During wildfire, tsunami, storms or other disaster events, all other conventional and public communications can be affected. This places an even greater need to insure operability and coverage of the County radio system.

To rectify this situation, the County is identifying suitable locations for new communications sites, preferably on County property in order to increase security, reduce cost and facilitate construction and use. Once a given site or site complex has been identified and it is determined that site control is feasible, the County is conducting environmental analysis.

Currently, the County has determined that a site on the *makai* portion of the Ocean View Fire Station lot is a suitable site (see Figures 1-3 for site location and appearance, and Appendix 1 for Site Plan). As listed in Table 1, the communication site will have a 130-foot tall radio tower equipped with one microwave dish and two 2-way radio antennas, along with a communications shelter, emergency generator, fuel tank, and fencing. Tests have demonstrated that this will be a safe and effective location that offers lines of sight to other key facilities, which will enable critical coverage of gap areas and improve overall County radio coverage in Ka‘ū.

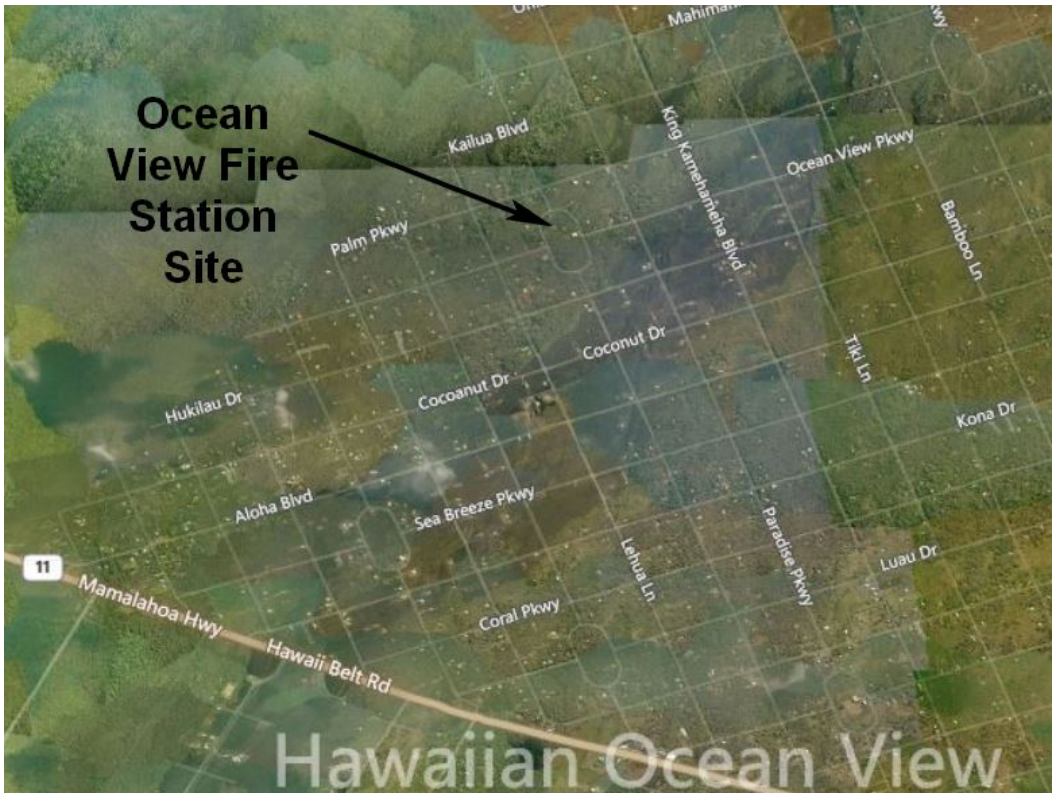
Table 1. Communication Site Details

Site/Feature	**Ocean View Fire Station Communication Site**
Tower Height	130 feet
Width at Top	2’-6”
Width at Base	14’-8”
Antennas*	One 6’ diameter microwave dish at 125’; one 2-way radio antenna at top; and one 2-way radio antenna at 100’

*Microwave frequencies will be in the 6-11 Ghz range and the radio systems will be 150-174 MHz

Figure 1a. Location Map – Island Location

Figure 1b. Location Map – Aerial Image



Satellite Map from Bing © 2015 Microsoft, HERE, Pictometry Bird's Eye

Figure 2. TMK Map

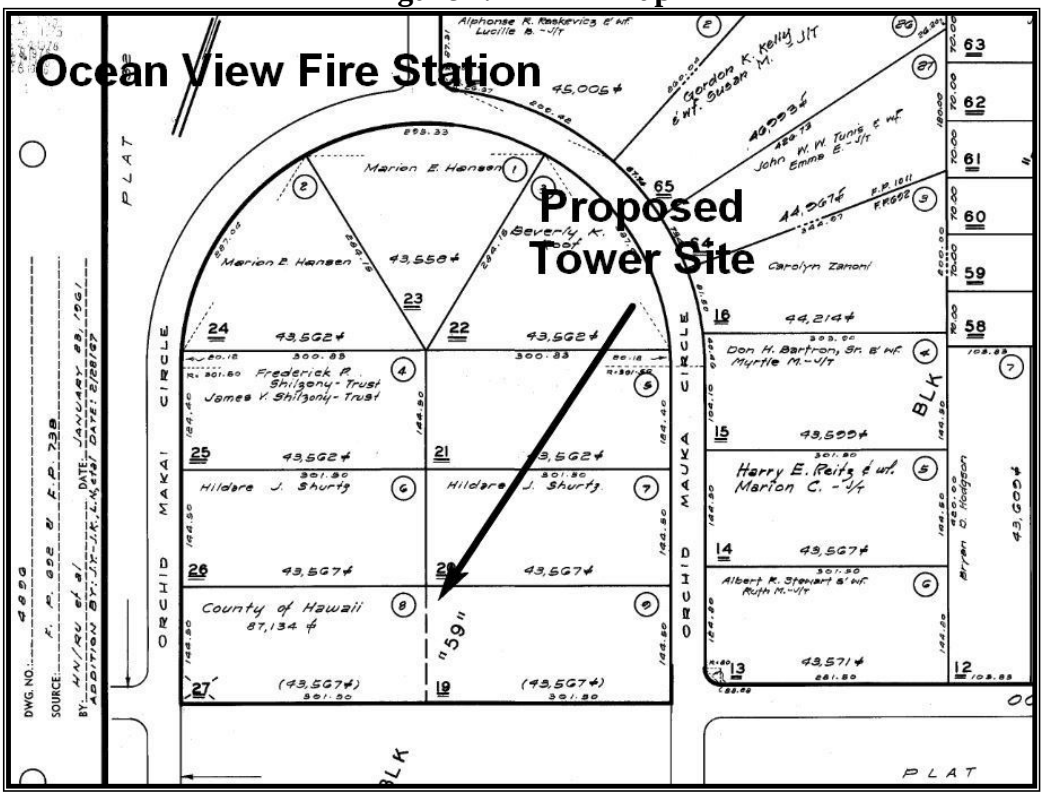


Figure 3. Project Site Photograph

For security, all features at the site will be enclosed within a fenced compound, and the Fire Department will provide a 24-hour presence on site. In order to avoid impacts to Hawaiian hoary bats, the fences will not have barbed wire or razor wire. Given that the tower is less than 200 feet in height and is not located in close proximity to an airport or known flight path, the County does not anticipate the need for tower lighting. Final determination of lighting requirements will be made upon submittal of the Antenna Structure Registration (ASR) with the Federal Communications Commission (FCC).

The FCC has mandated that by January 1, 2013, all public safety and business industrial land mobile radio systems operating in the 150-512 MHz radio bands must cease operating using 25 kHz efficiency technology, and begin operating using at least 12.5 kHz efficiency technology. The purpose is to ensure more efficient use of the spectrum and greater spectrum access for public safety and non-public safety users. Migration to 12.5 kHz efficiency technology will allow the creation of additional channel capacity within the same radio spectrum, and support more users. After January 1, 2013, licensees not operating at 12.5 KHz efficiency may be in violation of the Commission's rules and could be subject to FCC enforcement action, which may include admonishment, monetary fines, or loss of license. The proposed County of Hawai‘i communications facilities have been designed to conform to the mandated narrow bandwidth frequency requirements imposed by the FCC. The County of Hawai‘i has received a waiver from the FCC to continue operating in the wideband 25 kHz mode until July 31, 2017, at which time the County narrow-banding upgrade project will be completed.

The cost of the Ocean View Fire Station Radio Communication Site project is estimated at $1,200,000. Cost estimates for construction are at this point approximate and will be refined during design. If the project is approved, design is expected to be completed early in the first quarter of 2016. Construction would begin after securing a County of Hawai‘i Use Permit for the site and should be completed within about six to eight months.

1.2 Environmental Assessment Process

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law and its implementing regulations, Title 11, Chapter 200, of the Hawai‘i Administrative Rules, are the basis for the EA process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document states the finding (anticipated finding, in the Draft EA) that no significant impacts are expected to occur; Part 5 lists each criterion and presents the findings (preliminary, for the Draft EA) for each made by the County of Hawai‘i Department of Public Works, the proposing/approving agency. If after considering comments to the Draft EA the approving agency determines that no significant impacts would likely occur, then the agency issues a Finding of No Significant Impact (FONSI), and the action is permitted to proceed to other necessary permits and approvals. If the agency concludes that significant impacts are expected to occur as a

result of the proposed action, then an Environmental Impact Statement (EIS) is prepared.

1.3 Public Involvement and Agency Coordination

The following agencies, organizations and individuals were consulted in the development of the EA:

Federal:
- Federal Communications Commission
- U.S. Fish and Wildlife Service

State:
- Department of Transportation
- Department of Health
- Department of Land and Natural Resources: Director; Historic Preservation Division
- Office of Hawaiian Affairs

County:
- Police Department
- County Council
- Department of Water Supply
- Fire Department
- Planning Department

Organizations and Individuals:
- Sierra Club
- Neighboring property owners

Copies of communications received during early consultation are contained in Appendix 2a. It should be noted that during the early consultation phase of the preparation of the EA, two potential communication sites in the Puna District were also to be included for analysis in the EA. Since that time, it was determined that site control could not be achieved in a reasonable amount of time, and these proposed communication facilities may need to be relocated to other sites that the County has not yet been able to identify. *This EA concerns only the Ocean View Fire Station communication site*.

Comments to the Draft EA and responses to these comments are contained in Appendix 2b. Various places in the EA have been modified to reflect input received in the comment letters; additional or modified non-procedural text is denoted by double underlines, as in this sentence.

PART 2: ALTERNATIVES

2.1 No Action

Under the No Action Alternative, the Ocean View Fire Station communication site would not be constructed, and critical gaps in radio coverage would not be addressed. The community would not benefit from better response time to police, fire, medical and civil defense emergencies.

2.2 Alternative Locations

Officials with the County of Hawai‘i evaluated several properties on multiple criteria including coverage area (to maximize effectiveness), County ownership (if possible; to increase security, reduce cost and facilitate construction and use), available electricity and access, and extent of previously disturbed surface area. The selected site was superior to all other sites, and as there do not appear to be appreciable environmental impacts at the proposed site, no alternative sites have been advanced for study.

To ensure appropriate and effective radio coverage, the County provided the radio manufacturer with a list of available County owned radio and microwave sites for consideration in the overall radio frequency (RF) design of the system. This list included existing and planned communication sites, which were to be considered as primary selection sites. In addition, the County provided a list of County-owned properties that are currently not being utilized as communication sites for consideration as secondary sites in the overall RF design. During the RF design process, the selected radio vendor produced coverage maps based upon various combinations of selected sites. In order to achieve the required coverage in the Ocean View area, the only satisfactory site available was the Ocean View Fire Station project site. Another County-owned site initially considered was the existing County radio site at South Point, but it could not provide the desired radio coverage in the Ocean View area due to a ridge that obstructs line of sight. Another upper elevation Ocean View site had favorable line of site but is not County owned and lacks utility power. Neither these nor any other known site under County control provides the necessary RF coverage in the underserved areas of Ka‘ū, where existing coverage can be poor or non-existent.

In order to connect the proposed new RF site to the existing system, there must be line-of-sight connectivity to the existing microwave network, due to the lack of fiber or other means of backhaul in the new project site locations. The tower at the Ocean View Fire Station project site can be sized sufficiently to connect via a new microwave link to the existing County site at South Point.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The area that will be utilized for the communication site is referred to throughout this EA as the *project site*.

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The project site is at 2,950 feet in elevation in a somewhat cool and dry environment, with about 34 inches of annual rainfall (Giambelluca et al 2013; UH Hilo-Geography 1998).

Geologically, the project site is located on the flank of Mauna Loa, not far from the Southwest Rift. The surface consists of a geologically recent lava flow dated at between 750 to 1,500 years before the present, where the dry climate has not allowed soil development (Wolfe and Morris 1996; U.S. Soil Conservation Service 1973). Permeability is rapid, runoff is slow, and erosion hazard slight on the native surface, which has been bulldozed except in one small corner of the site.

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey at the project site is Zone 2, on a scale of ascending risk from 9 to 1 (Heliker 1990:23) This means that the project site is at considerable risk of having lava flow activity within the next 200 to 500 years. In such areas, lava inundation could happen next week, or it may not occur for centuries. The uncertainty that comes with such a risk level has been clearly demonstrated in Pahoa recently in the activity of what has come to be called the *June 27* (2014) *lava flow*, which still may pose a potential threat to certain inhabited areas of Puna.

The Island of Hawai‘i experiences high seismic activity and is at risk from major earthquake damage (USGS 2000), especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 15, 2006 demonstrated. All facilities will be designed based on requirements of the 2006 International Building Code to ensure appropriate design. The project site does not appear to be subject to subsidence, landslides or other forms of mass wasting.

Impacts and Mitigation Measures

In general, although the project site is exposed to considerable lava flow hazard, geologic conditions impose no substantial constraints on the proposed action. The substrate is suitable for construction of the facilities, including the radio tower, with proper engineering. Aside from lava flow hazard, no geologic hazard exists. Although a lava flow could put the infrastructure at risk, the need to respond to emergencies such as lava flows in Kaʻū is one of the critical reasons to construct the new communication site. If the facility were in imminent danger of being inundated by lava, that time scale of the flow's advance is such as to allow safe evacuation of any personnel who might be present. Most lava flows advance slowly enough to allow removal and transport of valuable equipment and supplies, if necessary. Considering all these factors, the County has determined that it is therefore reasonable and prudent to invest in radio communication infrastructure in this location.

3.1.2 Drainage, Water Features and Water Quality

Existing Environment

According to Flood Insurance Rate Maps (FIRM) available at the website of the DLNR Engineering Division (http://gis.hawaiinfip.org/fhat/), the project site is located entirely within Zone X, which is comprised of areas determined to be outside the 500-year flood plain. No known areas of local (non-stream related) flooding are present.

Impacts and Mitigation Measure

Because the project site is already developed and has not been known to flood in the past, and because of the lack of sensitive waters nearby, the risks for flooding or impacts to water quality are negligible. Rooftop runoff from the proposed 200 square-foot communications shelter will be minimal and all site runoff can easily be accommodated by the existing runoff absorbing areas on the bulldozed project site.

3.1.3 Flora, Fauna and Ecosystems

Existing Environment: Vegetation and Flora

The project site has been modified by bulldozing, and the area no longer supports natural vegetation (see photo in Figure 3). Based on the project site's nearly 3,000-foot elevation, average annual rainfall of 35 inches, recent lava geologic substrate, and adjacent vegetation, the natural vegetation here is Montane Dry Shrubland (Gagne and Cuddihy 1990). The surrounding vegetation is typical of lava flows at this elevation in Kaʻū and Kona: *ʻōhiʻa*, *amaʻū* (*Sadleria cyatheoides*), uki (*Machaerina angustifolia*), pilo (*Coprosma* sp.), *ʻakia* (*Wikstroemia* sp.), *a'ali'i* (*Dodonaea viscosa*), *pukiawe* (*Leptecophylla tameiameiae*), and *kolea lauliʻi* (*Myrsine sandwicensis*). The site proposed for the tower has been bulldozed and now contains weeds, except for a very

small corner with a remnant of the natural vegetation consisting of a few *ʻōhiʻa, aʻaliʻi, pilo, ʻakia, uki,* and *pukiawe.*

A botanical survey conducted by Ron Terry, Ph.D., determined that no rare, threatened or endangered plant species are present at the site.

Existing Environment: Faunal Surveys

Because of the primarily non-native, managed vegetation on the utilitarian site, which is managed to support a fire station, there is little habitat for native animal species. Systematic 8 to 10-minute bird counts were conducted by professional ornithologist Reginald David. Most birds seen or heard on the site were alien to the Hawaiian Islands, although some native birds were observed; other native birds were not observed but may be present.

The Ocean View project site had a total of 32 individual birds of eight species recorded during the point count. One Hawaiian Hawk (*Buteo solitarius*), an endangered endemic species, was seen flying over nearby. House Sparrows (*Passer domesticus*) accounted for 50 percent of all birds recorded. In addition to birds, the presence of dogs (*Canis familiaris*) was detected nearby. No reptiles or amphibians were observed, although it is likely that various non-native lizards are present.

Existing Environment: Endangered Fauna

Hawaiian Hawks (*Buteo solitarius*) are known to forage near forested areas throughout the island of Hawaiʻi (Klavitter 2000; David 2015) and can be seen flying around most forested areas of Kaʻū. No hawk nests were observed, and the short stature of trees in and adjacent to the site is unsuitable for hawk nesting. Furthermore, in general, hawks are unlikely to nest near areas such as the project site, which has have heavy disturbance and noisy activities.

Although not detected during the survey, the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened endemic Newell's Shearwater (*Puffinus newelli*) have been recorded over-flying parts of the Kaʻū Districts between April and the end of November each year, but with extremely low passage rates. There are neither nesting colonies nor appropriate nesting habitat for either of these listed species within or close to the project site. Because it is distant from both the coastline and the upslope nesting colonies on the high mountains, any seabirds transiting the area are likely flying quite high, more than 300 feet above ground level.

The area surrounding the project site could conceivably harbor roosts for endangered Hawaiian hoary bats (*Lasiurus cinereus semotus*), Hawaiʻi's only native land mammal. These bats are solitary and cryptic and are vulnerable to disturbance during the pupping season from June 1 to September 15 each year.

Impacts and Mitigation Measures

Because of the lack of native ecosystems and or threatened or endangered plant species, no adverse impacts to botanical resources would occur as a result of utilizing the project site for a communications facility.

The principal potential impacts that construction and operation of the radio tower and associated infrastructure poses to Hawaiian Hawks would occur during the clearing and grubbing phases of construction as vegetation is removed. Loud and irregular activities near a hawk nest, such as using heavy equipment or building a large structure, may cause nest failure. Harassment of hawk nesting sites can alter feeding and breeding patterns or result in nest or chick abandonment. Nest disturbance can also increase exposure of chicks and juveniles to inclement weather or predators. Vegetation removal can disturb nesting hawks to the point that they abandon an active nest, break an egg, or knock a young chick out of the nest. This is possible during the hawk nesting season, which runs from March through September. As there is no vegetation on the project site for hawks to nest in, and adjacent vegetation does not appear conducive to hawk nests, it is not expected that the construction and operation of the proposed radio tower will result in deleterious impacts to this species. However, in order to ensure that hawks that might be present in tall trees on adjacent vegetation are not affected, the County of Hawai‘i is prepared to authorize a survey for hawk nests if landclearing or tower erection is scheduled from March through September.

The primary cause of mortality in both Hawaiian Petrels and Newell’s Shearwaters is thought to be predation by alien mammalian species at the nesting colonies (USFWS 1983, Ainley et al., 2001). Collision with man-made structures is the second most significant cause. Many bird species are known to strike objects such as antennas or guywires that protrude above surrounding vegetation. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds can collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets for feral mammals (Cooper and Day 1998; Ainley et al. 2001). In order to minimize impacts at the radio tower site, the total surface area of the proposed tower has been minimized to the degree consistent with a stable tower, and no guy wires or permanent lighting will be used. Given that the proposed tower is only 130 feet in height and not located in close proximity to an airport or known flight path, the County does not anticipate the need for tower lighting. Final determination of lighting requirements will be made upon submittal of the Antenna Structure Registration (ASR) with the FCC. In the unlikely event that the FCC requires lighting, design will utilize a red flashing light, which is less attractive to seabirds. Temporary lighting might be necessary during emergency site work being performed due to radio failure, but the duration would likely be only a few hours, and thus there would be negligible impact to seabirds.

As stated in a letter of July 11, 2015 in response to early consultation (see Appendix 2a), the U.S. Fish and Wildlife Service (USFWS) ran a computer model using available data

for passage rates of seabirds for the areas where the tower is planned to be located, the proposed tower height and a one meter radial distance from the center of the tower to its perimeter, based on the radio tower design. Model results indicated that collisions between transiting seabirds and the tower are unlikely to occur.[1]

The principal potential impact that construction activity poses to Hawaiian hoary bats would occur during the clearing and grubbing phases, as vegetation is removed. As there is no vegetation at the project site suitable for bats to use for roosting sites, the chance for impacts is very small. However, in order to ensure there are no impacts to this endangered bat species, the County of Hawai‘i will require that woody vegetation taller than 15 feet not be removed or disturbed between June 1 and September 15, when Hawaiian hoary bats may be sensitive to disturbance. In addition, no barbed wire or razor wire fencing will be installed at the project site.

The USFWS reviewed the activity, provided information on listed species and potential impacts, and suggested mitigation measures to reduce impacts to minimal levels (see letter of July 11, 2015 in Appendix 2a). The agency concluded that implementation of these measures will minimize impacts but does not absolutely ensure that take of listed species associated with this proposed action will be fully avoided.

In addition to mitigation measures listed above, in response to a comment on the Draft EA from the Office of Environmental Quality Control (see Appendix 2b), after construction of the project, DPW will provide information to Fire Department personnel on the disposition of injured seabirds in the extremely unlikely event of a seabird downing. DPW will also consult with DLNR-DOFAW concerning potential monitoring protocol.

In the unlikely event that the FCC requires lighting of the tower, the County of Hawai‘i will contact the USFWS for additional assistance and evaluation. The USFWS also recommended the FCC or its non-Federal representative consult to address potential project impacts to listed species. Consultation between the agencies is currently ongoing.

3.1.4 Air Quality, Noise, and Scenic Resources

Environmental Setting

Manmade air pollution in the Ocean View area is minimal. The principal influence on air quality is volcanic emissions of sulfur dioxide, which convert into particulate sulfate and produce a volcanic haze (vog) that chronically blankets the district.

[1] As discussed in Section 1.3, above, during the early consultation phase of preparation of this EA to which the USFWS responded, two additional communication sites in Puna were also to be included in the EA. Since that time, it was determined that site control could not be achieved in a reasonable amount of time, and the communication facilities may need to be relocated to other sites that have not yet been able to be identified.

Noise on the project site is usually low, although it can be periodically moderate to high because of motor vehicles, facility operations or maintenance, or helicopter overflights.

The General Plan calls out in Chapter 7 various sites of natural beauty for each of the districts in the County of Hawai‘i, and also identifies Exceptional Trees that have been protected by County ordinance. The project site is not in itself considered significant for its scenic character, as it is located within a subdivision and has a utilitarian landscape devoted to fire protection. No identified sites of natural beauty or Exceptional Trees are present.

Impacts and Mitigation Measures

Construction would produce minor and temporary noise impacts. The County will require the contractor to limit construction to daytime hours and consult with the Department of Health pursuant to Title 11, Chapter 46, HAR (Community Noise Control) if construction noise is excessive and requires mitigation. Operationally, the proposed project would not measurably affect air quality or noise levels beyond those already present on the site. Generators would only be utilized for emergency power when the electric grid was down.

The facility would alter the visual characteristics of the site. The self-supporting, three-legged tower will be made of steel with a lattice structure (see Sheet A2 of Appendix 1 for illustration of the proposed tower). The tower will house one six-foot diameter microwave dish and two 2-way radio antennas. The facility will also have a 10-foot by 20-foot communications shelter and a generator with a fuel tank for emergency power. All the new features will be enclosed within a fenced compound. Although not excessively tall compared with many radio and cellular towers in the State of Hawai‘i, a 130-foot tower will protrude far above the tree canopy and be clearly visible from any surrounding locations that lack forest cover. The line of sight to various locations offered by a high point is of course the reason that the antennas are mounted on towers. The tower height has been carefully calculated to be the minimum necessary to achieve its communication objective and provide coverage. The tower will be visible from a number of locations. The project site is within an area with other developed structures, primarily homes and public infrastructure.

Figure 4 provides maps and cross-sections that depict the sight lines in two directions from the proposed tower. Without factoring in tree cover near a viewer location, it is clear that the tower will be visible in much of the surrounding area. This, again, is the reason the antenna are elevated on towers to begin with. At most viewer locations, however, trees would obscure views of the tower. Depending on the particular circumstances, trees from 20 to 80 feet in height would tend to block views of the tower. In areas without such tree cover nearby, however, the tower would be visible, although as an increasingly minor component of the overall view with increasing distance.

In terms of impacts to areas of natural beauty in the General Plan, the plan calls for protecting “…the views of areas endowed with natural beauty by carefully considering

Figure 4a. Sightline from Tower at Ocean View Fire Station Towards Ocean View Commercial Area

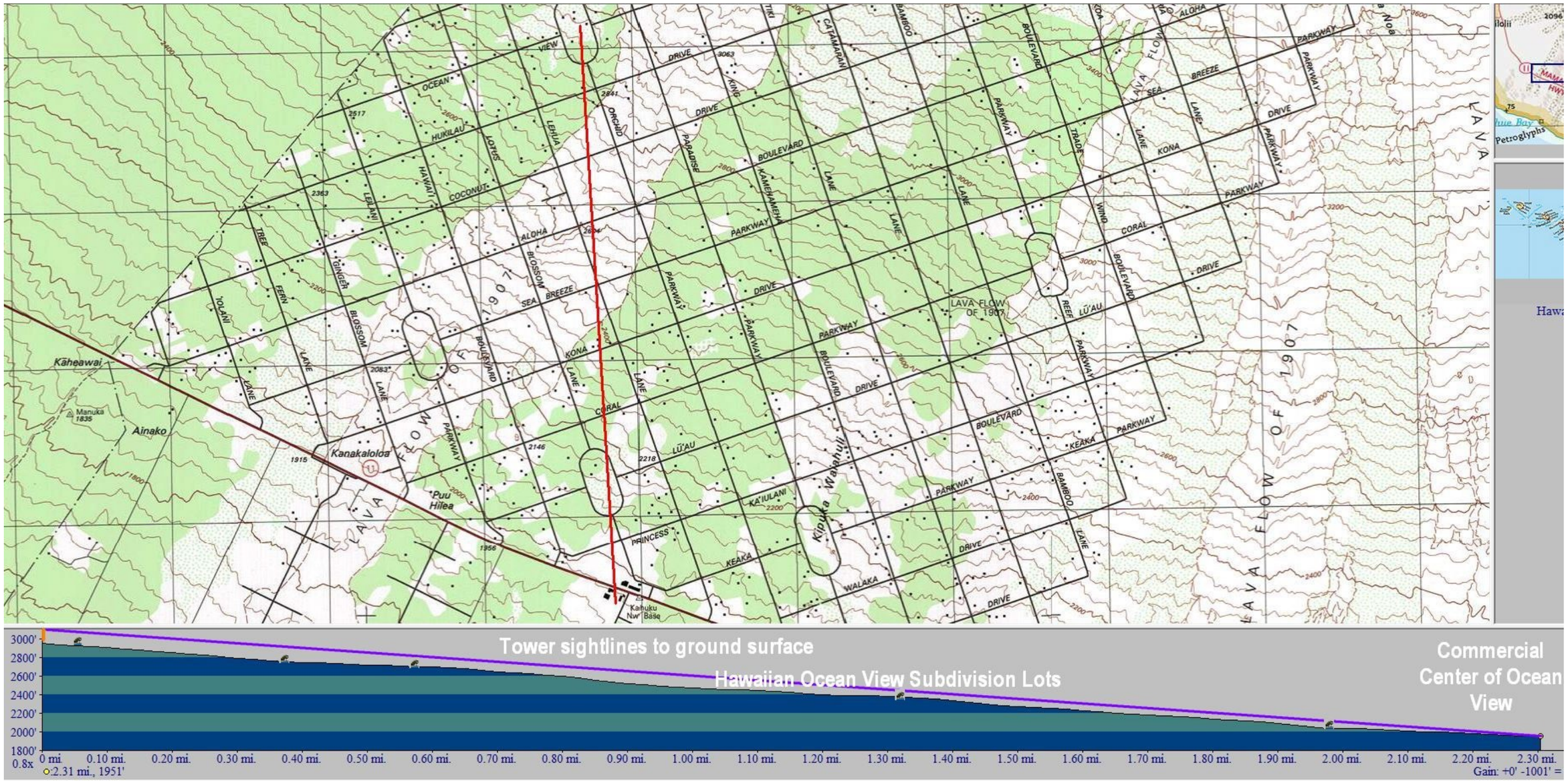
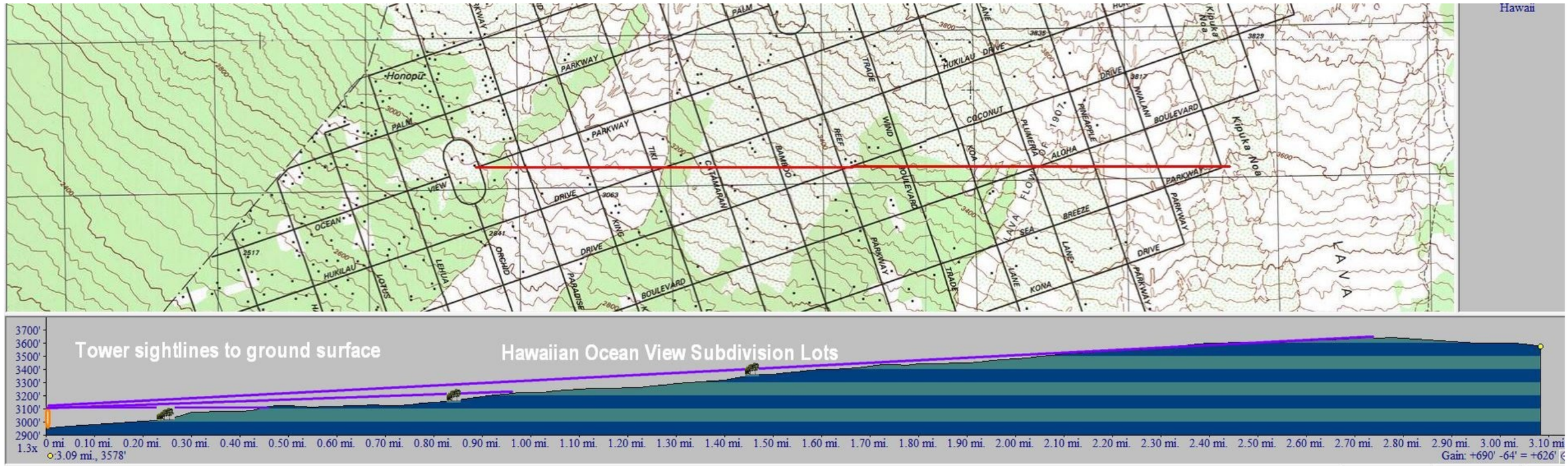


Figure 4b. Sightline from Tower at Ocean View Fire Station Towards Eastern Edge of Hawaiian Ocean View Estates Subdivision



the effects of proposed construction during all land use reviews" and not allowing "incompatible construction in areas of natural beauty." For the Ocean View area, there is no potential for degradation of identified natural beauty sites. In sum, although there is inevitable visual impact associated with the construction of any radio tower, the scale of the tower limits visual impact to minor levels, and no important viewplanes or scenic sites recognized in the Hawai'i County General Plan would be affected.

3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions

No systematic records evaluation or intensive field investigation such as a Phase I Environmental Site Assessment has been undertaken at the project site. It has site been part of the fire protection infrastructure for several decades, first as a volunteer facility and later as a County station. It has no known history of industrial use, and there is no obvious evidence of dumping. It is unlikely that any potentially hazardous, toxic or radioactive waste would be found on the project site. However, reasonable precautions will be undertaken in the context of the project's construction plan to include provisions for the appropriate response and remediation should any such hazardous, toxic, or radioactive material be encountered during the construction phase of the project, in accordance with Department of Health requirements.

3.1.6 Electromagnetic Energy

An important design objective for all telecommunications facilities is to ensure that electromagnetic energy (EME) does not pose a hazard to workers or the public. This section discusses the EME produced by radio and microwave antennas and the precautions to ensure the minimization of effects.

Existing Environment and Regulatory Setting

EME refers to the ubiquitous radiant energy associated with a variety of processes found both in nature and the manmade world. The sun is the principal source of electromagnetic radiation in our solar system, producing visible light, infrared energy, ultraviolet radiation, and other forms. EME of various wavelengths is essential not only for the conveniences of modern life but even for human life and ecosystem health. Radio waves, microwaves, visible light, and X-rays are all examples of electromagnetic waves that differ from each other in wavelength. Short wavelength forms of energy such as X-rays and gamma rays have much more energy than longer wavelengths, such as infrared and radio waves. Many devices that are part of everyday life utilize EME, including X-ray machines, lighting, radio, television, microwave ovens, and cellular telephones. Exposure to certain forms of EME at very high power levels can be harmful or even fatal. Accordingly, there are regulations and policies that guide radiation exposure from various devices at various wavelengths and power levels.

EME in the radio frequency (RF) spectrum is frequently used to provide communications over a distance. Wireless communications use RF energy or radio waves to send and

receive signals that carry data or voice information. In general, the long wavelengths of the RF spectrum are not harmful to health or life at the exposures that we normally receive. However, precautions must be taken near transmitters to ensure that safe exposure limits are not exceeded. This generally takes the form of safe standoff distances from the transmitters.

Experts in science, engineering, medicine, health, and industry work with organizations to develop standards for safe exposure to RF energy. These standards provide recommended levels of RF exposure for both workers and the general public. These recommended RF exposure levels include substantial margins of protection.

Wireless products and systems are designed, manufactured, and tested to ensure they meet government-established RF exposure levels. A common way to measure EME exposure levels is known as power density, which is defined as RF power per unit area. For example, power density can be expressed in terms of watts per square meter (W/m^2).

Exposure standards and guidelines have been developed by various organizations and countries over the past several decades. In North America and most of Europe exposure standards and guidelines have generally been based on exposure levels where effects considered harmful to humans occur. Safety factors are then incorporated to arrive at maximum levels of exposure that provide for sufficient protection of various segments of the population. In the U.S., the FCC is required by the National Environmental Policy Act of 1969 and other laws and regulations to evaluate the effect of emissions from FCC-regulated transmitters on the quality of the human environment. Several organizations, such as the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers, Inc. (IEEE), and the National Council on Radiation Protection and Measurements (NCRP) have issued recommendations for human exposure to RF electromagnetic fields. On August 1, 1996, the FCC adopted the NCRP's recommended Maximum Permissible Exposure limits for transmitters operating at frequencies of 300 kHz to 100 GHz.

The FCC rules require manufacturers to comply with the FCC RF energy exposure limits for wireless products and systems marketed and deployed in the U.S. When used as a consequence of employment, the FCC requires product users to be fully aware of and able to control their exposure to meet occupational requirements. Exposure awareness is facilitated by the use of signage directing users to specific user awareness information.

Besides FCC rules, wireless products and systems typically comply with the following RF energy exposure standards and guidelines:

- Institute of Electrical and Electronic Engineers (IEEE) C95.1-2005
- International Commission on Non-Ionizing Radiation Protection (ICNIRP)
- Health Canada Safety Code 6
- Industry Canada RSS-102
- Australian Communications Authority Radio Communications Standard et seq.

Impacts and Mitigation Measures

A computational assessment was carried out to provide an estimation of the EME exposure from the new radio antennas. The analysis, which is presented in full in Appendix 3 and summarized below, was conducted according to methodologies in compliance with FCC regulations. The radio system to be installed at the Ocean View Fire Station project site would operate in the 150-174 MHz frequency band. The transmitter output power would be about 130 watts (or less) and transmit in an omni-directional (or wide sector) pattern with energy emissions concentrated towards the horizon.

The computational assessment considered the RF power output of the radio antennas based on their frequencies, powers and heights. This allowed determination of the occupational and general public distances beyond which EME exposure would be below FCC maximum limits. The FCC exposure limits, when expressed in terms of equivalent power density, are frequency dependent. In particular, at 136 MHz the limit is 2 W/m^2 for the general public and 10 W/m^2 for occupational-type exposure. Considering both exposure directly in front of the antenna and ground-level exposure, the resulting compliance distance is 1.3 meters (4.3 feet) for occupational exposure and 5.7 meters (18.7 feet) for general public exposure. There is no potential for any human occupation of space within this exposure distance except during installation or service of the antennas, at which time they should not be transmitting. Away from the antenna, the EME intensity declines very rapidly, eventually becoming inversely proportional to the square of the distance from the source; e.g., doubling the distance reduces exposure by a factor of four.

Point-to-point dish microwave antennas transmit and receive RF signals across relatively short distances (from a few tenths of a mile to 30 miles or more). These antennas are generally rectangular or circular in shape and are usually mounted on a supporting tower, a rooftop, the sides of buildings or on similar structures that provide a clear and unobstructed line-of-sight between both ends of a transmission path. The dish antennas at the project site would transmit continuously in the 6-11 GHz range, and concentrate their emission in a narrow beam with minimal dispersion outside of the relatively narrow beam. The associated transmitter RF output powers are typically in the range of one (1) watt or less. Because of this low amount of power, the only significant EME exposure would be directly in front of the dish, so EME exposure levels from dish antennas at the proposed communication site are much lower than those from the radio antennas.

In summary, no adverse EME exposure to the public or workers would occur as result of the proposed communications infrastructure, which will have appropriate signage for worker and general public safety. The manufacturer of the radio system has additional information available on EME exposure and safety precautions at: http://responsibility.motorolasolutions.com/index.php/downloads/dow07-rfexposureassessmentstand/

3.2 Socioeconomic and Cultural

3.2.1 Socioeconomic Characteristic

Table 2 provides population and socioeconomic characteristics for the County of Hawai‘i and the Ocean View area. With a diverse population with 67 percent minorities, mainly Asian and Pacific Islander, the County has for decades been one of the 100 fastest-growing counties in the U.S. The median age is over 40 years and more than 15 percent of the population is 65 or older, one of the oldest populations in the State of Hawai‘i. However, more than 22 percent of the population is children under 18 years of age. This age distribution is indicative of situations in which certain portions of the working age population have left the area. Several segments of the population that typically exhibit disadvantaged measures of social welfare are disproportionately represented in the population as compared to the State of Hawai‘i. Median family income is much lower than the State as a whole, and more than 18 percent of individuals in the County have income below the poverty level, about double the statewide rate. Similar patterns pertain to households receiving welfare, food stamps, and disability payments. The Ocean View area has even higher rates of unemployment and poverty.

The proposed project would benefit the socioeconomic environment by providing reliable County radio service that can assist Fire, Police, Emergency Medical Services and Civil Defense personnel in effective missions to serve the citizens of the County. The proposed new communication site is especially critical for the Ka‘ū District, a disadvantaged area with chronically high rates of poverty, unemployment, crime and medical issues. Limited police, fire and other emergency infrastructure makes communication in Ka‘ū, a very large and sparsely settled district, even more important.

3.2.2 Cultural Resources and Practices

Existing Environment: Settlement and Development of Hawaiian Culture

The first inhabitants of Hawai‘i are believed to be settlers who had undertaken difficult voyages across the open ocean. For many years, researchers have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawai‘i were underway by A. D. 300, although recent work suggests that Polynesians may not have arrived in Hawai‘i until at least A. D. 1000 (Kirch 2012).

Impacts

The initial inhabitants of Hawai‘i are believed to have come from the southern Marquesas Islands and settled initially on the windward side, eventually expanding to leeward areas.

Table 2. Selected Socioeconomic Characteristics

CHARACTERISTIC	Hawai‘i Island	Ocean View
Total Population	187,044	4,437
Percent White	33.0%	48.7%
Percent Asian	17.1%	5.5%
Percent Hawaiian or Pacific Islander	12.5%	20.0%
Percent Two or More Races	28.9%	22.0%
Median Age (Years)	40.7	45.2
Percent Under 18 Years	22.5%	24.7%
Percent 65 Years and Over	15.4%	12.1%
Percent Households with Children	25.5%	26.3%
Average Household Size	2.83	2.52
Percent Housing Vacant	22.0%	28.1%
Percent Over 16 Years in Labor Force*	61.2%	48.5%
Median Household Income*	$51,520	$42,981
Percent Below Poverty Level*	18.3%	31.2%
Percent 25 years and older with High School Degree*	91.0%	91.5%
Percent with Disability*	13.5%	n/a
Percent Foreign Born*	12.7%	n/a

Source: U.S. Census Bureau American Fact Finder: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

* Note: margin of error for small populations such as Ocean View may be large on these measures, which are determined by sample surveys

The Development Period, believed under Kirch's new concept to have occurred from A.D. 1100 to 1350, brought an evolution of traditional tools, including a variation of the adze (*ko‘i*), and some new Hawaiian inventions such as the two-piece fishhook and the octopus-lure breadloaf sinker. That was followed by the Expansion Period (A. D. 1350 to 1650) which saw greater social stratification, intensive land modification, and population growth. This period was also the setting for the second major migration to Hawai‘i, this time from Tahiti. Also established during this period was the *ahupua‘a*, a land-use concept that incorporated all of the eco-zones from the mountains to the shore and beyond. The usually wedge-shaped *ahupua‘a* provided a diverse subsistence resource base (Hommon 1986) and added another component to what was already becoming a well-stratified society (Kirch 2012).

Ahupua‘a were ruled by *ali‘i ‘ai ahupua‘a* or lesser chiefs and managed by a *konohiki*. *Ali‘i* and *maka‘ainana*, or commoners, were not confined to the boundaries of *ahupua‘a*, as resources were shared when a need was identified. *Ahupua‘a* were further divided into smaller sections such as *‘ili, mo‘o‘aina, pauku‘aina, kihapai, koele, hakuone* and *kuakua*. The chiefs of these land units have their allegiance to a territorial chief or *mo‘i* (literally translated as king) (Hommon 1986).

As population grew during the following centuries so did the reach of inland cultivation in the upland environmental zones and consequent political and social stresses. During the Proto-Historic Period (A. D. 1650-1795), wars reflective of a complex and competitive social environment are evidenced by *heiau* building. During this period, sometime during the reign of Kalaniopuʻu (A. D. 1736-1758), Kamehameha I was born on the Island of Hawaiʻi.

Existing Environment: Context of Kaʻū District

The project site lies within the Kaʻū District. Although somewhat out of the crossroads of better known Hawaiian traditions and history, the district figures prominently in certain stories and *mele* and have unique cultural resources and practices.

The Polynesian Family System in Kaʻū, one of the most important ethnographic monographs about traditional Hawaiian society and land use, was written by Mary Kawena Pukui and E.S.C. Handy (1972) recalling the early 20th century, a time when many traditional practices had long ago disappeared from other areas of Hawaiʻi. It is a treasure trove of information about settlement and practices in the district. It is clear that the settlement focus in Kaʻū was the well-watered slopes with fertile soil that extended from Waiʻohinu to Wood Valley, along with the coastal areas that were within the corresponding *ahupuaʻa*. The massive western *ahupuaʻa* of Kahuku (in which the Ocean View site is located) was not covered as much by recent lava as it is today, but it was relatively unsettled, except near the coast. Despite its rough and forbidding appearance, ethnographic and early historic accounts clearly indicate that the coastline of Kahuku was once an active and at least lightly settled area. Its coastline was noted as a fine fishing ground that attracted even Kamehameha I (Silva 1987:D-4). Fishermen and their families once inhabited the coastal region in various villages. Inland and upslope areas were utilized for dispersed dry-land agriculture and habitation. Planting or clearing mounds, trails, house platforms, *ahu* and walls are present in places. The far upland areas of Kahuku were apparently not inhabited on a permanent basis. Hawaiians born in the early 1800s report that upland areas were used for bird hunting, procurement of sandalwood and *koa* wood, goat hunting, and gathering fern *pulu* (Silva 1987).

Existing Environment: Post-Western Contact History

Traditional life in Hawaiʻi took a sharp turn on January 18, 1778 with the arrival of the British Captain James Cook in the islands. On a return trip to Hawaiʻi ten months later, Kamehameha visited Cook aboard his ship the *Resolution* off the east coast of Maui and helped Cook navigate his way to Hawaiʻi Island. Cook exchanged gifts with Kalaniopuʻu at Kealakekua Bay the following January, and Cook left Hawaiʻi in February. However, Cook's ship then sustained damage to a mast in a severe storm off Kohala and returned to Kealakekua, setting the stage for his death on the shores of the bay.

During the Proto-Historic Period there was a continuation of the trends toward intensification of agriculture, *aliʻi*-controlled aquaculture, settling of upland areas and

development of traditional oral history. The *Ku* cult, *luakini heiau* and the *kapu* system were at their peaks, but the influence of western civilization was being felt in the introduction of trade for profit and a market-system economy. By 1810, the sandalwood trade established by Europeans and Americans twenty years earlier was flourishing. That contributed to the breakdown of the traditional subsidence system, as farmers and fishermen were required to toil at logging, which resulted in food shortages and a decline in population.

The rampant sandalwood trade resulted in the first Hawaiian national debt, as promissory notes and levies granted by American traders were enforced by American warships. The assimilation of western ways advanced through the short-lived whaling period and into the era of sugarcane, which completely transformed large area of Hawai‘i along with its society.

Following the death of Kamehameha I in 1819, the customary relaxing of *kapu* took place. But with the introduction of Christianity shortly thereafter, his successor, Kamehameha II, renounced the traditional religion and ordered that *heiau* structures either be destroyed or left to deteriorate. The family worship of *‘aumakua* images was allowed to continue.

In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawai‘i scouting communities in which to establish church centers for the growing Calvinist mission. Ellis recorded observations made during this tour in a journal (Ellis 1963). His writings contain descriptions of residences and practices in various parts of Ka‘ū that shed light on the conditions in the coastal areas of the *ahupua‘a* that contain the three project sites. Passing from South Kona to the Waiahukini area of Ka‘ū, Ellis noted the area of Kahuku lying about seven miles *makai* of the Ocean View Fire Station site:

> At this place we hired a man to go about seven miles into the mountains, for fresh water; but he returned with only one calabash full, a very inadequate supply, as our whole company had suffered much from thirst, and the effects of the brackish water they had frequently drank, since leaving Honaunau.
>
> Unwilling to spend the Sabbath in the desolate and almost forsaken village of Kapua, we prepared for a long day's journey, as we knew of no village before us containing more than five, or six houses, for nearly thirty miles distance.
>
> Before we left Kapua, we were so favoured as to procure water enough to fill our canteens, and about 10 A. M. set out again on our way. Messrs. Thurston, Bishop and Goodrich walked on by the sea-side. About noon they reached Kaulanamauna, and shortly after left the division of Kona and entered that of Kau….

> The division of Kau commences at Kaulanamauna, runs along to the south point of the island, and stretches about 40 miles along the south-east shore. On entering it, the same gloomy and cheerless desert of rugged lava spreads itself in every direction, from the shore to the mountains. Here and there, at distant intervals, they passed a lonely house, or a few wandering fishermen's huts, with a solitary shrub of thistle struggling for existence among the crevices in the blocks of scoria and lava. All besides was one vast desert, dreary, black, and wild. Often all traces of a path entirely disappeared. For miles together, they clambered over huge pieces of vitreous scoria, or rugged piles of lava, which, like several of the tracts they had passed in Kona, had been tossed into its present confusion by some violent convulsion of the earth.
>
> After about eighteen miles of most difficult travelling, they reached Keavaiti, a small opening among the rocks, where, in case of emergency, a canoe might land in safety….
>
> The wind was still too strong to allow the canoe to proceed on her voyage; and those who had travelled by land, felt too much fatigued to go on without some refreshment and rest. Desirous of spending the Sabbath with the people at Tairitii, which was still fourteen or sixteen miles distant, we determined to rest a few hours, and then prosecute our journey by moonlight….
>
> After leaving Keavaiti, Messrs. Thurston, Bishop and Goodrich, travelled over the rugged lava, till the moon becoming obscured by dark, heavy clouds, they were obliged to halt under a high rock of lava, and wait the dawn of day; for they found it impossible to proceed in the dark, without being every moment in danger of stumbling over the sharp projections of the rocks, or falling into some of the deep and wide fissures, that intersected the bed of lava in every direction. After waiting about an hour, they resumed their journey; and Messrs. Bishop and Goodrich reached Tairitii, about half an hour after Mr. Thurston's arrival. At 10 A. M. Mr. Thurston preached to the people of Tairitii, and the neighbouring village of Patini, all of whom are fishermen (Ellis 1963:94-97).

The *Māhele 'Aina* took place in 1848, placing all land in Hawai'i into three categories: Crown Lands, Government Lands and Konohiki Lands. Ownership rights were "subject to the rights of the native tenants," or those individuals who lived on the land and worked it for their subsistence and for their chiefs, who could claim for the parcels that came to be called *kuleana*.

For the Ocean View project site, following the *Māhele*, Kahuku Ahupua'a was awarded to W. P. Leleiohoku [LCAw. 9971]. His holdings passed to Ruth Ke'elikolani and thence to Pauahi Bishop. There were a few *kuleana* Land Commission Awards within Kahuku near the coast and near the *ala loa*. No individual awards were made in or near the Ocean View Fire Station site.

Despite this fundamental shift in the basis of land ownership and stewardship, land use in the Kaʻū District was initially slow to transform. By the late 19th century, sugar cane plantations began to dominate the landscape in the moister areas with soil, and the towns of Naalehu and Pahala grew with immigrant workers. Ranching took over much of the drier, grassy plains. Some shoreline areas remained in more traditional uses, but the devastating tsunami that followed the massive earthquakes of 1868 destroyed most of the coastal villages east of South Point. The Kahuku area was beset with a series of lava flows that made it yet more uninhabitable, especially in the inland areas. The only change in this area involved improvements to the *ala loa* were undertaken during the late nineteenth century to establish a good road from Kona to Kaʻū. Portions of this old road parallel the current Māmalahoa Highway and consist of both single and two-track paths and improved graveled/cindered roadways. None of these were situated far *mauka* near the Ocean View Fire Station.

A constant through all these eras of history in Kaʻū, the well-developed Hawaiian traditions of fishing and collecting food from the ocean and mountain persisted. These practices have been passed down generation to generation and continue to flourish today. Many people still fish with rod and reel along the shore in Kaʻū, utilizing the wisdom of past fishermen to select fishing locations, proper bait, and technique. Fishermen throw net, fish by rod and reel, or spear fish at different locations along the shoreline to catch specific fish such as *āholehole, ʻāweoweo, kala, kole, kūmū, manini, mamo, moana* and many other types of fish. In addition, the traditional collection of *ʻōpihi, ʻaʻama,* and *limu* along the rocky shoreline is still practiced. Traditional Hawaiian fishing practices, shoreline gathering practices, and ocean access are protected by State law. Hunting and gathering also occur in mountain areas, on both government land such as forest reserves and on private land.

Existing Environment: Cultural Resources at the Project Site

The project site is confined entirely within a disturbed lot dedicated to County fire protection infrastructure. No caves, springs, *puʻu,* native forest groves, gathering resources or other natural features are present on or near the previously disturbed project site. As part of the EA, an effort was made to obtain information about any potential traditional cultural properties and associated practices that might be present, or have taken place at the project site. Property neighbors and various agencies including the Office of Hawaiian Affairs and the State Historic Preservation Division were contacted. There are no initial indications that there are any traditional cultural properties in the immediate vicinity or current use for traditional and customary practices. The project site is not located near the coast or streams and no fishing or gathering of aquatic resources occurs. The vegetation is generally non-native and does not contain the quality and quantity or resources that would be important for native gathering, and no hunting occurs at this developed site. As discussed in the next section, no archaeological remains reflecting cultural history or supporting cultural values are present. Based on this, it would appear that no known valuable natural, cultural or historical resources are present on the project site.

Impacts and Mitigation Measures

It currently appears that use of the project site for communication infrastructure to increase coverage of the County radio system that is critical for providing emergency responses would not likely impact any culturally valued resources or cultural practices. OHA and other parties were supplied a copy of the Draft EA in order to help finalize this finding. No party reviewing the Draft EA supplied any cultural information.

3.2.3 Archaeology and Historic Sites

Existing Environment

The radio communication site takes up an area of about 0.05 acres in an area that has already been completely disturbed by previous grading and are parts of fully developed County facilities.

Impacts and Mitigation Measures

The project site was inspected for surface archaeological sites and other historic properties, and none appeared to be present. On June 2, 2005, the DPW requested the State Historic Preservation Division by letter to comment on this finding for the Ocean View project site (along with two other sites in the Puna District that were at the time being considered for radio towers). SHPD was asked to concur, if appropriate, with the County's finding that no historic properties would be affected by the action (see letter in Appendix 2a). The County is awaiting SHPD review to determine if the finding is appropriate or whether an archaeological survey is required. As of February 15, 2016, SHPD had not replied to the June 2015 letter or provided a comment on the Draft EA. In any case, as a precaution during construction, the DPW will ensure that in the unlikely event that human skeletal remains or undocumented archaeological resources are encountered, work in the immediate area of the discovery shall be halted and the State Historic Preservation Division contacted as outlined in Hawai‘i Administrative Rules 13§13-275-12.

3.3 Infrastructure

3.3.1 Utilities

Existing Facilities and Services, Impacts and Mitigation Measures

The only necessary utility service is electricity, which is available. Electrical service will be provided to the equipment shelter via buried conduit from the existing building.

No permanent effect to any utilities, including existing water lines, electrical, telephone and CATV would occur.

3.3.2 Transportation Facilities

Existing Facilities and Conditions, Impacts and Mitigation Measures

Road access for the project site consists of a driveway within the Ocean View Fire Station site at TMK 9-2-031:019, to Orchid Circle (private subdivision roadway), to State Highway 11.

No road or driveway construction will be required. As the project does not involve any increase in traffic or adverse alteration of road facilities or traffic conditions, no Traffic Impact Analysis Report (TIAR) was conducted for the project.

Construction of the project will involve large trucks for delivery of materials such as concrete and basecourse, as well as the steel radio tower, pre-fabricated radio shelters, generators, and fuel tanks. Some oversize or overweight vehicles may be necessary for very short periods. If such vehicles are required, the contractor will be required to notify County and State highway agencies and to take measures to minimize inconvenience to the public and adverse effects to roads. Mitigation measures will include supplying professional traffic control, e.g., police flagmen and pilot vehicles.

The construction of radio towers requires consideration of potential impacts to aviation. Per Title 14 of the Code of Federal Regulations (14 CFR) Part 77, the prime objectives of the Federal Aviation Administration (FAA) are to promote air safety and the efficient use of the navigable airspace.

For towers of a certain height or in a certain location, organizations that sponsor the construction must file a Notice of Proposed Construction or Alteration (FAA Form 7460-1) with the FAA, so that this agency may evaluate the proposal. According to 14 CFR Part 77.9, this applies to construction that meets one of these conditions:

- Any construction or alteration exceeding 200 feet above ground level
- Any construction or alteration:
  - within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet
  - within 10,000 feet of a public use or military airport which exceeds a 50:1 surface from any point on the runway of each airport with its longest runway no more than 3,200 feet
  - within 5,000 ft of a public use heliport which exceeds a 25:1 surface any highway, railroad or other traverse way whose prescribed adjusted height would exceed the above noted standards
- When requested by the FAA
- Any construction or alteration located on a public use airport or heliport regardless of height or location.

Furthermore, radio towers that may pose a hazard to navigation as determined by these conditions must conform with FAA Advisory Circular 70/7460-1K, Obstruction Marking and Lighting. This describes the standards for marking and lighting structures such as buildings, chimneys, antenna towers, cooling towers, storage tanks, supporting structures of overhead wires, etc.

The proposed tower is 130 feet in height and thus does not exceed the threshold of 200 feet above ground surface. Furthermore, it is more than 40 miles from the nearest airport. It would thus appear that there is no requirement to file FAA Form 7460-1 or to comply with the marking and lighting standards described in Advisory Circular 70/7460-1K. However, the FAA and the Hawai‘i Department of Transportation, Airports Division, were supplied a copy of the Draft EA for comment and coordination to ensure that the proposed tower does not pose a hazard to navigation.

3.4 Secondary and Cumulative Impacts

The proposed project would not involve major secondary impacts, such as population changes or effects on public facilities.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. Most of the adverse effects of the project are related to construction and are temporary – minor disturbance to air quality, traffic, noise and visual quality– and thus very limited in severity, nature and scale. Consultation of registers of EAs, Environmental Impact Statements, and Special Permit applications did not reveal any major construction projects occurring near the project site within a one-year timeframe that could generate similar construction impacts with which these minor and temporary effects could accumulate.

3.5 Required Permits and Approvals

The following agency permits and approvals would be required:

- Hawai‘i County Department of Public Works: Building Permit, Electrical Permit, Plumbing Permit, Grading Permit, and Drainage Approval
- Hawai‘i County Planning Department: Plan Approval
- Hawai‘i County Windward Planning Commission: Use Permit

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai‘i State Plan

Adopted in 1978 and last revised in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State’s long-run growth and development activities. The three themes

that express the basic purpose of the *Hawai‘i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. The proposed project would promote these goals by enhancing emergency radio service on the Island of Hawai‘i, thereby enhancing public health, quality-of-life and community and social well-being.

3.6.2 Hawai‘i State Land Use Law and Hawai‘i County Zoning/SMA

All land in the State of Hawai‘i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS. The Ocean View project site is within the State Land Use Agricultural District. The County zoning is A-1a (Agricultural, 1-acre minimum lot size). The proposed use is consistent with intended uses for these designations. According to Chapter 25 (Zoning) of the Hawai‘i County Code, Section 25-4-12, a telecommunication antenna or tower may be permitted in the RS, RD, RM, RCX, RA, FA, A, IA, and O districts if a use permit is obtained for such use and a freestanding tower shall be setback from every property line a minimum of one foot for every five feet of tower height. In addition, according to Section 25-2-71, plan approval shall be required in all applicable districts prior to the construction or establishment of telecommunication antennas and towers, as permitted under section 25-4-12. Therefore the proposed tower will require a Use Permit and a plan approval and will also be subject to conditions of those approvals.

The project site is situated outside the County’s Special Management Area (SMA), and no SMA permit is required.

Given acquisition of a Use Permit, and consideration and mitigation of any impacts, the proposed project is consistent with these zoning designations, as it is a public purpose use required for public safety.

3.6.3 Hawai‘i County General Plan and Community Development Plans

The *General Plan* for the County of Hawai‘i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawai‘i County Planning Department). The *General Plan* itself is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai‘i. Most relevant are the following Goal and Policies, and Courses of Action:

ECONOMIC GOALS

> Provide residents with opportunities to improve their quality of life through economic development that enhances the County’s natural and social environments.

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

Promote and develop the island of Hawai‘i into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.

Discussion: The project is consistent with the Economic Goals of the Hawai‘i County General Plan, supporting an improved quality of life through improved County services, including emergency services, which is consistent with the physical, social and cultural environments of the island of Hawai‘i.

ENVIRONMENTAL QUALITY GOALS

Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.

Maintain and, if feasible, improve the existing environmental quality of the island.

Control pollution.

ENVIRONMENTAL QUALITY POLICIES

Take positive action to further maintain the quality of the environment.

ENVIRONMENTAL QUALITY STANDARDS

Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.

Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.

Federal and State environmental regulations shall be adhered to.

Discussion: The project construction would control pollution, improve the existing environmental quality, quality of life, and sustainability of the island by improving the County radio system, and is therefore consistent with the Environmental Quality Goals of the Hawai‘i County General Plan. The project will adhere to all applicable Federal and State environmental regulations and will incorporate pertinent environmental quality controls.

FLOODING AND NATURAL HAZARDS GOALS

Protect human life.

Prevent damage to man-made improvements.
Control pollution.
Prevent damage from inundation.
Reduce surface water and sediment runoff.
Maximize soil and water conservation.

FLOODING AND NATUAL HAZARDS POLICIES

Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.
The County and the private sector shall be responsible for maintaining and improving existing drainage systems and constructing new drainage facilities.
Encourage grassed shoulder and swale roadway design where climate and grade are conducive.
Consider natural hazards in all land use planning and permitting.
Discourage intensive development in areas of high volcanic hazard.

FLOODING AND NATURAL HAZARDS STANDARDS

"Storm Drainage Standards," County of Hawaii, October, 1970, and as revised.
Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawai‘i County Code.
Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawai‘i County Code.
Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

Discussion: The project will be consistent with the applicable Goals, Policies, and Standards of the Hawai‘i County General Plan. The project will conform with applicable Federal, State, and County regulations pertaining to storm water runoff. Although sited in an area with high volcanic hazard, the use is site specific and requires this location in order to serve the affected community. If necessary, some equipment and supplies can likely be salvaged in the event of a lava flow.

HISTORIC SITES GOALS

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

HISTORIC SITES POLICIES

Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.

Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.

Discussion: The project will conform to the Historic Sites Goals and Policies of the Hawai‘i County General Plan. The area was inspected and found to be completely disturbed by modern infrastructure activity. The State Historic Preservation Division was consulted regarding the potential for the presence of historic properties and is expected to concur that no historic properties are present. If necessary, an archaeological survey will be conducted to ensure appropriate evaluation and treatment historic properties were present. Assessment of cultural impact has been conducted as part of the EA process and no impacts are anticipated.

NATURAL BEAUTY GOALS

Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.

Protect scenic vistas and view planes from becoming obstructed.

Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

NATURAL BEAUTY POLICIES

Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.

Consider structural setback from major thoroughfares and highways and establish development and design guidelines to protect important viewplanes.

Do not allow incompatible construction in areas of natural beauty.

Discussion: The project is consistent with the Natural Beauty Goals and Policies of the Hawai‘i County General Plan. No sites of exceptional natural beauty will be impacted by the project. The Ocean View project site is somewhat isolated and outside of any public view areas.

NATURAL RESOURCES AND SHORELINES GOALS

Protect and conserve the natural resources from undue exploitation, encroachment and damage.

Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.

Protect rare or endangered species and habitats native to Hawai‘i.

Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.

Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

NATURAL RESOURCES AND SHORELINES POLICIES

Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.

Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.

Encourage an overall conservation ethic in the use of Hawaii's resources by protecting, preserving, and conserving the critical and significant natural resources of the County of Hawaii.

Encourage the protection of watersheds, forest, brush, and grassland from destructive agents and uses.

The installation of utility facilities, highways and related public improvements in natural and wildland areas should avoid the contamination or despoilment of natural resources where feasible by design review, conservation principles, and by mutual agreement between the County and affected agencies.

Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: The project has been sited in an already developed area in order to avoid damage to natural resources. The project is an example of prudent use of public funds, and will not affect endangered species and habitats.

PUBLIC FACILITIES GOAL

Encourage the provision of public facilities that effectively service community and visitor needs and seek ways of improving public service through better and more functional facilities in keeping with the environmental and aesthetic concerns of the community.

PUBLIC FACILITIES POLICIES

Continue to seek ways of improving public service through the coordination of service and maximizing the use of personnel and facilities.

Coordinate with appropriate State agencies for the provision of public facilities to serve the needs of the community.

PUBLIC FACILITIES – PROTECTIVE SERVICES

Development of police and fire facilities should entail joint use structures whenever feasible.

PUBLIC FACILITIES – PROTECTIVE SERVICES COURSES OF ACTION

Expansion of Police, Fire, and emergency medical facilities should be considered in accordance with district needs.

Discussion: The project is consistent with Goals and Policies of the Public Facilities of the Hawai‘i County General Plan, as it involves improvement of radio facilities utilizing interagency cooperation.

LAND USE GOALS

Designate and allocate land uses in appropriate proportions and mix and in keeping with the social, cultural, and physical environments of the County.
Protect and encourage the intensive and extensive utilization of the County's important agricultural lands.
Protect and preserve forest, water, natural and scientific reserves and open areas.

LAND USE POLICIES

Zone urban- types of uses in areas with ease of access to community services and employment centers and with adequate public utilities and facilities.
Encourage the development and maintenance of communities meeting the needs of its residents in balance with the physical and social environment.
Encourage urban development within existing zoned areas already served by basic infrastructure, or close to such areas, instead of scattered development.

Discussion: The project is consistent with the Land Use Goals and Policies sections of the Hawai‘i County General Plan.

The *Hawai‘i County General Plan Land Use Pattern Allocation Guide (LUPAG)*. The LUPAG map component of the *General Plan* is a graphic representation of the Plan’s goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. The project site is classified within the LUPAG as Rural. As with the State Land Use Districts and the County zoning, given appropriate permitting and consideration and mitigation of impacts, the proposed project is consistent with this designation, as it is a public purpose use required for public safety.

Ka‘ū Community Development Plans (CDP). The Ocean View project site is within the Ka‘ū District; the CDP for Ka‘ū is currently in development. Material contained on the

website for the CDP lists the following strategies for the CDP (www.hawaiicountycdp.info/kau-cdp/documents/KauCDP.0315draft.pdf):

- Protects coastal areas, agricultural land, and mauka forests from development
- Protects open space, areas with natural beauty, and scenic view planes
- Guides the development of programs to strengthen protections for coastal and agricultural lands as well as open space and view planes
- Preserves historic resources
- Guides the restoration of historic sites and buildings, the retention of village and town character, and the documentation of oral, written, and video histories
- Guides the expansion of lands held in public trust
- Ensures appropriate public access to the shoreline and mauka forests
- Guides the development of a regional network of trails
- Guides collaborative stewardship and enhancement of coastal and forest ecosystems, cultural resources, agricultural lands, public access, and trails
- Concentrates future development in the existing towns, villages, and subdivisions
- Identifies specific commercial and industrial areas in Pāhala, Nāʻālehu, and Ocean View
- Supports the preservation of village and town character and guides the enhancement of communities' unique sense of place
- Advances redevelopment and growth management with brownfield assessments, a County-wide affordable housing plan, and community-based redevelopment strategies for nonconforming subdivisions.
- Prioritizes the improvement of existing potable water systems and wastewater systems to support infill growth
- Prioritizes formalizing and improving emergency alternative routes
- Prioritizes flood prevention
- Prioritizes safety improvements along Wood Valley Road and Māmalahoa Highway
- Guides road and park improvements in Mark Twain and Green Sands
- Prioritizes bus system improvements, including a Kaʻū loop route, an Ocean View route, evening trips to Hilo and Kona, and bus shelters
- Prioritizes new fire stations and upgraded fire equipment
- Prioritizes police station improvements, a new substation in Ocean View, and the maintenance of four police officers on each shift
- Prioritizes a hazard mitigation plan for Ocean View and the Kahuku Park Community/Senior Center, Gym, and Shelter
- Prioritizes the Ocean View transfer station as well as green waste drop-off and mulch pick-up sites
- Prioritizes and guides the development of a school and library in Ocean View
- Guides the development of skate parks and an ATV park
- Prioritizes community input during infrastructure project planning and design
- Preserves opportunities to live off the land
- Guides the implementation of regional economic development strategies

- Guides the development of a regional education, enterprise development, and research network
- Guides regional strategies to increase "buying local"
- Guides efforts to strengthen the local agriculture value chain
- Allows for the diversification of agriculture-based businesses and rural uses on agricultural and rural lands
- Guides the development of local, renewable, distributed energy networks and prioritizes greater public review of commercial renewable energy projects
- Guides exploratory efforts to secure community payments for ecosystem services
- Guides the expansion of the regional network of health and wellness services
- Guides the development of a regional hoʻokipa network – a place-based approach to community tourism
- Guides the development of plans for Punaluʻu

The project is in no way inconsistent with any of these strategies, and in choosing a developed location within the Hawaiian Ocean View Estates subdivision it minimizes land clearing and visual impact to undisturbed areas. According the Planning Department (see letter of June 25, 2015 in Appendix 2a, which also includes comments on two other sites in the Puna District which at the time were under consideration): "The subject project may be consistent with Community Objective 7, adopted by the Steering Committee, which calls for the CDP to identify viable sites for critical community infrastructure, including water, emergency services, and educational facilities to serve both youth and adults."

The Planning Department further identified the following polices:

> Policy 14: *Plan approval and related conditions shall consider forest and coastal ecosystems, agricultural land, open space, viewscapes, areas of natural beauty, archeological and historic sites, and historic buildings when assuring that proper siting is provided for, proper landscaping is provided, unsightly areas are properly screened or eliminated, and natural and man-made features of community value are preserved. (HCC 25-2-77(a)* & 76);
>
> Policy 58: *In the Kaʻū CDP Planning Area, applications for Use Permits for wind energy facilities and telecommunications antennas and towers shall include view plane and, as appropriate, line-of-sight analysis to demonstrate how the request does not cause substantial, adverse impact to the community's character, including open space, public views, and areas of natural and scenic beauty, and proposed conditions to mitigate scenic impacts. (HCC 25-2-60* & 64).

These issues have been considered in the analyses contained in this chapter on scenic impacts, biology and historic properties. Given the relatively modest size of the radio tower (130 feet), the location on the same lot as the Ocean View Fire Station, and the urgent need for emergency communications to serve the immediately surrounding area and all of Kaʻū, the project is highly consistent with these draft policies.

PART 4: DETERMINATION

Based on the findings above, and in consideration of comments received, the Hawai‘i County Department of Public Work has determined that the proposed project will not have any significant effect in the context of Chapter 343, Hawai‘i Revised Statues and section 11-200-12 of the State Administrative Rules, and has issued a Finding of No Significant Impact (FONSI).

PART 5: FINDINGS AND REASONS

Chapter 11-200-12, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No valuable natural or cultural resources would be committed or lost. The area was inspected and found to be completely disturbed by modern infrastructure activity. The State Historic Preservation Division was consulted regarding the potential for the presence of historic properties and is expected to concur that no historic properties are present.
2. *The proposed project will not curtail the range of beneficial uses of the environment.* The proposed project expands and in no way curtails beneficial uses of the environment.
3. *The proposed project will not conflict with the State's long-term environmental policies*. The State’s long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. By improving emergency radio services, the project fulfills aspects of these policies calling for an improved social environment. It is thus consistent with all elements of the State’s long-term environmental policies.
4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The project will benefit the social welfare of the community.
5. *The proposed project does not substantially affect public health in any detrimental way.* The proposed project will benefit public health by improving emergency radio service, which facilitates police, fire, medical and civil defense emergency response.
6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities*. No secondary effects are expected to result from the proposed action, which would improve the County’s radio service and would not induce permanent in-migration or affect public facilities.
7. *The proposed project will not involve a substantial degradation of environmental quality*. The project does not have any environmental impacts that would lead to environmental degradation.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* The project site supports only non-

native vegetation. Impacts to rare, threatened or endangered species of flora or fauna will not occur, given design elements to avoid impacts and planned surveys and restrictions on timing of vegetation removal.

9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* The project is not related to additional activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.
10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources would occur through proper adherence to construction best management practices and mitigation measures that will be contained in the grading permit from the County Department of Public Works.
11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* Although the project is located in an area with volcanic and seismic risk, the entire Island of Hawai‘i shares this risk, and the project employs design and construction standards appropriate to the seismic zone and is not imprudent to construct. The area is exposed to considerable lava flow hazard, but the need to respond to emergencies such as lava flows in these areas are critical reasons to construct the new communication site. If the site were in imminent danger of being inundated by lava, that time scale of the flow’s advance is such as to safely evacuate any personnel and remove and transport valuable equipment. Considering all these factors, the County has determined that it is therefore reasonable and prudent to invest in radio communication infrastructure in these locations.
12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic vistas and viewplanes identified in the Hawai‘i County General Plan, nor any other scenic resources, will be adversely affected by the project. The project does not interfere with mountain or shoreline views. Although there is inevitable visual impact associated with the construction of any radio tower, the scale of the tower limits visual impact to minor levels, no important viewplanes or scenic sites recognized in the Hawai‘i County General Plan would be affected.
13. *The project will not require substantial energy consumption*. Construction and operation will require energy use, but the new communication site will enable improved coverage for public safety officers, resulting in more efficient emergency response times and corresponding energy savings.

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ENVIRONMENTAL ASSESSMENT

Hawai‘i County Radio Communication Site At Ocean View Fire Station

APPENDIX 1
Detailed Site Plan

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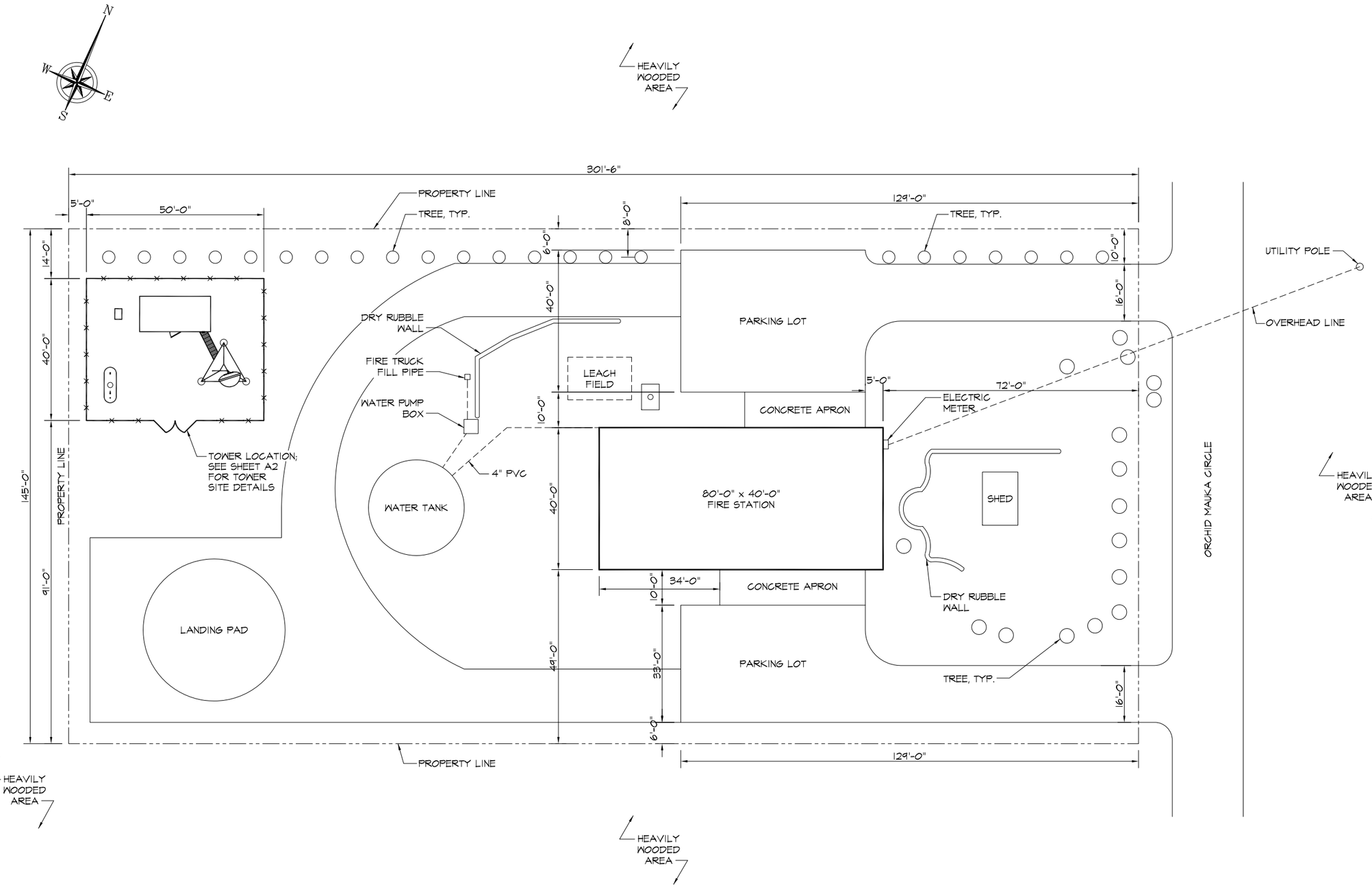

SITE PLAN

SCALE: 1" = 15'-0"

1 / A1

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COUNTY OF HAWAII
STATE OF HAWAII

PROJECT INFORMATION:

COUNTY OF HAWAII
STATE OF HAWAII

CURRENT ISSUE DATE:
08/18/15

ISSUED FOR:
PRELIMINARY

REV.:	DATE:	DESCRIPTION:	BY:
0	08/18/15	ISSUED FOR PRELIMINARY	KB

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TITLE _____
SIGNATURE _____
DATE _____

DRAWN BY:	CHK.:	APV.:
K. BRAVO	LD	LD

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SHEET TITLE:
FIRE STATION #20
SITE PLAN

SHEET NUMBER: A1
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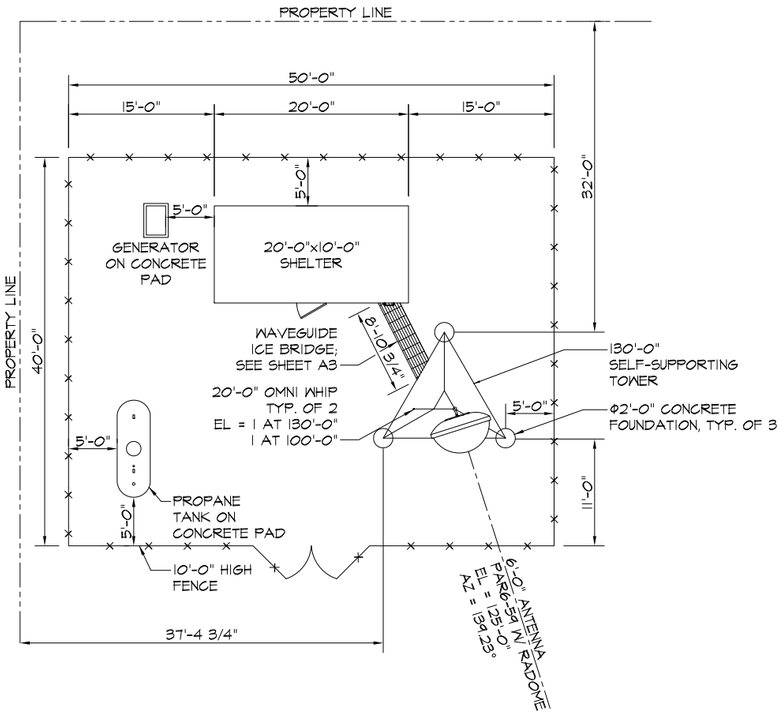
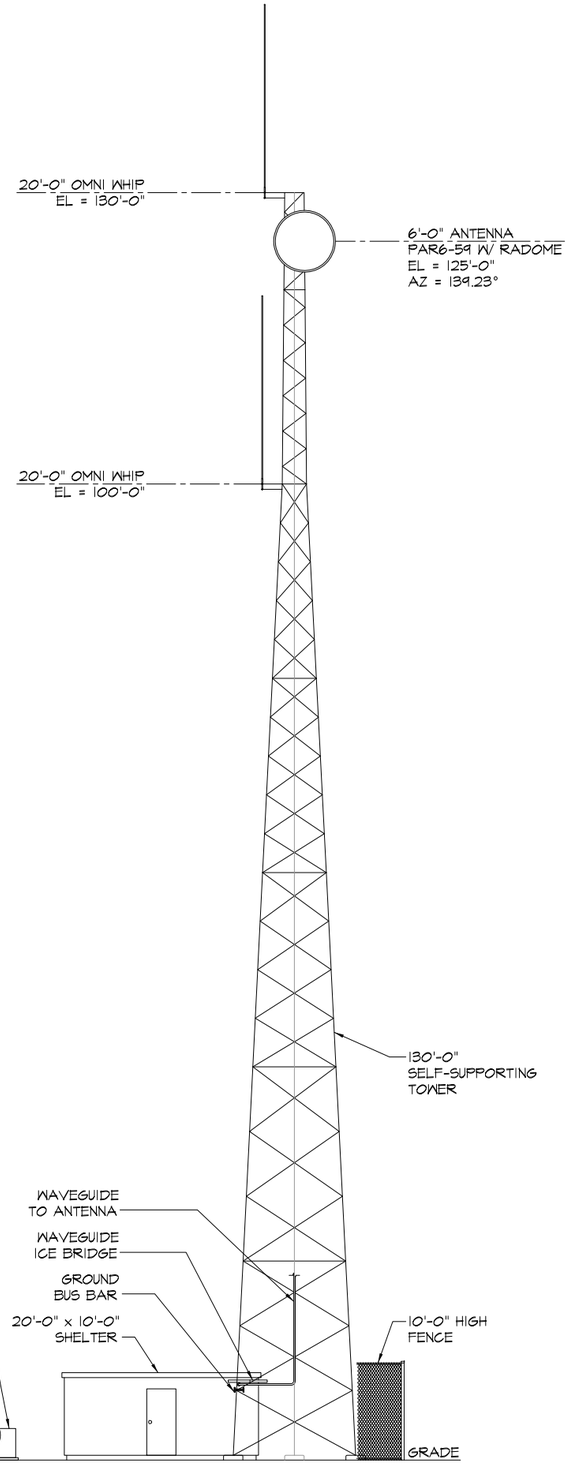


TOWER SITE PLAN VIEW

1 / A2

SCALE: 1/8" = 1'-0"



TOWER SITE ELEVATION VIEW

2 / A2

SCALE: 1/8" = 1'-0"

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K. BRAVO	LD	LD

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SHEET TITLE:

FIRE STATION #20
TOWER SITE
PLAN & ELEVATION VIEWS

SHEET NUMBER:	REVISION:
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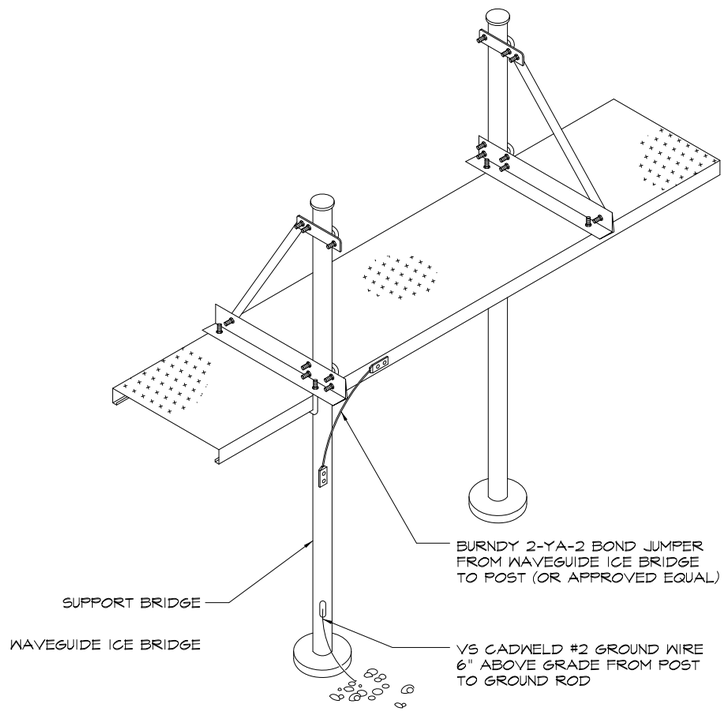
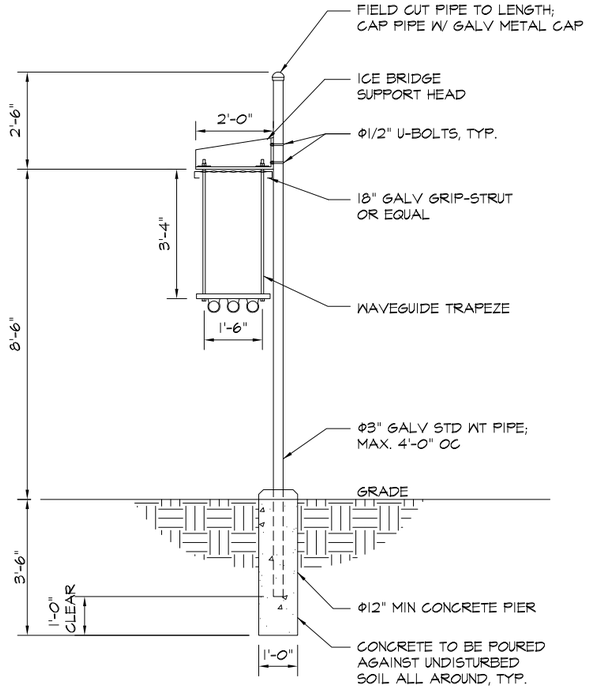
PROJ. NO. J-14-00649



WAVEGUIDE ICE BRIDGE GROUNDING DETAIL

1 / A3

SCALE: 1/2" = 1'-0"



WAVEGUIDE ICE BRIDGE DETAIL

2 / A3

SCALE: 1/2" = 1'-0"

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SIGNATURE _____

DATE _____

DRAWN BY:	CHK.:	APV.:
K. BRAVO	LD	LD

LICENSURE:

SHEET TITLE:

FIRE STATION #20
WAVEGUIDE ICE BRIDGE
DETAILS

SHEET NUMBER:	REVISION:
A3	0

PROJ. NO. J-14-00649

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ENVIRONMENTAL ASSESSMENT

Hawai‘i County Radio Communication Site At Ocean View Fire Station

APPENDIX 2a
Comments in Response to Early Consultation

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William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai`i

POLICE DEPARTMENT
349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

June 15, 2015

Mr. Ron Terry, Principal
Geometrician Associates, LLC
P. O. Box 396
Hilo, HI 96721

Dear Mr. Terry:

Subject: Early Consultation for Hawai'i County Radio System Upgrade Project New Sites, TMKs 9-2-031:019 (Ocean View Fire Station Site); 1-2-009:039 (Lanipuna Water Tank Site); and 1-3-045:039 (Keauohana Well Site), Puna and Ka'u Districts, Island of Hawai'i

Thank you for your letter of May 30, 2015, to provide our department an opportunity to comment on an early consultation for the Hawai'i County Radio System Upgrade Project.

Your letter was reviewed by Lieutenant Reed Mahuna of the Puna District, who also consulted Captain Burt Shimabukuro of the Ka'u District. We have no comments at this time.

Sincerely,

HENRY J. TAVARES, JR.,
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

RM:lli
150366

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

June 24, 2015

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96721

PRE-ENVIRONMENTAL ASSESSMENT
HAWAI'I COUNTY RADIO SYSTEM UPGRADE PROJECT
TAX MAP KEY 1-2-009:039, 1-3-004:039 AND 9-2-031-019

This is in response to your Pre-Environmental Assessment letter dated May 30, 2015.

The Department assumes that the proposed communications tower and related support facilities will not require water service.

Should there be any questions, please contact Ryan Quitoriano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

Kokamoto

FV Quirino Antonio, Jr., P.E.
Manager-Chief Engineer

RQ:dfg

William P. Kenoi
Mayor

Duane Kanuha
Director

Bobby Command
Deputy Director

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

June 25, 2015

Mr. Ron Terry
Geometrician Assoc., LLC
PO Box 396
Hilo, HI 96721

Dear Mr. Terry:

SUBJECT: Pre-Consultation for Draft Environmental Assessment
Project: Hawai'i County Radio System Upgrade, Lanipuna Water Tank Site, Keau'ohana Well Site & Ocean View Fire Station Site
TMKs: (3) 1-2-009: 039 & 1-3-045:039, Puna, Hawai'i &
(3) 9-2-031:019, Ka'ū, Hawai'i

Thank you for your letter dated May 30, 2015, requesting comments from this office regarding the preparation of a Draft Environmental Assessment (EA) for the subject project.

The County of Hawai'i, Department of Public Works (DPW) is proposing a project to upgrade the County of Hawai'i's radio system, which is used by various County agencies for emergency and other communications. Some components of the current radio system are outmoded, in need of repair, and do not conform to the new requirements of the Federal Communications Commission (FCC). Most importantly, they do not allow communication in certain critical areas of the Puna and Ka'ū Districts, meaning the Fire, Police and Civil Defense personnel are sometimes cut off from communication with headquarters and other personnel.

TMK: (3) 1-2-009:039
The project site is designated Forest Reserve and is situated within the State Land Use Conservation District. In addition, according to the County of Hawai'i General Plan 2005 (amended December 2006), the subject property is designated as Conservation by the Land Use Pattern Allocation Guide. The subject area is not within the Special Management Area (SMA). The project site is located in a Priority Watershed Area as determined by the State of Hawai'i Department of Land and Natural Resources.

The project site is located directly off of Highway 130 (Pahoa-Kalapana Highway). Hawai'i County General Plan, Section 7, Natural Beauty lists goals and policies that address scenic vistas and viewplanes. Table 7-1 specifically lists the "viewplane from Pahoa-Kalapana Highway looking makai" as a site of natural beauty.

TMK: (3) 1-3-045:039
The project site is zoned A-1a (Agricultural-1 acre minimum lot size). The project site is situated within the State Land Use Agricultural District. In addition, according to the County of Hawai'i General Plan 2005 (amended December 2006), the subject property is designated as Low Density Urban and Extensive Agriculture by the Land Use Pattern Allocation Guide. The subject area is not within the Special Management Area (SMA). The project site is located in a Priority Watershed Area as determined by the State of Hawai'i Department of Land and Natural Resources.

According to Chapter 25 (Zoning) of the Hawai'i County Code, Section 25-4-12, a telecommunication antenna or tower may be permitted in the RS, RD, RM, RCX, RA, FA, A, IA, and O districts if a use permit is obtained for such use and a freestanding tower shall be setback from every property line a minimum of one foot for every five feet of tower height. In addition, according to Section 25-2-71, plan approval shall be required in all applicable districts prior to the construction or establishment of telecommunication antennas and towers, as permitted under section 25-4-12. Therefore the proposed tower will require a use permit and a plan approval and will also be subject to conditions of those approvals.

TMK: (3) 9-2-031:019
A special permit (SPP 96-21) was issued on February 27, 1997 to allow the construction and establishment of a Volunteer Fire Station on the subject property.

The project site is zoned A-1a (Agricultural-1 acre minimum lot size). The project site is situated within the State Land Use Agricultural District. In addition, according to the County of Hawai'i General Plan 2005 (amended December 2006), the subject property is designated as Rural by the Land Use Pattern Allocation Guide. The subject area is not within the Special Management Area (SMA). The project site is located in a Priority Watershed Area as determined by the State of Hawai'i Department of Land and Natural Resources.

According to Chapter 25 (Zoning) of the Hawai'i County Code, Section 25-4-12, a telecommunication antenna or tower may be permitted in the RS, RD, RM, RCX, RA, FA, A, IA, and O districts if a use permit is obtained for such use and a freestanding tower shall be setback from every property line a minimum of one foot for every five feet of tower height. In addition, according to Section 25-2-71, plan approval shall be required in all applicable districts prior to the construction or establishment of telecommunication antennas and towers, as permitted under section 25-4-12. Therefore the proposed tower will require a use permit and a plan approval and will also be subject to conditions of those approvals.

The Draft Ka'ū Community Development Plan (CDP), including all public comments and feedback, is currently being reviewed by the Ka'ū CDP Steering Committee. The subject project may be consistent with Community Objective 7, adopted by the Steering Committee, which calls for the CDP to Identify viable sites for critical community infrastructure, including water, emergency services, and educational facilities to serve both youth and adults.

In addition, the following draft policies would apply to this project and should be considered in the DEA for the project and any project alternatives:

- Policy 14: *Plan approval and related conditions shall consider forest and coastal ecosystems, agricultural land, open space, viewscapes, areas of natural beauty, archeological and historic sites, and historic buildings when assuring that proper siting is provided for, proper landscaping is provided, unsightly areas are properly screened or eliminated, and natural and man-made features of community value are preserved. (HCC 25-2-77(a) & 76)*; and

- Policy 58: *In the Ka'ū CDP Planning Area, applications for Use Permits for wind energy facilities and telecommunications antennas and towers shall include view plane and, as appropriate, line-of-sight analysis to demonstrate how the request does not cause substantial, adverse impact to the community's character, including open space, public views, and areas of natural and scenic beauty, and proposed conditions to mitigate scenic impacts. (HCC 25-2-60 & 64).*

Please provide us with a copy of the Draft EA for our review.

If you have any questions or if you need further assistance, please feel free to contact Hans Santiago of this office at 961-8165.

Sincerely,

DUANE KANUHA
Planning Director

HKS:
P:\wpwin60\Hans\EA-EIS Review\preconsultdraftea County Radio Sites and Towers- Puna and Kau.doc

cc: Mr. Warren Lee, Director, Department of Public Works

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

In Reply Refer To:
01EPIF00-2015-TA-0308

JUL 1 1 2015

Mr. Ron Terry
Geometrician Associates, LLC
Post Office Box 396
Hilo, Hawaii 96721

Subject: Technical Assistance for Proposed Hawaii County Radio System Upgrade at Three Sites on the Island of Hawaii

Dear Mr. Terry:

The U.S. Fish and Wildlife Service (Service) received your correspondence on June 10, 2015, requesting technical assistance for the County of Hawaii, Department of Public Works (DPW) proposed project to upgrade the County of Hawaii radio system, which is used by various county agencies for emergency and other communications. Some components of the current radio system are outmoded, are in need of repair, and do not conform to the new requirements of the Federal Communications Commission (FCC). The current system does not allow communication in certain areas of Puna and Kau Districts, meaning the Fire, Police and Civil Defense personnel are sometimes cut off from communication with headquarters and other personnel in these areas.

To rectify this situation, Motorola, Inc., under the supervision of the Hawaii County Civil Agency, is planning the construction of three new communications towers; two towers to be located in the Puna District at Lanipuna and Keauohana, and the third tower in Kau at the Ocean View Fire Station. The towers at Lanipuna and Keauohana are expected to be 100 feet tall, while the tower to be located at Ocean View is expected to be 140 feet tall. All three towers will be three legged, self-supporting (un-guyed) and made of steel with a lattice structure. The "Typical Tower Site Elevation View" diagram with your correspondence indicates the radius of a typical tower is 1 meter. The Lanipuna site will have two, 6-foot diameter microwave dishes and the Keauohana and Ocean View sites will have one six-foot diameter microwave dish and two 2-way radio antennae. All appurtenances will be attached at the tops of the towers. Each site will also have a 10-foot by 20-foot communications shelter and a generator with a fuel tank for emergency power. All the new facilities will be enclosed within a fenced compound. No barbed wire will be used in fencing. At the Lanipuna site it will also be necessary to extend electrical poles and lines 1,290 feet to the tower site. A total of five, 40-foot tall poles, spaced 250 to 270 feet apart, will be required. Electrical lines will be strung at approximately 25 feet in height. The forest surrounding the poles consists of trees taller than the poles and approximately

twice the height of the lines. The locations where the towers and communications shelters are planned to be built are in previously disturbed areas with lawn grass and cinder ground cover.

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Project, there are four listed species in the vicinity of the three project areas: the endangered Hawaiian hawk (*Buteo solitarius*), Hawaiian hoary bat (*Lasiurus cinereus semotus*) and Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*), and the threatened Newell's shearwater (*Puffinusauricularis newelli*). There is no critical habitat in the vicinity of the project areas. The Service recommends the following measures to avoid and minimize project impacts to these listed species:

Hawaiian hawk

Loud, irregular and unpredictable activities, such as using heavy equipment or building a structure, near an endangered Hawaiian hawk nest may cause nest failure. Harassment of Hawaiian hawk nesting sites can alter feeding and breeding patterns or result in nest or chick abandonment. Nest disturbance can also increase exposure of chicks and juveniles to inclement weather or predators. The Service, therefore, recommends that construction not occur during the Hawaiian hawk breeding season (March through September). If construction needs to occur during the hawk breeding season, we recommend a nest search of the area of the proposed construction site and surrounding area be conducted by a qualified ornithologist immediately prior to the advent of construction activities. Surveys should ensure that construction activity will not occur within 1,600 feet of any Hawaiian hawk nest.

Hawaiian hoary bat

The Hawaiian hoary bat is known to occur across a broad range of habitats throughout the State of Hawaii. This bat roosts in both exotic and native woody vegetation and, while foraging, leaves young unattended in "nursery" trees and shrubs. If trees or shrubs suitable for bat roosting are cleared during the Hawaiian hoary bat breeding season (June 1 to September 15), there is a risk that young bats that cannot yet fly on their own could inadvertently be harmed or killed. As a result, the Service recommends that woody plants greater than 15 feet tall should not be removed or trimmed during the Hawaiian hoary bat breeding season. Additionally, Hawaiian hoary bats forage for insects from as low as three feet to higher than 500 feet above the ground. When barbed wire is used in fencing, Hawaiian hoary bats can become entangled. The Service, therefore, recommends that barbed wire not be used for fencing as part of this proposed action.

Seabirds

Hawaiian petrels and Newell's shearwaters (collectively known as seabirds) are known to transit over the project areas in Puna and Kau when flying between the ocean and upland breeding colonies. Many bird species are known to strike objects, such as antennas or guywires, protruding above surrounding vegetation. In Hawaii, seabirds are attracted to lights and are known to collide with buildings, light poles, wires, and other tall objects. To minimize impacts to seabirds in Hawaii, we recommend minimizing the total surface area of the proposed towers and avoiding the use of guy wires. Any lights associated with the project should be cut-off, equipped with a motion sensor, or shielded so that the light cannot be seen from above. If the top of the tower must be lighted to meet FAA regulations, we recommend the use of a red flashing light versus the use of red or white solid light, if possible.

We ran a model using available data for passage rates of seabirds for the areas where the towers are planned to be located, the proposed tower heights, and a one meter radial distance from the

center of each tower to its perimeter based on the "Typical Tower Site Elevation View" diagram you provided to estimate take of listed seabirds for the proposed action. Model results for all towers combined indicated that the collisions between transiting seabirds and the towers are unlikely to occur. Please inform us if the project description changes, including any changes to tower design, as this may affect model output for estimated take of seabirds.

Implementation of these measures will minimize but does not ensure that take of listed species associated with this proposed action will be fully avoided. The FCC has designated the licensees, applicants, tower companies and their representatives as non-Federal representatives for informal section 7 consultation with the U.S. Fish and Wildlife Service pursuant to the Endangered Species Act of 1973. We recommend the FCC or its non-Federal representative consult with the Service to address potential project impacts to listed species.

Thank you for your efforts to conserve listed species and native habitats. Please contact Fish and Wildlife Biologist Jay Nelson (808-792-9441) if you have any questions or for further guidance.

Sincerely,

Michelle Bogardus
Island Team Leader
Maui Nui and Hawaii Island

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 1, 2015

Geometrician Associates
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation for Hawaii County Radio System Upgrade Project New Sites, Geometrician Associates, LLC for the County of Hawaii, Applicant, Puna and Kau, Hawaii, TMKs: (3) 9-2-031:019; 1-2-009:039; and 1-3-045:039

Please accept this letter as our amended response on this matter. Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from the (i) Engineering Division and (ii) Hawaii District Land Office on the subject matter. Should you have any questions, please feel free to call Kevin Moore at (808) 587-0426. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

DAVID Y. IGE
GOVERNOR OF HAWAII

JUN 4 PM 2:18 ENGINEERING

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

June 4, 2015

MEMORANDUM

TO: FROM:

DLNR Agencies:
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
___Div. of State Parks
___Commission on Water Resource Management
___Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

2015 JUN 30 PM 2:49

TO:

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Early Consultation for Hawaii County Radio System Upgrade Project New Sites

LOCATION: Puna and Kau, Hawaii, TMKs: (3) 9-2-031:019 (Ocean View Fire Station); 1-2-009:039 (Lanipuna Water Tank Site); and 1-3-045:039 (Keauohana Well Site)

APPLICANT: Geometrician Associates, LLC for the County of Hawaii

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by June 29, 2015.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed:

Print name: Carty S. Chang, Chief Engineer

Date: 6/30/15

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/ Russell Y. Tsuji
Ref.: Early Consultation for Hawaii County Radio System Upgrade Project – New Sites, Puna and Kau
Hawaii.032

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 an area of minimal tsunami inundation. The National Flood Insurance Program does not have any regulations for developments within this area.

( ) 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) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
( ) Mr. Carter Romero (Acting) at (808) 961-8943 of the County of Hawaii, Department of Public Works.
( ) Mr. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.
( ) Mr. Stanford Iwamoto at (808) 241-4896 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.

( ) 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.

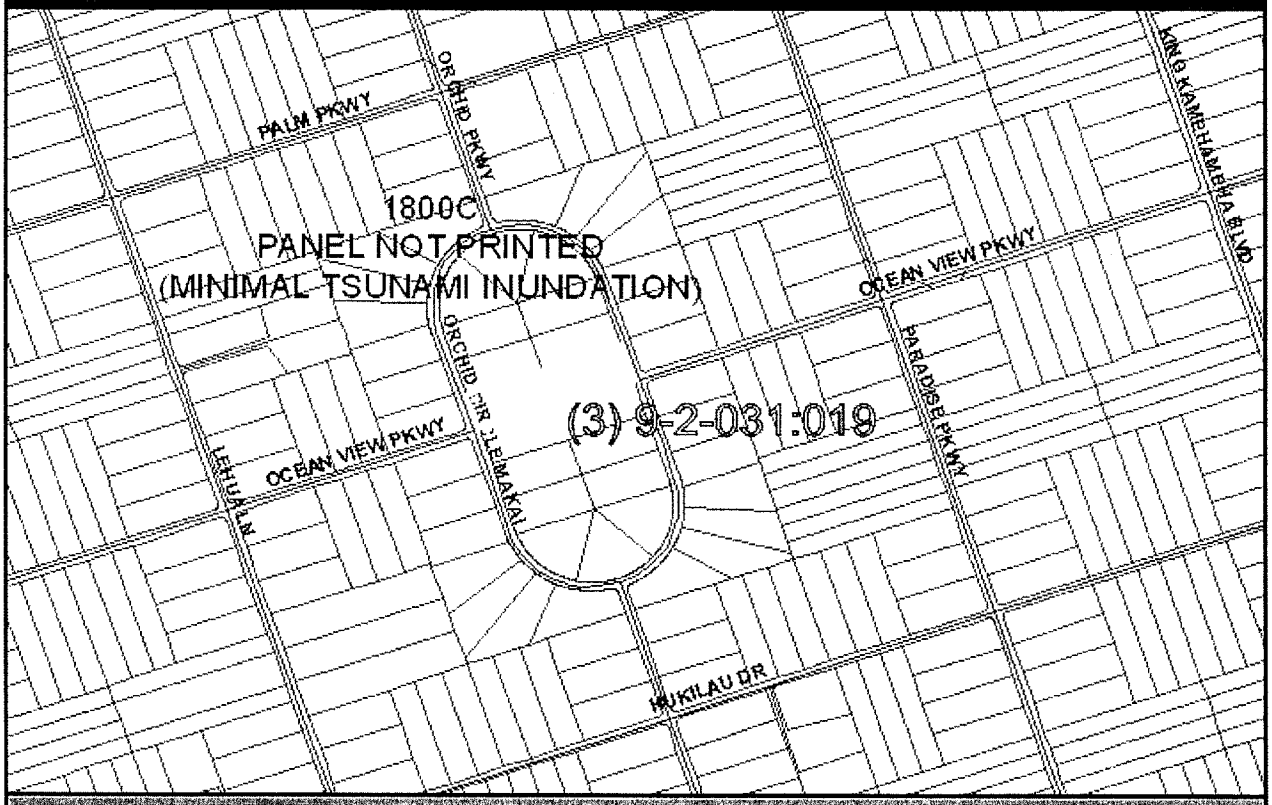
Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 6/30/15

OCEAN VIEW FIRE STA. SITE

State of Hawaii

FLOOD HAZARD ASSESSMENT REPORT



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A:** No BFE determined.
- **Zone AE:** BFE determined.
- **Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA – An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

COUNTY:	HAWAII
TMK NO:	(3) 9-2-031-019
PARCEL ADDRESS:	92-6091 ORCHID MAUKA CIRCLE OCEAN VIEW, HI 96737
FIRM INDEX DATE:	APRIL 02, 2004
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL(S):	1551661800C
PANEL EFFECTIVE DATE:	PANEL NOT PRINTED

PARCEL DATA FROM:	JUNE 2013
IMAGERY DATA FROM:	MAY 2005

IMPORTANT PHONE NUMBERS

County NFIP Coordinator	
County of Hawaii	
Frank DeMarco, CFM	(808) 961-8042
State NFIP Coordinator	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

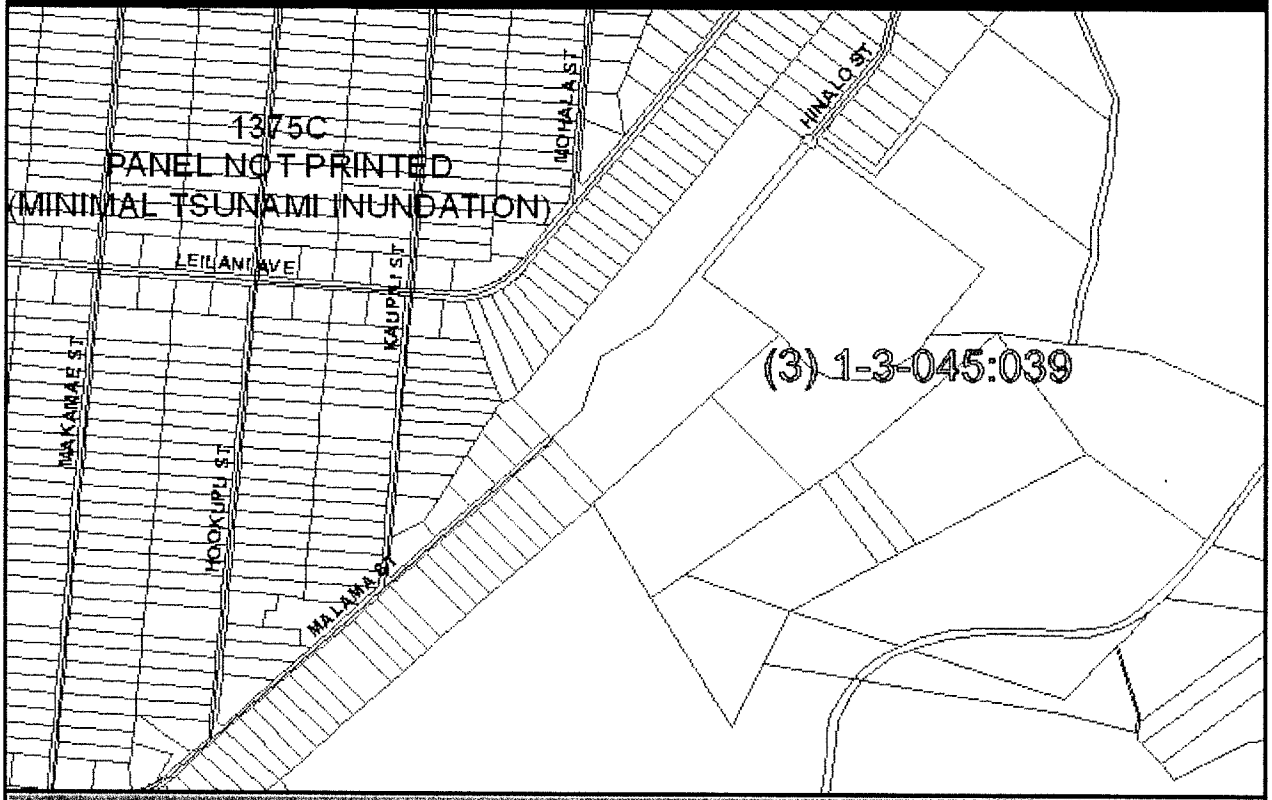
Disclaimer: The Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use of the information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR from any liability, which may arise from its use.

If this map has been identified as 'PRELIMINARY' or 'UNOFFICIAL', please note that it is being provided for informational purposes and is not to be used for official/legal decisions, regulatory compliance, or flood insurance rating. Contact your county NFIP coordinator for flood zone determinations to be used for compliance with local floodplain management regulations.

LAHIPUHA WATER TANK SITE

State of Hawaii

FLOOD HAZARD ASSESSMENT REPORT



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A:** No BFE determined.
- **Zone AE:** BFE determined.
- **Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA – An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

COUNTY:	HAWAII
TMK NO:	(3) 1-3-045-039
PARCEL ADDRESS:	13-695A HINALO STREET PAHOA, HI 96778
FIRM INDEX DATE:	APRIL 02, 2004
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL(S):	1551661375C
PANEL EFFECTIVE DATE:	PANEL NOT PRINTED

PARCEL DATA FROM:	JUNE 2013
IMAGERY DATA FROM:	MAY 2005

IMPORTANT PHONE NUMBERS

County NFIP Coordinator	
County of Hawaii	
Frank DeMarco, CFM	(808) 961-8042
State NFIP Coordinator	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

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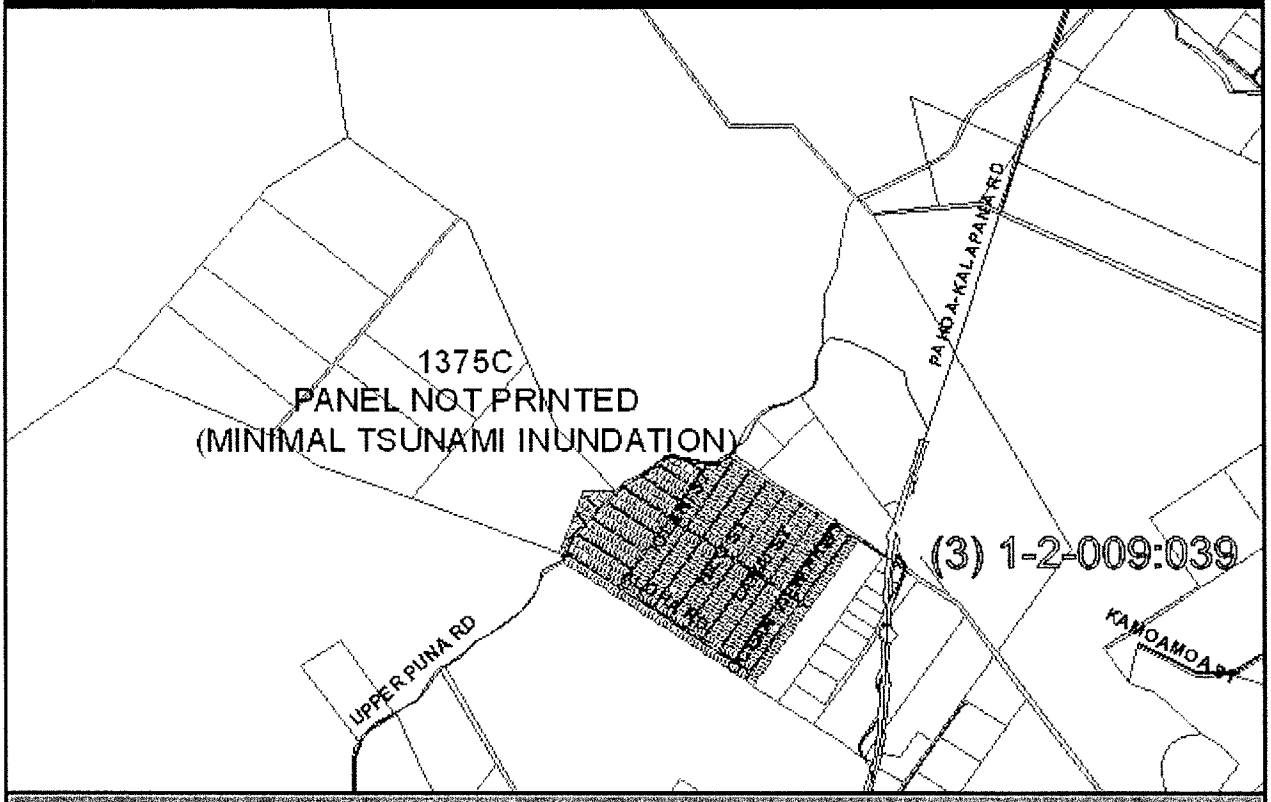
KEAUOHAHA WELL SITE

State of Hawaii

FLOOD HAZARD ASSESSMENT REPORT



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A:** No BFE determined.
- **Zone AE:** BFE determined.
- **Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA – An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

COUNTY:	HAWAII
TMK NO:	(3) 1-2-009-039
PARCEL ADDRESS:	12-4231 PAHOA KALAPANA ROAD PAHOA, HI 96778
FIRM INDEX DATE:	APRIL 02, 2004
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL(S):	1551661375C
PANEL EFFECTIVE DATE:	PANEL NOT PRINTED

PARCEL DATA FROM:	JUNE 2013
IMAGERY DATA FROM:	MAY 2005

IMPORTANT PHONE NUMBERS

County NFIP Coordinator	
County of Hawaii	
Frank DeMarco, CFM	(808) 961-8042
State NFIP Coordinator	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

Disclaimer: The Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use of the information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR from any liability, which may arise from its use.

If this map has been identified as 'PRELIMINARY' or 'UNOFFICIAL', please note that it is being provided for informational purposes and is not to be used for official/legal decisions, regulatory compliance, or flood insurance rating. Contact your county NFIP coordinator for flood zone determinations to be used for compliance with local floodplain management regulations.

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2015 JUN -8 A 10:17

RECEIVED
LAND DIVISION
HILO, HAWAII

June 4, 2015

2015 JUN 29 A11:07

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
___Div. of State Parks
___Commission on Water Resource Management
___Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: for Russell Y. Tsuji, Land Administrator

SUBJECT: Early Consultation for Hawaii County Radio System Upgrade Project New Sites

LOCATION: Puna and Kau, Hawaii, TMKs: (3) 9-2-031:019 (Ocean View Fire Station); 1-2-009:039 (Lanipuna Water Tank Site); and 1-3-045:039 (Keauohana Well Site)

APPLICANT: Geometrician Associates, LLC for the County of Hawaii

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by June 29, 2015.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:

Print name: GORDON C. HEIT
Date: 6/24/15

cc: Central Files

William P. Kenoi
Mayor

Walter K. M. Lau
Managing Director

Warren H. W. Lee
Director

Brandon A. K. Gonzalez
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
www.co.hawaii.hi.us

June 2, 2015

Susan Lebo, Ph.D, Acting Archaeology Branch Chief
Hawai'i State Historic Preservation Division
601 Kamokila Blvd., Rm. 555
Kapolei HI 96707

Dear Ms. Lebo:

Subject: **Request for No-Effects Determination for Early Hawai'i County Radio System Upgrade Project New Sites, TMKs 9-2-031:019 (Ocean View Fire Station Site); 1-2-009:039 (with easements on 1-2-009: 036 and 037)(Lanipuna Water Tank Site); and 1-3-045:039 (Keauohana Well Site), Puna and Ka'ū Districts, Island of Hawai'i**

The County of Hawai'i, Department of Public Works (DPW) is preparing an Environmental Assessment (EA) for a project to upgrade the County of Hawai'i's radio system, which is used by various County agencies for emergency and other communications. Some components of the current radio system are outmoded, in need of repair, and do not conform to the new requirements of the Federal Communications Commission (FCC). Most importantly, they do not allow communication in certain critical areas of the Puna and Ka'ū Districts, meaning the Fire, Police and Civil Defense personnel are sometimes cut off from communication with headquarters and other personnel. The only way to rectify this situation is to develop a series of new radio tower sites. After investigation of feasible locations, three County properties belonging to the Department of Water Supply and the Fire Department in the Puna and Ka'ū Districts were selected (see attached maps for locations). Tests have demonstrated that they will be safe and effective sites that offer line of sight to other facilities, which will enable coverage of gap areas in Puna and Ka'ū, and also improve overall radio coverage throughout the east half of the island.

As part of the EA, we are attempting to determine whether there are any effects to historic properties. ***Each of these tower sites takes up an area of about 0.05 acres on sites that have***

already been completely disturbed by previous grading and are parts of full developed County facilities. Two of the sites are completely fenced in. As shown in the attached Site Plans, the towers are expected to be 100 feet tall at the Lanipuna and Keauohana sites in Puna, and 140 feet tall at the Ocean View Fire Station. The self-supporting, three-legged towers will be made of steel with a lattice structure. The Lanipuna site will have two 6-foot diameter microwave dishes; the Keauohana and Ocean View sites will have one six-foot diameter microwave dish, and two 2-way radio antennae. Each site will also have a 10-foot by 20-foot communications shelter and a generator with a fuel tank for emergency power. All the new facilities will be enclosed within a fenced compound.

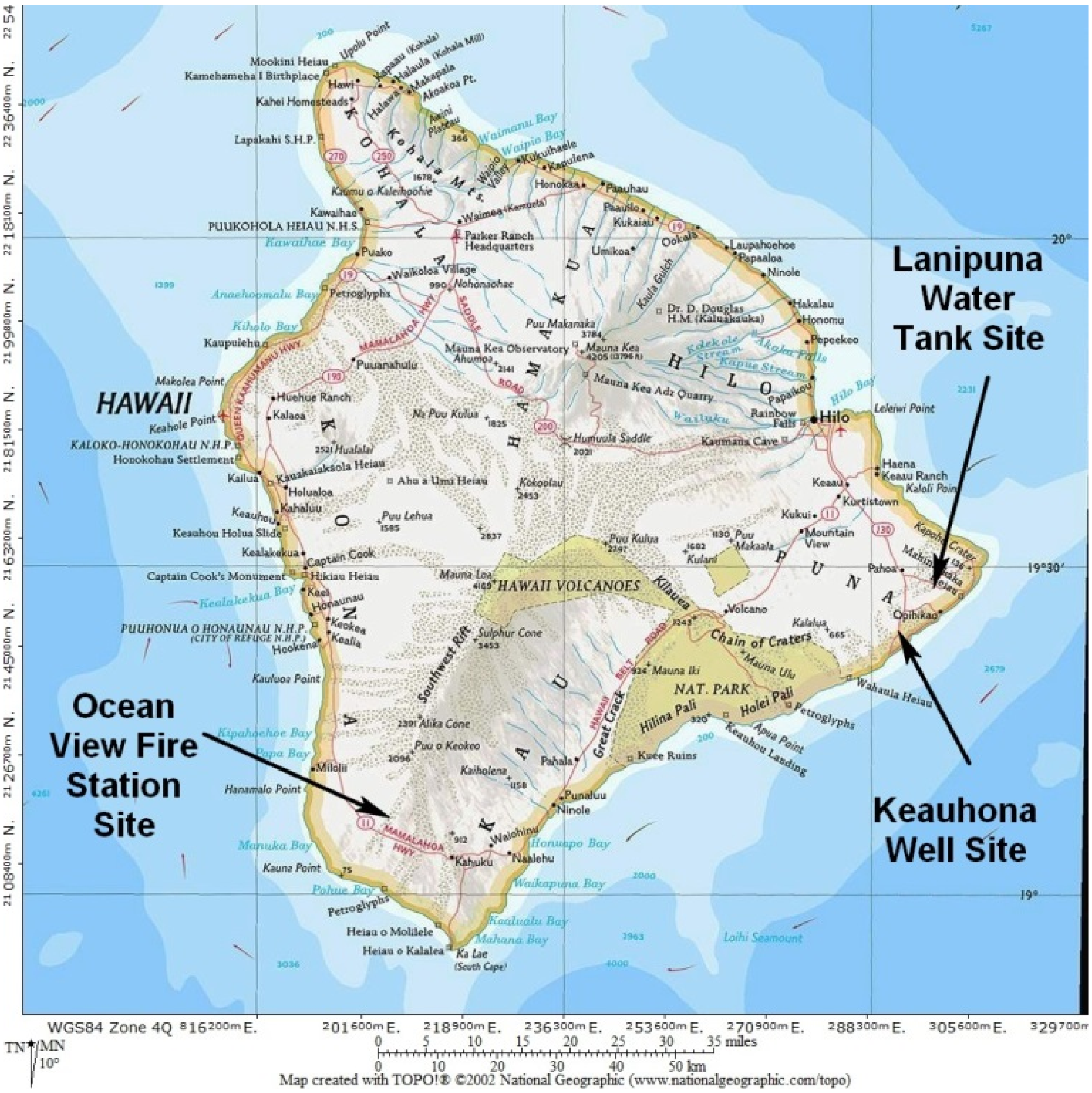
At the Lanipuna site it will also be necessary to extend electrical poles and lines along the side of the access road that extends from the end of Hinalo Street for a distance of 1,290 feet to the tower site. As shown on the attached electrical system layout diagram on a Google Earth image, a total of five (5) 40-foot tall poles, spaced 250 to 270 feet apart, will be required. ***As illustrated in the attached photos, the entire right-of-way was bulldozed prior to or as part of road improvements within the easement***. This is evident based on the flat terrain, the absence of ʻōhiʻa trees in the right-of-way in the northeastern half of the run (on the 1790 flow) and the presence of a row of planted rainbow eucalyptus on the southwestern half of the run (which is on a 400-750 year old lava flow). Our contractor, Dr. Ron Terry, inspected the area where the 5 poles would be installed and reported that each area had been flattened by heavy equipment and that no cultural features were present on the surface.

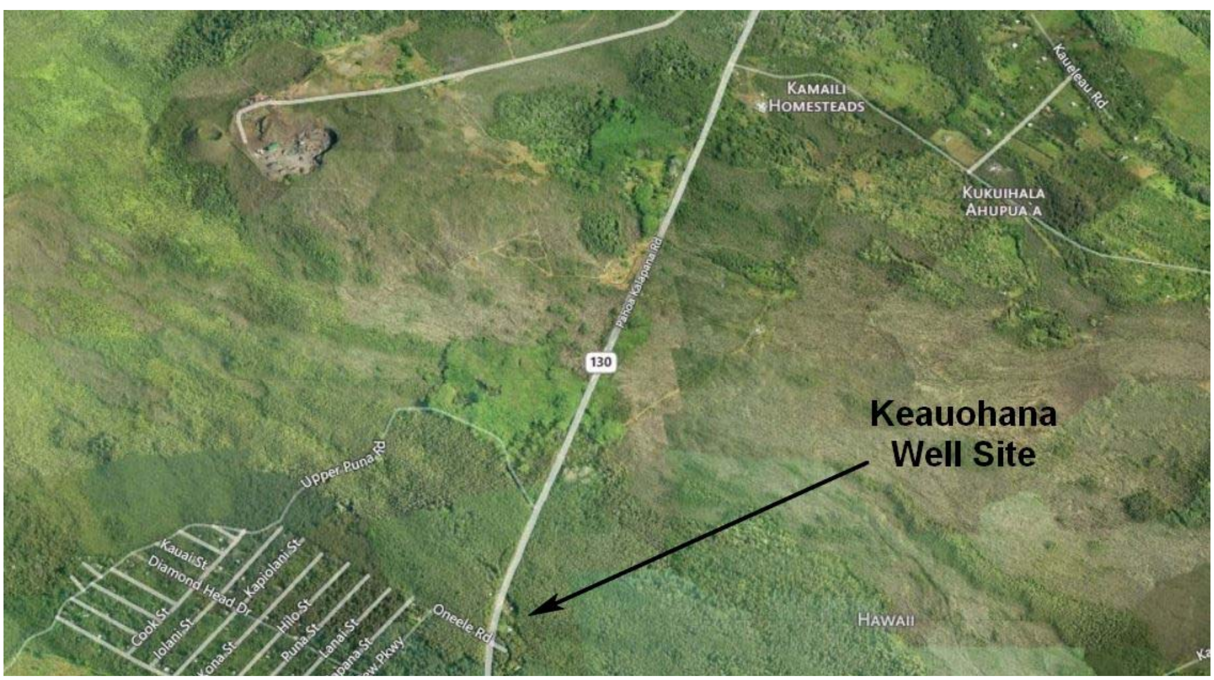
In summary, the undertaking affects very small, cleared sites that are within areas that have previously been affected by landclearing. No historic buildings, rock walls, terraces, caves, middens, platforms or similar features appear to be present. Furthermore, no such features appear to present nearby. Because of the extensive physical disturbance of the surface and the lack of manmade structures older than 50 years, it would appear that there is no potential for the construction of the towers and the five power poles to affect historic properties.

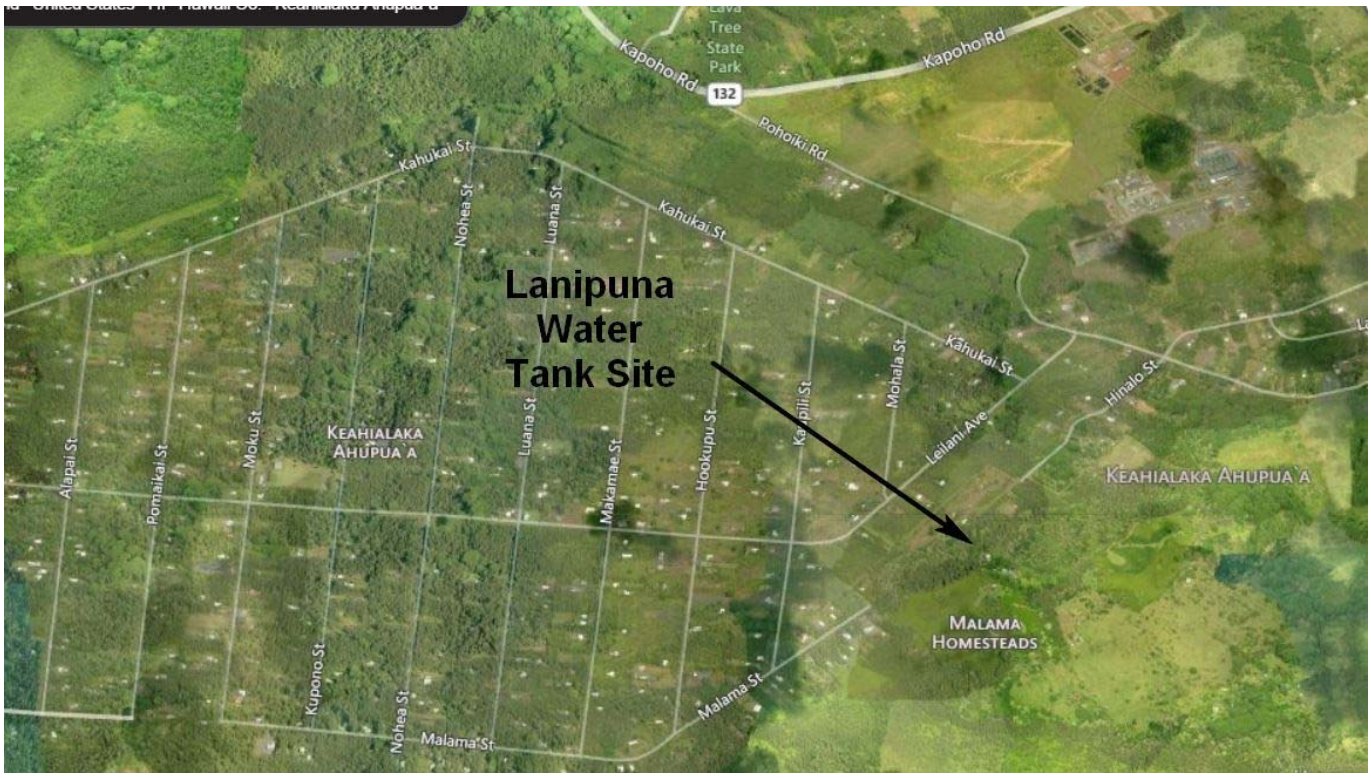
We seek your concurrence that the project would not affect historic properties, or, if you are unable to make that determination based on the information provided, your recommendation on additional information or reports needed to assess the effect on historic properties. We would be happy to provide any other additional information and/or accompany your personnel on an inspection of the sites. Please contact me at (808) 961-8466 or our consultant, Ron Terry, at (808) 969-7090 if you have any questions or require clarification.

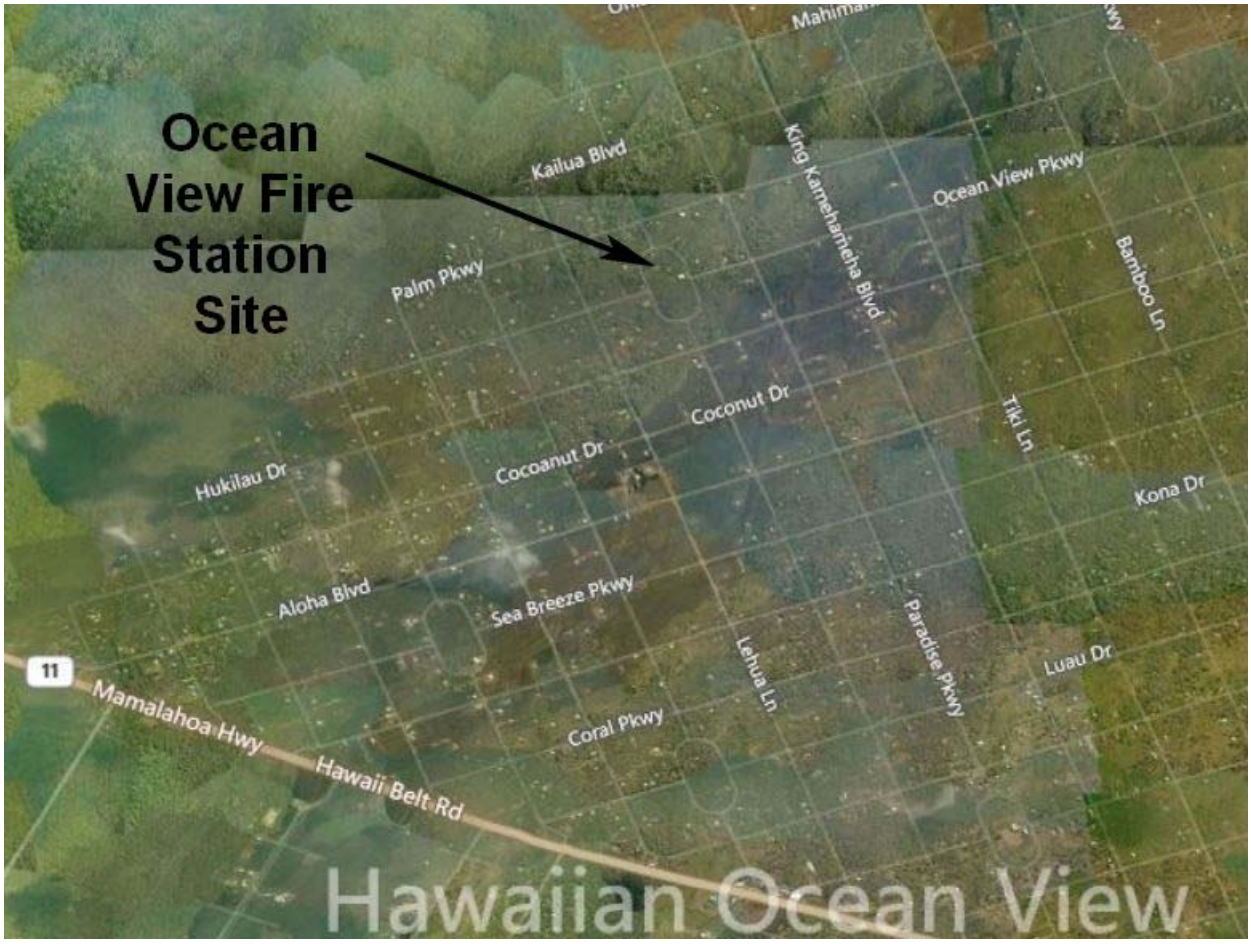
Respectfully,

Warren H.W. Lee, P.E.
Director


Lanipuna
Water
Tank Site
Ocean
View Fire
Station
Site
Keauhona
Well Site
HAWAII
Hilo
HAWAII VOLCANOES
NAT. PARK
WGS84 Zone 4Q
Map created with TOPO!® ©2002 National Geographic (www.nationalgeographic.com/topo)

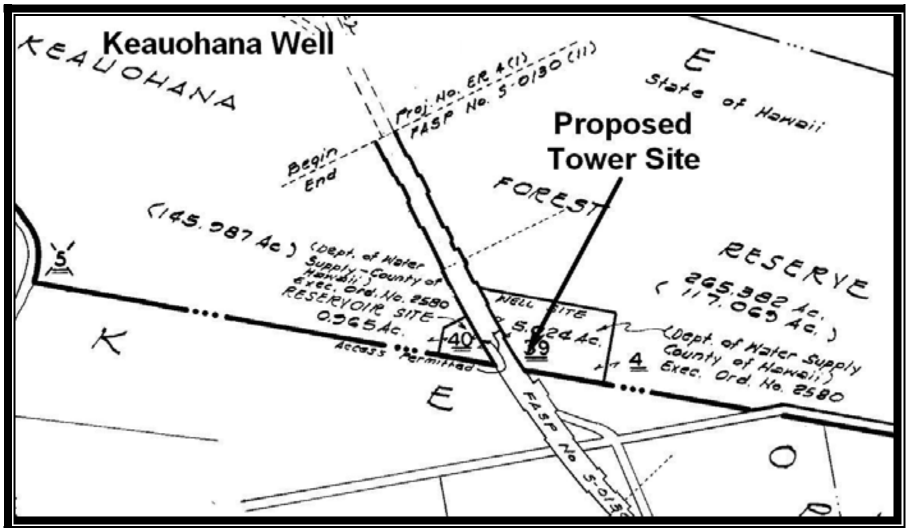

Keauohana
Well Site
KAMAILI
HOMESTEADS
KUKUIHALA
AHUPUA`A
Pahoa Kalapana Rd
130
Upper Puna Rd
Oneele Rd
HAWAII

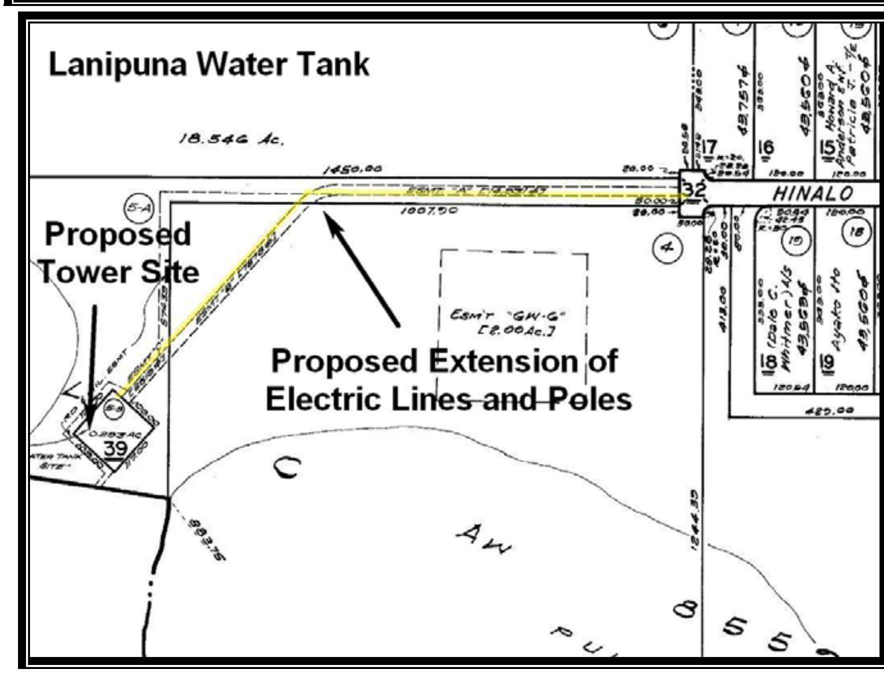


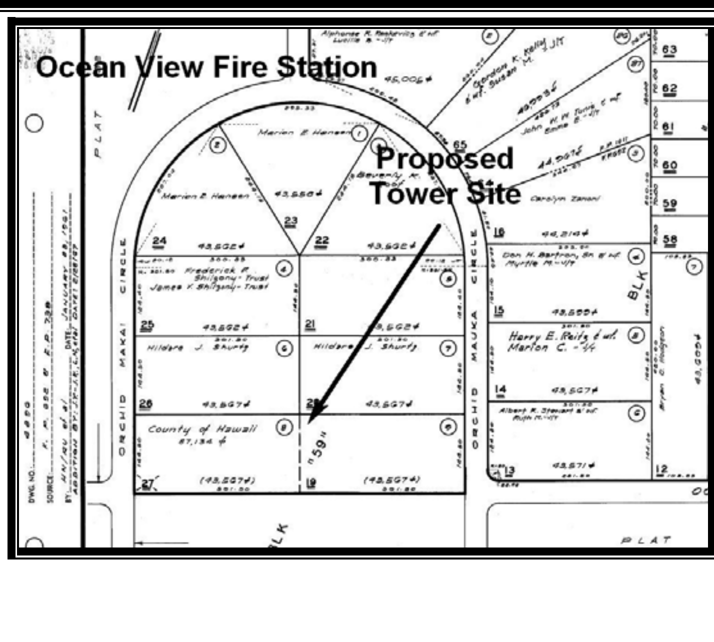


Satellite Maps from Bing ©2015 Microsoft, HERE, Pictometry Bird's Eye

TMK Maps


Keauohana Well
KEAUOHANA
Proj. No. ER 4(1)
FASP No. S-0130(11)
State of Hawaii
Proposed
Tower Site
Begin
End
FOREST
RESERVE
(145.987 Ac.)
(Dept. of Water Supply - County of Hawaii)
Exec. Ord. No. 2580
RESERVOIR SITE
0.965 Ac.
WELL SITE
5.024 Ac.
40
39
4
(265.382 Ac.)
(117.069 Ac.)
(Dept. of Water Supply County of Hawaii)
Exec. Ord. No. 2580
Access Permitted
FASP No. S-0130


Lanipuna Water Tank
18.546 Ac.
1450.00
1007.90
32
HINALO
Proposed
Tower Site
Esm't "GW-6"
[2.00 Ac.]
Proposed Extension of
Electric Lines and Poles
39
17
16
15
18
19
4
Ayako Ito


Ocean View Fire Station
Proposed
Tower Site
Marion E. Hansen
County of Hawaii
ORCHID MAKAI CIRCLE
ORCHID MAUKA CIRCLE
PLAT
Hildare J. Shurtz
Carolyn Zanoni
Harry E. Reitz
Frederick P. Shilgany-Trust
James Y. Shilgany-Trust
"59"

Keauohana Tower Site Area ▲ ▼ Ocean View Tower Site Area

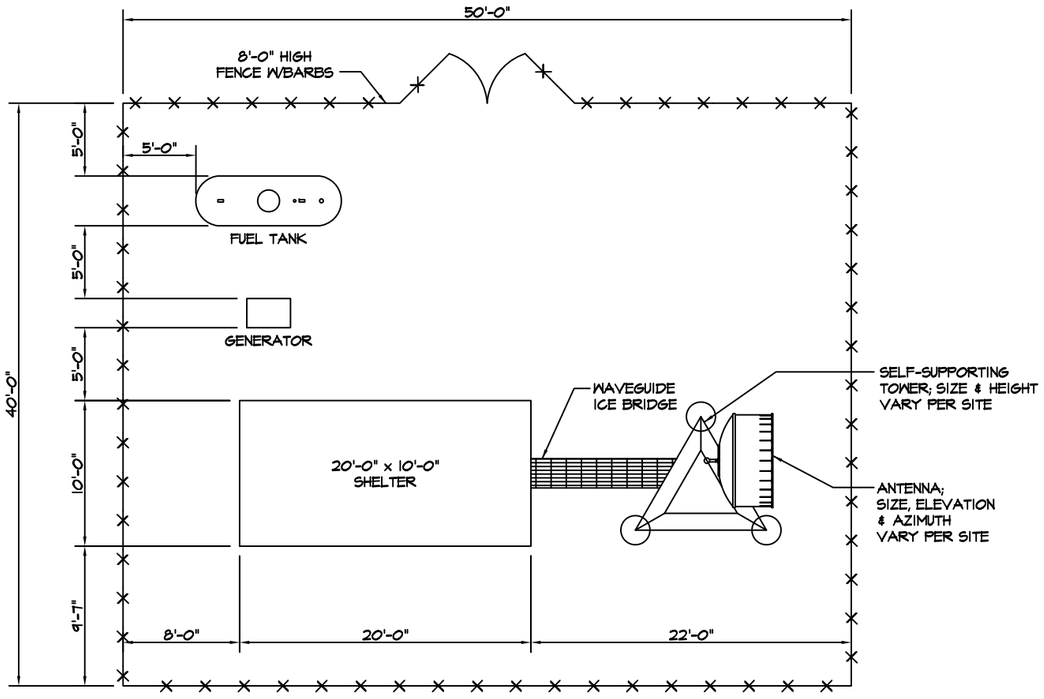
Lanipuna Tower Site

Tower Site Area ▲ ▼ Existing Electrical Poles and Lines to be Extended

Lanipuna Tower Site

Electric line run where 2 poles to be installed (northeast half, 1790 lava flow) ▲

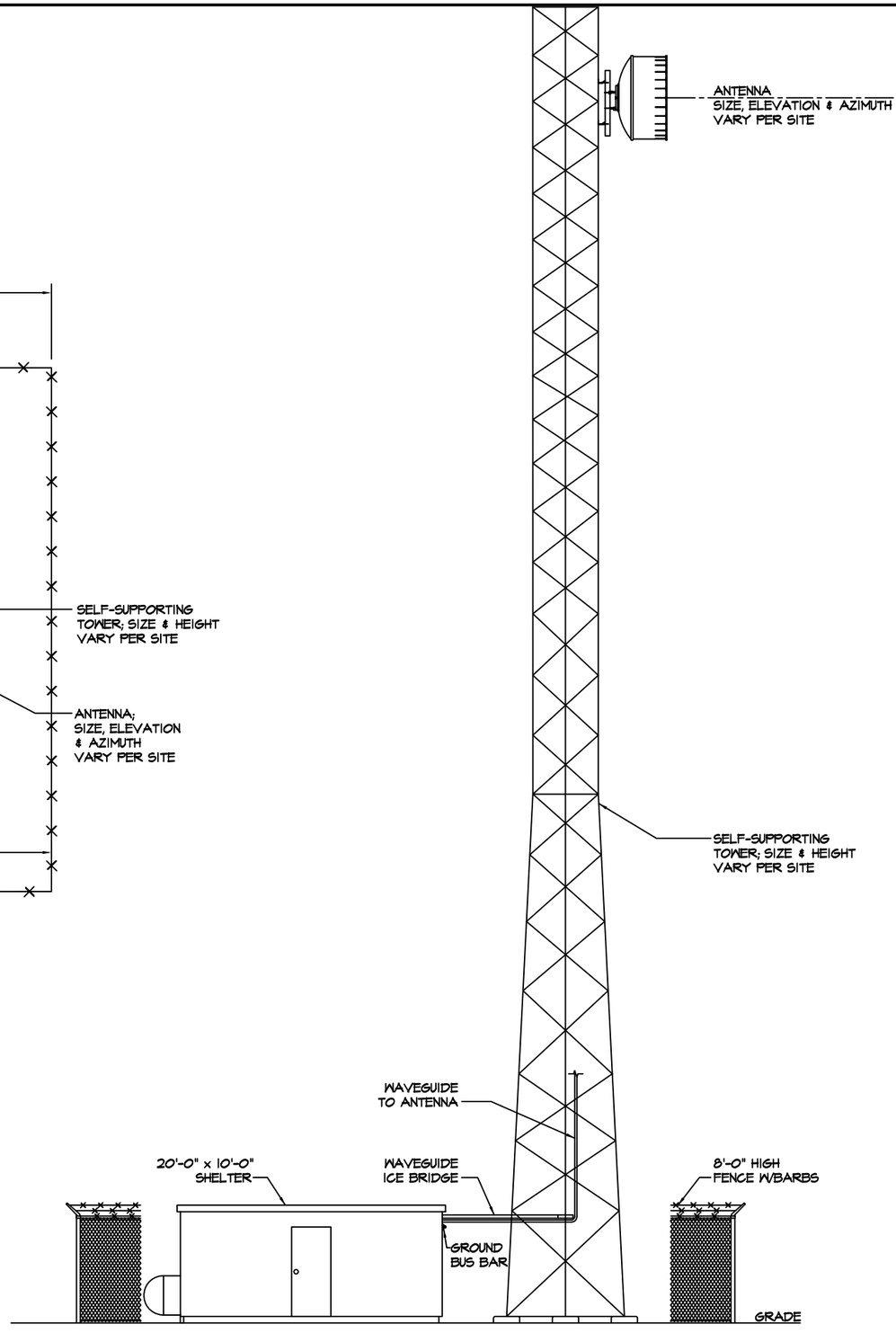
▼ Electric line run where 3 poles to be installed (southwest half, 400-750 year old lava flow)



TYPICAL TOWER SITE
PLAN VIEW

1
A1

SCALE: 3/16" = 1'-0"



TYPICAL TOWER SITE
ELEVATION VIEW

2
A1

SCALE: 3/16" = 1'-0"

THIS DRAWING, WHEN PLOTTED ON 11"x17" MEDIA, IS REDUCED TO HALF SCALE FROM THAT STATED ON THE DRAWINGS.

COUNTY OF HAWAII
STATE OF HAWAII

PROJECT INFORMATION:

COUNTY OF HAWAII

STATE OF HAWAII

CURRENT ISSUE DATE:

02/12/15

ISSUED FOR:

PRELIMINARY

REV.:	DATE:	DESCRIPTION:	BY:
0	02/12/15	ISSUED FOR PRELIMINARY	KB

scientel
WIRELESS, LLC
948 SPRINGER DRIVE
LOMBARD, IL 60148
TEL: 630-652-3800
FAX: 630-652-3805

APPROVALS:

NAME PRINTED _____

TITLE _____

SIGNATURE _____

DATE _____

DRAWN BY:	CHK.:	APV.:
K. BRAVO	LD	LD

LICENSURE:

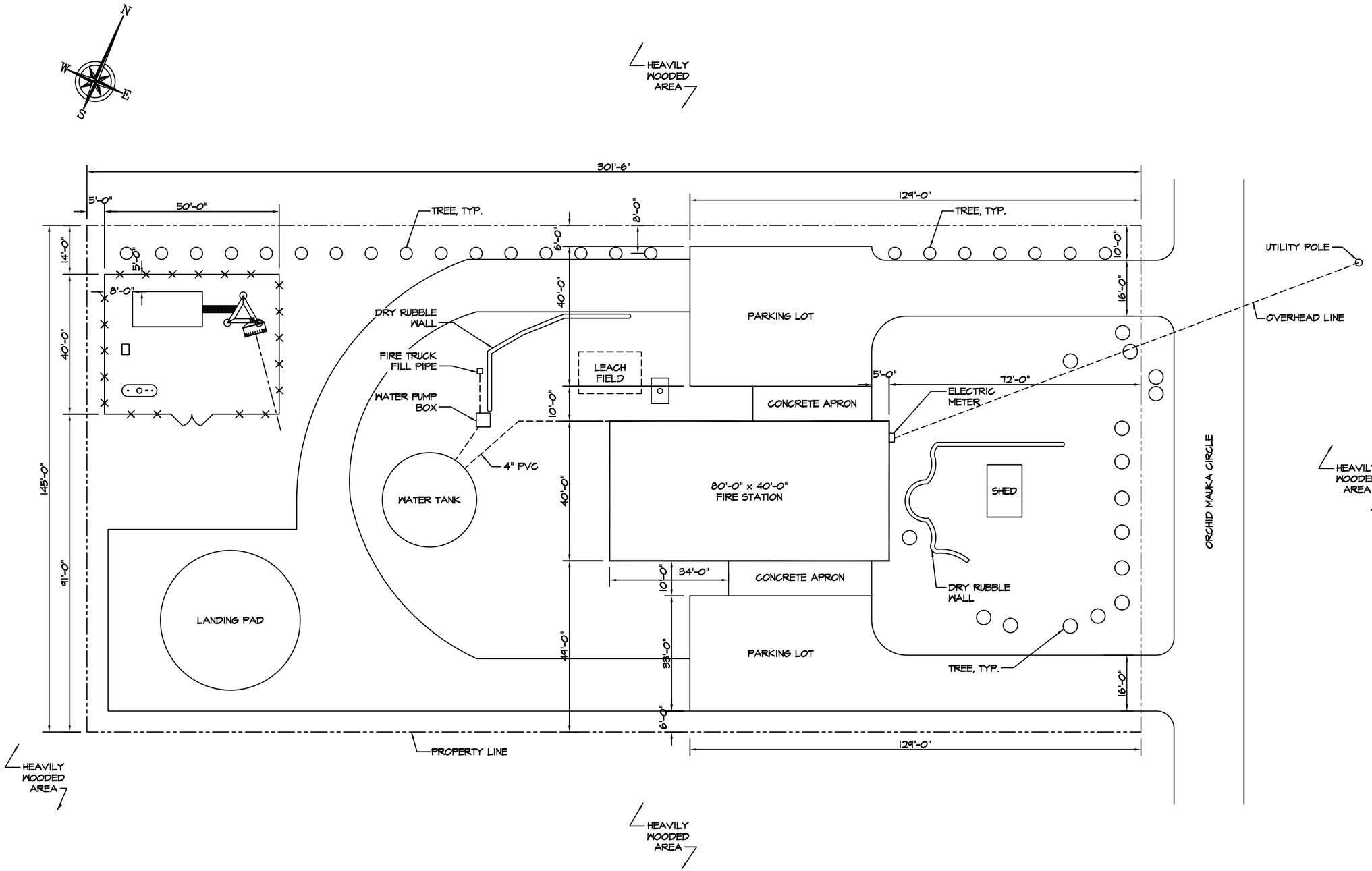
SHEET TITLE:

TYPICAL
TOWER SITE

SHEET NUMBER: A1

REVISION: 0

PROJ. NO. J-14-00649



SITE PLAN — 1 / A2

SCALE: 1" = 15'-0"

THIS DRAWING, WHEN PLOTTED ON 11"x17" MEDIA, IS REDUCED TO HALF SCALE FROM THAT STATED ON THE DRAWINGS.

COUNTY OF HAWAII
STATE OF HAWAII

PROJECT INFORMATION:

COUNTY OF HAWAII
STATE OF HAWAII

CURRENT ISSUE DATE:
02/12/15

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PRELIMINARY

REV.:	DATE:	DESCRIPTION:	BY:
0	02/12/15	ISSUED FOR PRELIMINARY	KB

scientel WIRELESS, LLC
948 SPRINGER DRIVE
LOMBARD, IL 60148
TEL.: 630-652-3800
FAX: 630-652-3805

APPROVALS:

NAME PRINTED
TITLE
SIGNATURE
DATE

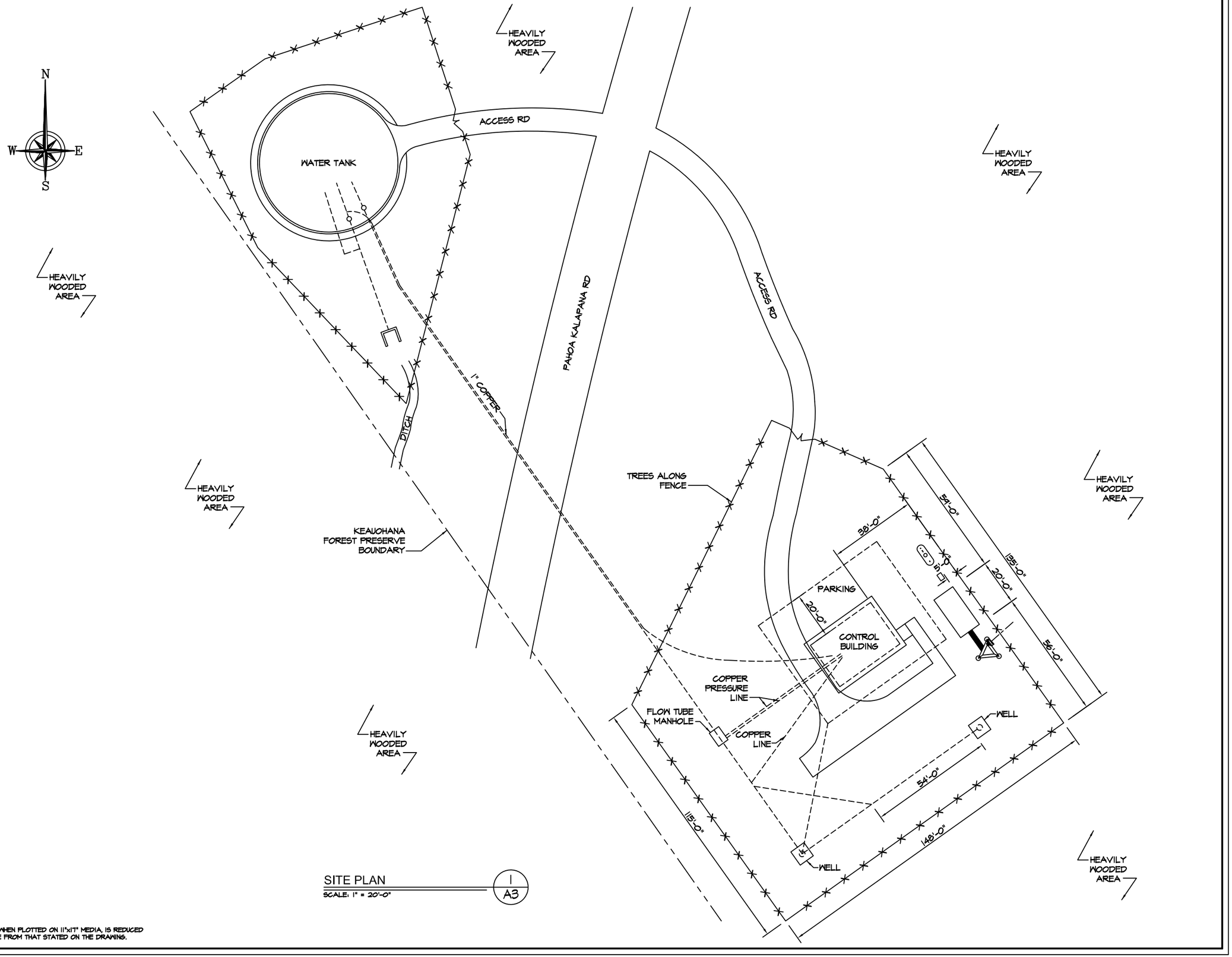
DRAWN BY:	CHK.:	APV.:
K. BRAVO	LD	LD

LICENSURE:

SHEET TITLE:
FIRE STATION #20
SITE PLAN

SHEET NUMBER: A2
REVISION: 0

PROJ. NO. J-14-00649



SITE PLAN — 1 / A3

SCALE: 1" = 20'-0"

THIS DRAWING, WHEN PLOTTED ON 11"x17" MEDIA, IS REDUCED TO HALF SCALE FROM THAT STATED ON THE DRAWING.

COUNTY OF HAWAII
STATE OF HAWAII

PROJECT INFORMATION:

COUNTY OF HAWAII

STATE OF HAWAII

CURRENT ISSUE DATE:

02/12/15

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PRELIMINARY

REV.:	DATE:	DESCRIPTION:	BY:
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scientel WIRELESS, LLC
948 SPRINGER DRIVE
LOMBARD, IL 60148
TEL: 630-652-3800
FAX: 630-652-3805

APPROVALS:

NAME PRINTED _____

TITLE _____

SIGNATURE _____

DATE _____

DRAWN BY:	CHK.:	APV.:
K. BRAVO	LD	LD

LICENSURE:

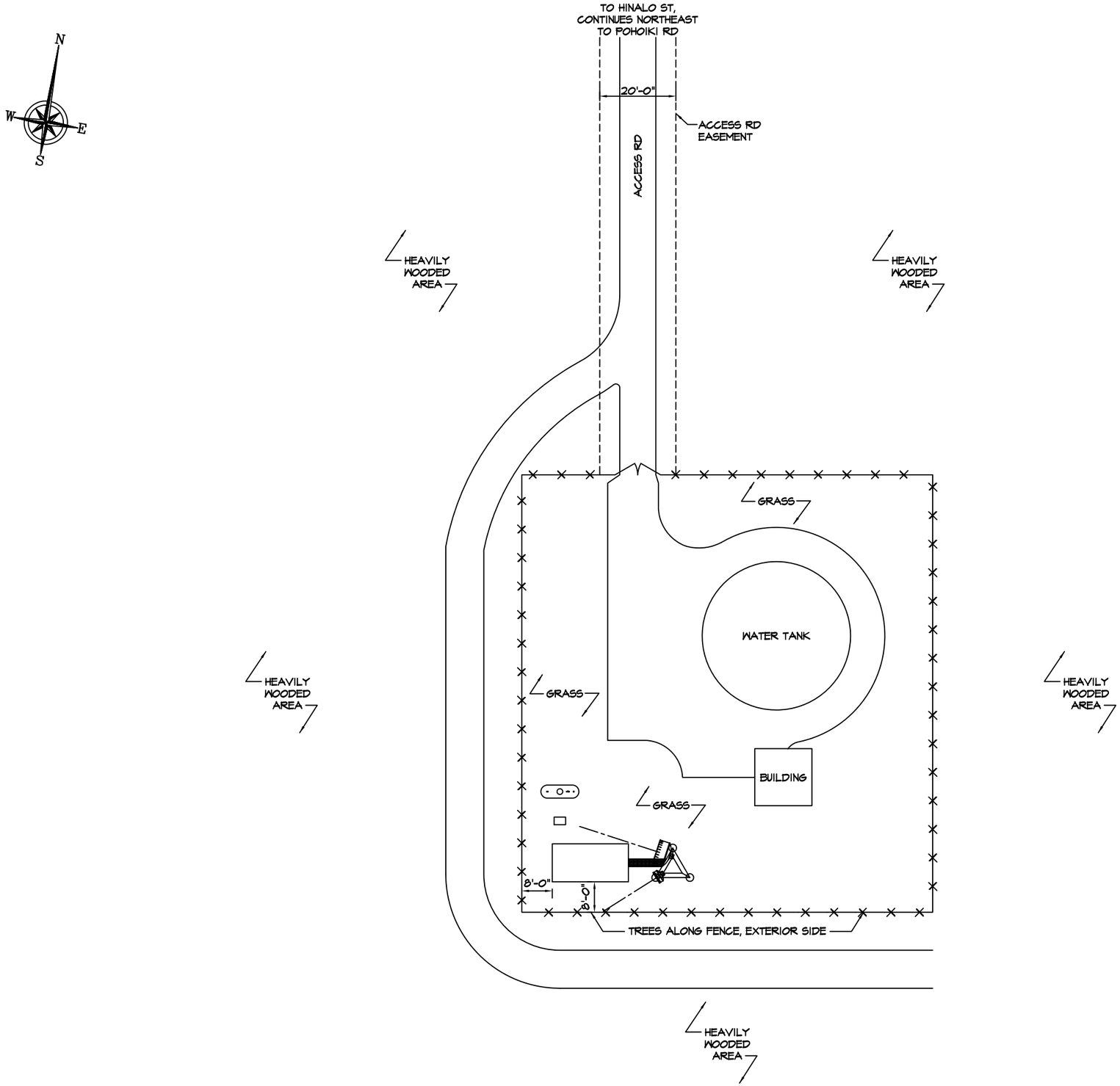
SHEET TITLE:

KEAUOHANA
SITE PLAN

SHEET NUMBER: A3

REVISION: 0

PROJ. NO. J-14-00649



SITE PLAN

SCALE: 1" = 15'-0"

1 / A4

THIS DRAWING, WHEN PLOTTED ON 11"x17" MEDIA, IS REDUCED TO HALF SCALE FROM THAT STATED ON THE DRAWING.

COUNTY OF HAWAII
STATE OF HAWAII

PROJECT INFORMATION:

COUNTY OF HAWAII

STATE OF HAWAII

CURRENT ISSUE DATE:

02/12/15

ISSUED FOR:

PRELIMINARY

REV.:	DATE:	DESCRIPTION:	BY:
0	02/12/15	ISSUED FOR PRELIMINARY	KB

scientel WIRELESS, LLC
948 SPRINGER DRIVE
LOMBARD, IL 60148
TEL: 630-652-3800
FAX: 630-652-3805

APPROVALS:

NAME PRINTED _____

TITLE _____

SIGNATURE _____

DATE _____

DRAWN BY:	CHK.:	APV.:
K. BRAVO	LD	LD

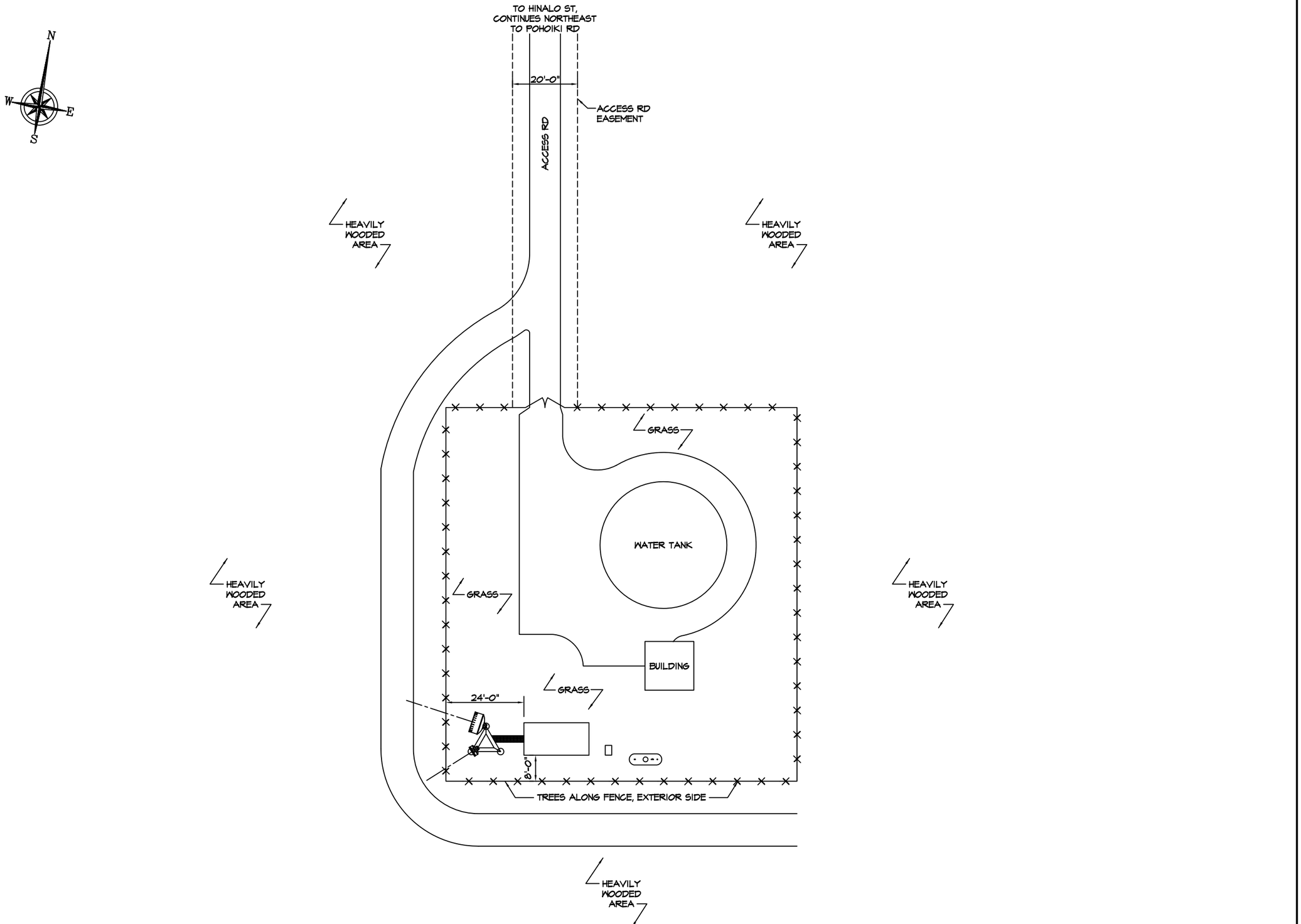
LICENSURE:

SHEET TITLE:

LANIPUNA
SITE PLAN

SHEET NUMBER: A4 REVISION: 0

PROJ. NO. J-14-00649



SITE PLAN 1/A4

SCALE: 1" = 15'-0"

THIS DRAWING, WHEN PLOTTED ON 11"x17" MEDIA, IS REDUCED TO HALF SCALE FROM THAT STATED ON THE DRAWING.

COUNTY OF HAWAII
STATE OF HAWAII

PROJECT INFORMATION:

COUNTY OF HAWAII

STATE OF HAWAII

CURRENT ISSUE DATE:

02/12/15

ISSUED FOR:

PRELIMINARY

REV.:	DATE:	DESCRIPTION:	BY:
0	02/12/15	ISSUED FOR PRELIMINARY	KB

scientel WIRELESS, LLC
948 SPRINGER DRIVE
LOMBARD, IL 60148
TEL: 630-652-3800
FAX: 630-652-3805

APPROVALS:

NAME PRINTED _____

TITLE _____

SIGNATURE _____

DATE _____

DRAWN BY:	CHK.:	APV.:
K. BRAVO	LD	LD

LICENSURE:

SHEET TITLE:

LANIPUNA
SITE PLAN

SHEET NUMBER: A4

REVISION: 0

PROJ. NO. J-14-00649

PUULENA
CRATER

P-10 (ET)
ID#119687
(40')
⊿ 10KVA

P-11 (ET)
ID#119688
(40')

T-??
(40')

(193')

193'

250'

250'

250'

270'

270'

NORTH

SITE PLAN
SCALE : 1"=60'

agery Date: 3/6/2014 2007

19°27'52.08" N 154°53'40.12" W elev 667 ft

Eye alt 2269 ft

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ENVIRONMENTAL ASSESSMENT

Hawai‘i County Radio Communication Site At Ocean View Fire Station

APPENDIX 2b
Comments to Draft EA and Response

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DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to
EMD/CWB

01033PNN.16

January 20, 2016

Mr. David Yamamoto
County of Hawaii
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, Hawaii 96720-4224

Dear Mr. Yamamoto:

SUBJECT: Comments on the Draft Environmental Assessment for the Hawaii County Radio Communication Site at Ocean View Fire Station
TMK: (3) 9-2-031:019
Kau, Island of Hawaii, State of Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated December 17, 2015, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. 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://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.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.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommended that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC 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.

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like

community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g., minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at: http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

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

NN:ak

c: DOH-EPO [via e-mail Noella.Narimatsu@doh.hawaii.gov only]
Mr. Ron Terry, Geometrician Associates [via e-mail rterry@hawaii.rr.com only]

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

February 25, 2016

Alec Wong, P.E., Chief
Clean Water Branch
Hawai'i State Department of Health
PO Box 3378
Honolulu HI 96801-3378

Subject: Comment to Draft Environmental Assessment on Hawai'i County Radio Communication Site at Ocean View Fire Station

Dear Mr. Wong:

Thank you for your comment letter dated January 20, 2016, on the Draft EA in which you provided references to DOH's standard comments, noted requirements in Chapters 11-54 and 11-55, HAR, related to water quality criteria and National Pollutant Discharge Elimination System (NPDES), recommended contact with the U.S. Army Corps of Engineers (USACE), and discussed green building practices. The County of Hawai'i affirms the need to comply with the water quality regulations. No water bodies including streams, bays, ponds or wetlands are included in the project area, and it therefore does not appear that permits related to Section 404 of the Clean Water Act are required. The project will disturb an area of about 2,000 square feet (most of it already graded), and there will be no hydrotesting or other NPDES triggers, and it therefore appears that an NPDES permit will not be required. The project involves minimal improvements, and all drainage will be contained onsite and will be allowed to percolate to recharge groundwater in the basal lens.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

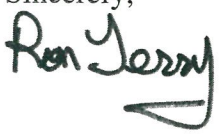
Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: David Yamamoto, DPW

Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: David Yamamoto, DPW

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 16-005

January 14, 2016

Mr. Ron Terry
Geometrician Associates
P.O. Box 396
Hilo, Hawaii 96721
Email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: **Draft Environmental Assessment (DEA) for Hawaii County Radio Communication Site at Ocean View Fire Station, Kau District, Hawaii**
TMK: 9-2-031:019

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your DEA to our office via the OEQC link:
http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2016-01-08-HA-5B-DEA-Hawaii-County-Radio-Communication-Site.pdf

EPO strongly recommends that you review the standard comments and available strategies to support sustainable and healthy design provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments. EPO has recently prepared draft Environmental Health Management Maps for each county. They are online: http://health.hawaii.gov/epo/egis

We suggest you review the requirements for the National Pollutant Discharge Elimination System (NPDES) permit. We recommend contacting the Clean Water Branch at (808) 586-4309 or cleanwaterbranch@doh.hawaii.gov after relevant information is reviewed at:

1. http://health.hawaii.gov/cwb
2. http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/standard-npdes-permit-conditions
3. http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/forms

EPO recommends you review the need and/or requirements for a Clean Air Branch permit. The Clean Air Branch can be consulted via e-mail at: Cab.General@doh.hawaii.gov or via phone: (808) 586-4200.

If noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work. Please call the Indoor and Radiological Health Branch at (808) 586-4700 and review relevant information online at: http://health.hawaii.gov/irhb/noise

EPO encourages you to examine and utilize the Hawaii Environmental Health Portal. The portal provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings. The Portal is continually updated. Please visit it regularly at: https://eha-cloud.doh.hawaii.gov.

You may also wish to review the draft Office of Environmental Quality Control (OEQC) viewer at: http://eha-web.doh.hawaii.gov/oeqc-viewer This viewer geographically shows where previous Hawaii Environmental Policy Act (HEPA) {Hawaii Revised Statutes, Chapter 343} documents have been prepared.

In order to better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www2.epa.gov/ejscreen

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design.

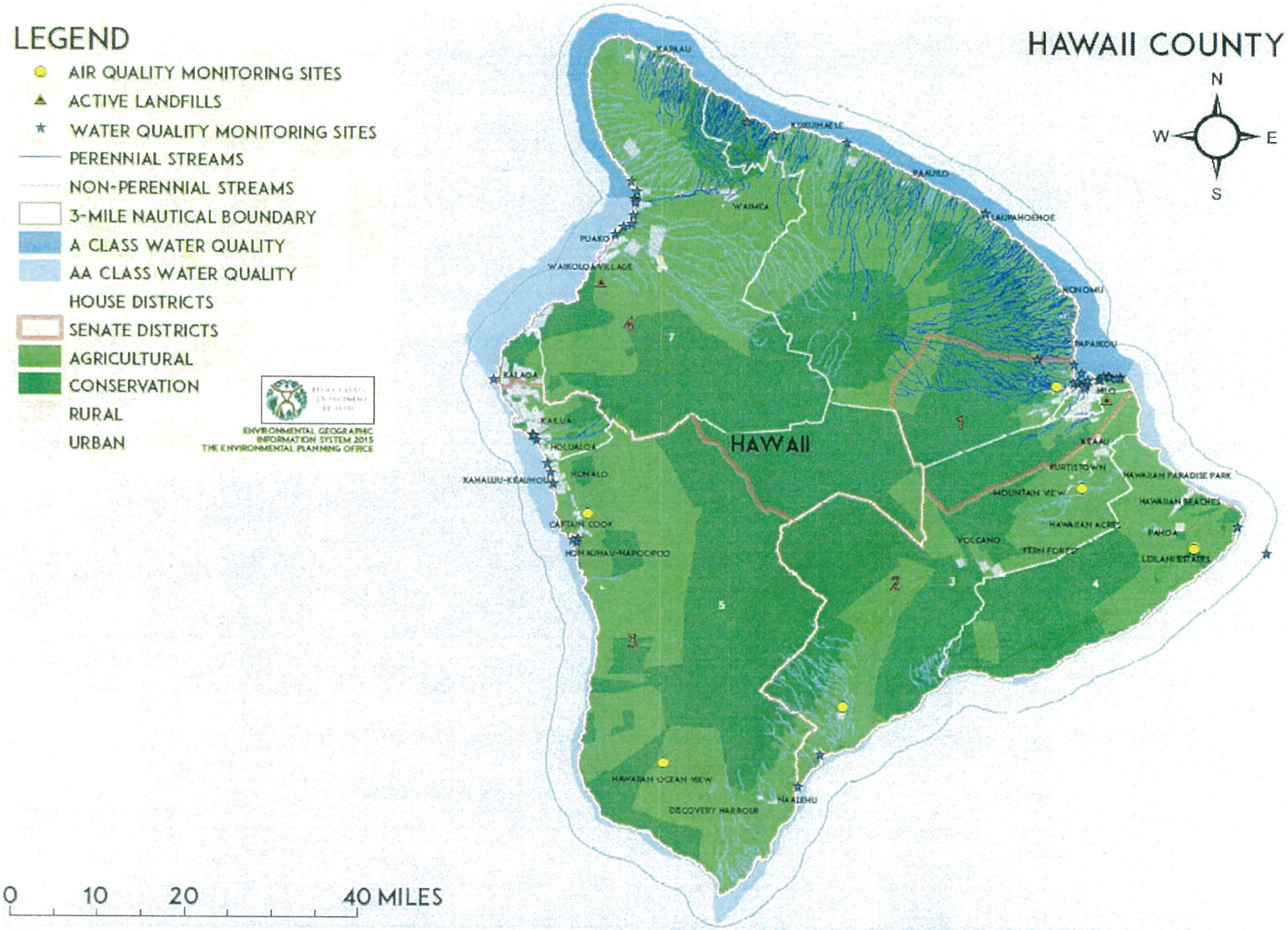
Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

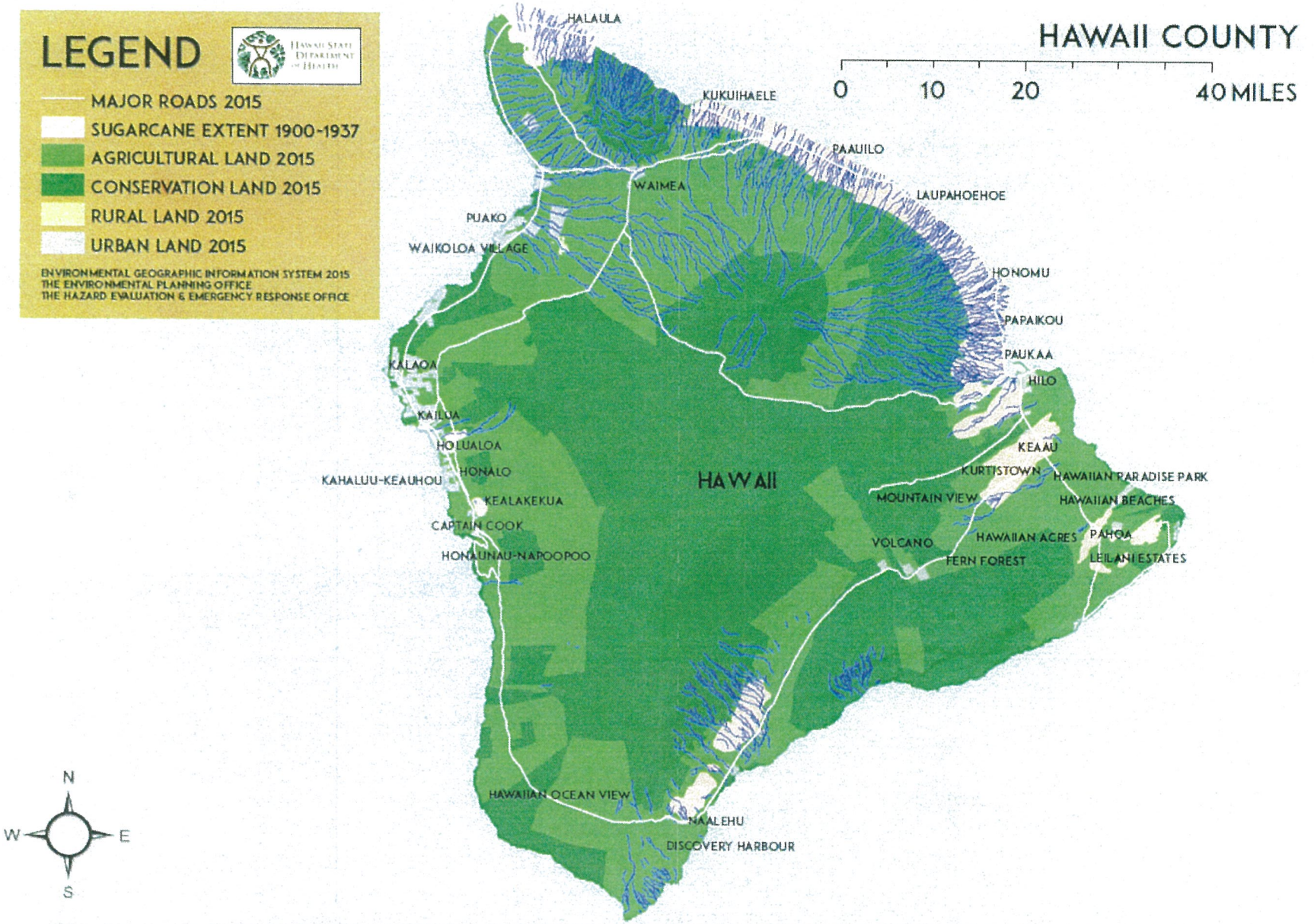
LM:nn

Attachment 1: EPO Draft Environmental Health Management Map
Attachment 2: EPO Historic Sugarcane Map
Attachment 3: OEQC Viewer Map
Attachment 4: U.S. EPA EJSCREEN (3 page report)

c: David Yamamoto, County of Hawaii, Department of Public Works
DOH: DHO Hawaii, CWB, IRHB, CAB, HEER, DDEH {via email only)



ENVIRONMENTAL HEALTH MANAGEMENT ON HAWAII



SUGARCANE ON HAWAII 1900-1937


hawaii.gov
Stay Connected
OEQC Viewer
ksu
23 sites found
Results
Filter
Nettle Caterpillar Biocontrol and Agent Host Specificity Report (DEA-AFNSI)
Environmental Assessment (Agency)
Hawaiian Islands Humpback Whale National Marine Sanctuary (EISPN)
Environmental Impact Statement (Agency)
Marine Turtle Research Program (DEA-AFNSI)
Environmental Assessment (Applicant)
WAIOHINU PRODUCTION WELL RESERVOIR (FEA-FONSI)
Environmental Assessment (Agency)
WRIGHT RD FENCE (FEA-FONSI)
Environmental Assessment (Agency)
Biocontrol Strawberry Guava (DEA-AFNSI)
Environmental Assessment (Agency)
Field Release Fopius Biocontrol of Medfly (DEA-AFNSI)
Environmental Assessment (Agency)
Field Release Binodoxys Biocontrol of Melon Aphid (DEA-AFNSI)
Environmental Assessment (Agency)
Programmatic General Permit Agreement for Restoration of Fishponds (FEA-FONSI)
Environmental Assessment (Agency)
SANDWICH ISLES COMM SUB FIBER OPTIC CABLE (FEA-FONSI)
Environmental Assessment (Applicant)
Field Release of Eurytoma Erythrina Gall Wasp BioControl (FEA-FONSI)
Environmental Assessment (Agency)
Integrated Cultural Resources Man Plan (FEA-FONSI)
Environmental Assessment (Applicant)
SANDWICH ISLES COMM SUB FIBER OPTIC CABLE (FEA-FONSI)
Environmental Assessment (Applicant)
Nettle Caterpillar (FEA-FONSI)
Hybrid
Google

EPA United States Environmental Protection Agency

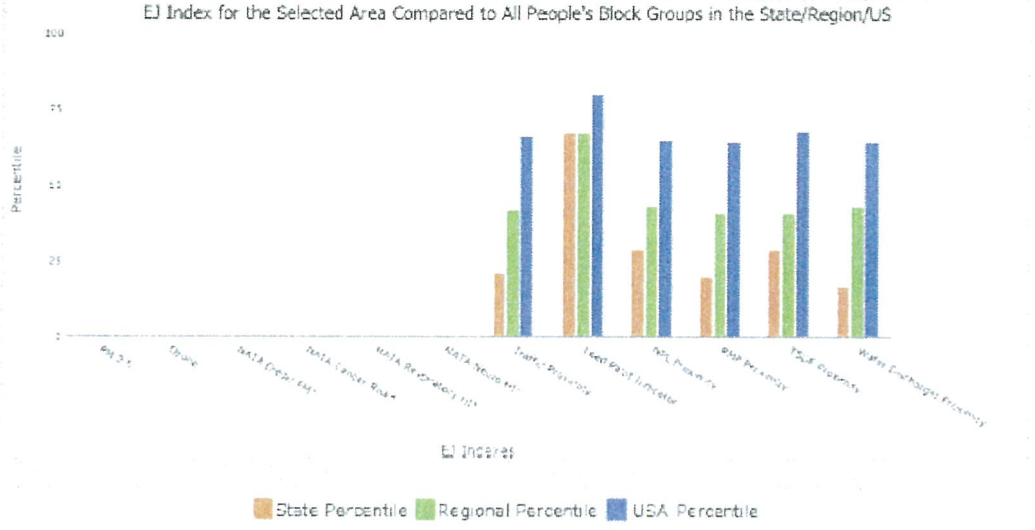
EJSCREEN Report

for 1 mile Ring Centered at 19.118286,-155.779390, HAWAII, EPA Region 9

Approximate Population: 625

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA Diesel PM*	N/A	N/A	N/A
EJ Index for NATA Air Toxics Cancer Risk*	N/A	N/A	N/A
EJ Index for NATA Respiratory Hazard Index*	N/A	N/A	N/A
EJ Index for NATA Neurological Hazard Index*	N/A	N/A	N/A
EJ Index for Traffic Proximity and Volume	21	42	66
EJ Index for Lead Paint Indicator	67	67	80
EJ Index for Proximity to NPL sites	29	43	65
EJ Index for Proximity to RMP sites	20	41	64
EJ Index for Proximity to TSDFs	29	41	68
EJ Index for Proximity to Major Direct Dischargers	17	43	64

EJ Index for the Selected Area Compared to All People's Block Groups in the State/Region/US



This report shows environmental, demographic, and EJ indicator values. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report

for 1 mile Ring Centered at 19.118286,-155.779390, HAWAII, EPA Region 9

Approximate Population: 625

January 13, 2016

Digitized Point

1:2,257

EPA United States Environmental Protection Agency

EJSCREEN Report

for 1 mile Ring Centered at 19.118286,-155.779390, HAWAII, EPA Region 9

Approximate Population: 625

Selected Variables	Raw Data	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in $\mu g/m^3$)	N/A	N/A	N/A	9.85	N/A	9.78	N/A
Ozone (ppb)	N/A	N/A	N/A	49.7	N/A	46.1	N/A
NATA Diesel PM ($\mu g/m^3$)*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Cancer Risk (lifetime risk per million)*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Respiratory Hazard Index*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Neurological Hazard Index*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Proximity and Volume (daily traffic count/distance to road)	2.9	280	3	190	3	110	7
Lead Paint Indicator (% Pre-1960 Housing)	0.081	0.17	43	0.25	42	0.3	31
NPL Proximity (site count/km distance)	0.0027	0.092	7	0.11	0	0.096	0
RMP Proximity (facility count/km distance)	0.0096	0.18	0	0.41	0	0.31	0
TSDF Proximity (facility count/km distance)	0.0028	0.092	7	0.12	0	0.054	2
Water Discharger Proximity (facility count/km distance)	0.0095	0.33	0	0.19	0	0.25	0
Demographic Indicators							
Demographic Index	58%	51%	72	46%	67	35%	80
Minority Population	58%	77%	16	57%	49	36%	74
Low Income Population	58%	25%	95	35%	81	34%	84
Linguistically Isolated Population	0%	6%	25	9%	20	5%	45
Population With Less Than High School Education	8%	10%	52	18%	35	14%	39
Population Under 5 years of age	6%	6%	55	7%	48	7%	52
Population over 64 years of age	13%	14%	45	12%	64	13%	54

* The National-scale Air Toxics Assessment (NATA) environmental indicators and EJ indexes, which include cancer risk, respiratory hazard, neurodevelopment hazard, and diesel particulate matter will be added into EJSCREEN during the first full public update after the soon-to-be-released 2011 dataset is made available. The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: http://www.epa.gov/ttn/atw/natamain/index.html.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

February 25, 2016

Laura Leialoha McIntyre, Program Manager
Hawai'i State Department of Health EPO
epo@doh.hawaii.gov

Subject: Comment to Draft Environmental Assessment on Hawai'i County Radio Communication Site at Ocean View Fire Station

Dear Ms. McIntyre:

Thank you for your comment letter dated January 14, 2016, on the Draft EA. In answer to your specific comments:

1. *EPO standard comments, Environmental Health Portal and Water Quality Standards*. Thank you for referencing these websites.

2. *Need for NPDES permit, Clear Air Permit and Community Noise Control compliance*. As discussed in Section 3.1.2 of the Draft EA, there is minimal grading and no aspect of the project triggers the need for an NPDES permit. Similarly, no aspect of the project involves air emissions, and no Clean Air Permit is needed. As discussed in Section 3.1.4 of the EA, the County will require the contractor to limit construction to daytime hours and consult with the Department of Health pursuant to Title 11, Chapter 46, HAR (Community Noise Control) if construction noise is excessive and requires mitigation. Operationally, the proposed project would not measurably affect noise levels.

3. *EPA EJSCREEN*. Thank you for the reference to the EPA site and the information you provided. The project is highly consistent with environmental justice, in that it has no disproportionately adverse impacts on low-income and minority populations, and it provides a low-income district with critical emergency infrastructure.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

DAVID Y. IGE
GOVERNOR OF HAWAII

Scott Glenn
INTERIM DIRECTOR

STATE OF HAWAI'I
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
Department of Health
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813
Telephone (808) 586-4185
Facsimile (808) 586-4186
Email: oeqchawaii@doh.hawaii.gov

David Yamamoto
County of Hawai'i
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, Hawai'i 96720

Dear Mr. Yamamoto,

SUBJECT: Draft Environmental Assessment (EA) for Hawai'i County Radio Communications Site at Ocean View Fire Station, Kā'u, Hawai'i

The Office of Environmental Quality Control (OEQC) reviewed the Draft EA prepared for the subject project and offers the following comments for your consideration.

The OEQC seconds all recommended mitigation measures for minimizing impacts to endangered and threatened species in the area. While avian and bat collisions are not anticipated, OEQC recommends monitoring for any collisions witnessed, evidence of collisions, and birds or bats found dead on the property for a year. This information can then be used to reassess the empirical impact the tower may have on flying species, and serve as the basis for measuring the effectiveness of the mitigation measures. OEQC also recommends ensuring that no Albizia trees are in the vicinity to prevent damage during high wind or hurricane conditions. Lastly, the OEQC would like to recommend considering climate change for this and all future projects. Changing weather patterns in the Pacific are projected to result in localized increased precipitation severity, such as periodic extreme heavy downpours. It is recommend that the project's infrastructure and stormwater run-off mitigation measures be able to withstand extreme precipitation and tropical storms.

Thank you for the opportunity to comment on the Draft EA. We look forward to a response that also will be included within the project's Final EA. If you have questions about these comments, please consult myself or Tom Eisen in our office at (808) 586-4185.

Sincerely,

Scott Glenn, Interim Director

Cc: Ron Terry, Geometrician Associates

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

February 25, 2016

Scott Glenn, Director
Office of Environmental. Quality Control
235 South Beretania Street, Suite 702
Honolulu HI 96813

Subject: **Comment to Draft Environmental Assessment on Hawai'i County Radio Communication Site at Ocean View Fire Station**

Dear Mr. Glenn:

Thank you for your comment letter dated on the Draft EA. In answer to your specific comments:

1. *Mitigation measures for minimizing impacts to endangered and threatened species.* Thank you for your assessment and recommendations. Our avian biologist and the U.S. Fish and Wildlife Service have stated that the risk of seabird collision in this area is very low, both because of the minimal height and size of the tower as well as the extremely low passage rates observed and/or modeled for the area. Inspection of tower areas for seabird collisions can be a complex process requiring trained observers frequently accessing the area. Kaua'i, where there is a high risk of collision, has an excellent network for reporting and dealing with downed birds. This does not exist in areas such as Ka'ū, where seabird downing is a rare event (we are unaware of any reports in this district). Nevertheless, DPW will actively consult with DLNR-DOFAW to determine if there are practical methods for instituting some form of inspection. In addition, Fire Department personnel will be provided with a copy of the protocol for dealing with a downed bird from an organization such as Save our Shearwaters or the Hawai'i Wildlife Center. Hawaiian hoary bats are not at risk of collision with a stationary tower.

2. *Albizia trees.* DPW concurs with your assessment of the hazard posed by albizia trees. Fortunately, the site has no albizia trees (or other tall trees) or realistic potential to have any tall trees growing nearby.

3. *Climate change.* DPW is cognizant of the need in its projects to account for potentially different and more extreme weather and climate in the future. The tower is rated for extremely high wind speeds, and the area that is required for grading is extremely small. All site runoff can easily be accommodated by the existing runoff absorbing areas on the previously graded project

site. Combined with the high permeability of the surrounding lava flow, the distance to the sea, and the lack of streams, there is no potential for stormwater runoff from the site impacting any water body during any rainfall event.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: David Yamamoto, DPW

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 5, 2016

Geometrician Associates, LLC
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

County of Hawaii
Department of Public Works
Attention: Mr. David Yamamoto
101 Pauahi Street, Suite 7
Hilo, Hawaii 96720

via email: dyamamoto@co.hawaii.hi.us

Dear Messrs. Terry and Yamamoto:

SUBJECT: Draft Environmental Assessment (EA) for Hawaii County Radio Communication Site at Ocean View Fire Station

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division and (b) Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 13, 2016

'16 JAN 13 AM 11:21 ENGINEERING

RECEIVED
LAND DIVISION
2016 JAN 22 AM 10:50
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO: FR:

DLNR Agencies:
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
___Commission on Water Resource Management
___Office of Conservation & Coastal Lands
_X_ Land Division – Hawaii District
_X_ Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment (EA) for Hawaii County Radio Communication Site at Ocean View Fire Station
LOCATION: Kau District; Island of Hawaii; TMK: (3) 9-2-031:019
APPLICANT: County of Hawaii, Department of Public Works

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **February 4, 2016**.

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on the Current Environmental Notice under Quick Links on the right.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: _____
Print Name: Carty S. Chang, Chief Engineer
Date: 1/21/16

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/ Russell Y. Tsuji
REF: Draft EA for Hawaii County Radio Communication site at Ocean View Fire Station Hawaii.005

COMMENTS

( ) We confirm that the parcel/project site, according to the Flood Insurance Rate Map (FIRM), is located in Zones X. The National Flood Insurance Program does not regulate developments within Zones X.

(X) Please take note that the project site, according to the Preliminary data in the Flood Insurance Rate Map (FIRM), is also located in Zone X. The National Flood Insurance Program does not regulate developments within Zones 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) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Carter Romero (Acting) at (808) 961-8943 of the County of Hawaii, Department of Public Works.

( ) Ms. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.

( ) Mr. Stanford Iwamoto at (808) 241-4896 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 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.

( ) 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: _____

_____

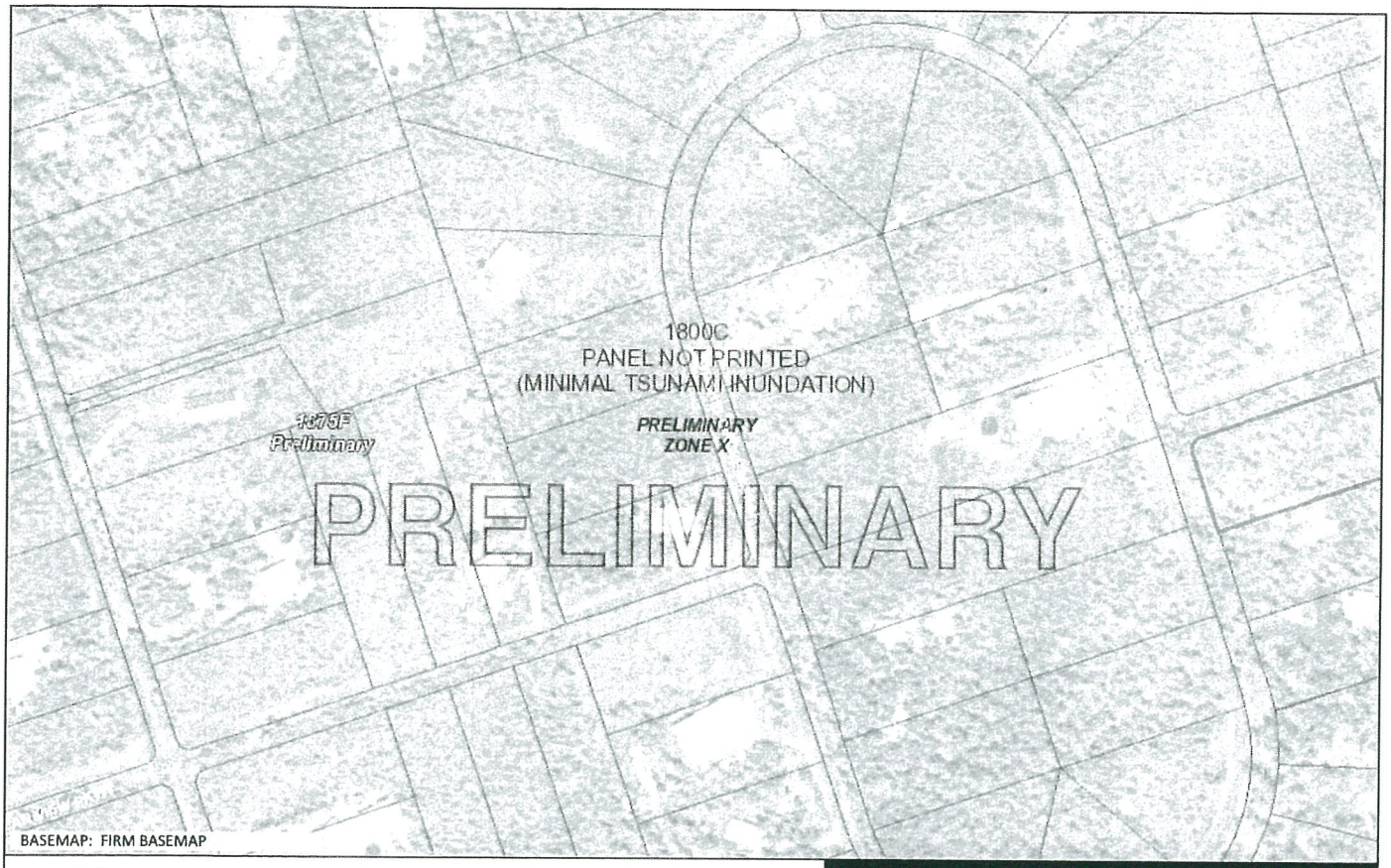
( ) Other: _____

_____

Should you have any questions, please call Mr. Rodney Shiraishi of the Planning Branch at 587-0258.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 1/21/14



BASEMAP: FIRM BASEMAP

Flood Hazard Assessment Report

www.hawaiinfip.org

EA Hawaii County Radio

Property Information

COUNTY:	HAWAII
TMK NO:	(3) 9-2-030:064
WATERSHED:	KAUNA
PARCEL ADDRESS:	UNKNOWN ADDRESS OCEAN VIEW, HI 96737

Notes:

Flood Hazard Information

FIRM INDEX DATE:	APRIL 02, 2004
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1551661800C
PANEL EFFECTIVE DATE:	PANEL NOT PRINTED

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

N

0 200 400 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 13, 2016

MEMORANDUM

RECEIVED
LAND DIVISION
2016 JAN 25 AM 11:10
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
___Commission on Water Resource Management
___Office of Conservation & Coastal Lands
_X_ Land Division – Hawaii District
_X_ Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment (EA) for Hawaii County Radio Communication Site at Ocean View Fire Station
LOCATION: Kau District; Island of Hawaii; TMK: (3) 9-2-031:019
APPLICANT: County of Hawaii, Department of Public Works

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **February 4, 2016**.

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on the Current Environmental Notice under Quick Links on the right.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

(✓) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed: _____

Print Name: GORDON C. HEIT
Date: 1/21/16

cc: Central Files

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

February 25, 2016

Russell Y. Tsuji, Administrator
Hawai'i State DLNR Land Division
P.O. Box 621
Honolulu HI 96809

Subject: **Comment to Draft Environmental Assessment on Hawai'i County Radio Communication Site at Ocean View Fire Station**

Dear Mr. Tsuji:

Thank you for your comment letter on the Draft EA dated February 5, 2016. We wish to acknowledge the no objection memo by the Hawai'i District Land Office and the statement by the Engineering Division that the property is in Flood Zone X, a designation noted in the Draft EA.

We very much appreciate your review of the document, including circulation to various DLNR agencies. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: David Yamamoto, DPW

William P. Kenoi
Mayor

Duane Kanuha
Director

Bobby Command
Deputy Director

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

February 4, 2016

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96721

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment
Applicant: County of Hawai'i, Department of Public Works
Project: Radio Communication Site at Ocean View Fire Station
TMK: (3) 9-2-031:019, Ka'ū, Hawai'i

This is in response to your letter received on January 7, 2016, requesting our comments on the above-referenced project.

We provided preliminary comments by letter dated June 25, 2015, for the proposed project and have no additional comments on the Draft Environmental Assessment.

If you have questions, please feel free to contact Esther Imamura of this office at 961-8139.

Sincerely,

DUANE KANUHA
Planning Director

ETI:klt
P:\Wpwin60\ETI\Eadraftpre-Consul\Terry Ocean View County Tower Site.Rtf

cc: Mr. David Yamamoto
Department of Public Works

Plannning Department - Kona

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

February 25, 2016

Duane Kanuha, Director
Hawaii County Planning Department
101 Pauahi Street, Suite 3
Hilo HI 96720

Subject: **Comment to Draft Environmental Assessment on Hawai'i County Radio Communication Site at Ocean View Fire Station**

Dear Mr. Kanuha:

Thank you for the comment letter dated February 4, 2016, in which you stated that your office had provided preliminary comments by letter dated June 25, 2015 for the proposed project and had no additional comments.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: David Yamamoto, DPW

PHONE (808) 594-1888

FAX (808) 594-1938

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
560 N. NIMITZ HWY., SUITE 200
HONOLULU, HAWAI'I 96817

HRD 16-7726

February 9, 2016

Ron Terry
Geometrician Associates
P.O. Box 396
Hilo, Hawai'i 96721

Re: Draft Environmental Assessment and Finding of No Significant Impact for Hawai'i County Radio Communication Site at Ocean View Fire Station
Kahuku Ahupua'a, Ka'ū Moku, Hawai'i Mokupuni
TMK: (3) 9-2-031:019

Aloha Mr. Terry:

The Office of Hawaiian Affairs (OHA) received your undated letter on January 13, 2016, requesting comments on the above-titled project. Given the project descriptions provided, our agency has no comments at this time. Should you have any questions, please contact Everett Ohta at 594-0231 or everetto@oha.org.

'O wau iho nō me ka 'oia 'i'o,

Kamana'opono M. Crabbe, Ph.D.
Ka Pouhana, Chief Executive Officer

KC: rg

C: David Yamamoto, Dept. of Public Works, County of Hawai'i

**Please address replies and similar, future correspondence to our agency:*
Dr. Kamana'opono Crabbe
Attn: OHA Compliance Enforcement
560 N. Nimitz Hwy., Ste. 200
Honolulu, Hawai'i 96817

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

February 25, 2016

Dr. Kamana'opono Crabbe
Office of Hawaiian Affairs
560 N. Nimitz Hwy., Suite 200
Honolulu, HI 96817

Subject: **Comment to Draft Environmental Assessment on Hawai'i County Radio Communication Site at Ocean View Fire Station**

Dear Dr. Crabbe:

Thank you for the comment letter dated February 9, 2016, in which you stated that your agency had no comments at this time on the project or Draft EA.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: David Yamamoto, DPW

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ENVIRONMENTAL ASSESSMENT

Hawai‘i County Radio Communication Site At Ocean View Fire Station

APPENDIX 3
EME Assessment-FCC Radiation Limit Information

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COUNTY OF HAWAI'I

FCC RADIATION LIMIT INFORMATION

TO DESIGN, FURNISH, DELIVER, AND INSTALL RADIO SYSTEM UPGRADES FOR THE COUNTY OF HAWAI'I

RFP NO. 2941

CONTRACT NO. 004757

CONTRACT DESIGN REVIEW

SUBMITTAL DATE: FEBRUARY 9, 2015

MOTOROLA SOLUTIONS

MOTOROLA SOLUTIONS

Hawaii, HI
Fire Station 20/Keauohana Tank
EME assessment

February 9th 2015

Central Coverage Design Team
Motorola Solutions Inc., Schaumburg, IL
ccdt@motorolasolutions.com

Executive Summary

A computational assessment was carried out to provide an estimation of the EME (Electromagnetic Energy) exposure at proposed new antenna site locations in Hawaii, HI, as described in the following.

The compliance is established with respect to the US FCC regulations [1]. The assessment was carried out using the methodologies specified in [1]-[2]. The following tables provide compliance distances for *general public* and *occupational-type* exposures:

Ground level (individual or combined exposures)		
Site name	**Exposure Type**	Compliance distance
Fire Station 20/Keauohana Tank	**General Public Exposure**	All locations compliant
	Occupational Exposure	All locations compliant

Locations facing the antenna (individual or combined exposures)				
Antenna Location	Transmit Antenna Type	Transmit Antenna Height	Compliance distance	
			General Public	**Occupational**
Antenna #1	136 MHz	68 ft	5.7 m	1.3 m

The stated compliance distances are typically much larger than those that would be predicted to be calculated on the basis of an actual measurement taken under an SAR (Specific Absorption Rate) analysis. SAR is a more accurate measure of exposure and is the basic measure for exposure under the current international safety limits [3-4]. However, SAR is much more complicated to estimate (via measurements or computer simulations) than free-space fields or the equivalent power density. Thus, in this case the simpler, practical approach to compute the compliance distance based on the analytical estimation of the free-space equivalent power density is used.

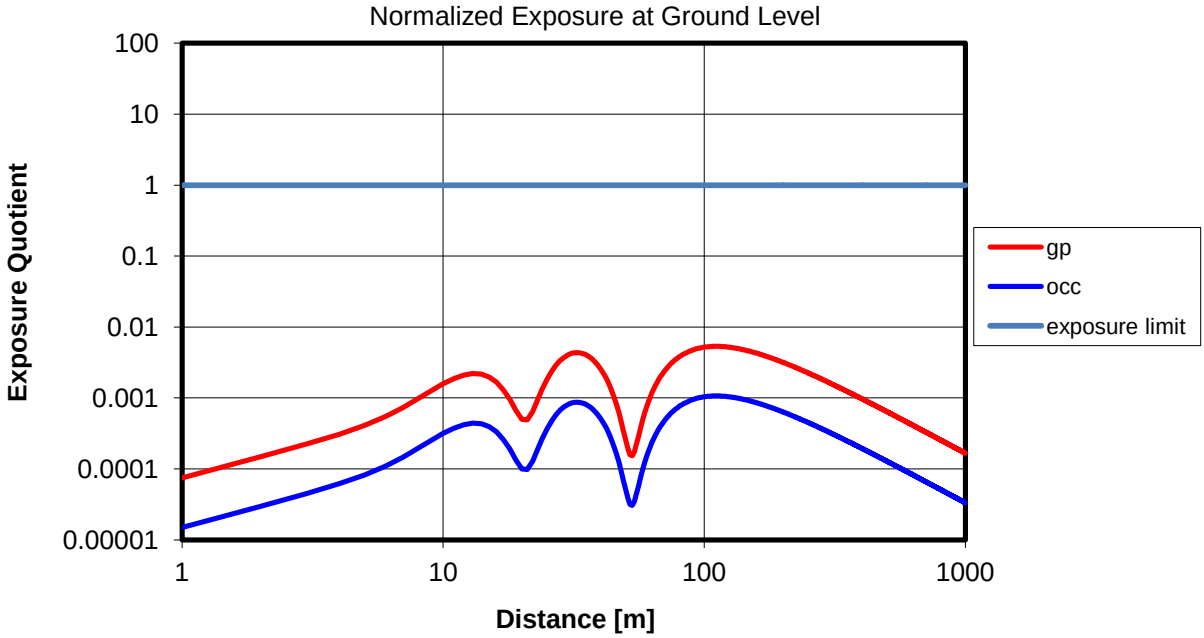
Applicable exposure limits

The FCC exposure limits [1], when expressed in terms of equivalent power density, are frequency dependent. In particular, at 136 MHz the limit is 2 W/m^2 for the *general public* (S_{gp}) and 10 W/m^2 for *occupational-type* (S_{occ}) exposure.

Results

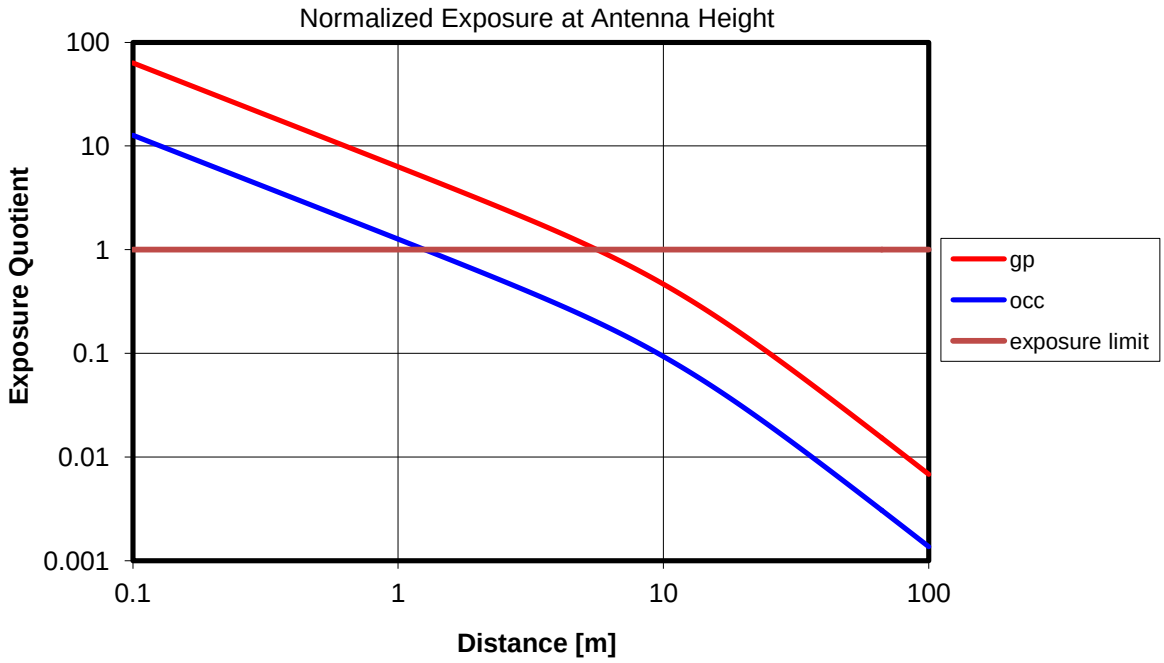
Ground Level

The following plot shows the exposure quotient at ground level, indicating that the exposure is at least 180 times lower than the general public limit at any distance from the tower.



In front of the antenna

A combined exposure quotient shown below yields a compliance distance of 1.3 m for occupational exposure and 5.7 m for general public exposure.



This EME (Electromagnetic Energy) Assessment Report (Report) contains Motorola's best estimate of EME exposure at the indicated sites. The actual EME exposure may vary, depending on various factors. Neither the Federal Communications Commission nor any other state or federal agency has reviewed, approved or disapproved this Report. Any publication, reproduction or transfer of this Report to a third party, requires the prior written approval of Motorola. Any such Motorola-approved publication, reproduction or transfer of this Report, must be of the Report in its entirety, including its complete wording and date of issue. By providing this Report, Motorola does not entitle the recipient to use any Motorola trademark or other intellectual property.

Site Matrix:

Tx Antenna	Frequency (MHz)	Antenna Model	Antenna Length (ft)	Antenna Gain (dBd)	Antenna Horizontal BW (deg)	Antenna Vertical BW (deg)	Mounting Height (ft)	Downtilt (deg)	Number of channels	Total ERP (dBm)	Total ERP (W)
Antenna #1	136	OA 40-41	21	9	176	17	68 AGL	0	4	60.02	1012

References

[1] United States Federal Communication Commission, “Evaluating compliance with FCC guidelines for human exposure to radiofrequency electromagnetic fields,” OET Bulletin 65 (Ed. 97-01), August 1997.

[2] R. Cicchetti and A. Faraone, “Estimation of the Peak Power Density in the Vicinity of Cellular and Radio Base Station Antennas,” *IEEE Transactions on Electromagnetic Compatibility*, Vol. 46, No. 2, pp. 275-290, May 2004.

[3] International Commission On Non-Ionizing Radiation Protection, “Guidelines For Limiting Exposure To Time-Varying Electric, Magnetic And Electromagnetic Fields (Up To 300 GHz),” published in: Health Physics 74 (4):494-522; 1998.

[4] IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields,3 kHz to 300 GHz (2005).

Appendix A: Exposure prediction models.

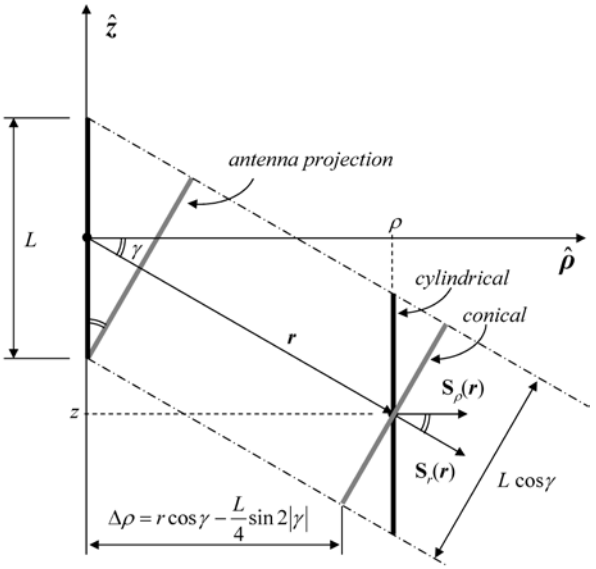


Fig. 1. Reference frame and notations employed to describe the cylindrical model.

Exposure prediction model

Three different models are employed to perform the exposure assessment. One is relative to exposures *in front of* collinear arrays; another is for exposures in front of dish antennas; another is for exposure *at ground/roof level*.

A. Exposure in front of collinear array antennas

The behaviors of the spatially averaged equivalent power density in the near radiating field of typical base station array antennas (omni-directional or sector coverage) can be predicted using simple algebraic formulas that depend on a few, readily available antenna parameters, such as directivity, beamwidth, physical length, and the radiated power [2]. The spatial domain where the prediction is valid encompasses the antenna *enclosing cylinder* (defined as a cylinder centred on the antenna axis, extending as much as the antenna length in height), at distances greater than one wavelength (i.e., outside the reactive near field region of the individual array elements), along all azimuth directions within and outside the main beam, up to the far field.

The most frequent application of the method is when exposure is assessed very close to the antenna, within its radiating near field region, where workers may be present for maintenance or other duties and in those cases where an exposure assessment is desired at buildings facing antennas. In those cases it is desirable to avoid large overestimations produced by simpler models that do not take into account the distributed nature of the radiator (but rather model the RF emission as stemming from a source point), while avoiding complex full-wave simulations or other type of modelling requiring in depth knowledge of the antenna structure and operation from an electromagnetic standpoint.

The method in [2] provides reliable predictions as long as scattered fields from objects surrounding the antenna are not significant and electrical beam down-tilt does not exceed 10^0. In practice, it is important that significant scatterers do not protrude inside the antenna enclosing cylinder, particularly in the main beam, and that pavement reflections do not become relevant. The model predictions are mostly reliable in the radiating near field, before the RF energy propagation regime converts from cylindrical to spherical in character, because antennas will most likely be installed in such a way that no significant scattering from pavement or nearby objects occurs in the radiating near field.

The reference frame relative to an array antenna axis and the relevant analytical notations employed in the analytical prediction formulas for the spatially-averaged power density are illustrated in Fig. 1.

The parameters required to apply the formulas are the following:

W_{rad} : Antenna radiated power;
L : Equivalent electrical antenna length (meters);
D_A : Antenna peak directivity (unitless); the peak gain can be used;
γ : Electrical down-tilt angle of the antenna main beam (radians);

Observe that the equivalent electrical antenna length is typically shorter than the antenna enclosure. This is due to the fact that the physical extension of the antenna array elements is confined within a sub-volume of the enclosure, and the fact that in some cases the power feeding profile for the array elements is non uniform, whereas the model assumes it is. Using a shorter antenna length in the RF exposure evaluation provides indeed a conservative bias since the RF energy emission is confined to a smaller effective aperture (the enclosing cylinder height) where, for a given radiated power, its power density is consequently higher.

For sector arrays, the prediction formula for the spatial-peak equivalent power density is:

.

$$\hat{S}_r(r,\phi;\gamma)=\frac{W_{rad}\ 2^{-\left(\frac{\phi}{\bar{\phi}_{3dB}}\right)^2}}{\bar{\phi}_{3dB}\cdot r\cdot L\cdot\cos^2\gamma\sqrt{1+\left(2\frac{r}{r_0}\right)^2}},\quad r_0=\frac{\bar{\phi}_{3dB}}{6}D_A L\cos^2\gamma \qquad (1)$$

The above prediction formula does not take into account the formation of grating lobes near *endfire*, whose power content typically becomes significant for tilt angles greater than 10^0. Hence, we delimit conventionally the validity of this formula to the range $|\gamma|\leq 10^0$.

Because near-field coupling between antenna and exposed body is not considered in the present treatment, the MPE estimates based on it should be trusted only for distances larger than a quarter wavelength.

B. Exposure in front of dish antennas

The following formula (2) [1] allows estimating an upper bound of the RF exposure in front of the dish antennas:

$$S_{dish}=\frac{4W_{rad}}{A} \qquad (2)$$

where: *A* is the area of the dish aperture. Therefore, antennas with larger apertures produce lower exposure than antennas with smaller apertures, for the same input RF power.

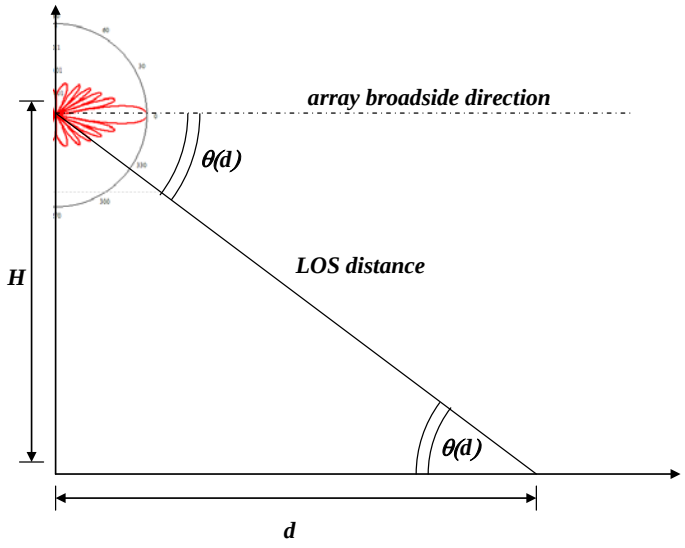


Fig. 2. Schematic of the ground-level exposure model adopted for the assessment.

C. Exposure at ground/roof level

This type of exposure occurs in the antenna far-field, and is very low, so simpler expressions can be employed. The antenna phase center is assumed to be the mounting height. The resulting predictive equation for the power density produced by each antenna at ground/roof level is:

$$S(d) = (2.56) \cdot \frac{W_{rad} \cdot G\left(\theta(d)\right)}{4\pi\left(H^2 + d^2\right)} \tag{3}$$

where W_{rad} is the radiated power, and $G(\theta)$ is the elevation gain pattern, which is approximated by means of the following expression

$$G(\theta) = G_A \left[\left| \frac{\sin\left(\frac{k_0 L}{2}\sin\theta\right)}{\frac{k_0 L}{2}\sin\theta} \cos^X \theta \right|^2 \left(1 - B\right) + B\cos^{1/X}\theta \right] \tag{4}$$

where G_A is the antenna gain, k_0 is the free space wavenumber and *L* is the effective antenna length yielding the appropriate vertical beamwidth, *X* and *B* are auxiliary parameters used to shape the elevation pattern, while *H* is the antenna height above ground and *d* is the field point distance from the base of the installation tower (see Fig. 2). The factor "2.56" is introduced to enforce near-perfect, in-phase ground reflection as recommended in [1].

Exposure assessment

Since the exposure is produced by transmitters operating in different bands, where applicable the *exposure quotient* (EQ) is computed according to [1] by scaling at each evaluation point the exposure produced by each source by the corresponding applicable exposure limit (the MPE – Maximum Permissible Exposure), and compliance is achieved if the EQ is not greater than unity:

$$EQ(x, y, z) = \sum_k \frac{S_k(x, y, z)}{MPE_k} \leq 1 \tag{5}$$

Appendix B: Antenna Datasheets.

OA Series

VHF Offset Dipole Arrays

136 - 174 MHz

RFI

These high performance VHF dipole offset arrays are ideal for use when a cardioid pattern is required. The arrays feature high gain, low noise performance and enhanced null fill coverage with typical cardioid coverage characteristics.

These antennas offer industry leading PIM ratings, essential for the latest digital radio systems. All welded alodined aluminum construction and new fabrication techniques in both the harness and dipole sections have proven to minimize intermodulation and noise generated within the antennas. The entire array rests at ground potential and offers the ultimate in lightning resistant antennas.

OA series arrays have an almost full 180° horizontal beamwidth. This eliminates the possibility of fading at the extremities of the target coverage area. Antenna gain is approximately unity at the rear of the antenna.

As would be expected from a cardioid array, the vertical beamwidth is slightly greater than its BA (omnidirectional) or EA (elliptical) pattern counterparts.

OA series arrays feature the same solid construction as the BA and EA Series. The folded dipoles utilize an internal phasing harness in stable, PTFE based double-shielded coaxial cable with PE jacket for optimum weatherproofing. The offset arrays incorporate extensive side lobe suppression, null fill, and power input levels of 750 watts continuous.

- High gain offset (cardioid) pattern. 5dBd or 9dBd versions available
- Operate over entire 136-174 MHz VHF band without tuning or adjustment
- 3° downtilt option available on OA40-41
- OA40-41-DIN may be ordered as 2 x 5dBd arrays on one boom assembly. Specify model OA2020-41-DIN. Typical space isolation between the two arrays is 25dB.
- **Industry leading PIM ratings providing low IM and low noise characteristics for optimum performance**

0A20-41-DIN

OA Series

VHF Offset Dipole Arrays

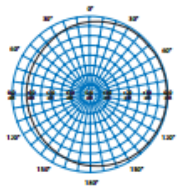
136 - 174 MHz

RFI

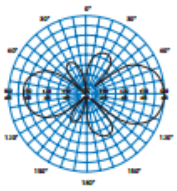
Electrical Specifications			
Model Number		OA20-41-DIN	OA40-41-DIN
Nominal Gain *dBd*		5	9
Frequency *MHz*		136 - 174	
Tuned Bandwidth		Entire band	
VSWR (Return Loss)		<1.5 :1 (14dB)	
Nominal Impedance Ω		50	
Downtilt		Not offered	0° Std, -3°. See note (2)
Vertical Beamwidth		35°	17°
Horizontal Beamwidth		178°	176°
Input Power *(Watts)*		750	
Passive IM 3rd order *(2x20W) dBc*		-150	-140

Mechanical Specifications			
Model Number		OA20-41-DIN	OA40-41-DIN
Construction & Configuration		2 dipoles (2 bays) Single sided Single section support	4 dipoles (4 bays) Single sided Dual section support
Length *inches*		138	248
Weight *lbs*		28	64
Shipping Weight *lbs*		188	282
Shipping Dimensions *inches*	H	21	21
	W	8	12
	L	146	146
Termination		7/16" DIN female with 20" 9142 cable tail	
Mounting Area		20" x 2.5" diam. aluminum	
Suggested Clamps (not included)		UC12	UC13
Projected Area *ft²*	No ice	4.0	8.0
	With ice	6.7	12.4
Lateral Thrust @ 100mph *lbs*		99	197
Wind Gust Rating *mph*	No ice	149	119
	With ice	117	95
Torque @100mph *ft-lbs*		406	1713

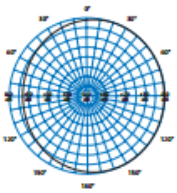
OA20-41-DIN - H Plane



OA20-41-DIN - E Plane



OA40-41-DIN - H Plane



OA40-41-DIN - E Plane