

UNIVERSITY OF HAWAII AT MĀNOA

OFFICE OF THE CHANCELLOR

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

Dear Ms. Salmonson:

Subject: Notice of Determination - Finding of No Significant Impact
Telecommunications Facility, University of Hawai'i at Mānoa
East-West Road Gateway House Rooftop Antenna Site,
Honolulu, O'ahu, HI TMK: (1) 2-8-023:003

The University of Hawai'i at Mānoa has reviewed the responses to comments related to the Draft Environmental Assessment received during the 30-day public comment period that began on January 23, 2006. The agency has determined that this project will not have significant environmental effects and has issued a Finding of No Significant Impact. Please publish this notice in the April 8, 2006 edition of *The Environmental Notice*.

We have enclosed the following items for your review:

- (1) One copy of the OEQC Environmental Notice Publication Form;
- (2) Four copies of the Final EA.

The following information is provided in accordance with the requirements for a Notice of Determination:

Identification of Applicant

T-Mobile West Corporation (formerly VoiceStream PCS II Corporation)

Identification of Accepting Agency

University of Hawai'i at Mānoa, State of Hawai'i

Determination

Finding of No Significant Impact (FONSI)

Reasons Supporting Determination

This determination is based on the significance criteria listed in Section 11-200-12 of the Environmental Impact Statement Rules:

March 23, 2006

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

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1. The proposed project will not involve an irrevocable commitment to loss or destruction of any natural or cultural resources.
2. The proposed project will not curtail the range of beneficial uses of the environment. The project will be located within the University of Hawai'i parcel and easements, designated for institutional facilities.
3. The proposed project will not conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.
4. The proposed project will not have a substantial negative effect on the economic or social welfare of the community or State. The project will not have a long-term impact on employment or economics. The impact on social welfare will be positive since the proposed project will enhance telecommunication service for the community.
5. The proposed project will not substantially affect public health (in a negative manner). Rather, the project will provide a means to minimize emergency response time by providing efficient, quality telecommunication service on the university campus and its surrounding area.
6. The proposed project does not involve substantial secondary impacts, such as effects on public facilities (in a negative manner). Rather, it will increase capacity of the existing communication system to serve the university campus and its neighboring parcels in conformance with the County General Plan and the Primary Urban Center Development Plan.
7. The proposed project does not involve a substantial degradation of environmental quality. Antenna facilities are clean, unmanned facilities that do not generate additional vehicular traffic or degrade noise or air quality.
8. The proposed project does not have considerable cumulative effect upon the environment, and no larger commitment is required for the proposed antenna site.
9. The proposed project will not substantially affect rare, threatened, or endangered species, or their habitat since there are none present within the project site.
10. The proposed project will not detrimentally affect air or water quality or ambient noise levels. These potential impacts and mitigation measures have been addressed in the appropriate sections of the EA.

FILE COPY

Final Environmental Assessment

for

***Proposed T-Mobile West Corporation
East West Road Gateway House
Rooftop Antenna Site
University of Hawai`i at Mānoa
Honolulu, O`ahu, Hawai`i***

Submitted Pursuant to Chapter 343, Hawai`i Revised Statutes (HRS), as amended

Applicant:
T-Mobile West Corporation

Approving Agency:
University of Hawai`i at Mānoa

Prepared by:
Environmental Planning Solutions, LLC

March 2006

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**DEPT. OF ENVIRONMENTAL
QUALITY CONTROL**

Final Environmental Assessment

**Proposed Antenna Facility
Gateway House Rooftop
University of Hawai'i at Mānoa
Tax Map Key No. 2-8-023:003**

Prepared Pursuant to Chapter 343, HRS, as amended

**Applicant:
T-Mobile West Corporation
625 Piikoi Street, Suite 100
Honolulu, Hawaii 96814**

**Approving Agency:
University of Hawai'i at Mānoa
2444 Dole Street
Honolulu, HI 96822**

**Prepared by:
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, HI 96816**

March 2006

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SUMMARY INFORMATION

CHAPTER 343, HAWAII REVISED STATUTES (HRS) FINAL ENVIRONMENTAL ASSESSMENT

Proposed Action: Installation of cellular telecommunications facility on the rooftop of the west wing of the Gateway House resident facility. The antenna facility will consist of 3 base transmitting system (BTS) cabinets and 1 electrical/telephone panel within an enclosed, raised metal platform. 11 panel-type antennae, 6-feet long x 9-inches wide, will be mounted on the exterior of the platform enclosure. The enclosure and antennae will be painted to blend with existing building color schemes. Electrical and telephone lines will extend from the facility along the interior of the rooftop parapet to the existing elevator shaft and then down the exterior of the shaft to first floor level service outlets.

Applicant: T-Mobile West Corporation
615 Piikoi Street, Suite 100
Honolulu, HI 96814
Contact: Mr. Roy Irei, Director of Development
Telephone: (808) 593-0600 Fax: (808) 593-1610

Approving Agency: University of Hawai'i at Mānoa
2500 Campus Road
Honolulu, Hawai'i 96822

Land Owner: University of Hawaii
State of Hawai'i
Office of Procurement, Real Property and Risk
Management, 1400 Lower Campus Road, Rm. 15
Honolulu, Hawai'i 96822
Contact: Ms. Lynn Nakamasu
Telephone: (808) 956-2115

T-Mobile West Corporation
UHM East West Road Gateway House Environmental Assessment

Project Location: 2563 Dole Street
West Tower
Honolulu, Hawai'i 96822

TMK No.: (1) 2-8-023:003

Land Use Classifications: State Land Use District: Urban
County Development Plan: Institutional
County Zoning: R-5 Residential

Lot Area: 88,760,400 square feet (103.482 acres)

Project Area: 280 square feet

Height Limit: 25-30 feet
Special Management Area: No
Flood Zone: AE & X

Permits Required: Minor Modification to Plan Review Use (PRU)
Building Permit

Assessment Prepared by: Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawai'i 96816
Contact: Colette Sakoda, Principal
Telephone: (808) 732-8602 Fax: (808) 538-3168

Agency Determination: Anticipated Finding of No Significant Impact

Agencies, Individuals and Organizations Contacted During Pre-Assessment:
-Mānoa Neighborhood Board No. 7
-State of Hawai'i, Department of Land and Natural Resources, Historic Preservation Division
-State of Hawai'i, Department of Health, Noise and Radiation Division
-University of Hawai'i at Mānoa, Environmental Health and Safety Office, Radiation Safety Program
-Hawai'i Natural Heritage Program
-United States Fish and Wildlife Service

1.0 INTRODUCTION AND PURPOSE AND NEED

T-Mobile West Corporation (formerly VoiceStream PCSII) is proposing to install a cellular communications facility at the ewa (west) wing of the existing Gateway House student residence building situated within the University of Hawai'i Manoa Campus located at 2563 Dole Street, Honolulu, on the island of Oahu. Prior to installation of the facility the University of Hawaii requested an environmental assessment (EA) be conducted of the facility for the site and project in compliance with the environmental laws of the State of Hawai'i.

Procedural requirements for the preparation of the EA, including contents and significance criteria, are defined by Hawai'i Administrative Rules, Department of Health, Chapter 200, Title 11, Environmental Impact Statement Rules, Subchapter 6, sections §11-200-10 and §11-200-12.

Purpose and Need: This project was initiated by the need for improvement to the spotty coverage in addition to increased customer demand on the University campus. To fulfill the licensing agreements with the Federal Communications Commission (FCC) and better serve the public, T-Mobile West Corporation commenced a study to determine the optimum location for a communications site.

This Environmental Assessment (EA) has been prepared to identify and evaluate the existing conditions and potential impacts of the installation of an antenna installation at the top of Gateway House on the natural and human environment. This EA has been prepared in accordance with the provisions of Chapter 343, HRS and Title 11, Chapter 200 of the State Department of Health's Administrative Rules, as the proposed action involves the use of state land. See Figures 1 and 2 for Vicinity and Building Location.

1.1 IDENTIFICATION OF APPLICANT

T-Mobile West Corporation, is a wireless telecommunications service provider proposing to implement this project.

1.2 IDENTIFICATION OF APPROVING AGENCY

The University of Hawai'i is the designated approving agency because it is the landowner. A minor modification to the University's Plan Review Use (PRU) File No. 88/PRU-3 is required by the City and County of Honolulu. Thus, the EA prepared in accordance with Chapter 343, HRS, is a supplemental document to the minor modification to the PRU application.

1.3 IDENTIFICATION OF AGENCIES AND ORGANIZATIONS CONSULTED IN MAKING THE ASSESSMENT

***T-Mobile West Corporation
UHM East West Road Gateway House Environmental Assessment***

Listed below are the agencies and organizations consulted in the preparation of the DEA.

Federal Government:

- U.S. Department of Interior U.S. Fish & Wildlife Service

State of Hawai`i:

- State Department of Education
- State Department of Land and Natural Resources
Historic Preservation Division
- State Department of Health, Noise and Radiation Division
- Office of Hawaiian Affairs
- State Department of Transportation
- University of Hawai`i Mānoa Facilities Planning and Management Office
- University of Hawai`i Environmental Health and Safety Office, Radiation Safety Program
- University of Hawai`i Mānoa Environmental Center
- Hawai`i Heritage Program

Utilities:

- HawTelcom, Inc.
- Hawaiian Electric Company
- Oceanic Time Warner Cable Hawai`i

City and County of Honolulu:

- Board of Water Supply
- Department of Planning and Permitting
- Department of Transportation Services
- Fire Department
- Police Department

Other:

- Mānoa Neighborhood Board No. 7

A total of nine (9) letters were received as of February 23, 2006. Letters and responses are included in the Appendix of this final environmental assessment. The University of Hawai`i Manoa has reviewed the letters and written responses and has concluded that the proposed project will not result in adverse impacts to the environment.

1.4 SUMMARY OF MAJOR IMPACTS AND MITIGATING MEASURES

1.4.1 SHORT TERM IMPACTS

TRAFFIC AND PARKING. Minor traffic impacts will occur as a result of construction related traffic and the operation of construction equipment which may, on occasion, impede traffic in the immediate vicinity of Gateway House. In addition, the proposed project may inhibit the use of the east end of East West Road fronting Gateway House while a boom truck is parked to unload the bulk of the panel antenna and equipment cabinet hardware. This is expected to be up to a 3-day period.

NOISE. Construction activities will result in an increase in noise levels during the one-month installation period. However, disruption to existing activities is anticipated to be minimal as the proposed project will not involve major earthmoving, pile driving or heavy demolition work.

AIR QUALITY. During construction, fugitive dust generation and on-site emission from construction and installation activities may affect air quality in the immediate vicinity of the project. However, these impacts are anticipated to be minor due to the short construction period and small size of the actual exterior equipment installation.

To mitigate potential short-term impacts associated with construction activities, the installation of the equipment should be coordinated with the university to minimize disruption of residents and use of the building's elevator, preferably concentrating construction drilling when the university is not in session.

1.4.2 LONG TERM IMPACTS

TRAFFIC AND PARKING. The proposed project will not result in any loss of parking spaces. Neither will it result in an increase in parking demand. The antenna facility will be unmanned and monitored from an offsite location. It will be visited once a month by a maintenance engineer whose normal length of stay on the site will be one hour. The project will not result in an increase in traffic volumes because it will be unmanned.

NOISE. The installation of electrical switching equipment in the 1 cabinet and 6 panel antennas will not result in any increase in noise levels in the long term at the rooftop or in the Gateway House.

VISUAL RESOURCES. The placement of 12 panel antennas flush-mounted on the walls of a 12-foot high equipment enclosure on the rooftop is anticipated to have limited impact on ground level views in the vicinity of the building as the view angle from the ground limits views to the outer portions of the roof. Visual impacts will mainly occur to view from the upper floors of adjacent buildings or from distant ground level viewpoints. However, these impacts are anticipated to be minimal because the overall size of the antennas and related accessories in comparison to the building itself will result in changes to portions of the building roof, but will not result in a significant alteration to the overall form. The antennas will be painted to blend in with the building paint color.

ELECTROMAGNETIC RADIATION (EMF). The rooftop of the Gateway House is restricted to public access. Only campus maintenance, contractors and T-Mobile West Corporation personnel will have access to the rooftop. These personnel will be aware of the facility and knowledgeable of the potential for exposure and can exercise control over their exposure. In the event that UH workers will be in close proximity to the antennas for prolonged periods, UH personnel will make prior arrangements with T-Mobile West Corporation. T-Mobile West Corporation will work with the UH personnel to mitigate any concerns including education of RF safety and use of RF monitor devices. If it is determined that work will be unsafe, T-Mobile West Corporation will work with UH on reducing the power level of the antennas possibly remotely powering down the antennas. UH personnel are aware that powering down the antennas will affect service and will be possible for rare and short periods of time. Caution or warning signs related to radiation safety will be posted on the locked roof access door and padlocked roof scuttle and the exteriors of the west facing wall.

T-Mobile West Corporation is licensed by the Federal Communications Commission (FCC) and complies with very strict emission guidelines. T-Mobile West Corporation radio engineers conducted an electromagnetic radiation (EMR) hazards analysis for the proposed installation of the T-Mobile West Corporation CDMA PCS base station site on Gateway House. The T-Mobile West Corporation report dated July 2005 in its entirety is included in the Appendix of this DEA. Analysis of the potential for RF hazards to personnel at the facility, conducted using an MPE analysis software application widely used in the wireless telecommunications industry, Roofview V4.15, revealed that personnel on the rooftop or in the rooms directly below the rooftop will not be exposed to the power densities exceeding the FCC Office of Engineering Technology (OET) Bulletin 65 Maximum Permissible Exposure (MPE) limits. Furthermore, personnel located in offices on the lower floors of the building and at ground level will not be exposed to power densities exceeding the FCC MPE limits. Therefore transmission from the proposed antennas will not be hazardous to personnel (T-Mobile West Corporation RF Engineering, July 2005).

Professor Vincent Z. Petersen, an expert in the field of radiation and radio transmission at the UHM Department of Physics, was asked by the Associated Students of the University of Hawai'i (ASUH), to determine whether a higher intensity KTUH antenna on Saunders Hall would result in a radiation hazard to occupants of the building. Dr. Petersen prepared a paper entitled, "Statement Regarding Electromagnetic Radiation Levels Associated with Proposed KTUH FM Radio Transmission" in 1995. Calculations prepared by Dr. Petersen concluded that the FM radiation from the KTUH antenna with 3000 watt total radiated power, does not constitute a radiation hazard to occupants at the top floor (or any floor) of the Social Sciences Building. The maximum intensity on the

rooftop was projected as 30 times lower than FCC-acceptable radiation levels of 1.0 mW/cm². Please refer to a copy of Dr. Petersen's paper in the Appendix.

T-Mobile West Corporation's antenna would be radiating at a significantly lower level than the KTUH site.

SOCIO-ECONOMIC. Wireless technology provides high quality, safe and secure communication services to the community. To be effective, the necessary infrastructure must be built so that the convenience, mobility and connectivity of wireless communication devices are easily and readily available to all residents. In addition to improving public safety and providing new jobs, T-Mobile West Corporation is helping build a communications infrastructure that will support economic growth and additional tax revenues. Efficient and reliable communication is an essential requirement for people in any community. This installation is a part of a cellular telecommunications system that will help fulfill this need.

1.5 SUMMARY OF ALTERNATIVES CONSIDERED

Initial search yielded five potential locations for the antenna site:

1. Burns Hall located in the southeast quadrant of the intersection of Dole Street and East West Road.
2. Hale Manoa located north of Burns Hall and east of East West Road.
3. Holmes Hall located in the northwest quadrant of the intersection of Dole Street and East West Road.
4. Pacific Ocean Science & Technology located immediately north of Holmes Hall.
5. Gateway House located in the southeast quadrant of Dole Street and East West Road.

Only Gateway House provided the required alignment with existing T-Mobile West Corporation cellular communication sites needed for optimal service. Because of this, Gateway House was found to be the most suitable site T-Mobile's antenna facility.

1.6 DETERMINATION

Based upon the findings presented in the DEA and supporting technical studies, the potential impacts of the installation and operation of the T-Mobile West Corporation antenna facility have been sufficiently examined and discussed. After reviewing the significance criteria outlined in Section 11-200-12, EIS Rules, Contents of Environmental Assessments, it has been determined that the action is not expected to result in significant adverse effects on the natural environment. The DEA was circulated for public review and comment for a period of 30 days from January 23 to February 22, 2006. The

University of Hawai'i has reviewed written comments received during the review period and has issued a Finding of No Significant Impact (FONSI) for the proposed project.

2.0 PROJECT DESCRIPTION

2.1 PURPOSE AND NEED FOR THE PROJECT

According to the Civil and Structural Engineering design plans prepared for the project by Hawaii Engineering Group, Inc. and the site information package prepared by T-Mobile West Corporation, the cellular communications facility will consist of several components, including:

- **Lease Area**

T-Mobile West Corporation proposes to lease an approximate 12-foot x 12-foot area located at the southerly end of the west wing rooftop of Gateway House to install communication equipment. The installation, which will operate 24 hours a day, 7 days a week, is unmanned, and requires only monthly maintenance by the carrier's personnel.

The proposed UH facility will help to bridge the gap in coverage throughout the University campus and meet user demand for better coverage.

- **Equipment Enclosure**

The equipment enclosure will consist of a raised, grated metal platform enclosed on the south, east and west sides with metal siding. The platform will rise about 2-feet above the existing rooftop, with access to the enclosure provided by metal stairs. The enclosure walls will extend a maximum of 10-feet above the platform. All elements of the enclosure, including the metal stairs will be painted to blend with existing building color schemes.

- **Equipment Cabinets**

Three base transmitting system (BTS) equipment cabinets will be installed within the enclosure and mounted on the metal platform. Dimensions of the BTS cabinets are 5-feet high x 5-feet wide x 4-feet deep.

- **Electrical and Telephone**

Electrical and telephone panels will be installed within the enclosure and mounted on the enclosure walls. The panels measure approximately 3-feet in height, 4-feet in width, and 1-foot in depth. Electrical and telephone lines will extend from the rooftop panels along the interior of the existing rooftop parapet and then down the wall on the west end of the west wing to service outlets on the first floor of the building.

- **Antennae**

*T-Mobile West Corporation
UHM East West Road Gateway House Environmental Assessment*

Twelve panel antennae will be mounted to the exterior walls of the rooftop enclosure. The antenna measures 6-feet long x 9-feet wide x 4-inches deep. The antennae and mounting brackets will be painted to blend with existing building color schemes.

- **Site Access**

Access to the rooftop enclosure will be by way of the existing elevator and stairs.

2.2 Cost of Development and Construction Schedule

The cost to construct the facility is estimated to be less than \$80,000.00 and it is anticipated that construction will require less than 30 days. It is scheduled to start upon receipt of all zoning and building permit approvals. Construction of the facility will be accomplished during normal daylight working hours. No construction activities will be performed at the site during nighttime hours, Saturdays, Sundays, or holidays. Scheduling of construction will be closely coordinated with the UH Mānoa Facilities Planning and Management Office to minimize potential noise and traffic impact concerns in and around Gateway House.

Wireless technology provides high quality, safe and secure communication services to the community. To be effective, the necessary infrastructure must be built so that the convenience, mobility and connectivity of wireless devices are easily and readily available to all residents. In addition to improving public safety and providing new jobs, T-Mobile West Corporation is helping build a communications infrastructure that will support economic growth and additional tax revenues. Efficient and reliable communication is an essential requirement for people in any community. This installation is a part of a wireless telecommunications system that will help fulfill this need.

2.3 LOCATION, OWNERSHIP AND SURROUNDING LAND USES

The west wing of Gateway House is a 10-story co-ed residential hall with the first floor and mezzanine occupied by a restaurant, dining room and administrative offices. The tower was completed in 1962 and is comprised of reinforced concrete and concrete masonry unit construction. Access to the upper floors is by way of an elevator and emergency stairway. Elevator and mechanical penthouses and air conditioning units presently occupy the rooftop of the building. The roof is of composition construction and is bordered by small 12 to 18-inch high parapet. Gateway House is situated in the southeasterly portion of the Manoa campus and is surrounded by athletic fields to the south, Frear Hall to the east, Burns Hall and National Marine Fisheries Services and Burns Hall to the north and Johnson Hall-B to the west.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT, ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

3.1 CLIMATE

A. Existing Conditions

Average daily minimum and maximum temperatures range from the low 70s (degrees Fahrenheit) to the low 90s, depending on the time of day and the season. Average daily temperatures vary by about 6.5 degrees between winter and summer seasons, and 15 to 20 degrees between day and night.

Precipitation is seasonal, with most rainfall occurring between the months of December through April. The adjusted median annual rainfall for this location is approximately 30 inches.

B. Anticipated Impacts and Mitigative Measures

The proposed project will have no effect on climatic conditions.

3.2 TOPOGRAPHY

A. Existing Conditions

The site is essentially flat. The elevation is approximately 70 feet above mean sea level (msl). The proposed project will not require alterations to existing grades as the project involves primarily installation of new fixtures to an existing structure without ground alterations or grading activities.

B. Anticipated Impacts and Mitigative Measures

The proposed project will have no effect on topographic conditions.

3.3 GEOLOGY AND SOILS

A. Existing Conditions

Geology. Oahu has four major geomorphic provinces: (1) Koolau Range; (2) Waianae Range; (3) Schofield Plateau; and (4) Coastal Plain. The Koolau Range forms the eastern part of the island and is the one lying behind Honolulu. Puu Konahuanui, the highest point, is 3,105 feet high. The range is 37 miles long and is deeply eroded by streams. In places it has high sea cliffs along its shore. The range consists entirely of thin, narrow, basaltic lava flows piled one upon the other like shingles, with minor amounts of volcanic ash and numerous dikes. Secondary

geomorphic forms are the Nuuanu Pali and the younger secondary tuff cones. It is believed that the main volcano was built during a single episode.

The rocks of the ancient Koolau volcano are chiefly thin tholeiitic basalts with minor amounts of ash and their associated dike feeders. The rocks have been divided into two groups, the Kailua volcanic series and the Koolau volcanic series. The Koolau volcanic series were erupted from two main rift zones in Pliocene time. Rejuvenated-stage lavas mainly erupted in the Honolulu areas, thus their name; the Honolulu Volcanics. The site is mapped by MacDonald, Davis and Cox as being underlain by alluvial soil and gravel overlying lava flows of the Honolulu volcanic series which consist of alkalic basalt, basanite, nephelinite, and melilitite.

Soils. According to the U.S. Soil Conservation Service, the soils on the property are comprised of Makiki Stony Clay Loam (MIA). This series consists of well-drained soil, and this particular soil type is found on slopes of 0 to 3 percent. Stones make up about 15 percent of this soil type by volume. The depth of the underlying bedrock or ash varies from 20 to 60 inches.

B. Anticipated Impacts and Mitigative Measures

Geology. Construction and operation of the facility will not impact or adversely affect any volcanic bedrock.

Soil. The proposed project will have no effect on soil character as the site is entirely urban in character and the proposed improvements, which are concentrated on the rooftop of Gateway House, will not involve earthwork.

3.4 SURFACE WATER AND DRAINAGE

A. Existing Conditions

The proposed project is designated as Zone X, defined as "areas determined to be outside the 500-year flood plain" by the National Flood Insurance Program, Flood Insurance Rate Map (FIRM). The site is urban in character with concrete pavement and landscaping. The bulk of work on the proposed project will be concentrated on the upper roof of the existing building.

B. Anticipated Impacts and Mitigative Measures

The proposed project is not anticipated to have any impacts on existing drainage patterns or volumes because the site is already highly urban. Ground level activity will involve trucking in the panel antennas, cabinet and associated facility hardware to the southeast side of the building, with construction workers carrying the bulk of the hardware to the rooftop via the elevator. Because most of the installation

hardware will be delivered to the rooftop in the same manner as office equipment, little to no impact is expected even during construction. The exception would be the delivery and boom-lifting of the cabinet to the ewa side of the building.

3.5 FLORA AND FAUNA
A. Existing Conditions

The vegetation and wildlife on the project site are entirely urban in character. A NEPA Land Use Screening analysis was conducted by VoiceStream in 2003. As part of the screening, the Hawai'i Natural Heritage Program at the University of Hawai'i at Manoa and the United States Department of the Interior, Fish and Wildlife Service (USFWS) were consulted. The Hawai'i Natural Heritage Program provided data of one rare species recorded in the area of Gateway House, the Hawaiian Hoary Bat. The bat was reportedly observed near a warehouse at the National Marine Fisheries Service (mauka of the project site) in 1982. The USFWS provided a statement that to the best of their knowledge, no federally listed threatened or endangered species, or proposed threatened or endangered species, or proposed designated critical habitat occur on the proposed project site. Existing vegetation in the vicinity of the ground floor improvements include medium to large trees. Other vegetation includes grass and shrubs on the south side of the building. Some birds observed at the site include the Barred Dove, the Common English Sparrow, and the Mynah. Other animal species likely to occur are feral cats and mice.

B. Anticipated Impacts and Mitigative Measures

Neither construction activity nor operation of the proposed antenna facility will result in disturbance or removal of existing vegetation in the vicinity of the ground floor improvements. Wildlife species currently utilizing the site will most likely be displaced into adjacent areas during facility hardware installation.

3.6 ARCHAEOLOGICAL /HISTORICAL RESOURCES

A. Existing Conditions

Archaeological and Historical Resources. Prior to the conduct of the environmental assessment, T-Mobile West conducted a NEPA Land Use screening of the project site in conformance with the National Environmental Policy Act of 1969. As part of the screening, the State Department of Land and Natural Resources Historic Preservation Division (SHPD) was consulted. SHPD found that because Gateway House was built in the last 50 years, there should be no historic properties affected. See Appendix for copies of letters from SHPD. There are no known archaeological

or historic sites on the project site. Gateway House is not on the National or State Historic Register.

Cultural Resources. Act 50, enacted by the Legislature of the State of Hawai'i (2000) requires state agencies and other developers to assess the effect of proposed land use or shoreline developments on the "cultural practices of the community and State as part of the HRS Chapter 343 environmental review process (2001). Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawai'ians and other ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are...contrary to the State's environmental policies...or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000).

As suggested in the "Guidelines for Assessing Cultural Impacts" (OEQC 1997), consultation with organizations familiar with cultural practices and features associated with the project area is permissible in the process of determining the project's impacts on cultural practices in the area. According to the OEQC (1997), a "good faith effort" is required to investigate the potential cultural impact on a property. In the case of the present site, limited archival research was conducted, and copies of the Draft EA will be sent to the Office of Hawai'ian Affairs and the State Historic Preservation Division. Consultation with these resource agencies provide a good faith level of effort.

The University of Hawai'i at Mānoa began in 1907 as a land-grant college of agriculture and mechanic arts called the College of Hawai'i. The first classes were held at a temporary site in downtown Honolulu. In 1912, the school moved to its permanent site in Mānoa Valley. Since 1912, the University of Hawai'i Mānoa campus has grown to encompass 304 acres as a major educational institution in urban Honolulu. The project area has not been used for traditional cultural purposes within the last 93 years.

B. Anticipated Impacts and Mitigative Measures

Because the proposed project does not require earthwork, no archaeological or historically significant resources are anticipated to be encountered during the construction and installation period. The State Historic Preservation Officer concluded that the project would have a "no historic properties affected" determination (February 2003). Additionally, comments from the Office of Hawai'ian Affairs will be sought during the Draft EA public review period. No changes will be made to the surrounding physical environment and visual impacts will be minimal. Based on preliminary historical research it is reasonable to conclude that Hawai'ian rights related to gathering, access or other customary

activities will not be affected and there will be no direct adverse effect upon cultural practices or beliefs.

Therefore, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawai`ian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by the proposed antenna installation on the property. Because there were no activities identified, there are no adverse effects.

B. Anticipated Impacts and Mitigative Measures

Because the proposed project does not require earthwork, no archaeological or historically significant resources are anticipated to be encountered during the construction and installation period. The State Historic Preservation Division (SHPD) was a consulted party during the Draft EA preparation and public review period. During the pre-assessment period, SHPD's determined that "no historic properties" would be affected by the proposed project. See February 2003 and March 2006 letters in the Appendix.

In accordance with Section 6E-46.6, HRS and Chapter 13-300, HAR, if any significant cultural deposits or human skeletal remains are encountered, work shall stop in the immediate vicinity and the contractor shall be required to contact SHPD.

3.7 TRAFFIC AND PARKING

A. Existing Conditions

Students, faculty and employees access the project site in a variety of ways: ride-sharing, motorcycles, mopeds, bicycles, City bus service, shuttle service, private vehicles, and on foot. Parking on campus nearest the project site is allowed by permit only. There is an open area where trucks can park for short periods at a time between Gateway House and Frear Hall for maintenance personnel and deliveries.

B. Anticipated Impacts and Mitigative Measures

Short-term impacts on parking between Gateway House and Frear Hall will probably occur as a result of construction related traffic entering and exiting the project site. Traffic generated by construction workers will occur during normal working hours and between 7:30 a.m. and 4:30 p.m. However, construction activity will have very little impact on traffic entering and leaving the campus because the number of project workers is expected to be small. Operation of construction/installation equipment and trucks may, on occasion, impede traffic and short-term parking in the immediate area of Gateway House during construction which is expected to occur over a 4-week period.

No long-term impacts on traffic or parking are expected because the proposed project is an unmanned facility that will operate 24 hours a day 7 days a week, with a once-per-month visit by the carrier's maintenance technician.

While the proposed project will have minimal impact on the existing traffic and parking conditions on the Mānoa campus, the contractor should be expected to do proactive planning to avoid any short-term delays or parking problems during construction. Such measures would include notifying the UHM facilities planning and management office, Gateway House faculty and administrative staff, and the security office of its construction schedule well in advance prior to commencement of activities, and to have a worker monitoring traffic and parking in the immediate vicinity of Gateway House during the peak construction/installation period.

3.8 UTILITIES

A. Water and Wastewater

UHM water and wastewater infrastructure systems are owned, operated and maintained by City and County of Honolulu agencies. Like the other buildings on the campus, Gateway House is served by these existing systems. The proposed project will not require water or wastewater system services because it is an unmanned facility. Therefore, this section does not include further discussion of water and wastewater systems.

B. Electrical and Telephone Systems

a. Existing Conditions

Electrical power for Gateway House is provided by Hawaiian Electric Company (HECO) while the electrical power distribution system for the entire campus including Gateway House is owned and managed by the University. Telephone service is provided by Hawaiian Telcom. The proposed project will require electrical power and telephone service for its operations on the Gateway House rooftop.

b. Anticipated Impacts and Mitigative Measures

According to past demand charts from the UHM Facilities Planning and Management office, the capacity required for the antenna facility would be available from the existing electrical power and telecommunications systems.

3.9 NOISE

A. Existing Conditions

Noise levels in the vicinity of the project site's ground floor through the upper floors are affected by students and vehicular noise. The elevator/mechanical room, located on the building's rooftop contributes to the ambient noise level of the

project area. Traffic noise in the immediate area is generally not disruptive because vehicle speeds are low.

B. Anticipated Impacts and Mitigative Measures

The construction activities of the T-Mobile West Corporation antenna facility will result in an increase in noise levels during the one month installation period. Construction related noise may affect dorm rooms on the upper levels. However, disruption to these activities is anticipated to be minor as the proposed project will not involve major activities such as earthmoving, pile driving or demolition work. At most, disruption may be limited to about 4 weeks. Construction related noise should not seriously affect ongoing residential activities in neighboring Frear and Johnson Hall dormitory buildings as student residents are usually in class on the main campus mauka of the project site during hours that project-related construction will be occurring. The anticipated increase in noise level will be limited to the contractor's allowed work hours of weekdays, 7:30 a.m. to 4:30 p.m.

There will be a brief two-to-three day period during which flatbed trucks will deliver the panel antennas, reels of coax cable, and the BTS equipment cabinet to the rooftop. Most equipment, except the BTS cabinet, coax cable and support beams, is small enough to be carried via the elevator to the rooftop. The trucks will likely be parked on the south side of the building to get equipment onto the building elevator in the most efficient way and to minimize disruption to the building's normal daily activities. The work can be performed on a weekend, if necessary, to minimize impact to the students.

No long-term noise impacts are anticipated by the operations of the unmanned antenna facility. After installation of the panel antennas and equipment cabinets is complete, noise generated from the rooftop will be practically unchanged from the current situation due to the fact that the proposed project is not a noise-generating facility. No emergency generator or air conditioner is planned for the antenna facility, which is sometimes included in telecommunications facilities.

3.10 AIR QUALITY

A. Existing Conditions

Overall the air quality in the vicinity of the project area is generally good. There are no major sources of pollution near the project site. The site is upwind from all major transportation corridors. Present air quality in the project area is mostly affected by air pollutants from motor vehicles, with carbon monoxide being the most abundant of the air pollutants emitted.

B. Anticipated Impacts and Mitigative Measures

1. Short-Term Impacts

There will be two types of short-term air quality impacts that will result from the proposed project: 1) fugitive dust generation and 2) on-site emissions from construction equipment. Fugitive dust emissions may arise from exterior site preparations and construction activity. On-site mobile and stationary construction equipment will emit some air pollutants in the form of engine exhausts. However, these impacts are anticipated to be minimal due to the short construction period and the small size and scale of the proposed project.

Contractor construction equipment will be required to comply with State and County standards with respect to maintaining equipment so that trucks and heavy equipment will be operating in good condition. Best management practices such as this will help minimize any on-site emissions of air pollutants during the brief construction period. Additionally, if the most disruptive phase of the installation involves a boom truck lifting supporting beams, coax cable and BTS equipment cabinet to the rooftop can be accomplished over a single weekend, air quality impacts would be substantially minimized.

2. Long-Term Impacts

Long-term air quality impacts will remain at current levels from normal, day-to-day operations after the construction of the proposed project since, 1) the capacity of the parking lot next to Gateway House will remain unchanged. As stated in Section 3.7 Traffic and Parking, this facility will be unmanned with a T-Mobile West Corporation technician expected to visit the project site once a month to maintain the equipment and antennas.

3.11 VISUAL RESOURCES

A. Existing Conditions

The Ko'olau mountains, Wa'ahila Ridge and Tantalus (Pu'u-'ōhi'a) serve as a backdrop for views in the vicinity of Gateway House. The west wing of Gateway House is a 10-story building. The roof of the building is flat and surrounded by a one- to 1.5-foot high parapet. Elevator and mechanical penthouses are located at the northern end of the rooftop. The roof of the building is not directly viewable from street level or surrounding structures.

B. Anticipated Impacts and Mitigative Measures

The installation of the proposed antennas will have limited impacts on ground level views as the view angle from the ground limits views to the outer portion of the roof. Visual impacts will mainly occur to views from the upper floors of adjacent buildings looking toward Gateway House. However, these impacts are anticipated to be minimal because the

facility will be situated at the southern end of the rooftop of the west wing of Gateway House. Only the walls of the facility will be viewable from street level and/or surrounding buildings. Additionally, the existing views are already impacted by the existing built environment; and (2) while the overall size of the antennas in comparison to the building as well as the elevator shaft will result in changes to a portion of the building roof, it will not result in a significant alteration to the overall form.

Mitigation Measures: The planned flush mounting of the panel antennas on the walls of the facility will be painted to blend in with the existing color of the building will help minimize any potential impact to the existing view. See photo simulation.

3.12 LAND USE DESIGNATIONS

A. Existing Conditions

The project site is located within the State's Urban land use district, as is all of the surrounding area. The project site is comprised of lands that are designated as R-5 single-family residential. There is a height limit of 25 feet for R-5 districts, but this limit is amended by City Council-approved Plan Review Use/Long Range Development Plan (PRU-LRDP) which sets different heights in different locations. Although no specific height is set for Gateway House, the general rule of thumb used in the UH LRDP is the relationship to surrounding facilities.

B. Anticipated Impacts and Mitigative Measures

No changes in land use classification or zoning are required to implement the proposed action.

3.13 SOCIO-ECONOMIC CHARACTERISTICS

A. Existing Conditions

The Mānoa community surrounding the UH Mānoa campus is an older, stable neighborhood of predominantly single family residences. Most homes were built in the first quarter of the twentieth century, and are still maintained in good condition. The neighborhood gets its name from the valley formed by two mountain ridges of the Ko'olau mountain chain. Wa'ahila Ridge borders UHM on the east, and residential properties and private educational institutions border much of the rest of the perimeter. Mānoa is generally regarded as a very desirable place to live, and hence, home values are high. Many University students, faculty and staff live in the surrounding community.

B. Potential Impacts and Mitigation Measures

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In the short-term, construction of the proposed facility will create a slight increase in employment opportunities for construction related jobs. In the long-term, the new telecommunications facility would be expected to not only improve the quality of T-Mobile West Corporation on-air service but could increase the customer base. In addition to improving public safety and providing new jobs, T-Mobile West Corporation is creating a communications infrastructure that will support economic growth and additional tax revenues. Efficient and reliable communication is an essential requirement for people in any community. This installation is a part of a cellular telecommunications system that will help fulfill this need.

3.14 Police and Fire

The proposed project is not expected to result in increased demand for police and fire protection. The antenna facility will not require employees except for one technician who would need to visit the Gateway House rooftop facility on a monthly basis to check equipment and maintain the hardware.

3.15 EMF

A. Existing Conditions

Electromagnetic fields exist wherever electricity is used. In August 1996 the Federal Communication Commission (FCC) adopted new guidelines for evaluating the environmental effects of radiofrequency (RF) energy from transmitters on wireless communication sites. While there is no scientific evidence that RF emissions from these sites operating within established safety guidelines pose a health risk, fields close to antennas on transmitter sites must be understood and care must be taken to assure safe operation during maintenance. The guidelines adopted by the FCC provide considerable margins of protection from any known health risk.

The Telecommunications Act of 1996 mandated that the FCC implement regulations to protect public and workers from potentially hazardous exposure to non-ionizing radiation. The Act of Congress was driven by the National Environmental Policy Act (NEPA) of 1969, which requires agencies of the federal government to evaluate the effects of their actions on the quality of the human environment. In addition, recent studies indicated existing standards did not adequately protect workers and the general public from continuously increasing presence of Emissions associated with radio frequency transmissions.

In response to this mandate, the FCC passed law 96-326 in August 1996. The new guidelines implement more recent scientific studies of the biological effect of RF emissions and were recommended for adoption by the American National Standards Institute (ANSI), the Institute of Electrical and Electronic Engineers (IEEE), and the National Council on

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Radiation Protection and measurements (NCRP). The FCC received favorable support for these stricter standards from the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), and the Occupational Safety and Health Administration (OSHA), as well as from a number of nongovernmental groups and companies.

Exposure limits in the new guidelines adopted by the FCC are specified in terms of Maximum Permissible Exposure (MPE) as a function of frequency; MPEs are given in units of electric and magnetic field strength and power densities. For exposure to multiple frequencies, the fraction (or percentage) of the MPE produced by each frequency is determined and these fractions (or percentages) must not exceed unity (or 100 percent).

T-Mobile West Corporation conducted an electromagnetic radiation (EMR) hazards analysis for the proposed base station on Gateway House. The complete report is included in the Appendix.

The compliance study considered both occupational/controlled exposure and general population/uncontrolled exposure to radio frequency. Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure. General pollution/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

The antennas for Gateway House will be mounted on the walls of the proposed communication facility. The walls will extend 12 feet above the existing rooftop. The bottom of each panel antenna will clear about 5.8 feet above the rooftop surface. T-Mobile West analysis indicated that a person standing 2 feet below the antenna for 30 minutes would be exposed to 73.92% of the FCC Maximum Permissible Exposure limit of 1.00 mW/cm².

B. Anticipated Impacts and Mitigative Measures

The prediction analysis conducted by T-Mobile West Corporation RF engineers in 2003 concludes that the cellular panel antennas at the proposed rooftop locations at Gateway House would not expose personnel to EME levels above the occupational/controlled MPE standard on the rooftop. Therefore, it is concluded that the T-Mobile West Corporation rooftop installation will not be hazardous to personnel. Personnel on the lower floors of Gateway House, and at ground level will not be exposed to power densities exceeding the

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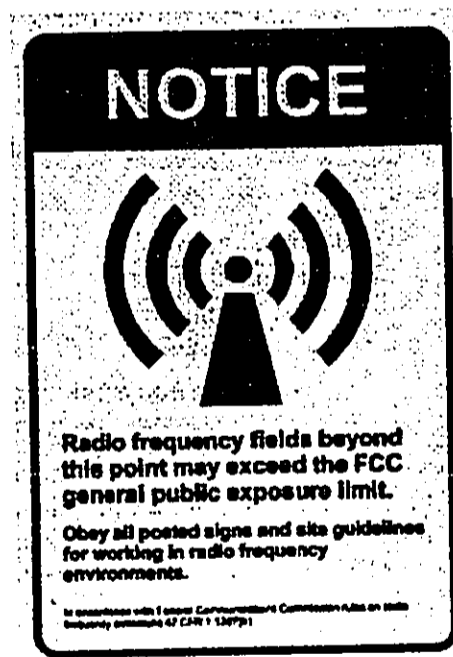
general population/uncontrolled MPE limits. Upon completion of installation of the facility, T-Mobile West Corporation will conduct an EMR hazards survey of the actual site to supplement the predicted analysis.

T-Mobile West concluded that the Effective Radiated Power (ERP) of the antennas proposed for the Gateway House project will be 265 watts, which is within the FCC permissible limits. See Certificate for Telecommunications Antenna, DPP form 0166L.6.13.88, and Certification of Categorical Exclusion for Antenna Installations, DPP form 56153 dated 10/12/04) Exhibit in the Appendix.

Safety Statement: RF Emissions Predictions Report prepared by T-Mobile can be found in the Appendix.

The antenna exclusion distance is 15 feet, and this contour will be inaccessible to the public due to the height of the antenna installation and rooftop access restriction. The proposed facility will conform to all applicable FCC regulations.

T-Mobile will provide signage as illustrated below at rooftop entry point. As a precautionary measure, the T-Mobile West Corporation transmitters should be silenced if maintenance is performed on the transmitting antennas or cables.



Professor Vincent Z. Petersen, an expert in the field of radiation and radio transmission at the UHM Department of Physics, was asked by the Associated Students of the University

of Hawai'i (ASUH), to determine whether a higher intensity KTUH antenna on Saunders Hall would result in a radiation hazard to occupants of the building. Dr. Petersen prepared a paper entitled, "Statement Regarding Electromagnetic Radiation Levels Associated with Proposed KTUH FM Radio Transmission" in 1995. Calculations prepared by Dr. Petersen concluded that the FM radiation from the KTUH 4-bay antenna with 3000 watt total radiated power, does not constitute a radiation hazard to occupants at the top floor (or any floor) of the Social Sciences Building. The maximum intensity on the rooftop was projected as 30 times lower than FCC-acceptable radiation levels of 1.0 mW/cm². Please refer to a copy of Dr. Petersen's paper in the Appendix.

4.0 INDIRECT AND CUMULATIVE IMPACTS

Using the FCC's exposure standard for radio frequency fields, it is possible to calculate a "safe distance" (also referred to as "exclusion distance") for every antenna. Based on radio engineering standard design for facilities such as those on the UH Mānoa campus, the typical cellular telephone 100-watt antenna has a "safe distance" of about 13 feet. A person standing farther than 13 feet for a half hour would probably not have his/her cells' water heated up or experience an adverse effect. Even for an antenna as powerful as KGMB TV's antenna between Kapiolani Boulevard and Makaloa Street near the Ala Moana Center, which effectively radiates a power of 100,000 watts, its "safe distance" has been calculated to be less than 175 feet (L. Au, State DOH, March 2006). With each UH Mānoa antenna's limited harmful or exclusion range, it would be highly unlikely for a person to be simultaneously within the harmful range of more than one antenna at a time. Consequently, there would be no cumulative exposure. Therefore, the cumulative and indirect impact from multiple antennae on UH Mānoa campus rooftops would be insignificant.

5.0 UNAVOIDABLE ADVERSE IMPACTS

The construction of the antenna facility will have only minimal adverse environmental impacts which cannot be fully mitigated by the measures planned to be implemented. The following list includes those short-term and long-term impacts that are expected to be unavoidable.

1. Negligible releases of air contaminants will occur from construction equipment. Emissions of fugitive dust may occur during dry periods as a result of construction operations despite efforts to control dust per State Department of Health (DOH) regulations.

2. In the short-term, the visual character of the area will be affected by construction activities and by the presence and operation of construction equipment.
3. Short-term increases in noise levels will result from construction activities. Noise and construction may cause minor disruptions to floors directly below the proposed activity.

6.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The construction and operation of the T-Mobile West Corporation antenna facility will involve the irretreivable commitment of certain physical and fiscal resources. The major resource commitment will be the loss of utility infrastructure space on the upper roof of Gateway House for the development of the project. Financial resources, construction materials, manpower, and energy will be expended by T-Mobile West Corporation to construct and operate the facility.

The impact of utilizing these resources should, however, be weighed against the benefits of providing upgraded, expanded, and improved T-Mobile West Corporation service on the University of Hawai'i at Mānoa campus.

7.0 ALTERNATIVES

Alternative sites that were considered are discussed in Section 1.6 of this FEA.

The no-action alternative would result in T-Mobile West Corporation not proceeding with necessary physical upgrades of its existing service level for the Mānoa area. This alternative would result in no change to the present environmental characteristics of the project site; to employment, to government expenditures, to infrastructure services, and to traffic conditions. However, the existing capacity is diminishing and continued operations without improvements will make it difficult for T-Mobile West Corporation to maintain expected quality service to its present customers on the UHM campus. A potential scenario that may result from the no-action alternative is: For any customer who is in need of emergency assistance or able to respond to an emergency situation, lack of reliable broadband PCS service at a critical moment could mean a lost opportunity to save a life.

The selection of a communications site is first determined by the coverage need specified by VoiceStream Radio Frequency engineers. Based on the location of the coverage area, an existing structure or a property's ability to fulfill the height requirement is an

important factor in providing the clearest unobstructed line of transmission. If the availability of an existing structure is non-existent, then the placement of a tower is determined based on the topography of the area.

T-Mobile West Corporation commenced their study of locating a communications site within the campus in year 2000. Initial search established five potential locations for the communications site and included:

1. Burns Hall located in the southeast quadrant of the intersection of Dole Street and East Mānoa Road;
2. Hale Manoa located north of Burns Hall and east of East West Road;
3. Holmes Hall located in the northwest quadrant of the intersection of Dole Street and East West Road;
4. Pacific Ocean Science & Technology located immediately north of Holmes Hall; and
5. Gateway House located in the southeast quadrant of Dole Street and East West Road.

Only Gateway House provided the required alignment with existing T-Mobile West Corporation cellular communication sites. Thus, Gateway House was selected as the most appropriate project site.

8.0 RELATIONSHIP TO EXISTING PLANS, POLICIES

This section includes a discussion of the relationship of the project to the following policies and plans: Hawai'i State Plan, State Land Use Law, University of Hawai'i, Mānoa Campus Long Range Development Plan (LRDP), the County Development Plan, and the Land Use Ordinance.

8.1 The Hawai'i State Plan

This section includes an assessment of the proposed facility to the applicable goals, objectives, and policies of the Hawai'i State Plan, Chapter 226, HRS.

Section 6(a): Objectives and policies for the economy-general:

Section 6(b): Applicable policies:

“(9): Foster greater cooperation and coordination between the public and private sectors in developing Hawai'i's employment and economic growth opportunities.”

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Discussion: By working out an amenable leasing arrangement with T-Mobile West Corporation, both T-Mobile West Corporation and the UH Mānoa administration are an example of public and private sector partnerships which are beneficial to the State's economic growth and diversification. The facility will be under lease from the State of Hawai'i and will provide a source of revenue to the State.

Section 18(a): Objectives and policies for facility systems—
energy/telecommunications:

Section 18(b): Applicable policies:

Section 18(d): Applicable telecommunication objectives:

"(2): Encourage public and private sector efforts to develop means for adequate, ongoing telecommunication planning."

Discussion: By working with T-Mobile West Corporation, the UH Mānoa offices of Facilities Planning and Management and Procurement Real Estate and Risk Management are actively participating in the planning process to help achieve the State's objectives of gaining dependable, efficient, and economical statewide telecommunication systems capable of supporting the needs of residents and businesses. By facilitating T-Mobile West Corporation's plans to expand and improve its telecommunication system, this action should spur this carrier's competitors to either improve or expand their services in this area as well.

8.2 STATE LAND USE LAW

The proposed project is presently classified within the State Land Use Urban District. Public and private utility system facilities and research institutions are compatible in the Urban District. Thus, the project is consistent with the State Land Use District classification.

8.3 UNIVERSITY OF HAWAII, MĀNOA CAMPUS LONG RANGE DEVELOPMENT PLAN (LRDP)

In 1987, the University of Hawai'i Board of Regents adopted the LRDP for the University of Hawai'i Mānoa Campus, to guide campus development through the year 2010. The Gateway House is part of the Central Campus layout. Gateway House was built in or around 1960.

Because the roof level of Gateway House houses mechanical and electrical systems and other equipment appurtenant to the mechanical systems of the building, the proposed use is similar and compatible with current uses. The proposed project is consistent with the University of Hawai'i, Mānoa Campus LRDP.

8.4 CITY AND COUNTY OF HONOLULU GENERAL PLAN

The 1992 edition of the General Plan is a statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity of O`ahu's citizens. These objectives contain both statements of desirable conditions to be sought over the long run and statements of desirable conditions which can be achieved within an approximate 20-year time horizon. The General Plan is also a statement of broad policies which facilitate the attainment of the objectives of the Plan. The following discussion provides an assessment of how the proposed project implements the objectives and policies for Education in the General Plan.

Objective C To make Honolulu the center of higher education in the Pacific.

Discussion: The proposed project is located at the Mānoa campus of the University of Hawai`i thereby facilitating the objective to focus on Honolulu as the center of higher education.

Policy 1

Encourage continuing improvement in the quality of higher education in Hawai`i.

Discussion: The project proposes to improve the quality of higher education locally by helping to upgrade wireless communication systems on the Mānoa campus.

Policy 2

Encourage the development of diverse opportunities in higher education.

Discussion: By enabling the upgrade of the University's telecommunications system, the project proposes to strengthen the physical infrastructure that can facilitate diversification and expansion of opportunities to faculty, students and administration.

The proposed facility is appropriately located on the Gateway House rooftop because the hardware is proposed to be non-intrusive on existing views while expanding and improving the quality of high tech broadband PCS communications services to T-Mobile West Corporation customers. Equally important to note, antenna facilities such as the proposed project are clean and nonpolluting state-of-the-art installations.

8.5 THE CITY AND COUNTY OF HONOLULU PRIMARY URBAN CENTER DEVELOPMENT PLAN

The City and County of Honolulu Primary Urban Center Development Plan (PUC DP), approved on June 21, 2004 (Ordinance No. 04-14), presents a vision for the PUC's future development consisting of policies, guidelines and conceptual schemes that will serve as a policy guide for more detailed zoning maps and regulations and for public and private

sector investment decisions. The PUC-East Land Use Map designates the University of Hawai'i parcel as Institutional. Since the proposed project is accessory to the university's infrastructure as a technical, non-intrusive improvement to the existing telecommunication system, it would be consistent with the existing Institutional land use designation.

8.6 LAND USE ORDINANCE – ZONING

The existing zoning is R-5 Residential. University uses are permitted in the R-5 Residential District with an approved Plan Review Use (PRU). An antenna installation such as this is defined by the Land Use Ordinance (LUO) as a Utility Installation Type B which is an allowed use in residential zoning districts, subject to conditions. However, the University of Hawai'i at Mānoa is operating under a Plan Review Use (PRU) File No. 88/PRU-3 (City and County of Honolulu Department of Planning and Permitting (DPP)). According to the DPP (December 2004) instead of a Conditional Use Permit-minor (CUPm) for a utility installation, a minor modification to the PRU will be required. Section 8.7 Plan Review Use below contains a detailed discussion. Development standards related to permitted uses and the maximum height of structures for the university are regulated under the PRU. A building permit is also required.

8.7 PLAN REVIEW USE

Plan Review Use (PRU) approval is required for a number of public and private uses including colleges and universities. In December 1989, a PRU was approved for the Five-Year master plan 1988-1993 University of Hawai'i, Mānoa Campus. As a result, the University of Hawai'i at Mānoa is operating under a Plan Review Use File No. 88/PRU-3.

On December 13, 1989, a PRU File No. 88/PRU-3 (Resolution No. 89-411, CD-2) was approved by the Honolulu City Council to expand the University of Hawai'i Mānoa campus. A major modification to the PRU was approved on March 10, 1993 (Resolution No. 92-286) to increase the seating capacity of the Physical Education Facilities Phase II and to redesignate the facility as the Special Events Arena (DPP, December 2004). The proposed T-Mobile West Corporation antenna facility is necessary to expand and improve broadband PCS communication service for the university campus. The proposed project is consistent with the uses approved in the PRU, and therefore can be reviewed as a minor modification to the PRU.

9.0 FINDINGS AND REASONS FOR SUPPORTING THE DETERMINATION

Based upon the findings presented in the DEA, the potential impacts of installation and operation of the proposed telecommunications antenna facility have been sufficiently examined and discussed. After reviewing the significance criteria in Section 11-200-12, EIS Rules, Contents of the Environmental Assessment, the University of Hawai'i at Mānoa has determined that the action is not expected to result in significant adverse effect on the natural environment. The DEA was circulated for 30 days from January 23 to February 22, 2006. Copies of the DEA were circulated to 16 agencies and organizations, and 9 written responses were received. Comments and responses can be found in the Appendix of this document. All in all, the project is not expected to result in any adverse impacts to the environment. Therefore, a Finding of No Significant Impact (FONSI) has been issued by the University of Hawai'i at Mānoa.

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

Development of the proposed project is not expected to impact natural or cultural resources, as the project site is located in a developed, urbanized area and the rooftop is already populated with similar mechanical and electrical facility hardware. Consultation with the Office of Hawaiian Affairs (OHA) conducted during the Draft EA 30-day review period indicated that no known cultural resources exist at the project site. See OHA response in the Appendix of this document. SHPD indicated in a letter dated March 15, 2006 that no historic structures exist within or near the area of potential effect.

2. Curtails the range of beneficial uses of the environment.

The proposed project will be compatible with the existing uses of the surrounding area and will have minimal disturbance to the UHM campus and surrounding community as it is located on the Gateway House roof with other similar mechanical and electrical facilities.

3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in chapter 344 HRS.

The proposed project is consistent with the State's long-term environmental policies as well as the State's Land Use Plan because the proposed location is an urban, developed part of campus designated for scientific and research activity.

4. Substantially affects the economic or social welfare of the community or State.

Short-term construction related activities may result in negative impacts, as well as positive economic impact through increased work for a selected contractor and design

engineers during implementation of the project. Long-term adverse effects are not foreseeable, as the economic and social welfare of the community should not be affected.

5. Substantially affects public health.

Short-term construction related activities will not impact public health as they are temporary in nature. In addition, construction activities will be regulated by State and County standards to minimize noise, dust, and exhaust emissions.

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

The proposed project does not directly result in secondary impacts, and will only increase capacity of the communications systems to serve O`ahu's citizens in conformance with the County General Plan.

7. Involves a substantial degradation of environmental quality.

The proposed project is located on a rooftop of a 10-story building, therefore the environmental quality of the surrounding campus will be essentially unaffected.

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

The proposed project does not have any cumulative effect upon the environment, and no larger commitments are required for the proposed antenna facility.

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

There are no known rare, endangered, or threatened species or habitat associated with the project site. The area has been urbanized and the ground on which Gateway House is located has undergone a relatively sufficient level of disturbance over the years with its subsequent improvements.

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

Negative effects on environmental quality will be short-term due to construction and be limited to the areas adjacent to the project. These short-term impacts will be mitigated to meet project plans approvals and specification regulations.

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

The project site is not located in an environmentally sensitive area that would be vulnerable to flooding because it is outside the 500-year flood plain. It is far removed from the tsunami zone, coast, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal waters. Therefore, the project will not affect environmentally sensitive areas.

12. Substantially affects scenic vistas and view planes identified in county or states plans or studies.

The panel antennas are being installed on the walls of the new communication facility on the building's rooftop to avoid causing any disruption to existing vistas and view planes. The panel antennas are also being painted to match the color of the structure. Therefore, the proposed project is not expected to having an adverse affect on existing views on campus or surrounding areas.

13. Requires substantial energy consumption.

Energy consumption will consist of short-term construction activities, in which diesel or gas powered equipment will be used. Once completed, the antenna facility will require electrical power and telephone service at levels that UHM infrastructure and utilities systems have capacity enough to supply. Thus, the proposed project would not be a burden on the existing facilities in terms of energy requirements.

10.0 CONSULTED PARTIES

Listed below are the agencies and organizations consulted in the preparation and review of the DEA.

Federal Government:

U.S. Department of Interior U.S. Fish & Wildlife Service

State of Hawai`i:

State Department of Education

- State Department of Land and Natural Resources
Historic Preservation Division

- State Department of Health, Noise and Radiation Division

- Office of Hawaiian Affairs

- State Department of Transportation

- University of Hawai`i Mānoa Facilities Planning and Management Office

- University of Hawai`i Environmental Health and Safety Office, Radiation Safety Program

- University of Hawai`i Mānoa Environmental Center

- Hawai`i Heritage Program

Utilities:

- HawTelcom, Inc.

- Hawaiian Electric Company

- Oceanic Time Warner Cable Hawaii

City and County of Honolulu:

- Board of Water Supply

- Department of Planning and Permitting

- Department of Transportation Services

- Fire Department

- Police Department

Other Organizations:

Mānoa Neighborhood Board No. 7

Hawaii Natural Heritage Program

University of Hawai`i Mānoa Campus Facilities Maintenance and Faculty/Administration Consultation:

The Draft EA was widely circulated between January 23 and February 22, 2006 to agencies, organizations, as well as to UHM Facilities Planning and Management and the Environmental

Center for review and comment. T-Mobile West Corporation has reviewed all comments and concerns, and has subsequently addressed these through appropriate revisions in the final EA. Therefore, this final environmental assessment addresses all comments and issues raised during the public review period.

11.0 REFERENCES

- Broadcast Communication Authority. May 18, 1995. *Environmental Assessment, Proposed KTUH College Radio Power Increase from 100 Watts to 3000 Watts Transmitting Power Porteus Hall, University of Hawai`i at Mānoa*. Honolulu, Hawai`i.
- VoiceStream PCS II Corporation RF Engineering. July 2005. *Electromagnetic Radiation Hazards Analysis, University of Hawai`i at Mānoa Gateway House, Site HIC025*. Honolulu, Hawai`i.
- Environmental Planning Solutions, LLC. October 2004. *Final Environmental Assessment for Nextel Partners, Inc. (NPI) Telecommunications Facility on the University of Hawai`i at Mānoa Campus Hamilton Library Annex Rooftop, TMK No. (1) 2-8-023:003 (por)*. Honolulu, Hawai`i.
- Environmental Planning Solutions, LLC. October 2004. *Final Environmental Assessment for New Cingular Hawai`i LLC Telecommunications Facility on the University of Hawai`i at Mānoa Campus Bilger Addition Rooftop, TMK No. (1) 2-8-023:003 (por)*. Honolulu, Hawai`i.
- FCC Office of Engineering and Technology. August 1997. *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Frequency*. OET Bulletin 65. Washington, D.C.
- Group 70 International, Inc. December 1987. *University of Hawai`i Long Range Development Plan Appendix*. Honolulu, Hawai`i.
- Group 70 International, Inc. April 1994. *Long Range Development Plan University of Hawai`i, Mānoa Campus 1994 Update*. Honolulu, Hawai`i.
- Group 70 International, Inc. June 1994. *Weather Forecast Office, University of Hawai`i at Mānoa. Environmental Assessment*.
- Hawai`i Engineering Group, Inc. and RS Engineering Electrical Engineers, Honolulu March 2004. *Preliminary Construction Drawings. UH Mānoa Campus Bilger Hall*. Honolulu, Hawai`i.

***T-Mobile West Corporation
UHM East West Road Gateway House Environmental Assessment***

Petersen, Professor Vincent Z. Department of Physics, UHM. May 1995. Statement Regarding Electromagnetic Radiation Levels Associated with Proposed KTUH FM Radio Transmission. Honolulu, Hawai`i.

U.S. Department of Agriculture. August 1972. *Soil Survey of Islands of Kauai, O`ahu, Maui, Moloka`i and Lāna`i; State of Hawai`i*; Soil Conservation Service, in cooperation with the University of Hawai`i Agricultural Experiment Station. Washington, D.C.

Figures

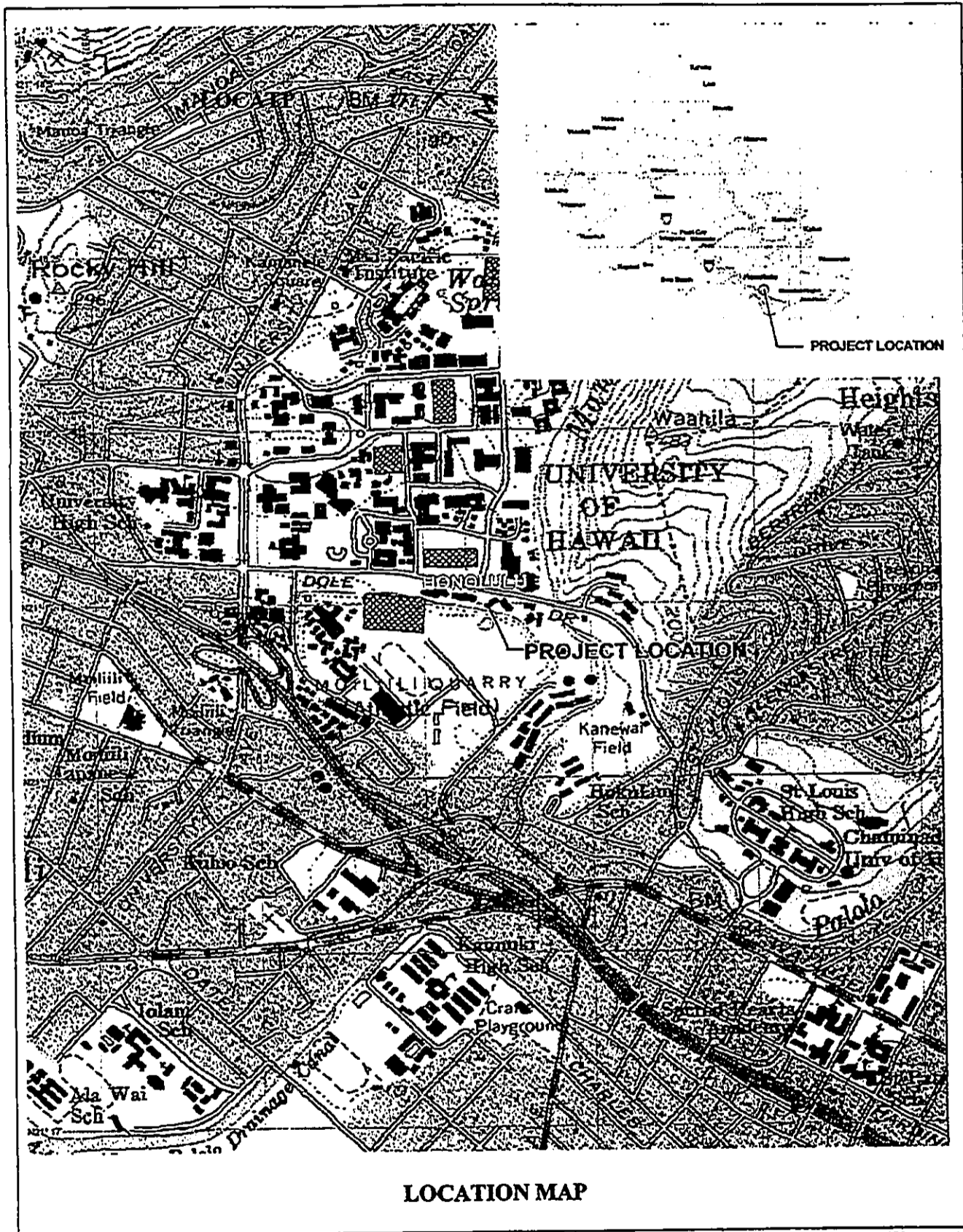


Figure 1

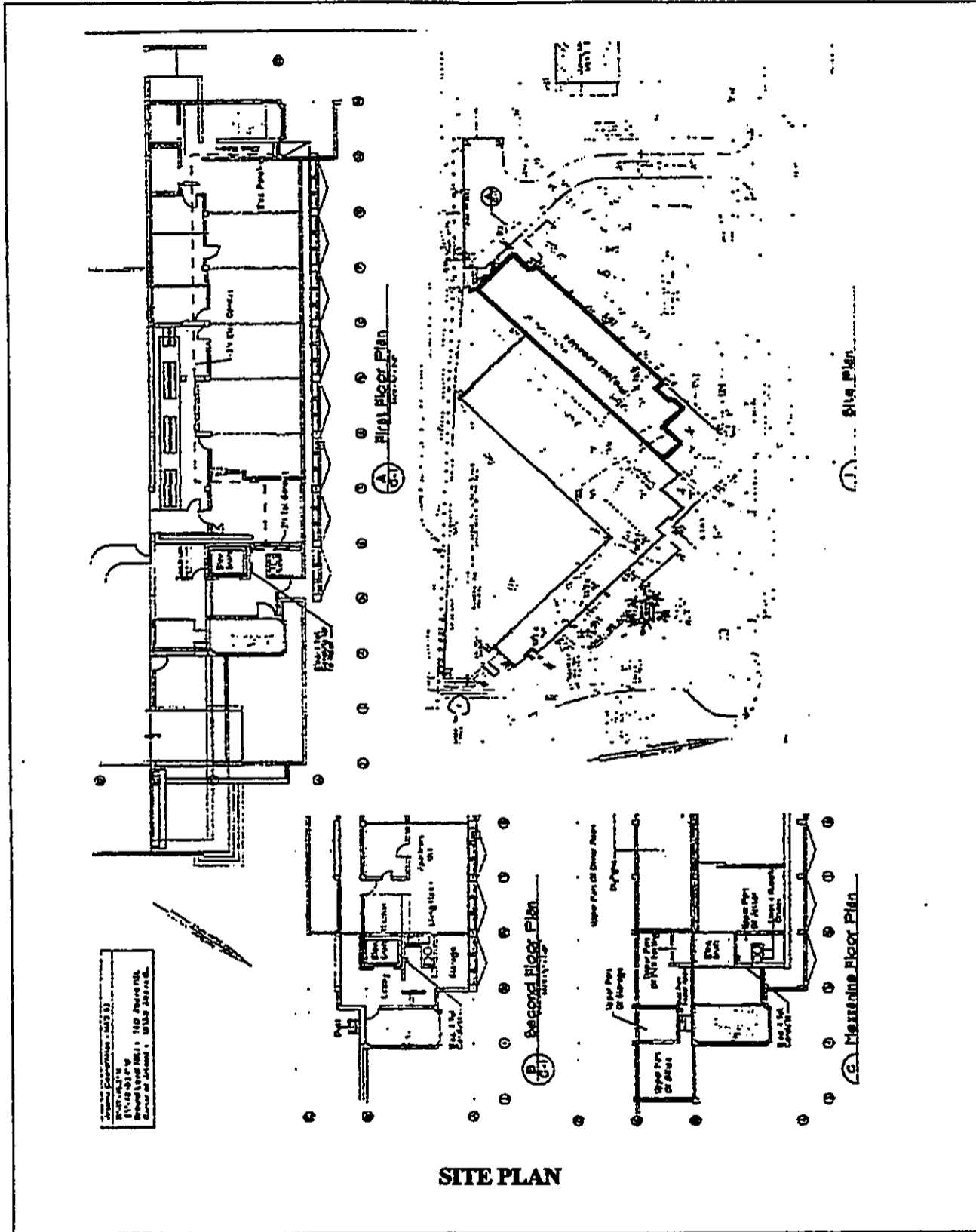
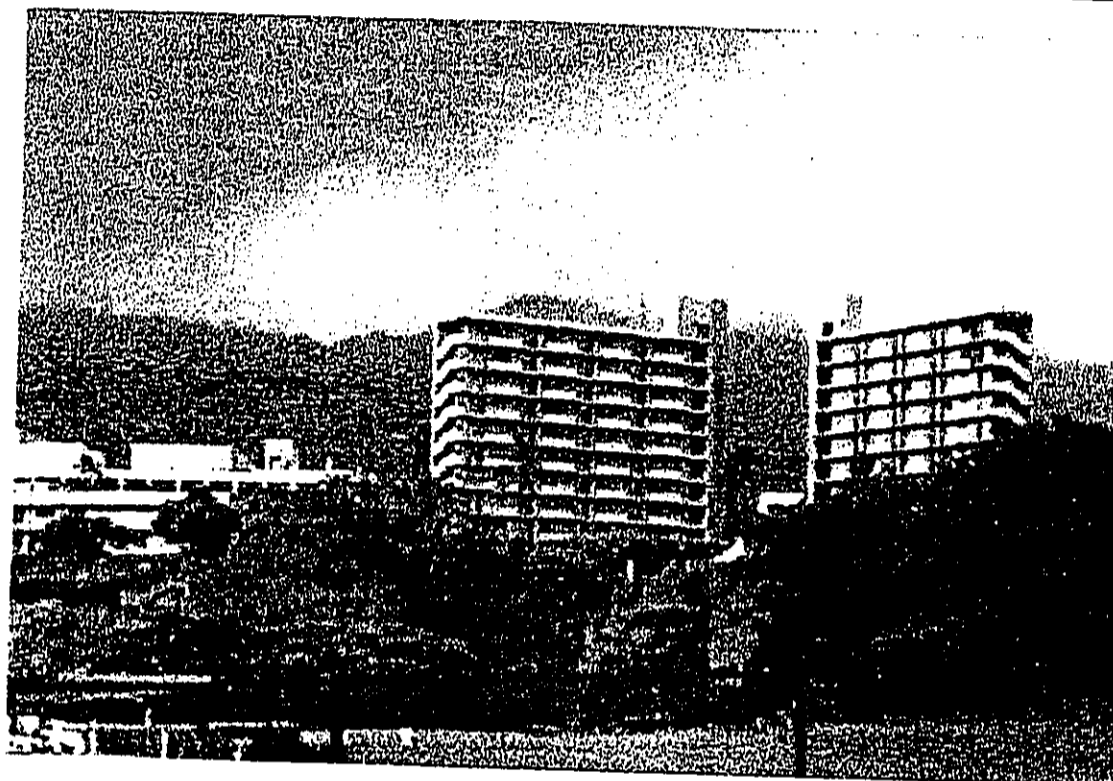


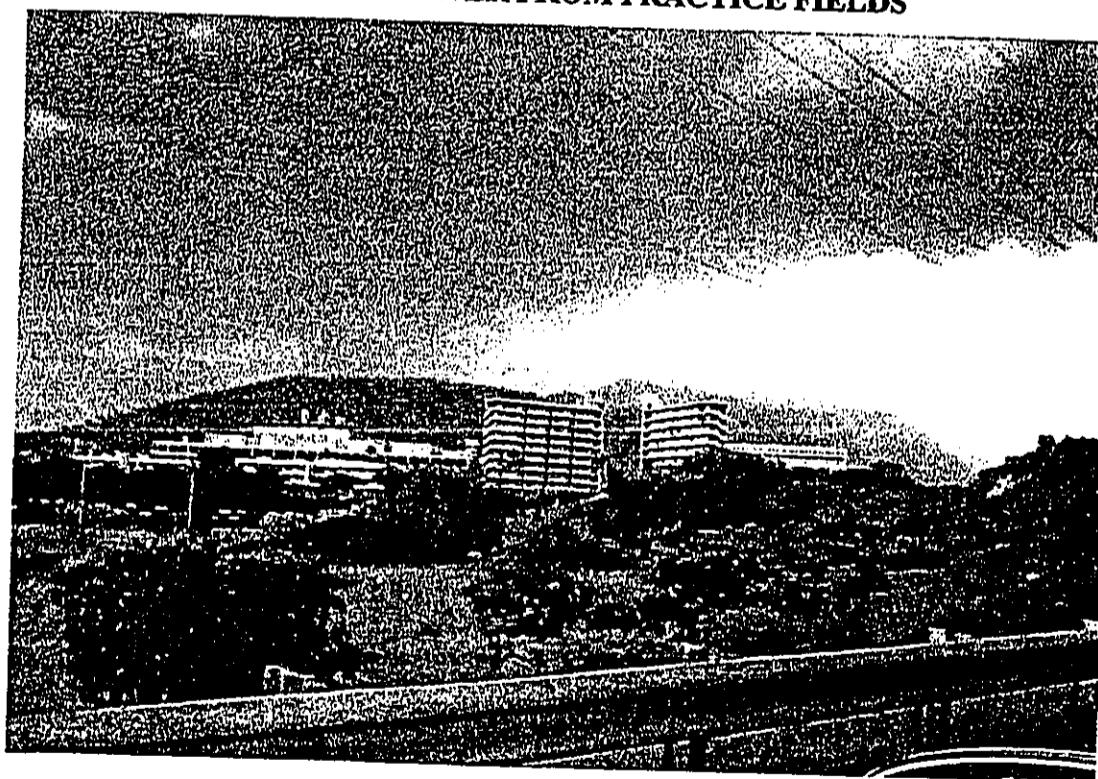
Figure 2

Photographs

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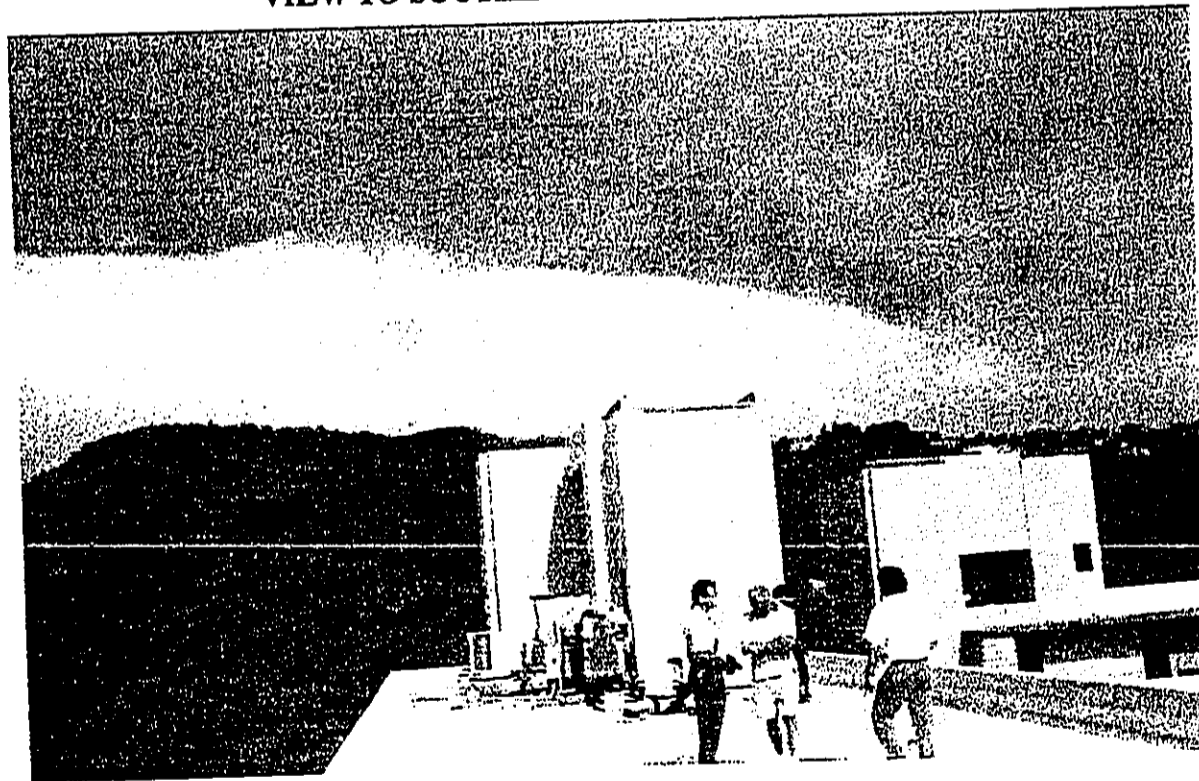
VIEW OF TOWER FROM PRACTICE FIELDS



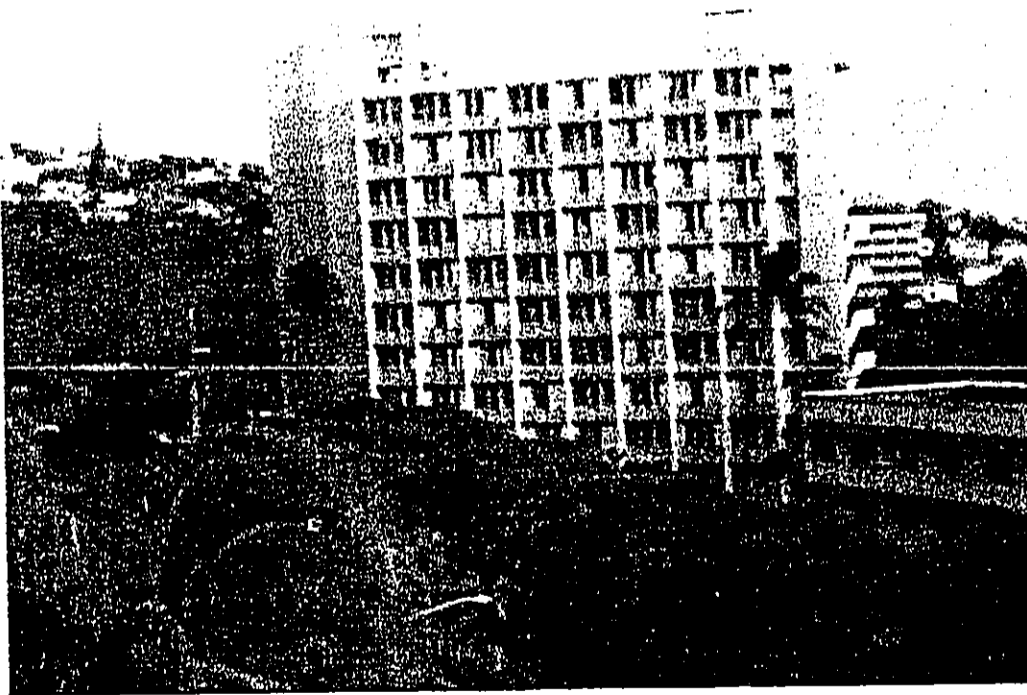
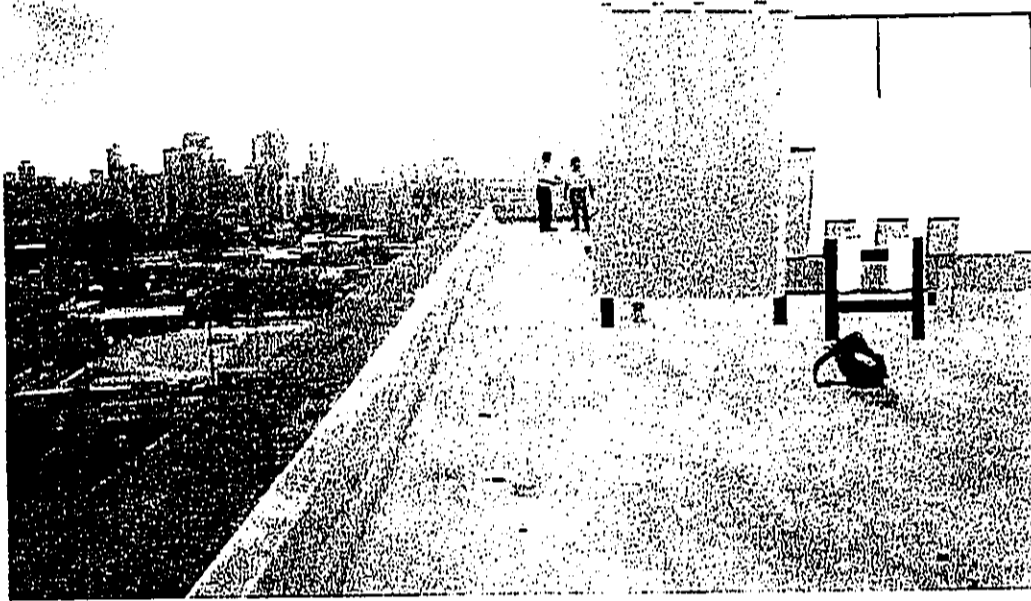
VIEW OF TOWER FROM KALELE ROAD



VIEW TO SOUTHERLY END OF ROOFTOP



VIEW TO NORTHERLY END OF ROOFTOP



PHOTOSIMULATIONS OF EQUIPMENT ENCLOSURE

Construction Drawings



T-Mobile

est Corporation

APPROVALS	
Director Of Capital Improvements Projects University Of Hawaii	Date
Director Of Facilities Planning And Management Office University Of Hawaii	Date

AD - GATEWAY HOUSE AD ROOFTOP ANTENNAS

lo. HI01144

US PREPARED BY:

, INC. - CIVIL & STRUCTURAL ENGINEERS

et, # 2-b Aiea, Hawaii, 96701
86-2092 Fax Number: (808)-486-9261

- ELECTRICAL ENGINEERS

st. Honolulu, Hawaii, 96821
7-9210 Fax Number: (808)-377-9210

Zoning Data
Zone: R-5
Setbacks: Front: 10'
Side & Rear: 5'
Height Limit: 25 Feet

PROJECT SUMMARY
Site Name : East West Road -Gateway House
Site Number : HI01144
Site Address : 2563 Dole Street Honolulu, Oahu, HI 96822
Landlord : University of Hawaii
Contact : Lynn Nakamasu tel : 808-9562115
Applicant : T-Mobile 615 Piikoi St., Suite 100 Honolulu, HI 96814 tel : 808-593-0600 fax: 808-596-2660
Tax Map No : (1) 2-8-29-30

APPROVALS	
The following parties hereby approve and accept these documents and authorize the contractor to proceed with the construction described herein. All construction documents are subject to review by the local Building Department and any changes or modifications they may impose.	
Landlord or Agent	Date
RF	Date
Site Acq.	Date
Construction	Date
T-Mobile	Date

INDEX TO DRAWINGS		
SHEET NO.	DWG. NO.	TITLE
1	T-1	Title Sheet
2	GN	General Notes
3	C-1	Site Plan, First, Mezzanine, Second Floor Plans
4	S-1	Building Elevations & Roof Plan
5	S-2	Equipment Layout, Section & Details
6	S-3	Platform Framing Details
7	E-1	Electrical Plan & Details
8	E-2	Electrical Specifications

T-Mobile

T-Mobile West Corporation

EAST WEST ROAD - GATEWAY HOUSE NEW EQUIPMENT AND ROOFTOP SITE No. HI01144

PLANS PREPARED BY:

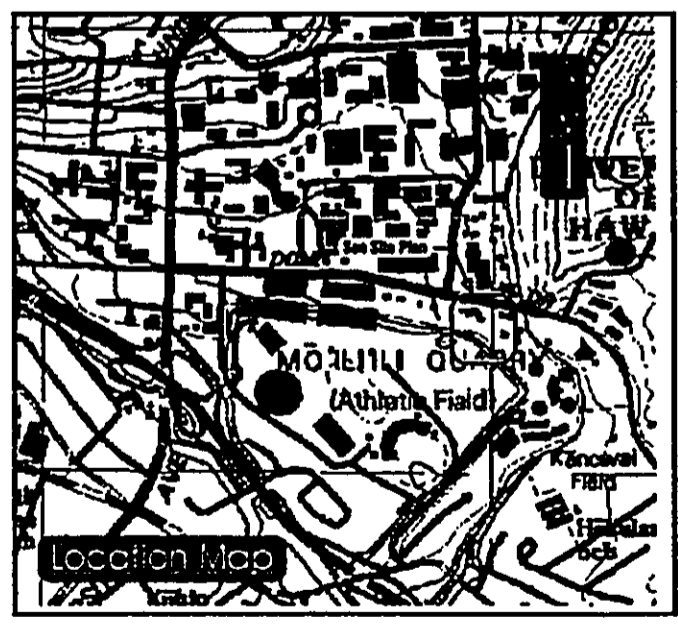
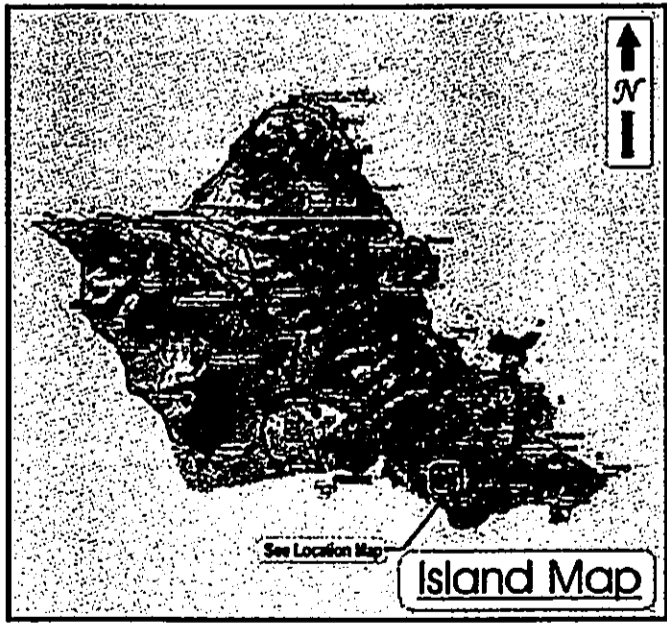
HAWAII ENGINEERING GROUP, INC. - CIVIL & STRUCTURAL
98-023 Hekaha Street, # 2-b Aiea, Hawaii, 96701
Telephone Number: (808)-486-2092 Fax Number: (808)-486-9261

RS ENGINEERING - ELECTRICAL ENGINEERS
1376 Kalanilikei St. Honolulu, Hawaii, 96821
Telephone Number: (808)-377-9210 Fax Number: (808)-377-9210



Exp. Date 04-30-04

This project was prepared by me or under my supervision and construction of this project will be under my supervision.



APPROVAL

The following parties hereby approve and accept the contractor to proceed with the construction described herein. These approvals are subject to review by the local Building Department and they may impose.

Landlord or Agent

RF

Site Acq.

Construction

T-Mobile

S:\2003 Projects\03-018 T-Mobile Gateway House\03-018TS.dwg, Model, 1/4/2006 4:18:47 PM, Hawaii Engineering Group, Inc.

Requirements

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... actor without a written change
... by the owner shall place full
... the contractor.

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... drawings as required and listed
... er for approval.

... ed, checked and corrected
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DIVISION 13 - Special Construction

13100 TOWER & ANTENNA INSTALLATION

PART 1 - GENERAL

1.1 Work Included

- A. If required, erect furnished tower.
- B. Ground tower temporarily during erection. Grounding shall include base(s) and anchors.
- C. If required, install side arms.
- D. Install antennas as indicated on the drawings and per the antenna manufacturer's and the owners specifications.
- E. Install galvanized steel antenna mounts as indicated on drawings.
- F. Install furnished galvanized steel waveguide ladder.
- G. Install furnished waveguide bridge as indicated on drawings.
- H. Supply and install one insulated ground bar on equipment cabinet.

- I. Supply and install grounding strap kits with long barrel compression lugs (sim. to Andrew-223700TBD or approved equal) atop tower base before entering the equipment building.
- J. Assist Owner technicians in performing sweep test of installed coax.
- K. Concrete piers for foundations shall be drilled and poured on the same day.

1.2 Related Work

- Furnish the following work as specified under construction documents, but coordinate with other trades prior to bid:
- If required:
- 1. Flashing of opening into outside walls
 - 2. Seal and caulk all openings
 - 3. Spec Painting
 - a. Paint all exposed equipment including Antennas, Coaxial Cables, Conduits, BTS Cabinets, Panels, Cabinets and related Electrical & Communications Equipment to match adjacent surface color. Submit sample brushout for approval.
 - 4. Cutting and patching


1.3 Requirements of Regulatory Agencies

- A. Furnish U.L. listed equipment where such label is available, install in conformance with U.L. standards where applicable.
- B. Install antenna, antenna cables, grounding system in accordance with drawings and specification in effect at project location and recommendations of state and local building codes, special codes having jurisdiction over specific portions of work. This includes but is not limited to the following:
 - 1. EIA - Electronic Industries Association RS - 222. Structural standards for steel antenna towers and antenna supporting structures.
 - 2. FAA - Federal Aviation Administration advisory circular AC 70/7460-HI, Obstruction marking and lighting.
 - 3. FCC - Federal Communications Commission Rules and Regulations Form 715, Obstruction Marking and Lighting Specifications for Antenna Structures and form 715A, High intensity Obstruction Lighting Specifications for Antenna Structures.
 - 4. AISC - American Institute of Steel Construction specification for structural joints using ASTM A325 or A490 bolts.
 - 5. NEC - National Electric Code - on tower lighting kits.
 - 6. UL - Underwriter's Laboratories approved electrical products.
 - 7. In all cases, part 77 or the FAA rules and parts 17 and 22 of the FCC rules are applicable and in the event of conflict, supersede any other standards or specifications.
 - 8. 1990 Life Safety Code NFPA - 101.

HAWAII ENGINEERING GROUP Inc.

Harbor Center
98-023 Hekaha St - # 2B
Aiea, Hawaii 96701
Ph: 808-495-2092
Fax: 808-496-9201

The project was prepared by me or under my supervision and construction of this project will be under my observation.



PROJECT: T-Mobile - East West Road - Gateway House

2563 Dale Street
Honolulu, Oahu, Hawaii 96822

TMK: (1) 2-8-29:30

General Notes

REVISIONS	BY

Date 4/16/03

Scale as noted

By dky

Job 03-018

Sheet **GN**

2 Of 8 Sheets

GENERAL

- All materials and workmanship shall conform to the drawings and specifications.
- The structural drawings and specifications represent the finished structure. They do not indicate the method of construction. The contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to, bracing, shoring for loads due to construction equipment, wind, seismic, etc. Observation visits to the site by the structural engineer shall not include inspection of the above items.
- The contractor shall be solely responsible for all excavation procedures including lagging, shoring and protection of adjacent property structures, streets and utilities.
- The contractor shall be solely responsible for coordinating the work of all trades and shall check all dimensions. All discrepancies shall be called to the attention of the architect and be resolved before proceeding with the work.
- Shop drawings required by the specifications shall be submitted to the architect for review prior to fabrications.
- See architectural drawings for size and location of all floor and wall openings, floor finishes, etc.
- Construction materials shall be spread out if placed on framed floors or roof. Loads shall not exceed the design live load per square foot. Provide adequate shoring, reshoring and/or bracing where structure has not attained design strength.
- Notes and details on drawings shall take precedence over general notes and typical details.
- See mechanical, plumbing and electrical drawings for size and location of all openings required for ducts, pipes and all pipe sleeves, electrical conduits and other items to be embedded in concrete or otherwise incorporated in structural work. Openings, pockets etc., larger than 6" shall not be placed in slabs, decks, beams, joists, columns, walls, etc., unless specifically detailed on the structural drawings. Notify the structural engineer when drawings by others show openings, pockets, etc., larger than 6" not shown on the structural drawings, but which are located in structural members.
- Special note: architectural plans are considered a part of the structural design drawings and are to be used to define detail configuration including, but not limited to, relative location of members, elevations, locations of all openings, depressions, slopes, joints, dimensions, etc.
- Design criteria -
 - Codes
1. UBC 1997
 - Live
1. Roof = 20 psf
 - Wind = 80 mph Exposure C
 - Seismic Zone 2A
- Special inspection requirements
None
- See architectural drawings for dimensions, limits of depressions, slopes, etc. not shown on the structural drawings. Immediately notify the architect if discrepancies occur between the dimension, depressions, slope, elevations, etc. shown on the architectural and structural drawings.
- The contractor shall coordinate the location of all new mechanical, plumbing, electrical, etc. penetrations which need to be introduced within any existing structural element. The contractor shall provide a consolidated shop drawing showing all the above penetration locations within existing structural elements and receive the architect's approval prior to introducing any of these penetrations. The contractor shall anticipate the need for localized structural strengthening due to required penetrations made to existing structural elements. This shall not be a basis for any cost or time impact.
- Contractor shall field verify all existing conditions and dimensions as well as new work. Any discrepancies shall be brought immediately to the attention of the architect.
- These drawings represent the existing conditions of the structure and the new work to be performed, based on the best available information. Some modifications and revisions in the design may be required due to unforeseen field conditions when concealed areas are uncovered during demolition and construction. The contractor shall anticipate some necessary modifications and revisions due to unforeseen field conditions, but this shall not provide grounds for any cost or time impacts.

STRUCTURAL STEEL

- Structural steel shall be detailed, fabricated and erected in accordance with the "AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", latest edition.
 - All structural steel shall conform to the ASTM designation A-36 unless otherwise noted.
 - All steel tubes shall conform to ASTM A500, Grade B.
 - Machine bolts shall conform to ASTM A-307, Grade A. All high strength bolts shall conform to ASTM A-325.
 - The structural steel fabricator shall furnish shop drawings of all steel for architect's review before fabrication.
 - Bolt holes in steel shall be 1/16" larger in diameter than nominal size of bolt used, except as noted.
 - All structural steel surfaces that are encased in concrete or masonry shall be left unpainted.
 - All welds shall be in conformity with the structural welding code AWS D1.1-77 of the American Welding Society. See specifications.
 - All exposed structural steel and miscellaneous metal shall be hot dip galvanized after fabrication.
 - All grout (or drypack) below base plates, beams bearing on concrete walls, etc., shall be non-shrink with $f_c = 5,000$ psi. See specification for additional information.
 - All existing structural steel members shall be cleaned to remove all visible rust, mill scale, paint and foreign matter by blast cleaning to a SSPC SPS specifications.
 - All structural steel members shall be primed and painted with zinc rich paint after fabrication.
- ### LIGHT GAUGE METAL FRAMING
- All stud/track material shall conform to the following:

16 gauge and heavier - 50 ksi min. Yield galvanized per ASTM A446 Grade D.
18 gauge and lighter - 33 ksi min. Yield galvanized per ASTM A446 Grade A.
 - All welding shall be performed by certified light gauge metal welders qualified for all appropriate directions per AWS D1.3.
Welding rods shall conform to the following:

18 gauge and lighter sheet - E60xx
16 gauge and heavier sheet - E70xx or E6013

All welds shall be retouched with zinc-rich paint.
 - The following specified fasteners shall be used where noted on the structural drawings unless acceptable substitutes are approved by the structural engineer of record:

Screw Design.	Nominal dia. (inches)
#1/4-14	0.250"
#12-14	0.216"
#10-16	0.190"
#8-18	0.164"
#6	0.138"

Penetration of screws through joined materials shall not expose fewer than 3 threads.
 - All calculated section properties, per 1991 UBC Standard 27-9, were based on the following nominal material thicknesses:

12 ga. - 0.1017"
14 ga. - 0.0713"
16 ga. - 0.0566"
18 ga. - 0.0451"
20 ga. - 0.0346"
23 ga. - 0.0188"

All light gauge steel shall conform to 1991 UBC Standard 27-9.
 - All wall studs shall have punch-outs (with spacing at 24" o.c.) unless otherwise noted.
Flame cutting of ends of load-bearing studs shall not be allowed.
 - Lateral blocking of wall studs shall be installed when wall sheathing, installed per UBC Chapter 47, does not continue full height on both sides of the studs. Blocking shall be installed per manufacturer's specifications, unless otherwise noted, and must be approved or verified prior to installation.
 - Floor joist blocking shall be spaced as follows, unless otherwise noted:

Joist Span (feet)	Blocking
up to 14	1 row at mid span
14 - 20	2 rows, at 1/3 points
20 - 26	3 rows, at 1/4 points
 - Splices in framing members shall not be permitted.

Division 1 - General Requirements

Part 1 General

1.1 Intent

- These specifications and construction drawings accompany them describe the work to be done and the materials to be furnished for construction.
- The drawings and specifications are intended to be fully explanatory and complementary. However, should anything be shown, indicated or specified on one and not the other, it shall be done the same as if shown, indicated or specified in both.
- The intention of the documents is to include all labor and materials reasonably necessary for the proper execution and completion of the work as stipulated in the contract.
- The purpose of the specifications is to interpret the intent of the drawings and to designate the method of the procedure, type and quality of materials required to complete the work.
- Minor deviations from the design layout are anticipated and shall be considered as part of the work. No changes that alter the character of the work will be made or permitted by the owner without issuing a change order.

1.2 Conflicts

- The Contractor shall be responsible for verification of all measurements at the site before ordering any materials or doing any work. No extra charge or compensation shall be allowed due to differences between actual dimensions and dimensions indicated on the construction drawings. Any such discrepancy in dimension which may be found shall be submitted to the owner for consideration before the contractor proceeds with the work in the affected areas.
- The Bidder, if awarded the contract, will not be allowed any extra compensation by reason of any matter or thing concerning which such bidder might have fully informed himself prior to the bidding.

- No plea of ignorance of conditions that exist, or of difficulties or conditions that may be encountered or of any other relevant matter concerning the work to be performed in the execution of the work will be accepted as an excuse for any failure or omission on the part of the contractor to fulfill every detail of all the requirements of the contract documents governing the work.

1.3 Form of Agreement

- AIA Document A107 Abbreviated Form of Agreement with Supplementary Conditions which either modify or supplement the conditions of the contract.

- The contractor is responsible for obtaining the building permit at the local jurisdiction as the Contractor-of-Record, and providing jurisdiction with all proof required to operate as a Contractor in that jurisdiction. The Contractor shall be reimbursed only the amount of any fee paid as follows.

- Plan review fee.
- Building permit fee
- Connections and inspections fee.

- Contractor is responsible for application and payment of contractor licenses and bonds.

1.4 Storage

- All materials must be stored in a level and dry fashion and in a manner that does not obstruct the flow of other work.

- Any storage method must meet all storage recommendations of the associated manufacturer.

1.5 Clean Up

- Contractors shall at all times keep the site free from accumulation of waste materials or rubbish caused by his employees at work and at the completion of the work, he shall remove all the rubbish from and about the building area, including all his tools, scaffolding and surplus materials and shall leave his work clean and ready for use.
- Exterior: Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.

- Remove all traces of splashed materials from adjacent surfaces.

- If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.

1.6 Change Order Procedure

- Orders may be initiated by the owner and/or the Contractor involved. The Contractor, upon verbal request from the owner shall prepare a written proposal describing the change in work or materials and any changes in the contract amount and present to the owner for approval. Submit requests for substitutions in the form and the accordance with procedures required for change order proposals. Any changes in scope of work or materials which are performed by the Contractor without a written change order as described and approved by the owner shall place full responsibility of these actions on the contractor.

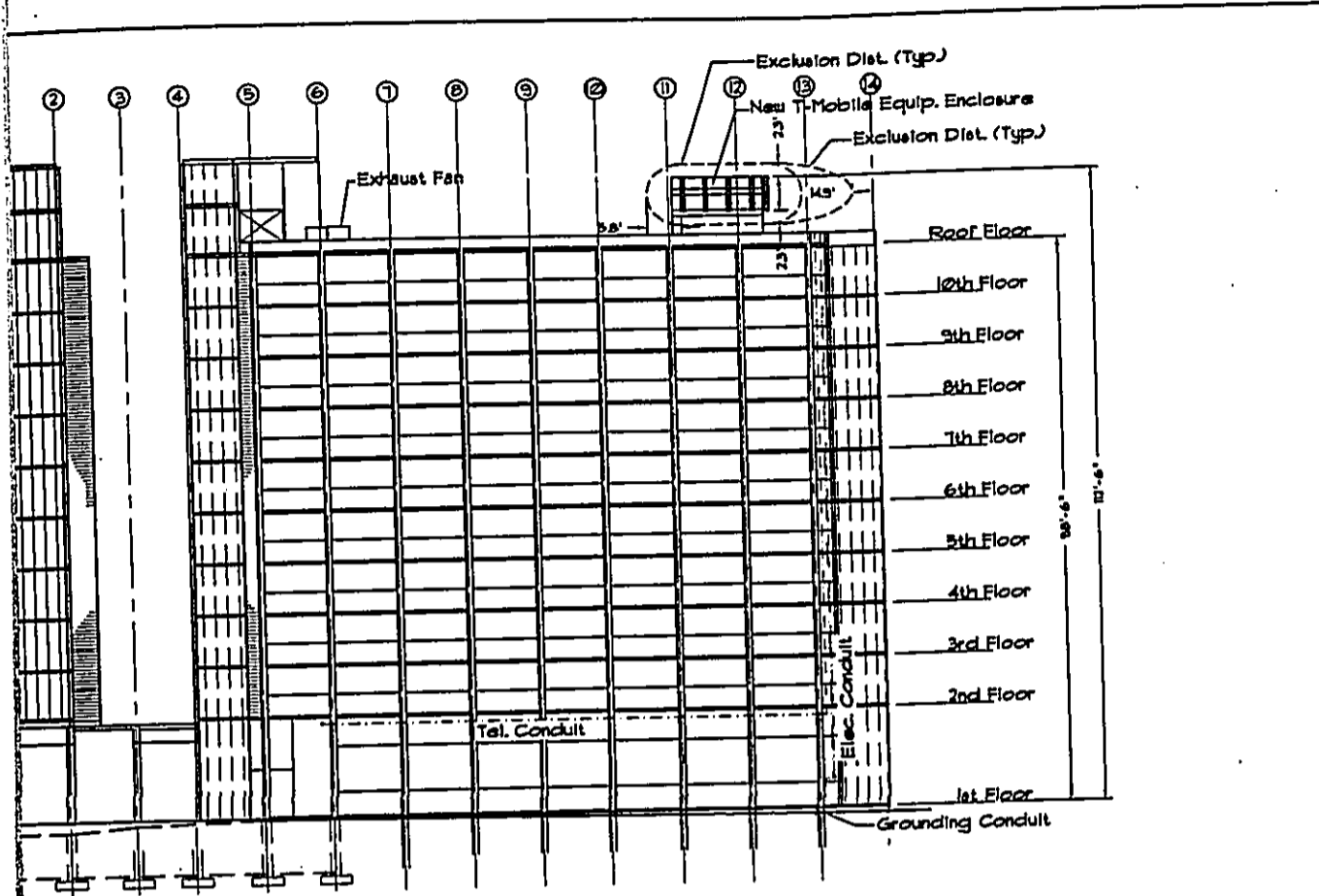
1.7 Related Documents and Coordination

- General Carpentry, electrical and antenna drawings are interrelated. In performance of the work, the Contractor must refer to all drawings. All coordination to be the responsibility of the Contractor.

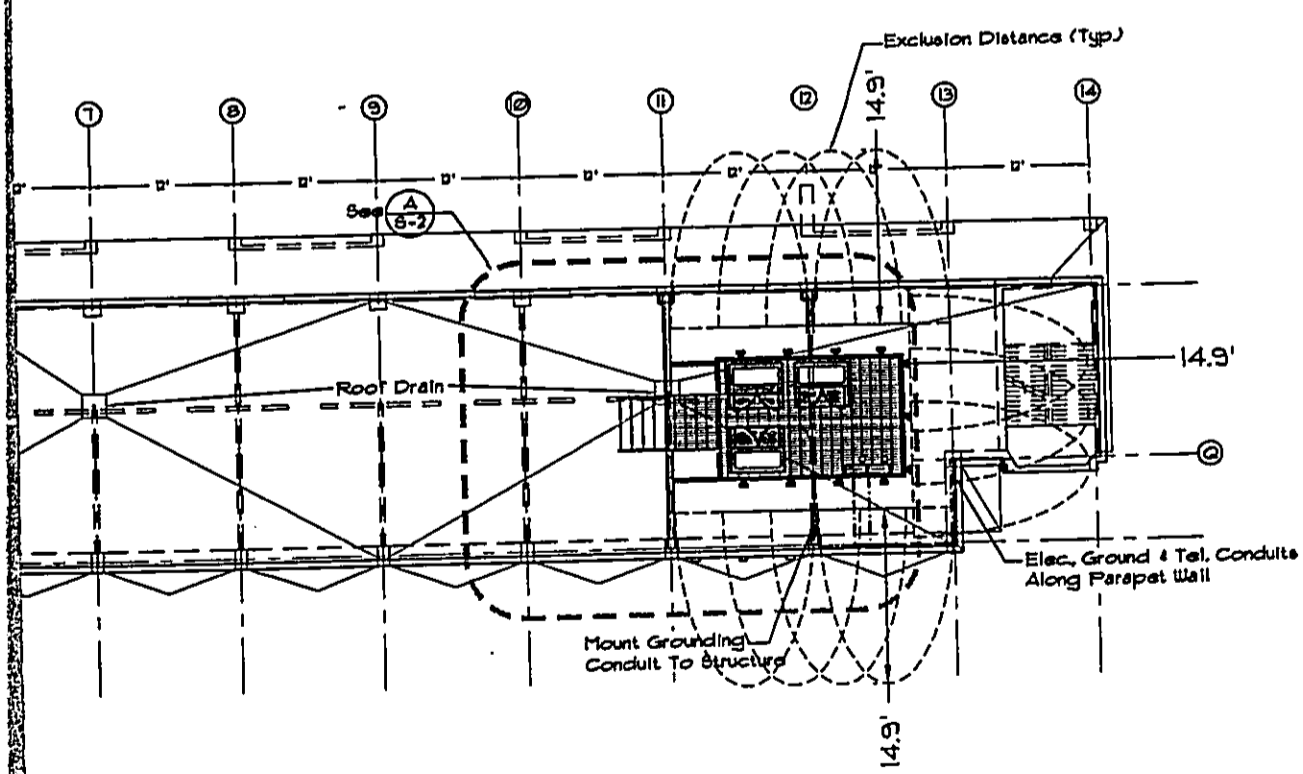
1.8 Shop Drawings

- Contractor shall submit shop drawings as required and listed in these specifications to the owner for approval.

- Shop drawings shall be reviewed, checked and corrected by contractor prior to submittal to the owner.



2
S-1
North Elevation
Scale: 1/8" = 1'-0"



A
S-1
Roof Plan
Scale: 1/4" = 1'-0"

**HAWAII
ENGINEERING
GROUP
Inc.**

Harbor Center
88-023 Hekaha St - # 28
Aiea, Hawaii 96701
Ph: 808-498-2002
Fax: 808-498-0284

This project was prepared by me or under my supervision and construction of this project will be under my observation.

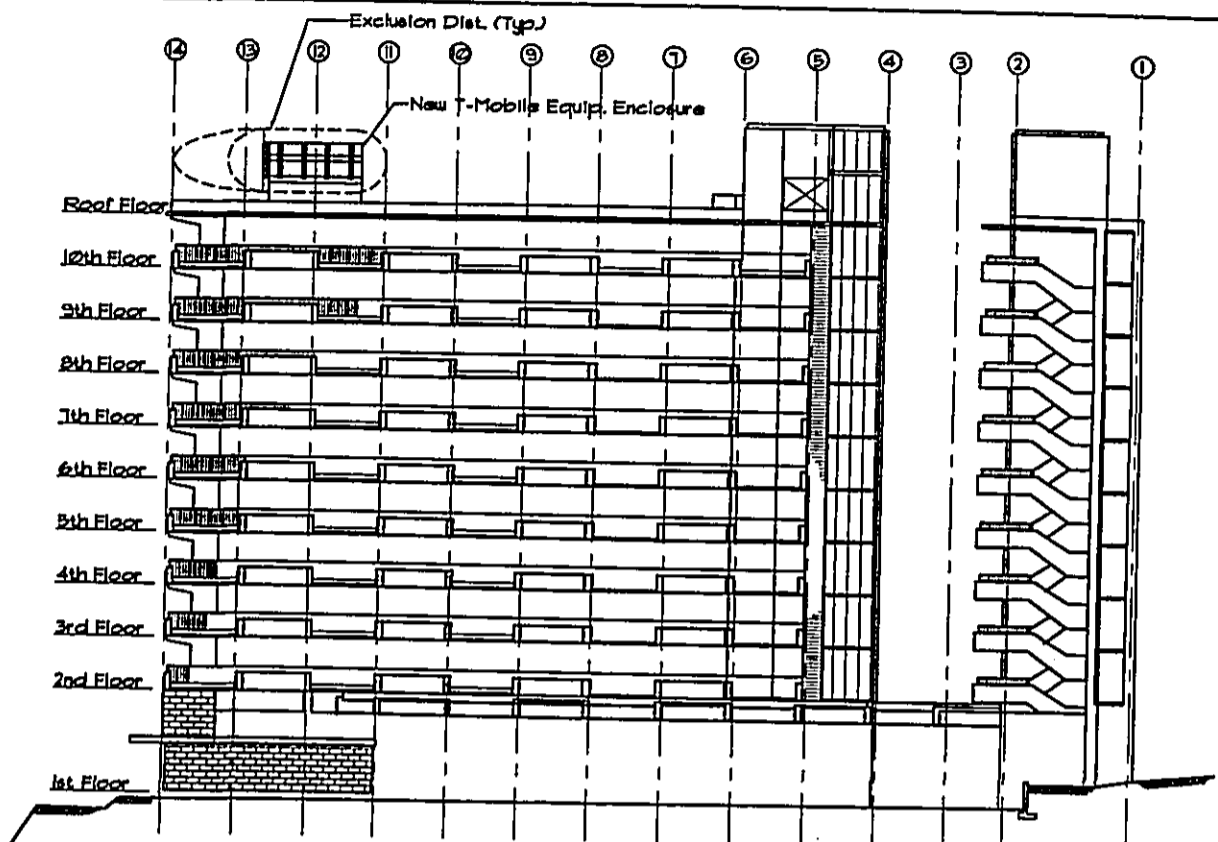


PROJECT: T-Mobile - East West Road - Gateway House
2563 Dale Street
Honolulu, Oahu, Hawaii 96822
T.M.K. (I) 2-8-29.50
Bldg. Elevations & Roof Plan

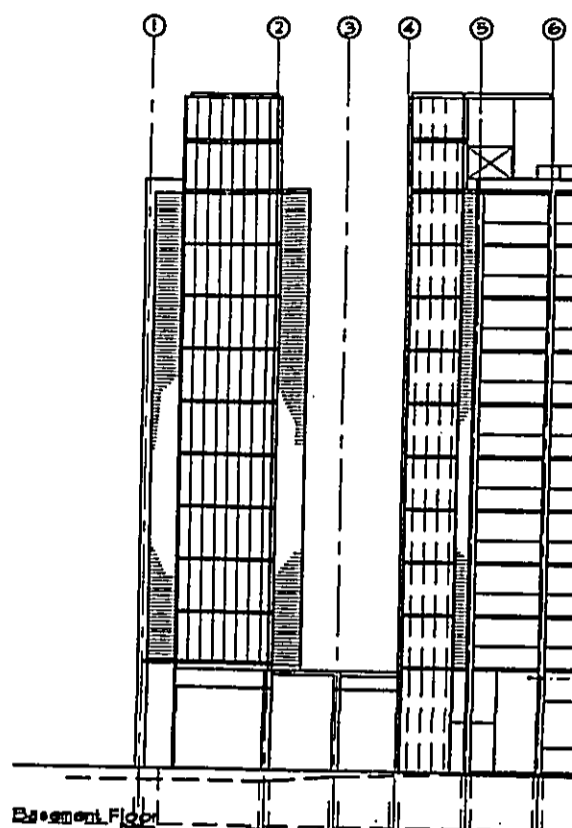
REVISIONS	BY

Date 4/16/03
Scale as noted
By dky
Job 03-018
Sheet **S-1**
4 Of 8 Sheets

S:\2003 Projects\03-018 T-Mobile Gateway House\03-018.dwg, S-1, 12/29/2005 3:22:15 PM, Hawaii Engineering Group, Inc.

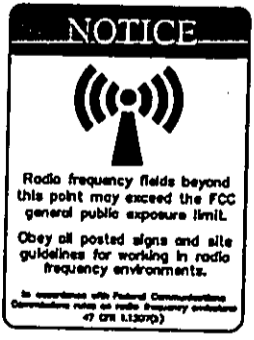


1
S-1
South Elevation
Scale: 1/16" = 1' - 0"



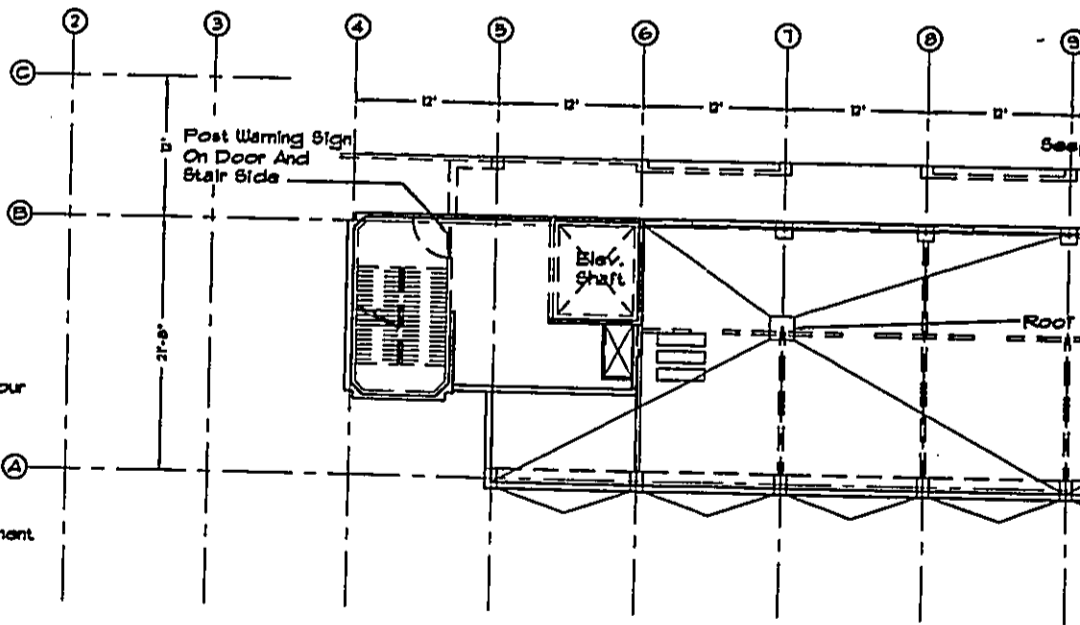
2
S-1
North Elev
Scale: 1/16" = 1' - 0"

Note:
1-All equipment and antennas painted to match existing building in non-reflective, earth-tone colors.
2-Restricted roof access by locked door.

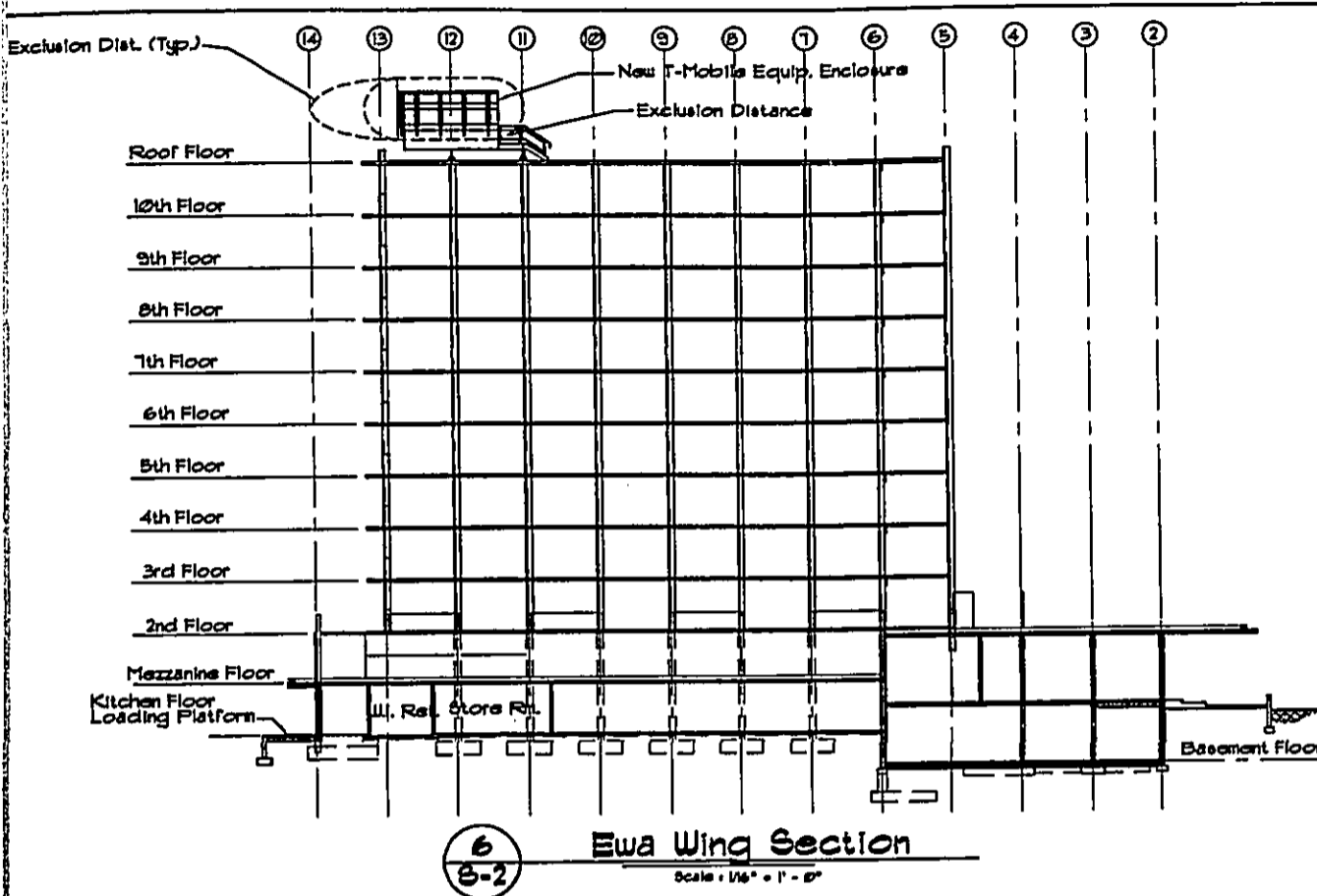


Notes:
This sign shall be aluminum with rounded corners and come with holes located near each of the four corners for mounting.
This caution sign should be posted at the site in a manner that prominently alerts the general public of the RF emissions at the site. The general public should not be able to approach a radiating antenna without first seeing the sign. This sign must be posted prior to the commencement of operations.

3
S-1
Warning Sign (To Be Posted On Roof Access Door)
Scale: n/a

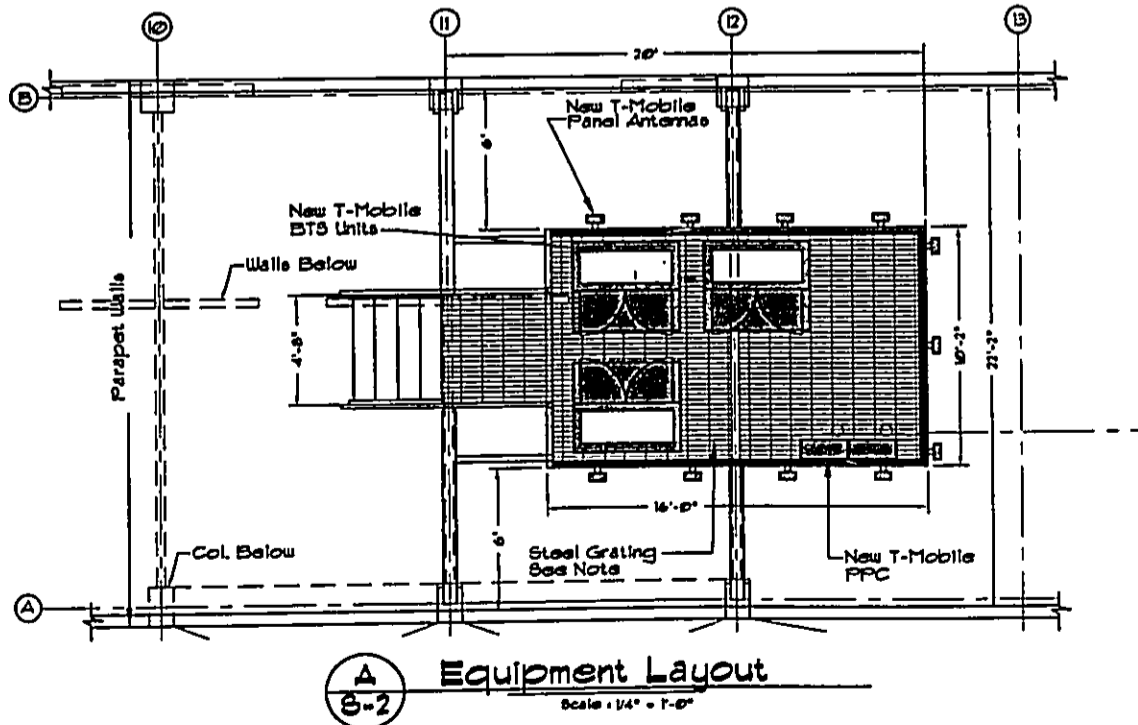


A
S-1
Roof Plan
Scale: 1/4" = 1' - 0"



Notes:

- 1 - Grating shall be size indicated bearing bars fabricated in accordance w/ NAAMN galvanized. Grating clips shall be provided by the steel fabricator and attached to all supporting members • Max. 10" O.C.
- 2 - All grating openings shall be banded.
- 3 - Openings shall be 1/2" shorter in each direction than the main grating plan. The removable pieces shall be banded.
- 4 - All welds to be 3/16" fillet E70X unless otherwise noted.
- 5 - Contractor shall submit shop drawing of platform steel framing to engineer for review prior to fabrication.



HAWAII ENGINEERING GROUP Inc.
 Harbor Center
 98-033 Hahaione St - # 28
 Aiea, Hawaii 96701
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 FAX 808-489-9201

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PROJECT: T-Mobile - East West Road - Gateway House
 2563 Dole Street
 Honolulu, Oahu, Hawaii 96822

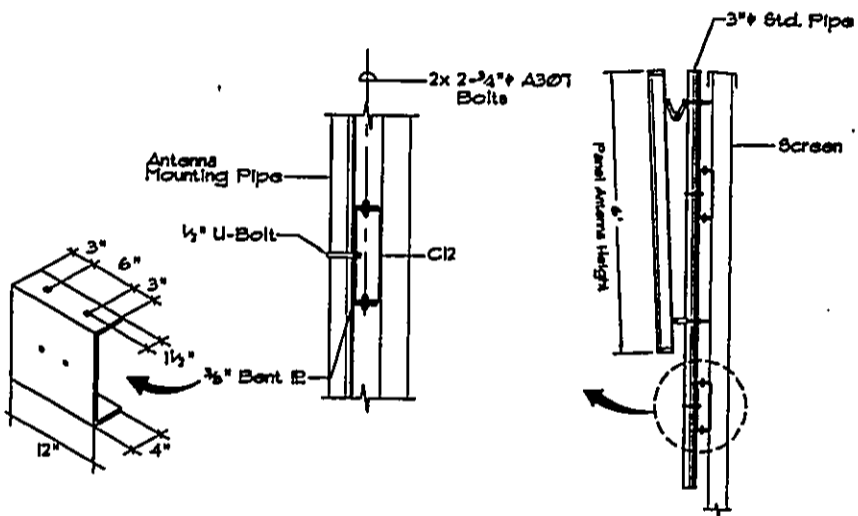
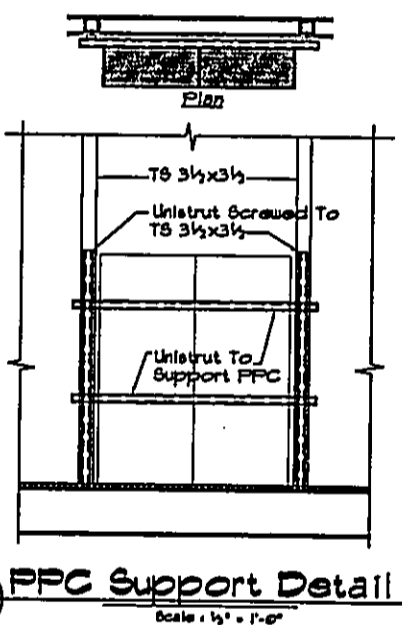
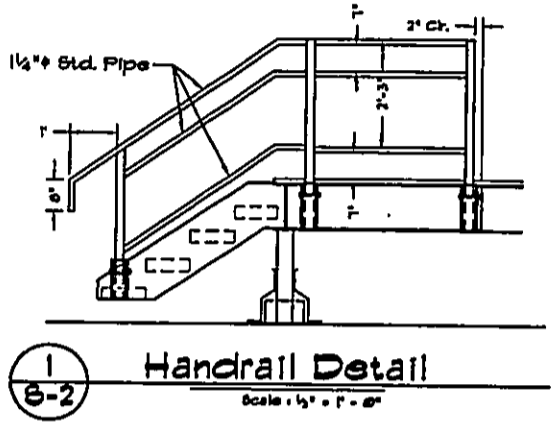
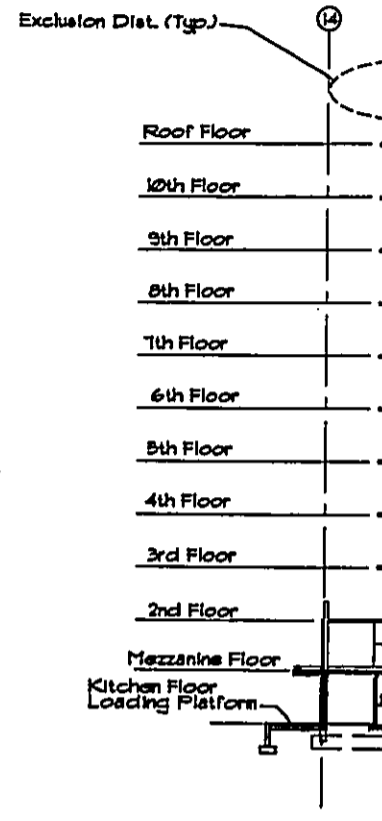
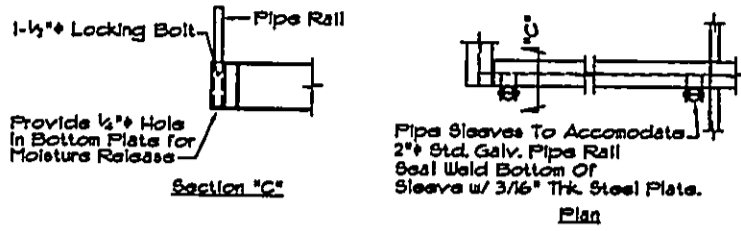
TAK: (1) 2-B-29:30

Equipment Layout, Section & Details

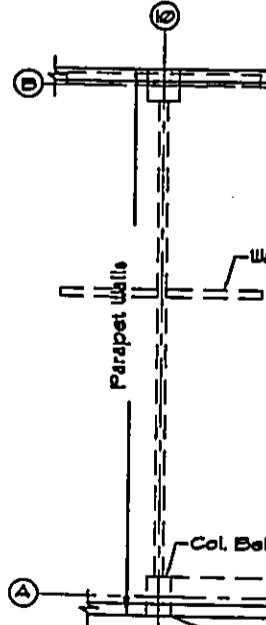
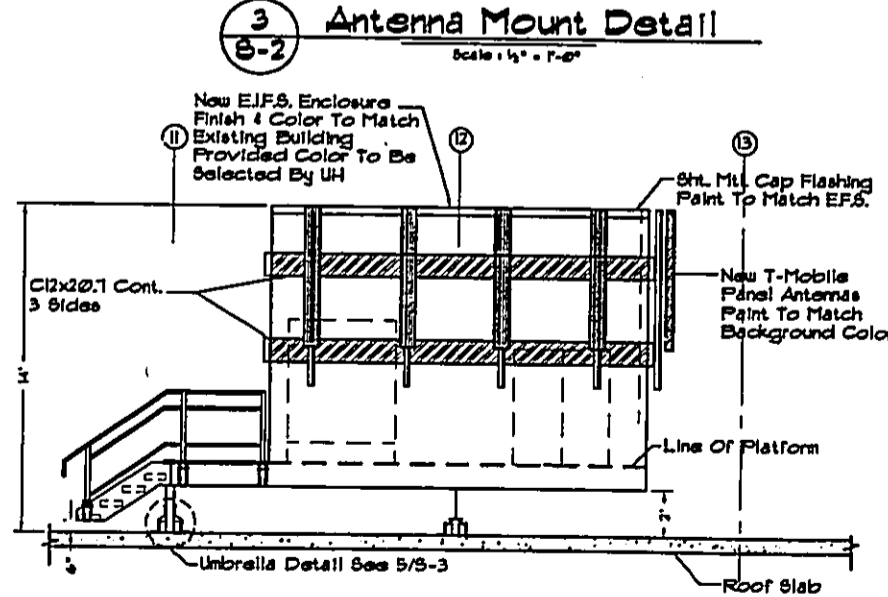
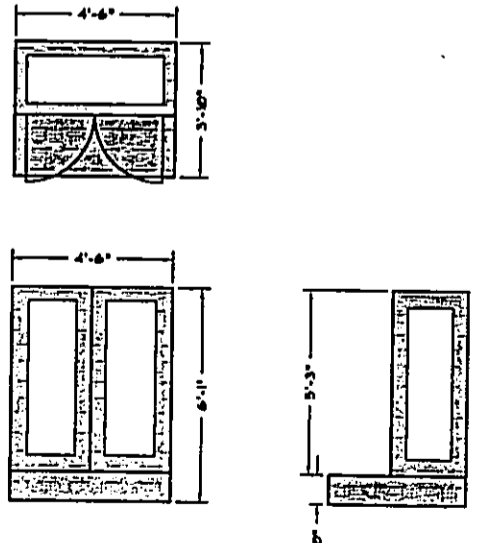
REVISIONS	BY

Date 4/16/03
 Scale as noted
 By dky
 Job 03-018
 Sheet **S-2**
 5 Of 8 Sheets

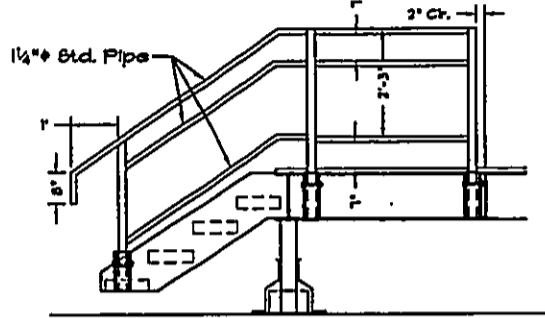
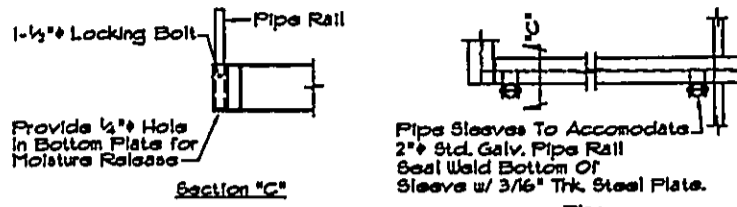
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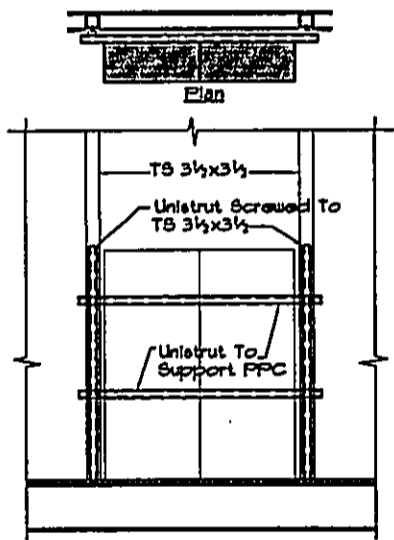
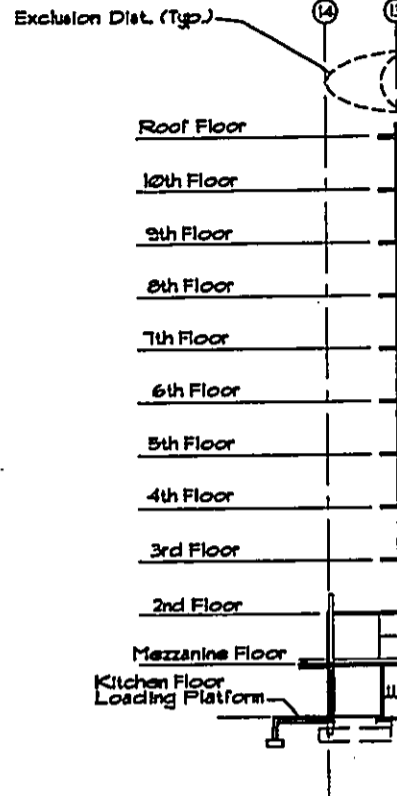
Notes:
1 - Grating shall be size indicated by the steel fabricator and attached
2 - All grating openings shall be bar
3 - Openings shall be 1/2" shorter in
4 - All welds to be 3/16" fillet E70X
5 - Contractor shall submit shop dra



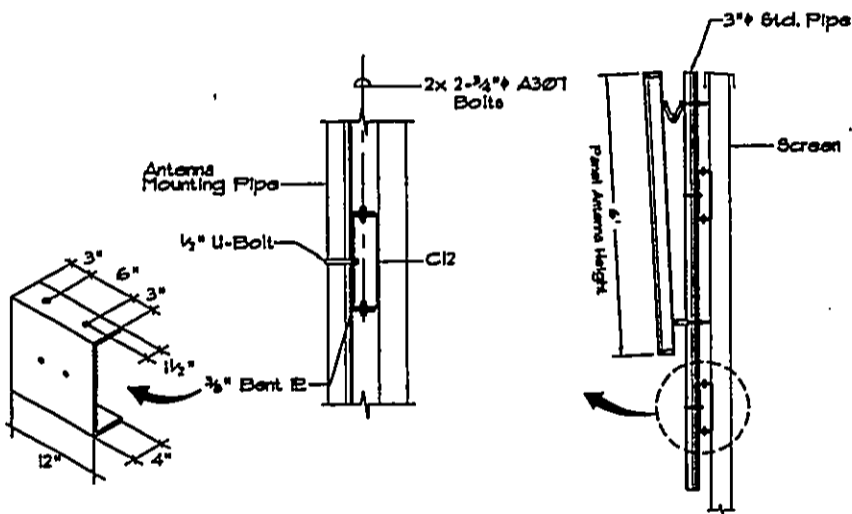
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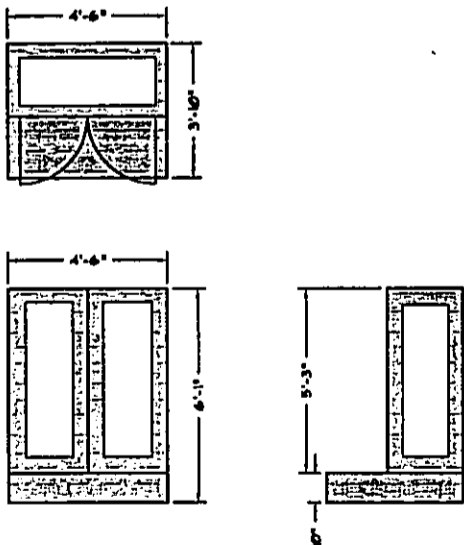
1 Handrail Detail
Scale: 1/2" = 1'-0"



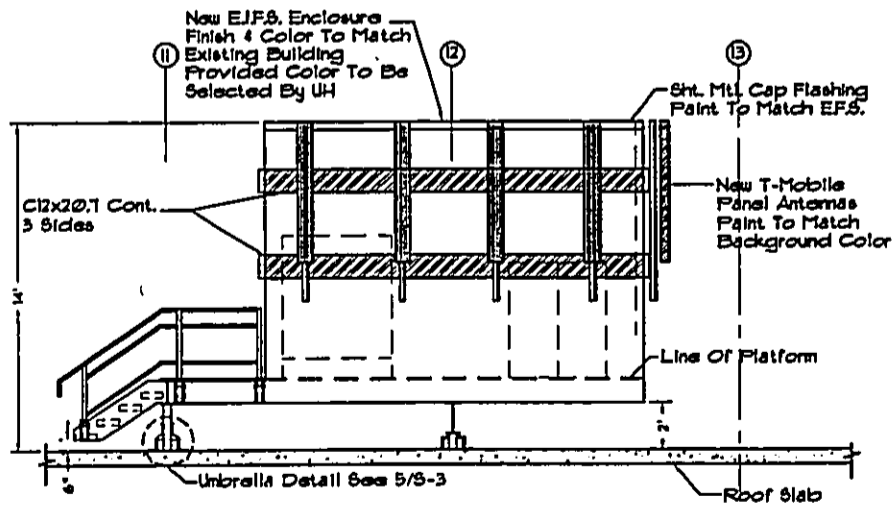
2 PPC Support Detail
Scale: 1/2" = 1'-0"



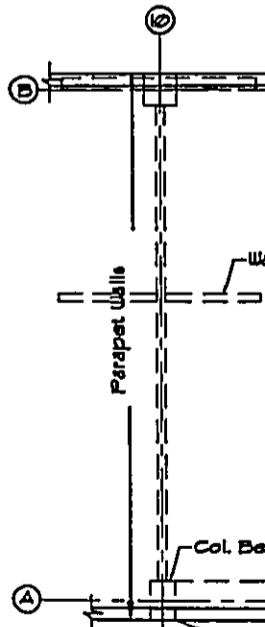
3 Antenna Mount Detail
Scale: 1/2" = 1'-0"



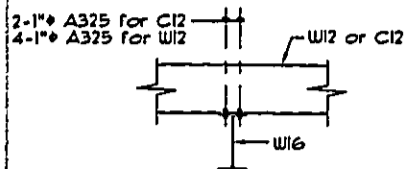
4 BTS 68000 Unit
Scale: 3/8" = 1'-0"



5 Platform Elevation
Scale: 1/4" = 1'-0"

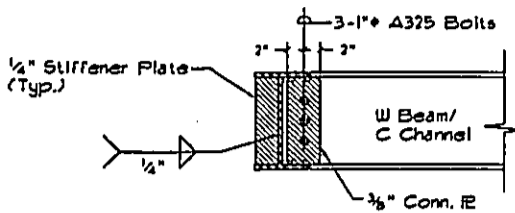


- Notes:
- 1 - Grating shall be size indicated by the steel fabricator and attached
 - 2 - All grating openings shall be bar
 - 3 - Openings shall be 1/2" shorter in
 - 4 - All welds to be 3/16" fillet E70X
 - 5 - Contractor shall submit shop dra



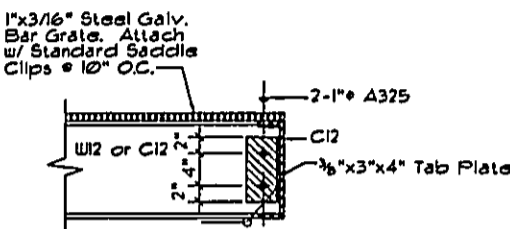
Detail

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



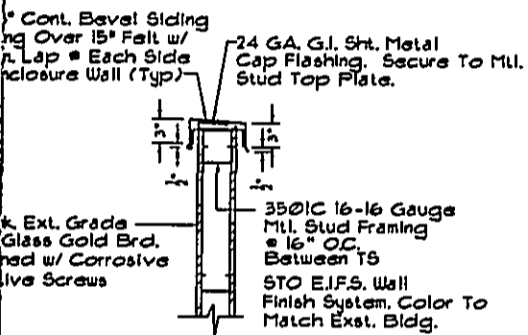
12 Beam to Beam Conn.

Scale: 1" = 1'-0"



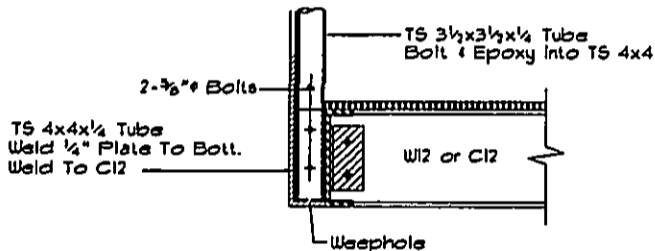
Detail

Scale: 1" = 1'-0"



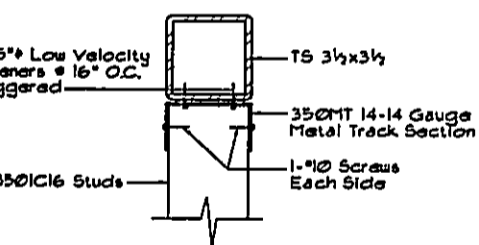
Wall/Cap Flashing Detail

Scale: 1" = 1'-0"



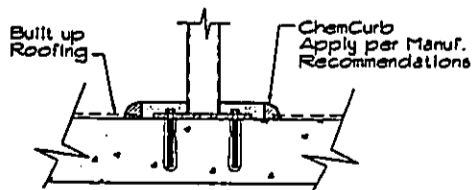
Detail

Scale: 1" = 1'-0"



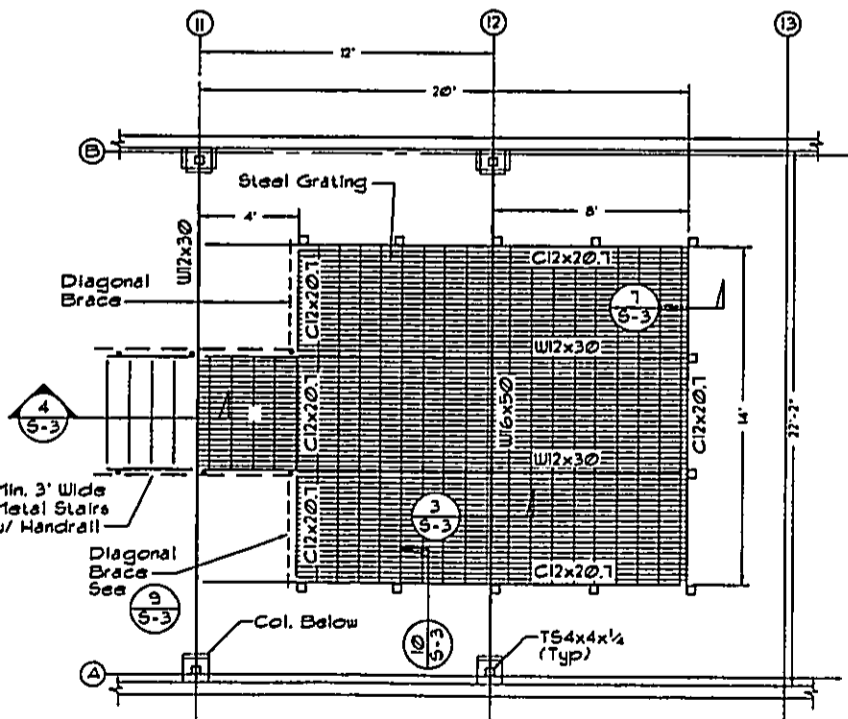
TS to Track Conn.

Scale: 3/4" = 1'-0"



ChemCurb Detail

Scale: 1" = 1'-0"



A Platform Framing Plan

Scale: 1/4" = 1'-0"

HAWAII ENGINEERING GROUP Inc.

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Ph 808-486-2092
Fax 808-486-9201

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PROJECT: T-Mobile - East West Road - Gateway House

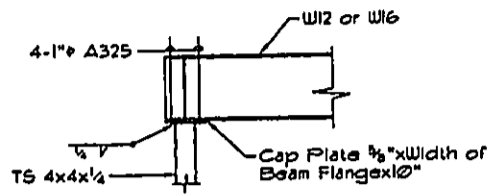
2563 Dole Street
Honolulu, Oahu, Hawaii 96822

TAK: (1) 2-B-29:30

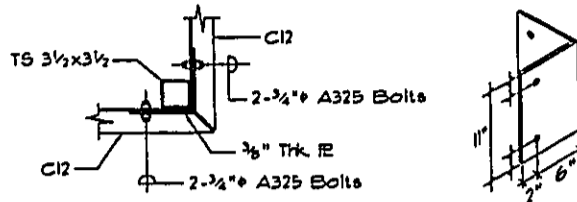
Platform Framing & Details

REVISIONS	BY

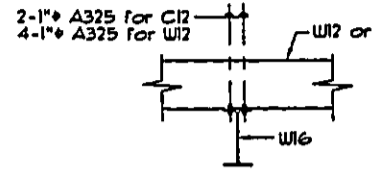
Date 4/16/03
Scale as noted
By dky
Job 03-018
Sheet **S-3**
6 Of 8 Sheets



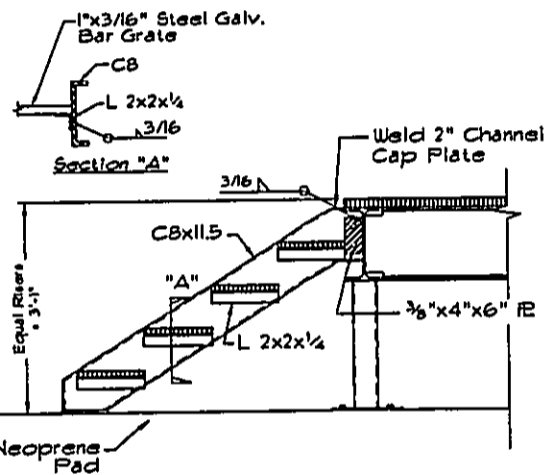
1
S-3 **Cap Plate Detail**
Scale: 1/2" = 1'-0"



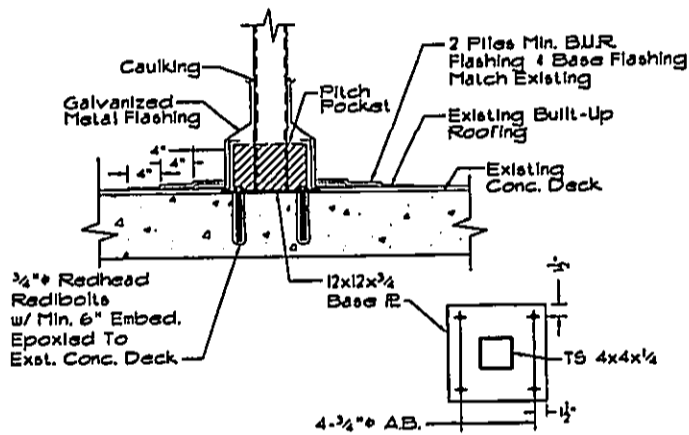
2
S-3 **C12 Corner Conn. Detail**
Scale: 1" = 1'-0"



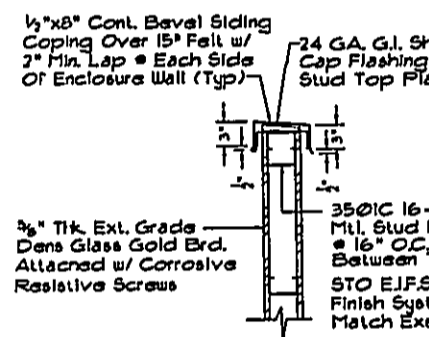
3
S-3 **Detail**
Scale: 1/2" = 1'-0"



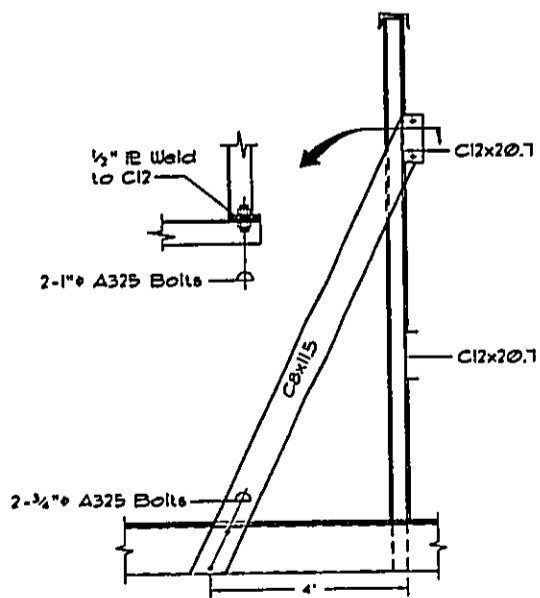
4
S-3 **Stair Detail**
Scale: 1/4" = 1'-0"



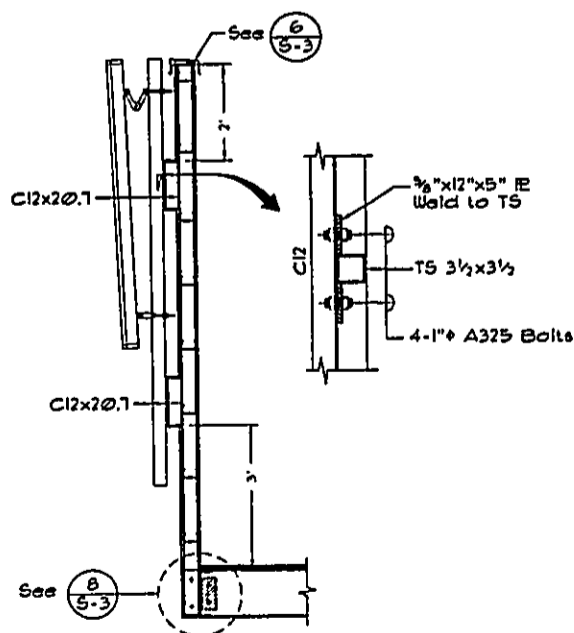
5
S-3 **Pitch Pocket Detail**
Scale: 1" = 1'-0"



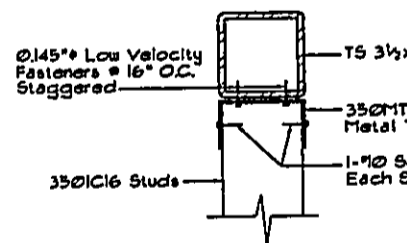
6
S-3 **Wall/Gap Flashing**
Scale: 1" = 1'-0"



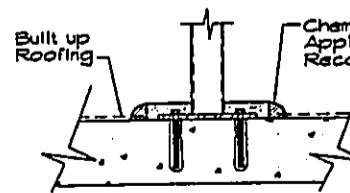
9
S-3 **Diagonal Brace Detail**
Scale: 1/2" = 1'-0"



10
S-3 **Screen Section**
Scale: 1/2" = 1'-0"

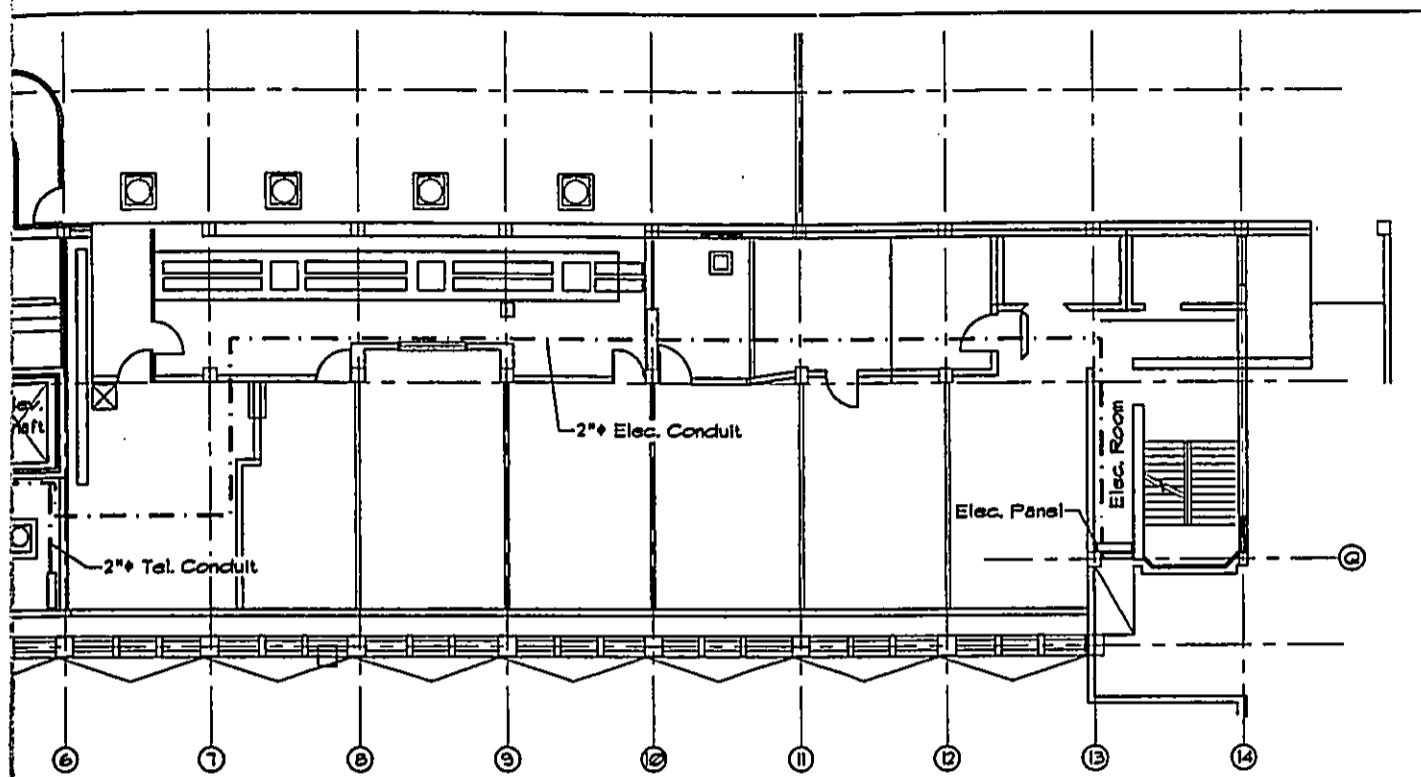


13
S-3 **TS to Track Co.**
Scale: 1/2" = 1'-0"

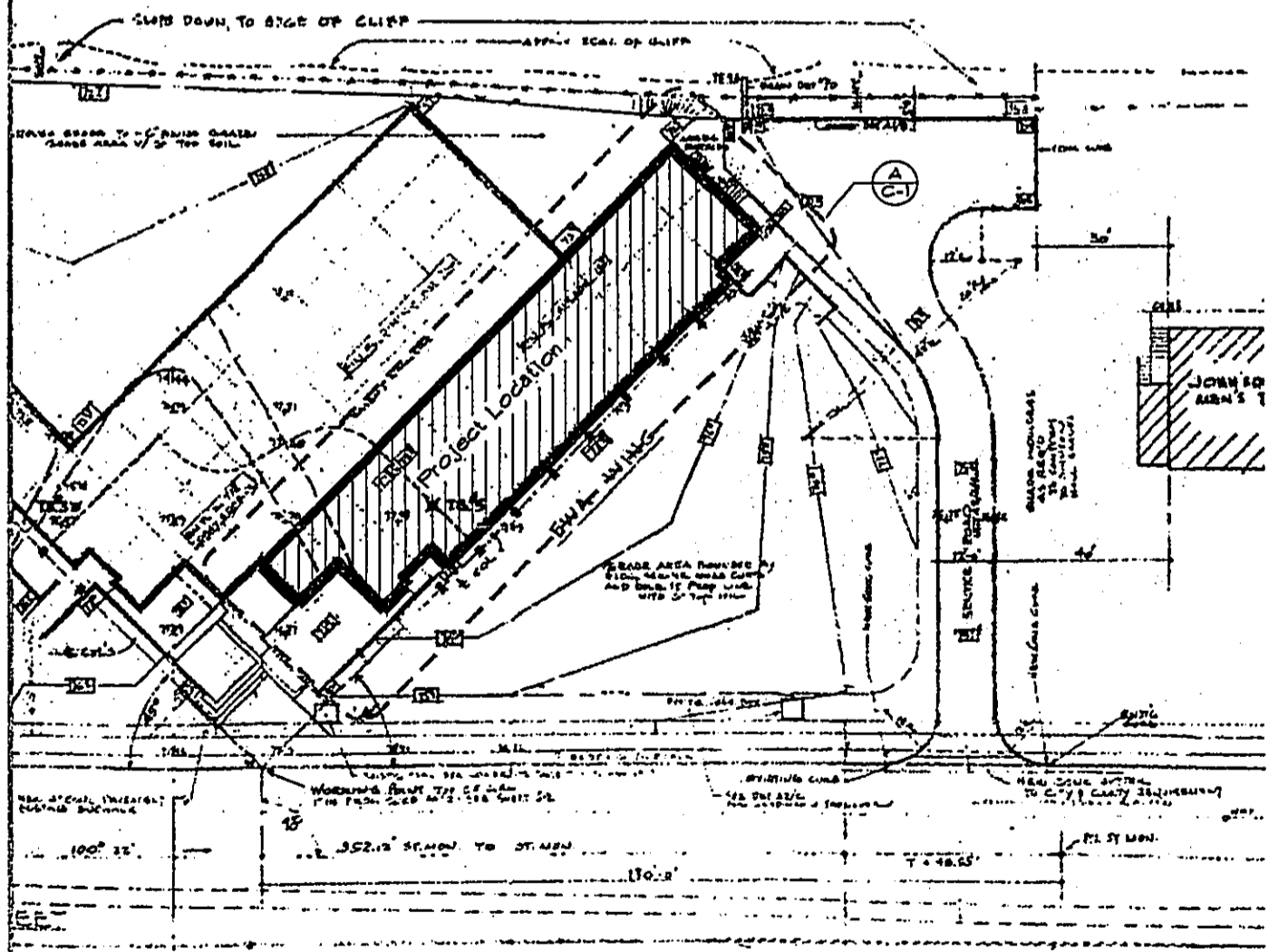


11
S-3 **ChemCurb Detail**
Scale: 1" = 1'-0"

Note:
Contractor may use ChemCurb, See Det. 11/5-3, in lieu of Pitch Pocket



**(A)
C-1** First Floor Plan
Scale: $\frac{1}{8}'' = 1'-0''$



**(1)
C-1** Site Plan
Scale: $1'' = 20'$

**HAWAII
ENGINEERING
GROUP
Inc.**

Harbor Center
88-023 Hekaha St - # 28
Aiea, Hawaii 96701
Ph: 908-480-2002
Fax: 908-480-9201

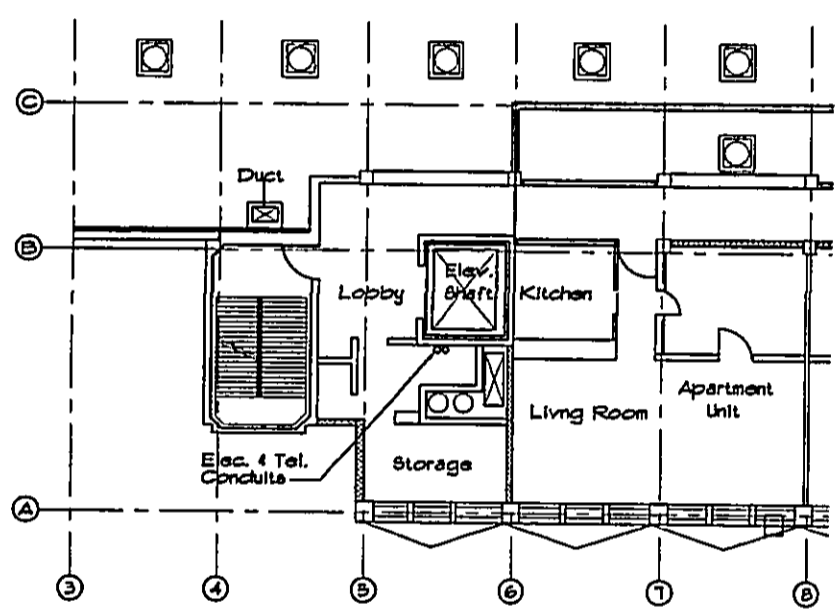
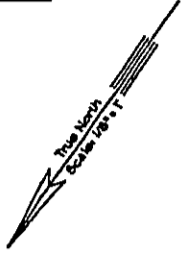
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PROJECT T-Mobile - East West Road - Gateway House
2563 Dole Street
Honolulu, Oahu, Hawaii 96822
DATE: 01-2-8-29:30

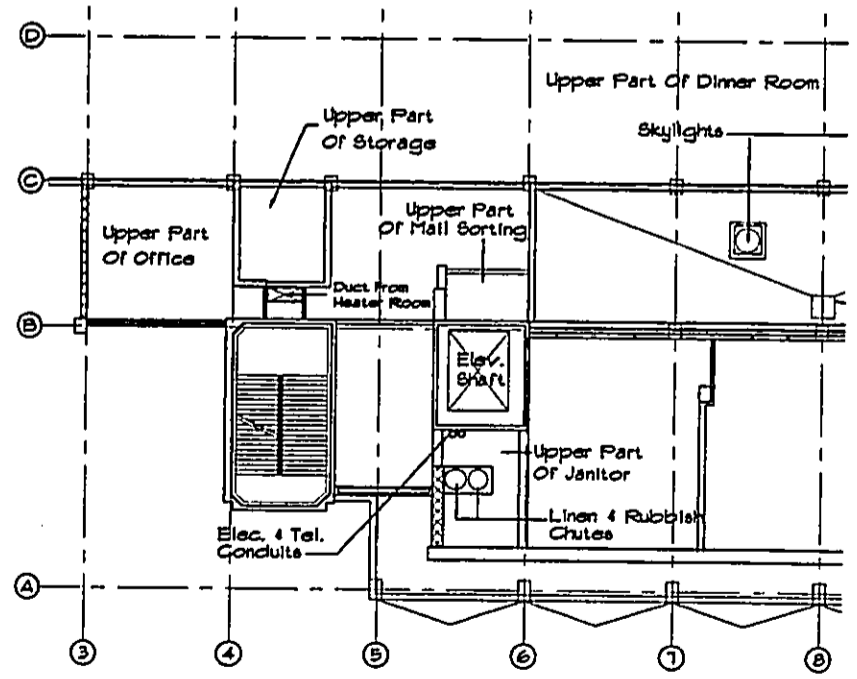
Site Plan, 1st, Mezz., 2nd Floor Plans

REVISIONS	BY
Date 4/16/03	
Scale as noted	
By dky	
Job 03-018	
Sheet C-1	
3 Of 8 Sheets	

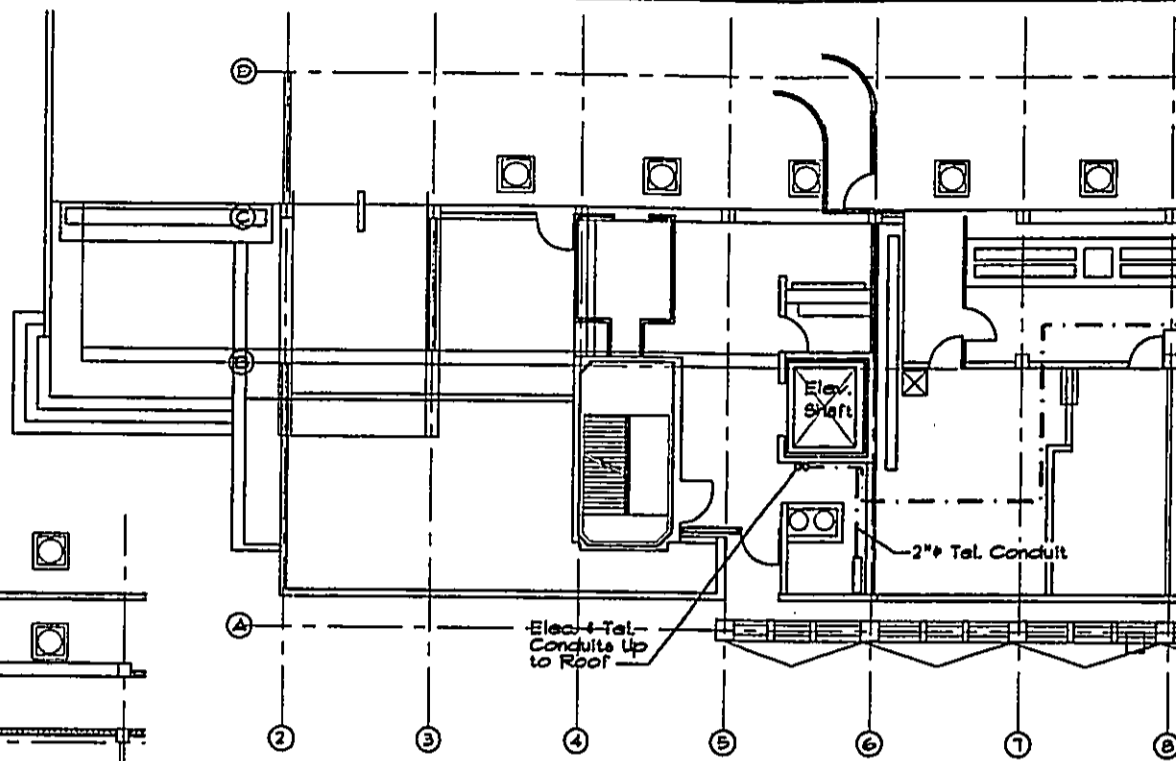
Antenna Coordinates - NAD 83
 21°-17'-45.3" N
 157°-48'-53.4" W
 Ground Level (GL) = 14.0' Above MSL
 Center of Antenna = 107.50' Above GL



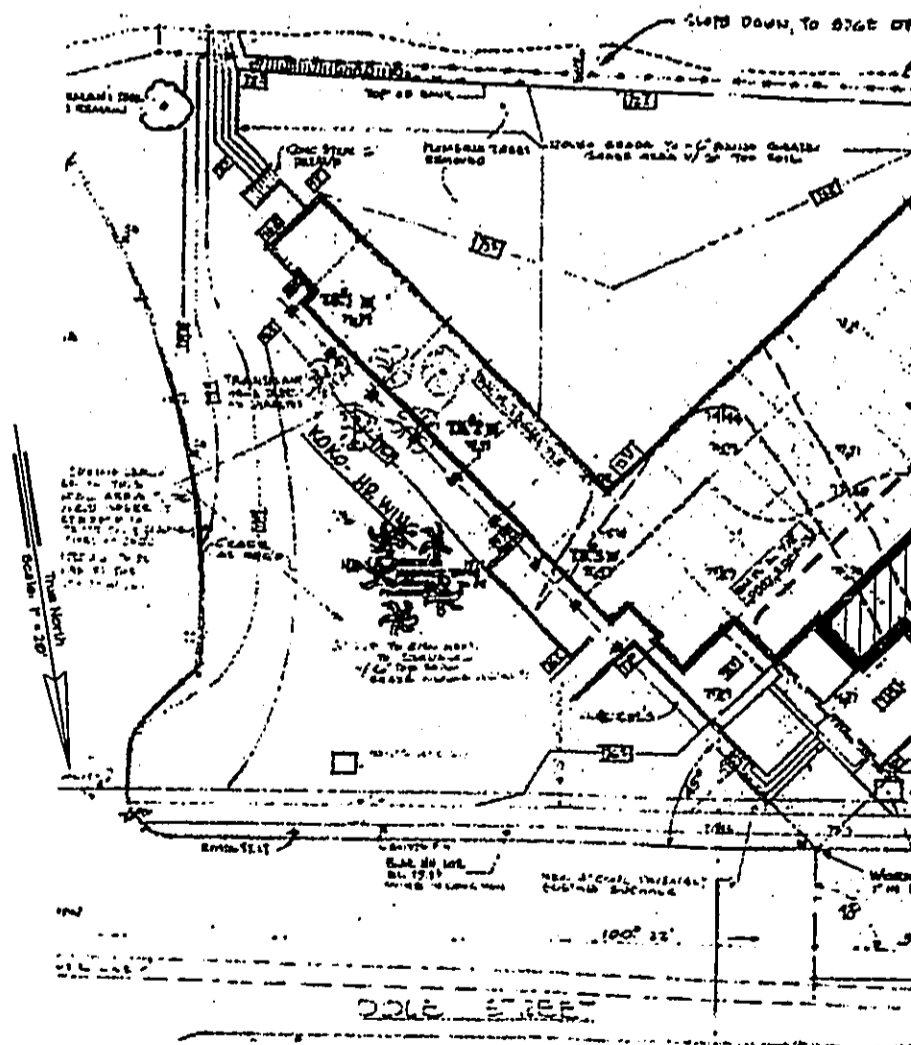
B Second Floor Plan
 Scale: 1/4" = 1'-0"



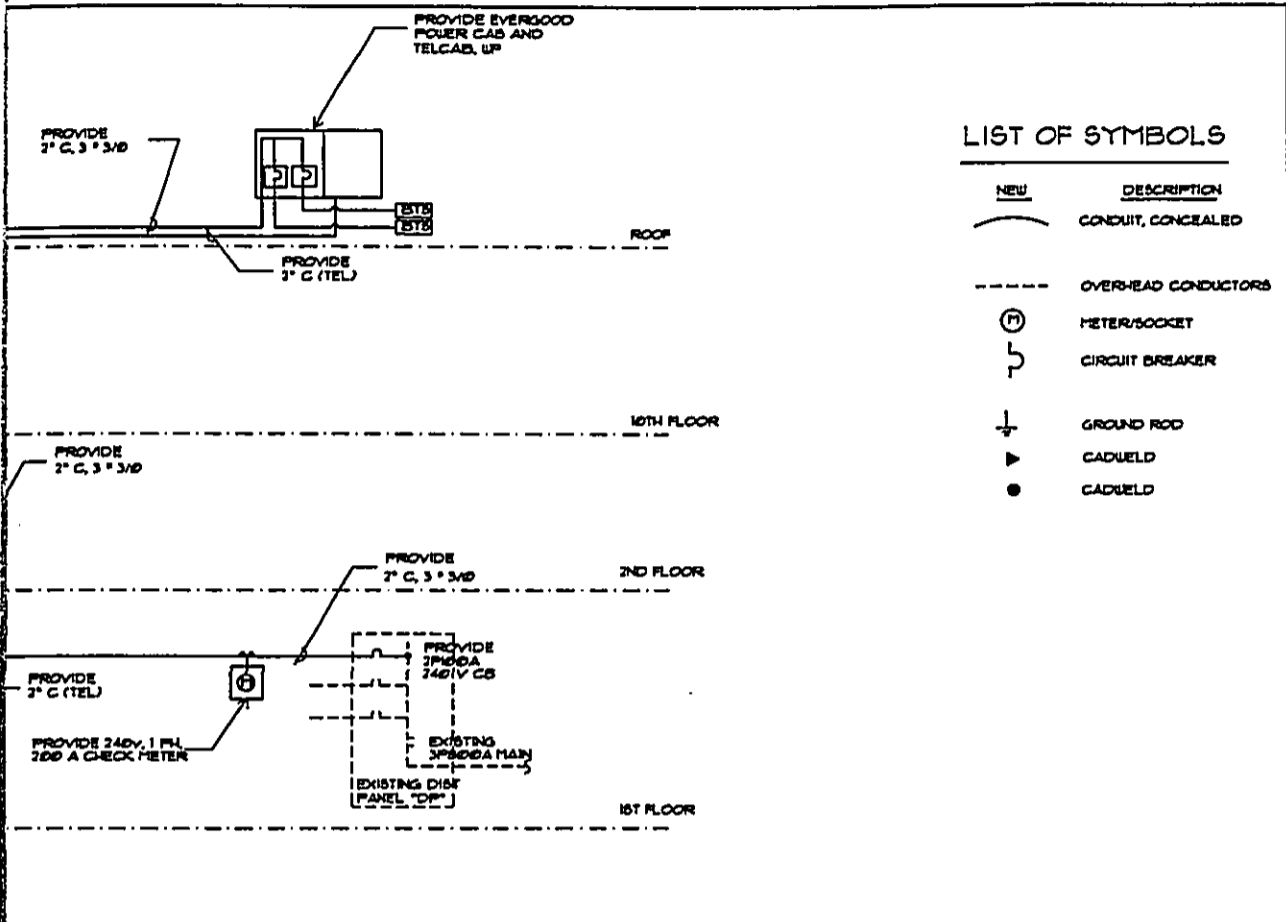
C Mezzanine Floor Plan
 Scale: 1/4" = 1'-0"



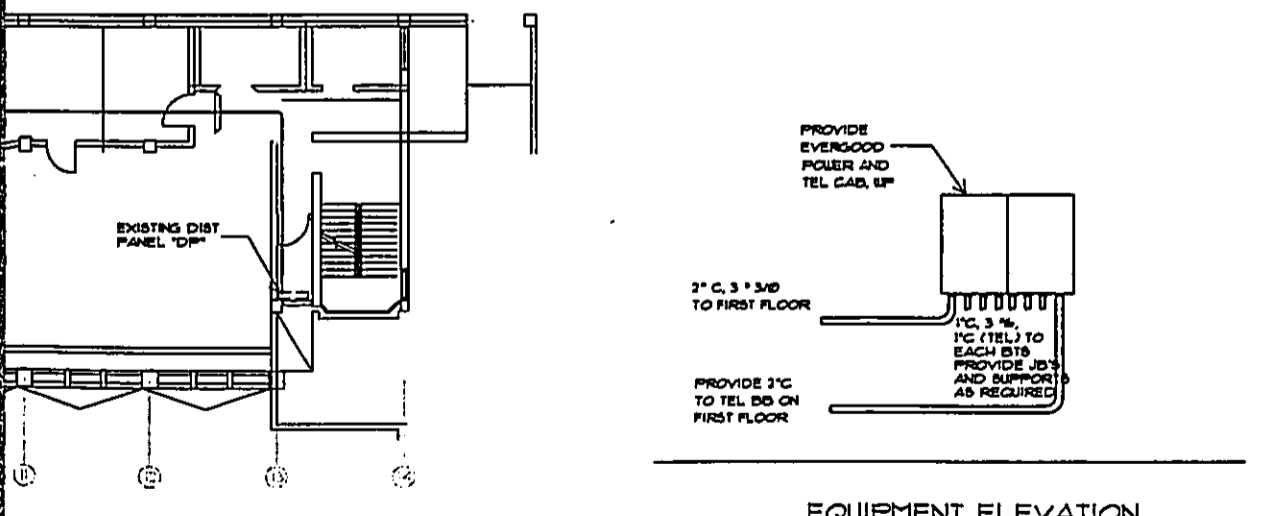
A Section C-1



1 C-1



ONE-LINE DIAGRAM
NO SCALE



EQUIPMENT ELEVATION
NOT TO SCALE

LIST OF SYMBOLS

NEW	DESCRIPTION
	CONDUIT, CONCEALED
	OVER-HEAD CONDUCTORS
	METER/SOCKET
	CIRCUIT BREAKER
	GROUND ROD
	CABLE TRAY
	CABLE TRAY

HAWAII ENGINEERING GROUP Inc.

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88-023 Hahaione St - # 20
Aiea, Hawaii 96706
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FAX 808-488-9282

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PROJECT: T-Mobile-East West Road-Gateway House

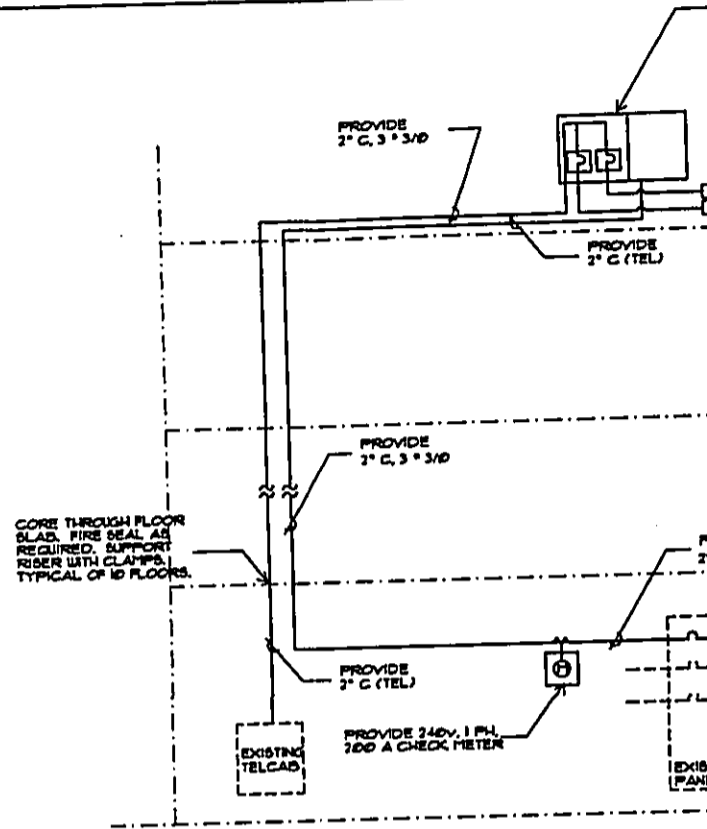
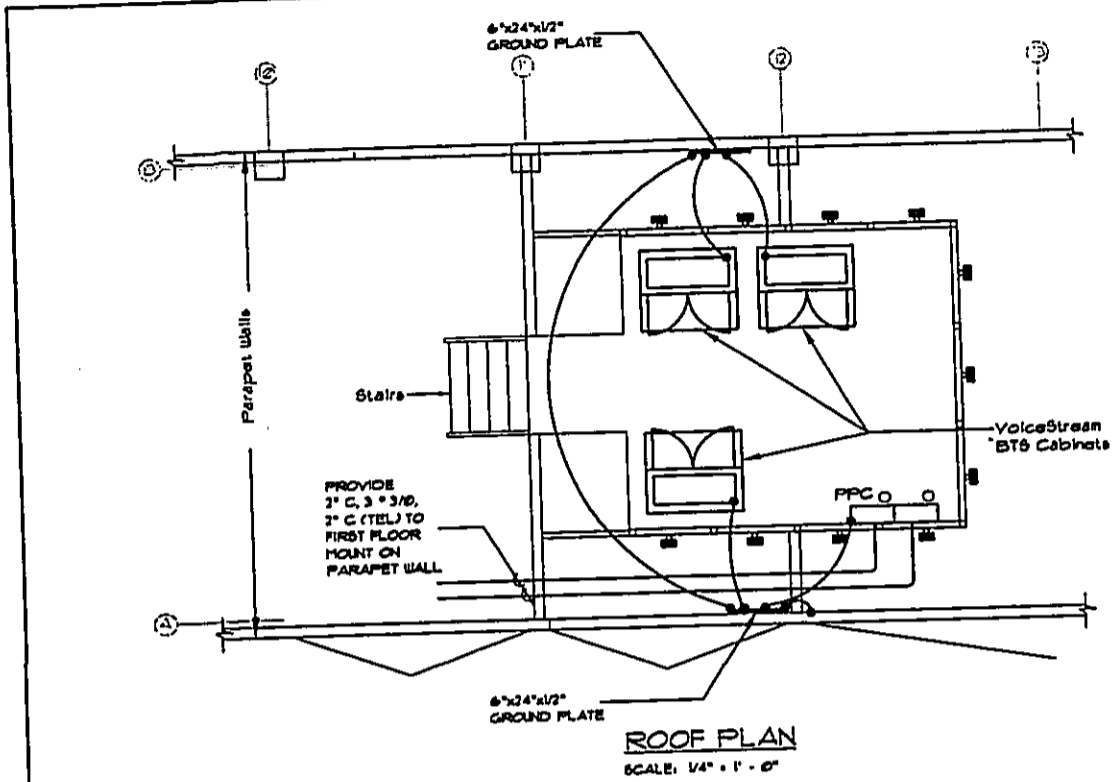
T.M. K. (12-2-8-29,30)

2563 Dole Street
Honolulu, Hawaii 96827

Electrical Plan, Site Plan, Equipment Elevation

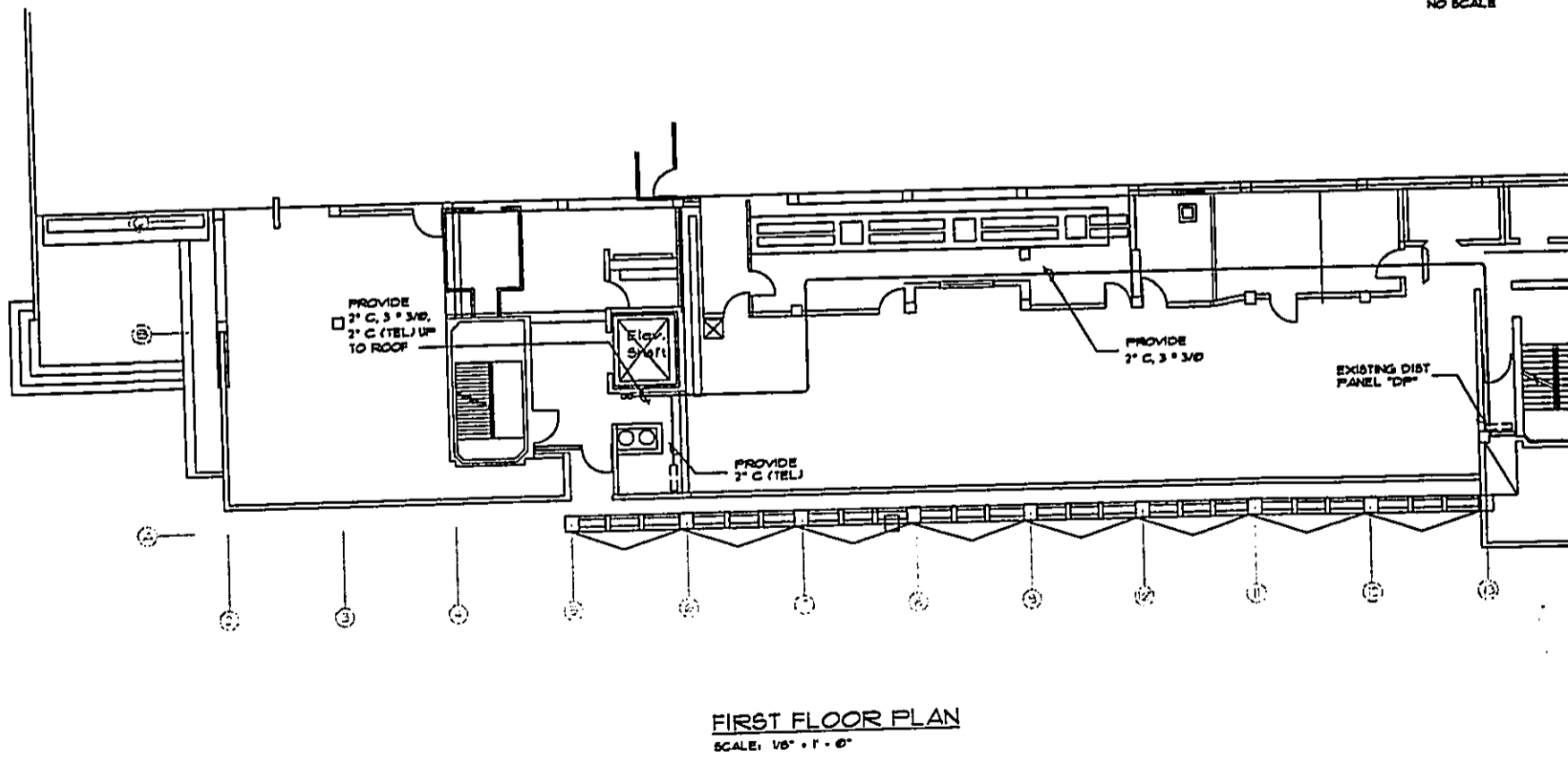
REVISIONS	BY

Date 4-16-03
Scale AS SHOWN
By smt
Job 00-038
Sheet
1 of 5 Sheets



NEAREST CU PIPE

ONE-LINE D
NO SCALE



connections on all multi-
common neutral conductor for
shall be copper.

breakers, fuses and electrical
equipment shall have an interrupting short
circuit capacity of 10,000 A.I.C.

Electrical installation shall
be as required by all applicable

and paint any area that has
been damaged in the course of the electrical

in fire rated walls shall be
in accordance with applicable
codes.

Conductors shall be copper
unless specifically noted
on drawings.

Conductors shall be solid tinned
unless noted 32.

shall be U.L. listed.

Conduit shall be U.L. label
zinc coated with zinc interior
be used when installed in or
concrete slabs in contact with the
ground or public roadways, in masonry
exposed on building exterior.
Conduit in contact with earth shall be
wrapped with Hunt's wrap process no. 5.

metallic tubing shall have U.L.
label and shall be gland ring
type. EMT shall be used only
for runs.

metallic conduit shall have U.L.
label and may be used where
permitted by code. Fittings shall be
"squeeze" type, seal tight
conduit. All conduit shall have
equipment ground wire.

Runs shall be surface mounted in
concrete walls unless indicated
otherwise. Conduit indicated shall run
parallel to ceiling, beams, Verify exact routing of
conduit with the Owner
before installing. No horizontal conduits
below 7'-6" AFF. No BX or ROMEK
permitted.

ground conduit shall be PVC
type 40 (unless otherwise noted) at a
depth of 24" below grade.

Equipment shall be labeled
with engraved plastic labels.

Coordinate electrical service with the
mechanical.

Continuation of work, conduct continuity,
and fault potential ground tests
before final closeout. Submit test reports to project
engineer on premises of all debris resulting
from work and leave work in a complete and
orderly condition.

30. Contractor shall coordinate with utility company
for connection of temporary and permanent
power to the site. The temporary power
and all hookup costs to be paid by contractor.

31. Grounding Electrode System

1. External Connections

A. All external grounding connections shall
be made by the "coldweld" process.
Connections shall include all cable to
cable splices, Tees, Xs, etc. All cable
to ground rods, ground rod splices and
lightning protection systems as indicated.
All materials used (molds, welding metal,
tools, etc.) shall be made by "coldweld" and
installed per manufacturer's
recommendation and procedures.

B. All interior grounding and bonding
connections shall be connected by two
holes crimp type (compression)
connections (except for the ACES and
ground rod). Mechanical connections,
filling or connections that depend solely
on solder shall not be used.

2. Ground Rods

A. All ground rods shall be 5/8" diameter x
10'-0" long "Copperweld" or approved
equal of the number and at locations
indicated. Ground rods shall be driven
full length vertical in undisturbed
earth. All ground rods to be 10' apart
unless otherwise noted.

3. Ground Bars

All ground bars shall be 1/4" thick bare
copper plate and of size indicated of
drawings.

4. Cables

All ground cable shall be standard TAND
solid bare copper of the size indicated
on drawings.

When the direction of the conductor must
change, it shall be done gradually. The
curvature of the turn shall be done in
accordance with the following chart:

Grounding Conductor	Minimum Bending radius to inside Edge
#6 to #4 awg	5"
#2 to #1/0 awg	6"
2/0 to 750 MCM	1'
Bus Bar	none

32. ASTM Full Potential Tests

1. Ground tests shall be performed as
indicated on drawings. A Bidde ground
ohmer or the method of using two auxiliary
ground rods (as described in IEEE
standard no. 81-1985, part 1) may be used.
The IEEE method requires the use of an
a.c. test current. The auxiliary test
rods must be sufficiently far away from
the rod under test so that the regions in
which their resistance is localized do not
overlap.

HAWAII ENGINEERING GROUP Inc.

Harbor Center
80-022 Kalia Rd - 2ND
Aloha, Hawaii 96808
Tel: 808-922-2222
Fax: 808-922-2222

This project was
prepared by me or
under my supervision
and construction of this
project will be under my
observation.



T. M. K. (1)-7-8-79-30

PROJECT: T-Mobile-East West Road-Gateway House

2563 Dale Street
Honolulu, Hawaii 96822 8128 * HI - 1336

Specifications

REVISIONS

BY

Date 4-16-03

Scale AS SHOWN

By 6671

Job 00-030

Sheet

III - 2

of Sheets

DIVISION 16 - GENERAL ELECTRIC

GENERAL ELECTRICAL PROVISIONS

1. Submittal of bid indicates contractor is cognizant of all job site conditions and work to be performed.
2. Contractor shall perform all verification observations, tests, and examination work prior to the ordering of the electrical equipment and the actual construction. Contractor shall issue a written notice of all findings to the architect listing all malfunctions, faulty equipment and discrepancies.
3. Heights shall be verified with owner prior to installation.
4. These plans are diagrammatic only, follow as closely as possible.
5. Electrical supply shall be 120/240 volts, single phase, 3 wire, 200 amps.
6. Each conductor of every system shall be permanently tagged in each panelboard, pullboxes, J-box, switch box, etc., in compliance with occupational safety and health act (O.S.H.A.).
7. Contractor shall provide all labor, materials, insurance, equipment, installation, construction tools, transportation, etc., for a complete and properly operative system energized throughout and as indicated on drawings, as specified herein and/or as otherwise required.
8. All materials and equipment shall be new and in perfect condition when installed and shall be of the best grade and of the same manufacturer throughout for each class or group of equipment. Materials shall be listed "J" where subject to such approval. Materials shall meet with approval of the division of Industrial safety and all governing bodies having jurisdiction. Materials shall be manufactured in accordance with applicable standards established by ANSI, NEMA AND NBFU.
9. All conduit may be surface mounted unless otherwise noted.
10. Contractor shall carry out his work in accordance with all governing state, county and local codes and O.S.H.A.
11. Contractor shall secure all necessary building permits and pay all required fees.
12. Complete job shall be guaranteed for a period of one (1) year after the date of job acceptance by owner. Any work, material or equipment found to be faulty during that period shall be corrected at once, upon written notification, at the expense of the contractor.
13. All conduit only (C.O.) shall have a pull wire or rope.
14. Provide project manager with one set of complete electrical "as installed" drawings at the completion of the job, showing actual dimensions, routings and circuits.
15. All brochures, operating manuals, catalogs, shop drawings, etc. shall be turned over to the Owner at job completion.
16. Use I-top connections on all multi-circuits with common neutral conductor for lighting fixtures.
17. All conductors shall be copper.
18. All circuit breakers, fuses and electrical equipment shall have an interrupting short circuit current to which they may be subjected and a minimum of 10,000 A.I.C.
19. The entire electrical installation shall be grounded as required by all applicable codes.
20. Patch, repair and paint any area that has been damaged in the course of the electrical work.
21. Penetrations in fire rated walls shall be fire stopped in accordance with applicable local building codes.
22. Wire and cable conductors shall be copper #8 awg minimum unless specifically noted otherwise on drawings.
23. Grounding conductors shall be solid tinned copper and annealed 32.
24. Not used
25. All materials shall be U.L. listed.
26. Conduit
 - A. Rigid conduit shall be U.L. listed galvanized zinc coated with zinc interior and shall be used when installed in or under concrete slabs in contact with the earth, under public roadways, in masonry walls or exposed on building exterior. Rigid conduit in contact with earth shall be 1/2 lapped wrapped with Hunt's wrap process no. 5.
 - B. Electrical metallic tubing shall have U.L. listed, fitting shall be gland ring compression type. EMT shall be used only for interior runs.
 - C. Flexible metallic conduit shall have U.L. listed label and may be used where permitted by code. Fittings shall be "joke" or "squeeze" type, seal tight flexible conduit. All conduit shall have full size equipment ground wire.
 - D. Conduit runs shall be surface mounted in ceilings or walls unless indicated otherwise. Conduit indicated shall run parallel or at right angles to ceiling, floor or beams. Verify exact routing of all exposed conduit with the Owner prior to installing. No horizontal conduits shall be below 7'-6" AFF. No BX or ROMEX cable is permitted.
 - E. All underground conduit shall be PVC schedule 40 (unless otherwise noted) at a minimum depth of 24" below grade.
27. All electrical equipment shall be labeled with permanent engraved plastic labels.
28. Coordinate the electrical service with the utility company.
29. Upon completion of work, conduct continuity, short circuit and fault potential ground tests for approval. Submit test reports to project manager. Clean premises of all debris resulting from work and leave work in a complete and undamaged condition.

Appendices

Appendix A

Pre-Assessment Phase: Agency Correspondence
DEA Comments and Responses

LINDA LINGLE
GOVERNOR OF HAWAII



GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

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

February 21, 2006

Ms. Kathleen Cutshaw
Vice Chancellor for Administration, Finance and Operations
University of Hawai'i at Mānoa
Honolulu, Hawai'i 96822

Dear Ms. Cutshaw:

The Office of Environmental Quality offers the following comments for your consideration and response.

Cumulative and Indirect Impact Assessment and Antennae Co-location Policy at the University of Hawai'i at Mānoa: We have examined our data base of projects related to antennae and subject to Chapter 343, Hawai'i Revised Statutes and find the following projects at the Mānoa campus, for which environmental assessments have been prepared by your agency.

1. January 8, 1984, Negative Declaration (ND), Replacement of Dish Antenna on Holmes Hall, University of Hawai'i at Mānoa
2. March 8, 1986, ND, Installation of Dish Antenna on Hawai'i Institute of Geophysics Building, University of Hawai'i at Mānoa
3. February 8, 1995, ND, PEACESAT 10 Meter Telecommunication Antenna Modification
4. March 8, 2005, FONSI - Nextel Partners, Inc., Proposed University of Hawai'i Hamilton Annex Antenna Facility.
5. July 8, 2005, FONSI - Cingular Wireless Antenna Facility at the Bilger Hall Addition, University of Hawai'i at Mānoa
6. October 8, 2005, FONSI - University of Hawai'i Kuykendall Annex Telecommunications Antennae
7. January 23, 2006, DEA - T Mobile West Corporation, Inc., Antenna at Mānoa Gateway House
8. January 23, 2006, DEA - SprintCom Antenna Site at Gilmore Hall Rooftop

In the past two years, antennae have been installed at various locations on campus. We respectfully recommend that the present project include an assessment of the indirect cumulative impacts over time and space of the antenna projects listed above. If you have not already done so, we would respectfully recommend that you consider a plan for placement of sources (such as antennae) of electromagnetic fields in the extremely low frequency range (0.003 to 3 KHz) in light of a policy of "prudent avoidance of exposure" to biological receptors. With respect to exposure to these electromagnetic fields, please consult with Dr. Leslie Au, Environmental Epidemiologist, Office of Hazard Evaluation and Emergency Response, Department of Health.

In September 2005, T Mobile removed antennae from a public housing project after residents objected to their presence for fear of health hazards. Will the university disclose to present and future student residents the presence of antennae close to their living areas? How do you anticipate the students' will react to this information?

Thank you for the opportunity to comment. If there are any questions, or if you would like to discuss this matter further, please call Jeyan Thirugnanam. at (808) 586-4185.

Sincerely,

Genevieve Salmonson
GENEVIEVE SALMONSON
Director

C: Mr. William Keoni Fox
Ms. Colette Sakoda

440-200-1000 FAX 440-200-1100

Environmental Planning Solutions, LLC

945 Makaiwa Street, Honolulu, Hawaii 96816-5401
Phone: (808) 732-8602 □ Fax: (808) 536-3168

March 21, 2006

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

Dear Ms. Salmonson:

Subject: T-Mobile West UH Mānoa Gateway House Draft Environmental Assessment

We received your letter addressed to Ms. Kathleen Cutshaw, the University of Hawaii at Mānoa Mānoa's Vice Chancellor for Administration dated February 16, 2006 regarding the subject project. The following has been prepared following our consultation with Dr. Leslie Au, toxicologist, Office of Hazard Evaluation and Emergency Response, State Department of Health, in response to your questions and concerns:

1. Comment: *Request for a Cumulative and Indirect Impact Assessment and Antennae Co-location Policy at the University of Hawai'i at Mānoa.*

Response: There are several misconceptions with respect to broadcasted energy from telecommunications antenna. First there is a misconception is that the broadcasted energy from antennae is the same thing as electric-power magnetic fields. It is not, according to Dr. Au. Adequate research of the health effects of broadcasted energy does exist. There is a health standard, which is published by the Federal Communications Commission (FCC) in its bulletin, FCC 96-326, Appendix A, Table 3, "NCRP Exposure Criteria for RF Fields (1986)," where the National Commission on Radiation Protection established standards for RadioFrequency Fields. Also, in that bulletin's Appendix C, the evaluation of all rooftop antennae are provided for, and Paragraph 1.1310, "Radiofrequency radiation exposure limits" reviews the health- based limits."

The second misconception is that radio energy which is broadcast from an antenna is the same thing as nuclear radiation. Again, it is not, states Dr. Au. Radio energy, within a certain distance, might have enough energy to heat up the water in a person's cells, like a microwave oven or sunlight, if the person stands within range for a long enough time period. When a person walks out of range, his cells may be (sun)burned, but they will cool down with no further effect, with little or no risk of DNA damage or cancer. Nuclear radiation has many times more energy that a person's water molecules are actually split and ionized, which makes the free radicals that damage DNA.

A third misconception is that there is cumulative exposure from all antennae on the UH Mānoa campus. Using the FCC's exposure standard for radiofrequency fields, it is possible to calculate a "safe distance" (also referred to as "exclusion distance") for every antenna. Radio engineers who help design antennas for facilities such as those on the UH Mānoa campus, estimate that the typical cellular telephone 100-watt antenna has a "safe distance" of about 13 feet. A person standing farther than 13 feet for a half hour would probably not have his cells' water heated up or experience an adverse effect. Even for an antenna as powerful as KGMB TV's antenna, which effectively radiates a power of 100,000 watts, its "safe distance" has been calculated to be less than 175 feet. With each UH Mānoa antenna's limited harmful or exclusion range, it would be highly unlikely for a person to be simultaneously within the harmful range of more than one antenna at a time. Consequently, there would be no cumulative exposure. Therefore, the cumulative and indirect impact from multiple antennae on the Mānoa campus rooftops listed in your letter would be insignificant.

2. Comment: *Consider use of "prudent avoidance" policy.*

Response: Yet another misconception is that the Department of Health's prudent avoidance policy applies to broadcasting antennae. The policy only applies to the magnetic fields originating from electric power lines and appliances, whether in the walls of buildings or outdoors on power poles. In 1994 when the policy was written, the scientific evidence was sparse, and magnetic fields had not been proven to be a health hazard, so the DOH advised avoiding magnetic fields wherever it was easily feasible. However, by 1997, sufficient research had been done, so that the National Academy of Sciences published its judgment that there is no hazard. (Possible Health Effects of Exposure to Residential Electric and Magnetic Fields, National Academy Press, Washington D.C., 1997).

3. Comment: *How do we anticipate students' reaction to the relocation of T-Mobile's antenna site at the public housing project?*

Response: Another misconception is that T-Mobile's antennae on the rooftop of Puuwai Momi were moved in late 2005 because of health risk. At a public meeting attended by concerned residents, Dr. Au explained that there was no health risk. Therefore, the antennae were not relocated because of a perceived health risk. T-Mobile never had to move its facility unless it wanted to. Eventually, months after the public meeting, at the end of T-Mobile's one-year lease, the state housing agency (HCDCH) offered T-Mobile another place that was rent-free. However, the new site would have to be in close proximity because the T-Mobile antennae serve the cell phone coverage requirements of people working and/or residing in the Honolulu Stadium service area. We therefore do not anticipate a reaction from students when the information of the Puuwai Momi T-Mobile site is reported correctly.

Ms. Genevieve Salmonson
March 21, 2006
Page 3

Thank you for your participation in the planning phase of this project.

Sincerely,



Colette M. Sakoda

cc: Wallace Gretz, UH Mānoa Facilities Planning & Management
Roy Irei, T-Mobile West

PHONE (808) 594-1888

FAX (808) 594-1865



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

HRD05/2215

February 15, 2006

Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, HI 96816

**RE: Draft Environmental Assessment for the Proposed Installation of an Antenna Facility
Atop the Gateway House Rooftop, University of Hawai'i at Mānoa, O'ahu, TMK (1) 2-8-0232:
003.**

Dear Colette Sakoda,

The Office of Hawaiian Affairs (OHA) is in receipt of your January 19, 2006 request for comment on the above listed proposed project. OHA offers the following comments:

The word Hawaiian is misspelled throughout the document; please see page 13, line 5, 24 and 28. While the word Hawai'i does take the diacritic 'okina, the word Hawaiian does not. Please note this for future submissions to OHA.

Our staff has no comment concerning the proposed construction of a cell antenna atop the existing Gateway House. Thank you for your continued correspondence.

OHA also asks that, In accordance with Section 6E-46.6, Hawaii Revised Statutes and Chapter 13-300, Hawaii Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work shall stop in the immediate vicinity and the State Historic Preservation Division (SHPD/DLNR) shall be contacted.

Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jesse Yorck, Native Rights Policy Advocate, at (808) 594-0239 or jessey@oha.org.

ʻO wau iho nō.

A handwritten signature in black ink, appearing to read "Clyde W. Nāmu'o".

Clyde W. Nāmu'o
Administrator

Environmental Planning Solutions, LLC

945 Makaiwa Street, Honolulu, HI 96816-5401
Phone: (808) 732-8602; Fax: (808) 538-3168

March 21, 2006

Mr. Clyde Nāmu`o, Administrator
Office of Hawaiian Affairs
State of Hawai`i
711 Kapi`olani Blvd., Suite 500
Honolulu, Hawai`i 96813

Dear Mr. Nāmu`o:

Subject: T-Mobile West UH Mānoa Gateway House Draft Environmental Assessment

We received your letter dated February 15, 2006 regarding the subject project. The following has been prepared in response to your questions and comments.

1. The word Hawaiian has been revised in the final environmental assessment.
2. Your comment regarding T-Mobile's contractor's actions during construction has been noted. In accordance with Section 6E-46.6, Hawai`i Revised Statutes and Chapter 13-300, Hawai`i Administrative Rules, if any significant cultural deposits or human skeletal remains are encountered, work shall stop in the immediate vicinity and the State Historic Preservation Division (SHPD/DLNR) will be contacted.

Thank you for your participation in the planning phase of this project.

Sincerely,



Colette M. Sakoda

cc: Wallace Gretz, UH Mānoa Facilities Planning & Management
Roy Irei, T-Mobile West

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4432 • FAX: (808) 527-6743
DEPT. INTERNET: www.honolulu-dpp.org • INTERNET: www.honolulu.gov

MUFI HANNEMANN
MAYOR



HENRY ENG, FAICP
DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

2006/ELOG-164(cm)

February 23, 2006

Mr. Wallace Gretz
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawaii 96816


Dear Mr. White:

Re: Draft Environmental Assessment
Gateway House Rooftop Antenna Facility
University of Hawaii, Manoa Campus, Oahu
Tax Map Key 2-8-023: 3

The Department of Planning and Permitting (DPP) reiterates the comments expressed in our letter dated October 31, 2005, which is included in the Appendix of the DEA. As noted in the letter, a Conditional Use Permit (minor) will be required and a Zoning Waiver (for height) may be required if the antenna is intended to improve regional service. If the facility is necessary to improve telecommunication service at the UH, then a minor modification to the University's PRU may be appropriate.

Should you have any questions, contact Carrie McCabe of our staff at 527-5349.

Very truly yours,


Henry Eng, FAICP, Director
Department of Planning and Permitting

HE:pl

g:\posseworkingdirectory\landuse\carrie\ecomments\06elog-164.doc

Environmental Planning Solutions, LLC

945 Makaiwa Street, Honolulu, Hawaii 96816-5401
Phone: 732-8602 • Fax: 538-3168

March 27, 2006

Mr. Henry Eng, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

Dear Mr. Eng:

Subject: T-Mobile West UH Mānoa Gateway House Draft Environmental
Assessment

We received your letter dated February 23, 2006 regarding the subject project. As stated in Section 1.0 Introduction and Purpose and Need of the Draft EA, the proposed antenna facility is necessary to improve telecommunication service at the UH Mānoa campus. Therefore, a minor modification to the University's PRU is appropriate for the proposed project.

Thank you for your participation in the planning phase of this project.

Sincerely,



Colette M. Sakoda

cc: Wallace Gretz, UH Mānoa Facilities Planning & Management
Roy Irei, T-Mobile West

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

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

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

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

March 15, 2006

Mr. Roy Irei
T-Mobile West Corporation
625 Piikoi Street, Suite 100
Honolulu, Hawaii'i 96814

LOG NO: 2006.0683
DOC NO: 0603CM46
Archaeology
Architecture

Dear Mr. Irei:

SUBJECT: Chapter 6E-8 Historic Preservation Review –
Proposed T-Mobile West Corporation, East West Road
Gateway House Rooftop Antenna Site, University of Hawaii at Mānoa
Mānoa Ahupua'a, Honolulu [Kona] District, Island of O'ahu
TMK: (1) 2-8-023:003 (portion)

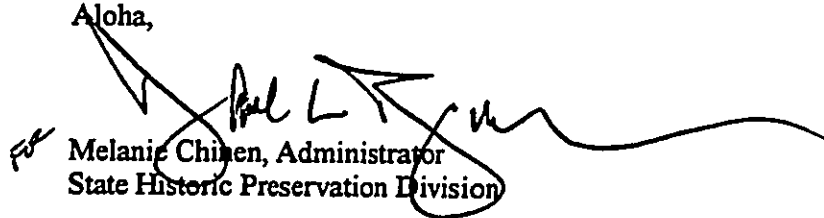
Thank you for the opportunity to review the aforementioned project. We received your documents on January 25, 2006. We apologize for the delay in responding. The proposed undertaking consists of the installation of cellular telecommunications facilities on the rooftop of the west wing of the Gateway House resident facility. Our office has previously commented on this proposed undertaking in a letter (LOG NO: 31759, DOC NO: 0302ST11) dated February 28, 2003.

We believe that no historic properties will be affected by this undertaking because:

- a) intensive cultivation has altered the land
- b) residential development/urbanization has altered the land
- c) previous grubbing/grading has altered the land
- d) an acceptable archaeological assessment or inventory survey found no historic properties
- e) this project has gone through the historic review process, and mitigation has been completed
- f) other: *There are no historic structures within or near the Area of Potential Effect. Gateway House is not listed on the National and/or State Register of Historic Places. No significant visual impacts will result from the proposed undertaking*

Please contact Dr. Chris Monahan at (808) 692-8015 if you have any questions about this letter.

Aloha,


Melanie Chinen, Administrator
State Historic Preservation Division

CM

Cc: Mr. Wallace Gretz, UH-Manoa
Ms. Colette Sakoda, Environmental Planning Solutions

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



February 2, 2006

MUFI HANNEMANN, Mayor

RANDALL Y. S. CHUNG, Chairman
HERBERT S. K. KAOPUA, SR.
SAMUEL T. HATA
ALLY J. PARK

RODNEY K. HARAGA, Ex-Officio
LAVERNE T. HIGA, Ex-Officio

CLIFFORD P. LUM
Manager and Chief Engineer

DONNA FAY K. KIYOSAKI
Deputy Manager and Chief Engineer

Ms. Colette Sakoda
Environmental Planning Solutions LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

Subject: Your Letter of January 19, 2006, on the Draft Environmental Assessment for
University of Hawaii Gateway House Rooftop Antenna Facility
TMK: 2-8-023:003

Thank you for the opportunity to comment on the proposed project.

We do not have any comments on the proposed antenna facility.

If you have any questions, please contact Robert Chun at 748-5443.

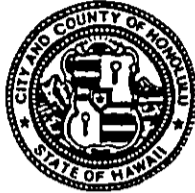
Very truly yours,

KEITH S. SHIDA
Principal Executive
Customer Care Division

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
<http://www.honolulu.gov>
<http://www.honolulupd.org>
www.honolulu.gov

MUFI HANNEMANN
MAYOR



BOISSE P. CORREA
CHIEF

GLEN R. KAJIYAMA
PAUL D. PUTZULU
DEPUTY CHIEFS

OUR REFERENCE BS-KP

January 27, 2006

Mr. Roy Irei, General Manager
T-Mobile West Corporation
625 Piikoi Street, Suite 100
Honolulu, Hawaii 96814

Dear Mr. Irei:


Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Antenna Facility Gateway House Rooftop, University of Hawaii at Manoa.

This project should have no significant impact on the facilities or operations of the Honolulu Police Department.


If there are any questions, please call Major Bart Huber of District 7 at 529-3796 or Mr. Brandon Stone of the Executive Bureau at 529-3644.

Sincerely,

BOISSE P. CORREA
Chief of Police

By 
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

cc: Ms. Genevieve Salmonson
OEQC
Mr. Wallace Gretz
University of Hawaii
✓ Ms. Colette Sakoda
Environmental Planning Solutions LLC
Serving and Protecting with Aloha

Hawaiian Telcom 

February 3, 2006

T-Mobile West Corporation
Attention: Roy Irei
925 Piikoi Street, Suite 100
Honolulu, Hawaii 96814

Subject: T-Mobile Antenna Facility – Gateway House Rooftop, UH of Manoa

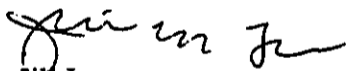
To Mr. Irei:

Thank you for the opportunity to review the above project. We have the following comments to make:

- As far as Hawaiian Telcom, Inc. is concern, providing telephone service should not negatively impact the environment within the project area
- All electrical work shall conform to all electrical codes.
- Telephone service connection shall be determined once electrical drawings are submitted.

Should you have any questions, please call Noel Remigio at 840-5847.

Sincerely,



Jill Lee
Manager – OSP Engineering, East & West Oahu

C: File (Punahou)
N. Remigio
Univeristy of Hawaii at Manoa, Wallace Gretz
2444 Dole Street
Honolulu, Hawaii 96822
Environmental Planning Solutions LLC ✓
945 Makaiwa Street
Honolulu, Hawaii 96816

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

3375 Koapaka Street, Suite H425
Honolulu, Hawaii 96819-1869
Phone: (808) 831-7781 Fax: (808) 831-7750 Internet: www.honolulufire.org

MUFI HANNEMANN
MAYOR



KENNETH G. SILVA
FIRE CHIEF

ALVIN K. TOMITA
DEPUTY FIRE CHIEF

February 1, 2006

Mr. Roy Irei
T-Mobile West Corporation
625 Piikoi Street, Suite 100
Honolulu, Hawaii 96814

Dear Mr. Irei:

Subject: Draft Environmental Assessment
Proposed Antenna Facility Gateway House Rooftop
University of Hawaii at Manoa

In response to a letter dated January 19, 2006, from Ms. Colette Sakoda of Environmental Planning Solutions LLC, the Honolulu Fire Department has no objections to the above-mentioned project.

Should you have any questions, please call Battalion Chief Lloyd Rogers of our Fire Prevention Bureau at 831-7778.

Sincerely,

A handwritten signature in cursive script, appearing to read "Kenneth G. Silva".

KENNETH G. SILVA
Fire Chief

KGS/DL:bh

cc: Wallace Gretz, University of Hawaii at Manoa
Colette Sakoda, Environmental Planning Solutions LLC

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4529 • Fax: (808) 523-4730 • Internet: www.honolulu.gov

MUFI HANNEMANN
MAYOR



MELVIN N. KAKU
ACTING DIRECTOR

ALFRED A. TANAKA, P.E.
DEPUTY DIRECTOR

February 24, 2006

TP1/06-137652R

Mr. Roy Irei
T-Mobile West Corporation
625 Piikoi Street, Suite 100
Honolulu, Hawaii 96814

Dear Mr. Irei:

Subject: T-Mobile West Corporation Gateway House Rooftop Antenna Site

Thank you for the January 19, 2006 letter from Environmental Planning Solutions LLC, requesting our review of and comments on the draft environmental assessment for the subject project. We have reviewed the document and do not have any comments to submit at this time.

Should you have any questions regarding this matter, please contact Ms. Faith Miyamoto of the Transportation Planning Division at 527-6976.

Sincerely,


MELVIN N. KAKU
Acting Director

cc: Ms. Genevieve Salmonson
OEQC

Mr. Wallace Gretz
UH - Manoa

✓ Ms. Collette Sakoda
Environmental Planning Solutions LLC



MANOA NEIGHBORHOOD BOARD NO. 7

c/o NEIGHBORHOOD COMMISSION • 530 SOUTH KING STREET, ROOM 400 • HONOLULU, HAWAII 96813
PHONE: (808) 527-5749 • FAX: (808) 527-5760 • INTERNET: www.cc.honolulu.hi.us

September 22, 2003

Mr. Wayne China
P. O. Box 2133
Aiea, Hawaii 96701

Re: Proposed Transmitter/Antenna Site for VoiceStream PCS II Corporation's Cellular Telephone System to be Located on the West Tower Rooftop of the University of Hawaii at Manoa's Gateway House Dormitory, 2563 Dole Street (Tax Map Key No. 1-2-8-029-030) (Makai-Koko Head (Southeast) of Intersection with East-West Road)

Dear Mr. China:

This letter is to confirm that:

(1) you made a presentation to the Manoa Neighborhood Board No. 7 at its Wednesday July 2, 2003 regular meeting (Agenda Item 7.3) on behalf of VoiceStream PCS II Corporation's application to the City & County of Honolulu Department of Planning & Permitting for the above-identified proposed transmitter/antenna site project; and

(2) after discussion, the Manoa Neighborhood Board No. 7 unanimously adopted the following motion by a vote of 11 in favor, 0 opposed, and 0 abstentions (11-0-0):

That the Manoa Neighborhood Board No. 7 has no objection to the application of VoiceStream PCS II Corporation for a proposed cellular telephone system transmitter/-antenna site to be located on the West Tower rooftop of the University of Hawaii at Manoa's Gateway House dormitory, 2563 Dole Street (Tax Map Key No. 1-2-8-029-030), makai-Koko Head (southeast) of the intersection with East-West Road.

The Manoa Neighborhood Board No. 7 has considered other applications for similar transmitter/antenna projects planned for construction within our district, including on the University of Hawaii at Manoa campus, and by adoption of the above motion had no objection to this application.

I understand that an Environmental Assessment is being prepared for the proposed project and that a Finding of No Significant Impact is reasonably anticipated to be made by the accepting agency.

Thank you for your presentation to the Manoa Neighborhood Board No. 7. I would appreciate learning when this project is completed. Otherwise, please feel free to contact me at telephone (808) 988-3469, fax (808) 988-6689.

Sincerely,

J. Thomas Heinrich
J. Thomas Heinrich, Chair



LINDA LINGLE
GOVERNOR OF HAWAII



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

DEPUTY
ERNEST Y. W. LAU

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

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

FEB 28 2003

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

Jerry M. Sessums, Ph.D.
President
South Pacific Geotechnical, Inc.
73-5574 Maiiau Street, Suite 1
Kailua-Kona, Hawaii 96740

LOG NO: 31759
DOC NO: 0302ST11
Architecture

Dear Mr. Sessums:

SUBJECT: Section 106 Review (NHPA)
Four [4] Proposed VoiceStream Wireless Cellular Communication Sites: [1] Waikiki Beach Comber Hotel, TMK: (1) 2-6-022;010, H Honolulu, Oahu, Hawaii, [2] NEX-COM NEX Building, TMK: (1)1-1-010:011, Pearl Harbor, Oahu, Hawaii; [3] East-West Road, Gateway House, TMK: (1)2-8-029:030, Honolulu, Oahu, Hawaii, [4] Pearl City HECO Power Pole, TMK: (1)9-8-052:002, Pearl City, Oahu, Hawaii

Thank you for the letter dated February 06, 2003, regarding the proposed installation of antennae at four (4) buildings on Oahu: (1) the attachment of three to four antennae and the installation of three BTS equipment cabinets atop the Waikiki Beach Comber Hotel building's roof; (2) the interior facility installation at the new Navy Exchange building; (3) the exterior attachment of nine panel antennae at the elevator penthouse and three BTS equipment cabinets on the makai side of the penthouse, all atop the existing Gateway House (west building) located on Dole Street within the University of Hawaii at Manoa campus; and (4) the installation of six panel type antennae on the makai side of and two BTS equipment cabinets below the existing Hawaiian Electric Company transmission line tower located at Komo Mai Drive in Pearl City. Being that all the facilities were built within the last 50 years, we believe that there should be "no historic properties affected."

Thank you for the opportunity to comment. Should you have any questions regarding architecture please contact Susan Tasaki at 692-8032.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter T. Young".

Peter T. Young, Chairman and
State Historic Preservation Officer

ST:jk

SOUTH PACIFIC GEOTECHNICAL, INC.

73-5574 Maiiau Street, Suite 1
Kailua-Kona, Hawaii 96740

Facsimile: (808) 322-3726

Telephone: (808) 322-3706

January 23, 2003

Hawaii Natural Heritage Program
University of Hawaii at Manoa
3050 Maile Way, Gilmore 409
Honolulu, Hawaii 96822

Attention: Mr. Roy Kam
Database Manager

Subject: NEPA Land Use Screening
NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) 1969
Listed or Sensitive Species, Threatened or Endangered Species and/or Critical Habitats
Four Cellular Communication Sites, Island of Oahu, Hawaii

Sir:

South Pacific Geotechnical, Inc. has been retained to accomplish NEPA Land Use Screening of four (4) cellular communication sites on the island of Oahu. As part of our NEPA research, we are requesting of your office concerning the distribution of listed or sensitive species, threatened or endangered species and/or critical habitats that could possibly be affected by the construction of communication facilities at these sites. The sites are identified as follows:

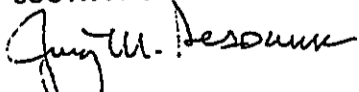
SITE NAME	ADDRESS	TMK	LATITUDE LONGITUDE	TYPE OF CONSTRUCTION
Waikiki Beach Comber Hotel	2300 Kalakawa Ave. Honolulu, HI 96815	(1) 2-6-22-010	N 21 16 39 W 157 49 36	Roof Top
East-West Road Gateway House	2563 Dole Street Honolulu, HI 96822	(1) 2-8-29-30	N 21 17 45 W 157 46 55	Roof Top
Pearl City HECO Power Pole	Komo Mai Drive Pearl City, HI 96782	(1) 9-8-52-2	N 21 24 14.2 W 157 57 13	Co-Location on Existing Power Pole
NEX-COM NEX Building	4725 Bougainvillea Rd. Pearl Harbor, HI 96818	(1) 1-1-10-011	N 21 21 04 W 157 55 53	Roof Top

We sincerely appreciate your assistance with this effort. Could you please submit your responses at your earliest convenience to:

SOUTH PACIFIC GEOTECHNICAL, INC.
73-5574 Maiiau Street, Suite 1
Kailua-Kona, Hawaii 96740
or email to:

Respectfully submitted:

SOUTH PACIFIC GEOTECHNICAL, INC.


Jerry M. Sessums, Ph.D.
President

Attachment: USGS Location Maps

Subj: **Four sites of Rare Species Review**
Date: 2/5/2003 8:20:56 AM Hawaiian Standard Time
From: rkam@hawaii.edu
To: sksjms@aol.com
File: southpacificgeo_eastwestroadgatewayhouse.zip (1124013 bytes) DL Time (45333 bps): < 7 minutes

Sent from the Internet (Details)

Dr. Sessums,

Attached is the information you requested. Three of the sites have no rare species in the vicinity. One site has one rare species nearby. Jpeg maps are attached for your records.

Waikiki Beach Comber Hotel
No rare species recorded at the site or vicinity.

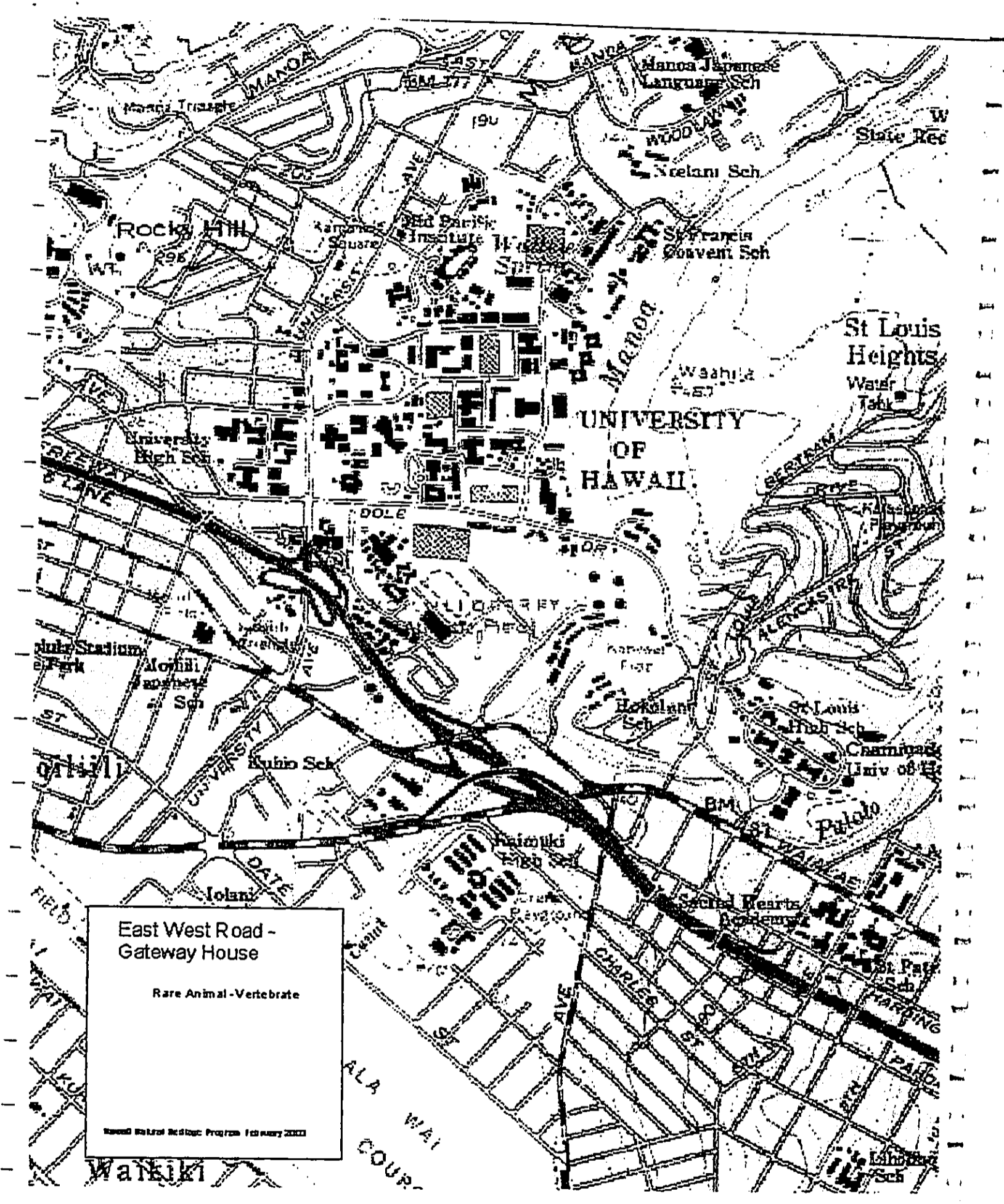
East West Road - Gateway House
One rare species recorded nearby:
LASIURUS CINEREUS SEMOTUS, 'OPE'APE'A, HAWAIIAN HOARY BAT
Federal Status: Listed Endangered
ObservationDate: 1982-??-??
Location Description: MANOA VALLEY, UNIVERSITY OF HAWAII CAMPUS, 2570 DOLE ST (DR)/ NATIONAL MARINE FISHERIES SERVICE, NEAR WAREHOUSE (P93ROW02)
Observation Description: 1 VISUAL (FLYING) BY CRAIG ROWLAND AND BEATRICE BURCH 1982-??-?? (P93ROW02)

Pearl City -HECO Power Pole
No rare species recorded at the site or vicinity.

NEXCOM
No rare species recorded at the site or vicinity.

Roy Kam
Data Manager
Hawaii Natural Heritage Program
Center for Conservation Research and Training
University of Hawaii at Manoa
Ph:(808)956-6894 Fax:(808)956-4001

Wednesday, February 05, 2003 America Online: Sksjms



East West Road -
Gateway House

Rare Animal - Vertebrate

Based on Natural Resource Program February 2003

SOUTH PACIFIC GEOTECHNICAL, INC.

73-5574 Maiiau Street, Suite 1
Kailua-Kona, Hawaii 96740

Telephone: (808) 322-3706

Facsimile: (808) 322-3726

January 23, 2003

United States Fish and Wildlife
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

Attention: Mr. Paul Hanson

Subject: NEPA Land Use Screening
NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) 1969
Four VoiceStream Wireless Cellular Communication Sites, Island of Oahu, Hawaii

Sir:

South Pacific Geotechnical, Inc. has been retained to accomplish NEPA Land Use Screening of four (4) cellular communication sites on the island of Oahu. As part of our NEPA research, we are requesting of your office information concerning the distribution of listed or sensitive species, threatened or endangered species, critical habitats, wildlife sanctuaries, preserves, refuges, wilderness areas, forests and national parks that may be in the vicinity of the sites and that could possibly be affected by the construction of communication facilities at these sites. The sites are identified as follows:

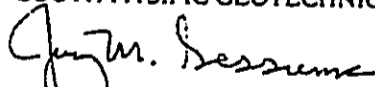
SITE NAME	ADDRESS	TMK	LATITUDE LONGITUDE	TYPE OF CONSTRUCTION
Waikiki Beach Comber Hotel	2300 Kalakawa Ave. Honolulu, HI 96815	(1) 2-6-22-010	N 21 16 39 W 157 49 36	Roof Top
East-West Road Gateway House	2563 Dole Street Honolulu, HI 96822	(1) 2-8-29-30	N 21 17 45 W 157 46 55	Roof Top
Pearl City HECO Power Pole	Komo Mai Drive Pearl City, HI 96782	(1) 9-8-52-2	N 21 24 14.2 W 157 57 13	Co-Location on Existing Power Pole
NEX-COM NEX Building	4725 Bougainvillea Rd. Pearl Harbor, HI 96818	(1) 1-1-10-011	N 21 21 04 W 157 55 53	Roof Top

We sincerely appreciate your assistance with this effort. Could you please submit your responses at your earliest convenience to:

SOUTH PACIFIC GEOTECHNICAL, INC.
73-5574 Maiiau Street, Suite 1
Kailua-Kona, Hawaii 96740
or email to:
[redacted]

Respectfully submitted:

SOUTH PACIFIC GEOTECHNICAL, INC.



Jerry M. Sessums, Ph.D.
President

Attachment: USGS Location Maps



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
1-2-2003-SP-082
1-2-2003-SP-083
1-2-2003-SP-084
1-2-2003-SP-085

JAN 31 2003

Mr. Jerry M. Sessums
South Pacific Geotechnical, Inc.
73-5574 Maiau Street, Suite 1
Kailua-Kona, Hawaii 96740


Dear Mr. Sessums:

This responds to your January 23, 2003, letter in which you request the U. S. Fish and Wildlife Service provide a species list for four cellular communication sites on the island of Oahu, Hawaii. The proposed site locations are Waikiki Beach Comber Hotel at 2300 Kalakaua Avenue, TMK (1) 2-6-22-010 (1-2-2003-SP-082), East-West Road Gateway House at 2563 Dole Street, TMK (1) 2-8-29-30 (1-2-2003-SP-083), Pearl City HECO Power Pole at Komo Mai Drive, TMK (1) 9-8-52-2 (1-2-2003-SP-084), and NEX-COM NEX Building at 4725 Bougainvillea Road, TMK (1) 1-1-10-011 (1-2-2003-SP-085). Your letter was received in this office on January 26, 2003. Construction of communication facilities at these sites are located on the roof tops, except for the Pearl City HECO Power Pole which will be located on the existing Power Pole.

We reviewed the information you provided and pertinent information in our files, including maps prepared by the Hawaii Natural Heritage Program. To the best of our knowledge, no federally listed endangered, threatened, or proposed threatened or endangered species, or proposed or designated critical habitat occur on the proposed project sites.

We appreciate your efforts to conserve endangered species. If you have any questions, please contact Katie Swift, Fish and Wildlife Biologist (phone: 808/541-3441; fax: 808/541-3470).

Sincerely,

 Paul Henson, Ph.D.
Field Supervisor

Appendix B

VoiceStream RF Engineering Electromagnetic Radiation Hazards Analysis



FCC MPE Compliance study for T-Mobile site HI01144
East West - Gateway House

Site number: HI01144
Site name: East West Rd.
WGS 84: N21° 17' 45.3" / W157° 48' 53.4"

Introduction.

A substantial amount of scientific research conducted all over the world over many years demonstrates that radio signals within established safety levels emitted from mobile telephones and their base stations present no adverse effects to human health.

There exist national and international safety guidelines for exposure to the public from radio waves:

- *International Commission on Non-Ionizing Radiation Protection (ICNIRP): Guidelines for limiting exposure to time varying electric, magnetic and electromagnetic fields. Health Physics 1998 74(4): 494-522.*
- *Institute of Electrical and Electronics Engineers (IEEE): IEEE Standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz. IEEE C95.1-1991 (revision of ANSI C95.1-1982) New York 1992.*
- *CENELEC: Human exposure to electromagnetic fields. High frequency (10 kHz to 300 GHz). European prestandard ENV 50166-2, Brussels 1995.*

The most widely accepted standards are those developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and Institute of Electrical and Electronics Engineers (IEEE). Nortel Base Stations must be installed according to instructions specified by Nortel, as well as taking any country-specific regulations for Non-Ionizing radiation protection into account.

FCC Guidelines for Evaluating Exposure to RF Emissions

In 1985, the FCC first adopted guidelines to be used for evaluating human exposure to RF emissions. The FCC revised and updated these guidelines on August 1, 1996, as a result of a rule-making proceeding initiated in 1993. The new guidelines incorporate limits for Maximum Permissible Exposure (MPE) in terms of electric and magnetic field strength and power density for transmitters operating at frequencies between 300 kHz and 100 GHz. Limits are also specified

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for localized ("partial body") absorption that are used primarily for evaluating exposure due to transmitting devices such as hand-held portable telephones.

Implementation of the new guidelines for mobile and portable devices became effective August 7, 1996.

The FCC's MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP)⁶ and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines.⁷ Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC's limits, and the NCRP and ANSI/IEEE limits on which they are based, are derived from exposure criteria quantified in terms of specific absorption rate (SAR). The basis for these limits is a whole-body averaged SAR threshold level of 4 watts per kilogram (4 W/kg), as averaged over the entire mass of the body, above which expert organizations have determined that potentially hazardous exposures may occur. The new MPE limits are derived by incorporating safety factors that lead, in some cases, to limits that are more conservative than the limits originally adopted by the FCC in 1985. Where more conservative limits exist they do not arise from a fundamental change in the RF safety criteria for whole-body averaged SAR, but from a precautionary desire to protect subgroups of the general population who, potentially, may be more at risk.

Tower-mounted ("non-rooftop") antennas that are used for PCS telephone warrant a somewhat different approach for evaluation. While there is no evidence that typical installations in these services cause groundlevel exposures in excess of the MPE limits, construction of these towers has been a topic of ongoing public controversy on environmental grounds, and we believe it necessary to ensure that there is no likelihood of excessive exposures from these antennas.

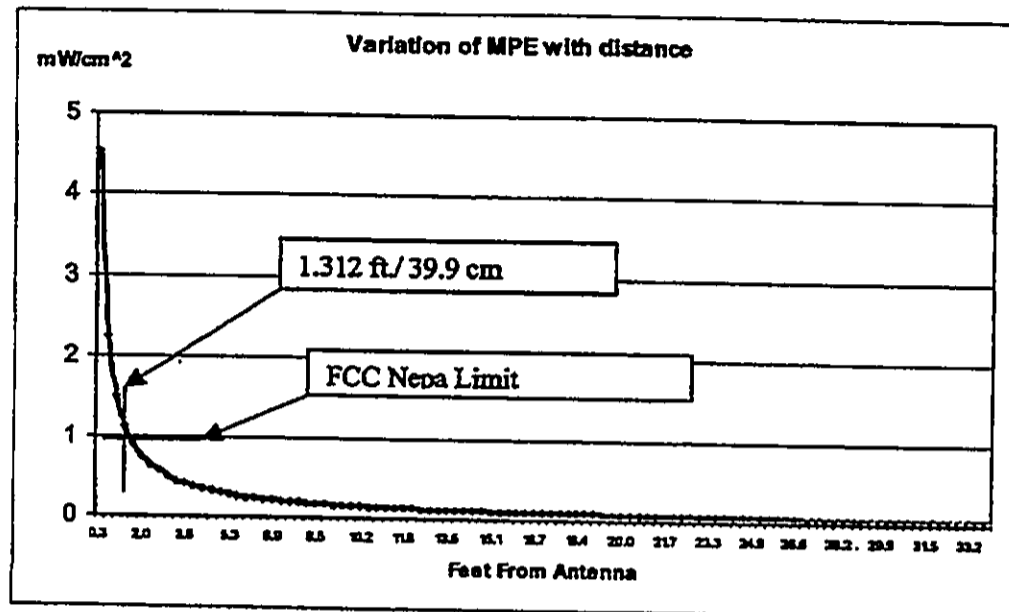
Although we believe there is no need to require routine evaluation of towers where antennas are mounted high above the ground, out of an abundance of caution the FCC requires that tower-mounted installations be evaluated if antennas are mounted lower than 10 meters above ground and the total power of all channels being used is over 1000 watts effective radiated power (ERP), or 2000 W ERP for broadband PCS.

These height and power combinations were chosen as thresholds recognizing that a theoretically "worst case" site could use many channels and several thousand watts of power. At such power levels a height of 10 meters above ground is not an unreasonable distance for which an evaluation generally would be advisable.

For antennas mounted higher than 10 meters, measurement data for cellular facilities have indicated that ground-level power densities are typically hundreds to thousands of times below the new MPE limits.

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Based on equation (3) the results are plotted to the following graph. This will indicate how close to a T-Mobile antenna a person placed for more than 30 minutes will receive an electromagnetic exposure greater than the MPE specified by FCC rules.



General Population/uncontrolled exposure limits are specified by FCC at a value of 1 mW/cm². In order to exceed the above limit a person should be placed closer than 1.312 ft (or 39.9 cm) in front of the antenna. This situation is very unlikely to occur since T-Mobile antennas are mounted (in case of site HI01144) more than 8ft above roof level.

Study performed as of today, December 23, 2003 by

RF Engineer: Troy Terazono

Verified by:

RF Manager : Jamin Kau

T-Mobile

Predicted MPE Procedures

All Predictions were calculated with the above formula (3). These data points can be cross-referenced between the Predicted MPE Table and the area drawings. Predictions are calculated for the T-Mobile RF Emission located at the site location after construction.

Predicted MPE Table at site location with T-Mobile RF Emissions

Location Point	Approximate Distance from proposed Antenna	Predicted Field Strength (% of Occupational Standard)	Predicted Field Strength (mW/cm ²)
1	4 ft.	36.96%	0.369629059
2	4 ft.	36.96%	0.369629059
3	4 ft.	36.96%	0.369629059
4	4 ft.	36.96%	0.369629059
5	4 ft.	36.96%	0.369629059
6	4 ft.	36.96%	0.369629059
7	4 ft.	36.96%	0.369629059
8	4 ft.	36.96%	0.369629059
9	4 ft.	36.96%	0.369629059
10	8 ft.	18.48%	0.18481453
11	13 ft.	11.37%	0.113732018
12	8 ft.	18.48%	0.18481453

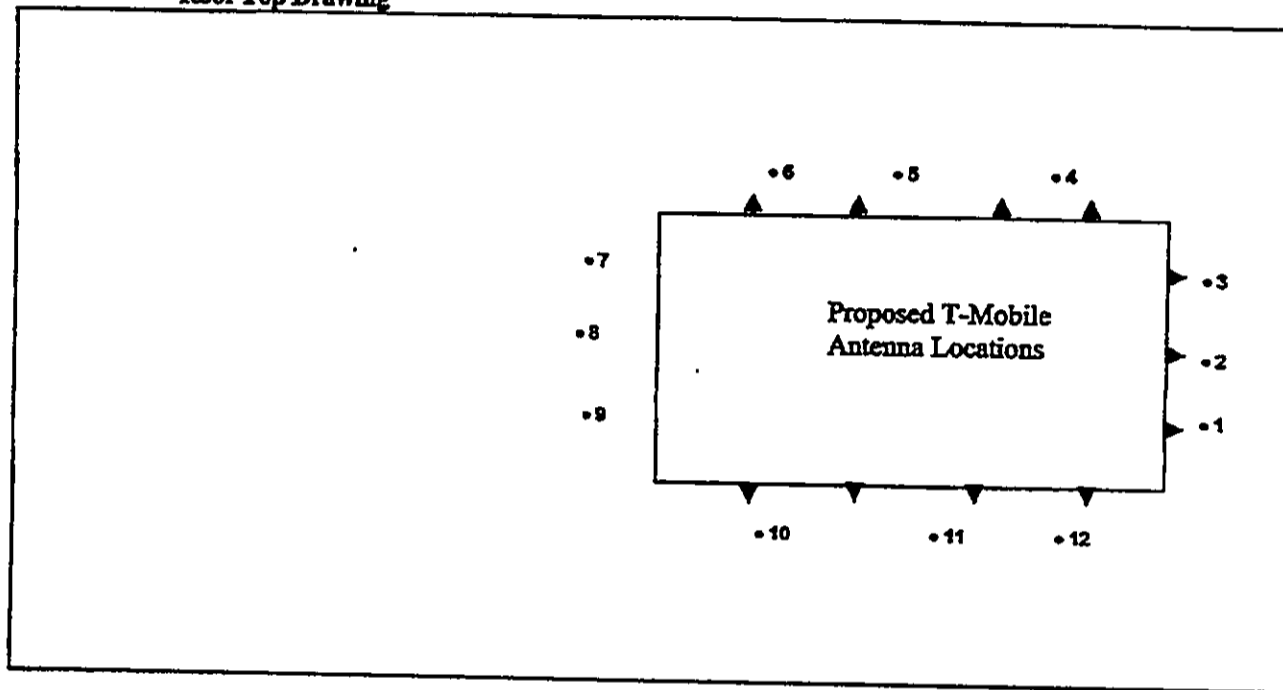


Predicted & Measured Data for the Proposed site at East West Gateway House

Measured MPE Procedures

All measurements were taken with a Narda 8718 Meter & the A8742D probe. Measurements & calibration procedures were followed as explained in the user's manual. The area in which any person may be subjected to RF Exposure was measured & data points were recorded throughout the area. These data points can be cross-referenced between the measured MPE Table and the area drawings. Measurements are cumulative reading from of all RF Emission located at the site location prior to construction of the T-Mobile Site.

Roof Top Drawing



Measured MPE Table at site location without T-Mobile RF Emissions

Location Point	Approximate Distance from proposed Antenna	Measured Field Strength (% of Occupational Standard)	Measured Field Strength (mW/cm ²) pre - installation
1	4 ft.	0.11%	0.0011
2	4 ft.	0.26%	0.0026
3	4 ft.	0.04%	0.0004
4	4 ft.	0.15%	0.0015
5	4 ft.	0.68%	0.0068
6	4 ft.	0.69%	0.0069
7	4 ft.	0.81%	0.0081
8	4 ft.	0.60%	0.006
9	4 ft.	0.64%	0.0064
10	8 ft.	0.38%	0.0038
11	13 ft.	0.58%	0.0058
12	8 ft.	0.58%	0.0058



Measured Data Table for On Air T-Mobile Site at UH Social Science Bldg.

Location Point	Approximate Distance from Antenna	Measured Field Strength (% of Occupational Standard)	Measured Field Strength (mW/cm ²)
1	20 ft.	0.00	0
2	25 ft.	0.00	0
3	35 ft.	0.30	0.003
4	25 ft.	0.92	0.0092
5	5 ft.	0.73	0.0073
6	12 ft.	0.66	0.0066
7	35 ft.	0.71	0.0071
8	38 ft.	0.68	0.0068
9	40 ft.	0.66	0.0066
10	40 ft.	0.81	0.0081
11	35 ft.	1.26	0.0126
12	5 ft.	0.84	0.0084
13	20 ft.	0.84	0.0084
14	20 ft.	3.51	0.0351
15	5 ft.	1.39	0.0139
16	10 ft.	0.96	0.0096
17	15 ft.	0.96	0.0096

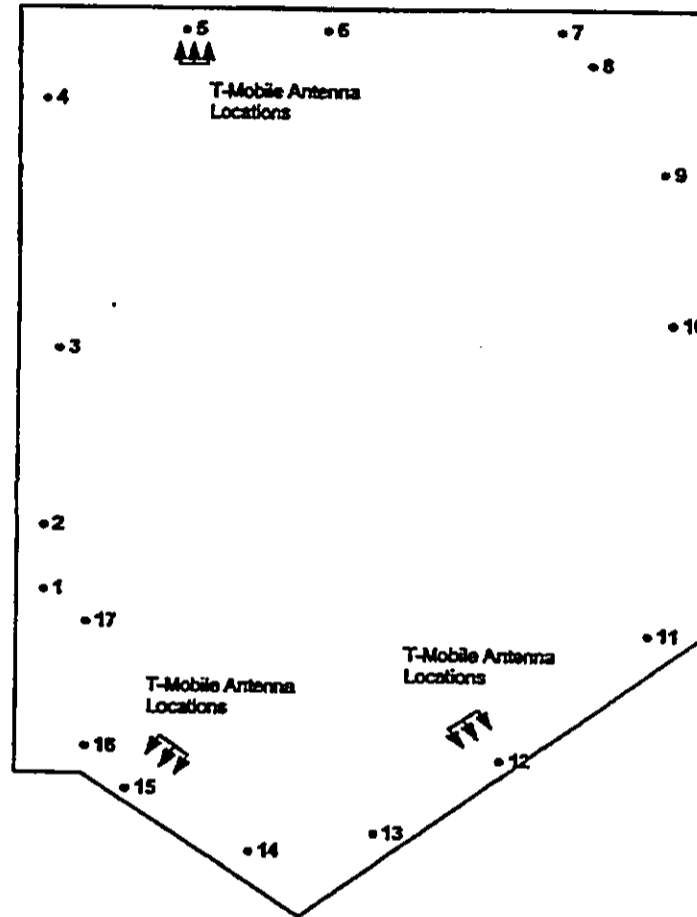
Measured MPE Data for T-Mobile On Air Site HI01136 located at UH Social Science building can be used as a reference for the MPE that would be produced by the proposed East West Gateway T-mobile site. BTS and antennas planned at the East West Gateway site location would be very similar to the existing equipment currently installed on the UH Social Science building.



Measured Data at UH Social Science Bldg with On Air T-Mobile Site.

Measured MPE Procedures

All measurements were taken with a Narda 8718 Meter & the A8742D probe. Measurements & calibration procedures were followed as explained in the user's manual. The area in which any person may be subjected to RF Exposure was measured & data points were recorded throughout the area. These data points can be cross-referenced between the measured MPE Table and the area drawings. Measurements are cumulative reading from T-Mobile, KTUH Radio Station, UH Microwave and other RF Emission located on the roof top of the UH Social Science Building.



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For sector-type antennas, power densities can be estimated by dividing the net input power by that portion of a cylindrical surface area corresponding to the angular beam width of the antenna. Mathematically, this can be represented by Equation (3) in which the angular beam width, θ_{BW} , can be taken as the appropriate azimuthal "power dispersion" angle for a given reflector.

$$S = \left(\frac{180}{\theta_{BW}} \right) \frac{P_{net}}{\pi R h} \quad (3)$$

where:

- S = power density
- Pnet = net power input to the antenna
- θ_{BW} = beam width of the antenna in degrees
- R = distance from the antenna
- h = aperture height of the antenna

For example, for the case of a 60-degree azimuthal beam width, the surface area should correspond to 1/6 that of a full cylinder. This would increase the power density near the antenna by a factor of three over that for a purely omni-directional antenna. For example, a conservative estimate could be obtained by using the 3 dB (half-power) azimuthal beam width for a given sectorized antenna. Equation (3) can be used for any vertical collinear antenna, even omni-directional ones.

In case of T-Mobile site HI01144, antennas will be installed at 8 ft above roof level or approx. 243 cm. Therefore, a person standing 2 feet 1(121.92cm) below the antenna the formula (3) returns:

Pnet = 9300	mWatt	
θ_{BW} = 65	3dB degree	
R = 121.92	cm	
h = 243	cm	
MPE = 0.739258	mW/cm ²	(4)
FCC Exposure Limit = 1.00	mW/cm ²	

Fig.1

The results of the analysis indicate that the actual exposure received by an individual standing for 30 minutes at the base of T-Mobile facility will be only 73.92% of the Maximum Permissible Exposure.

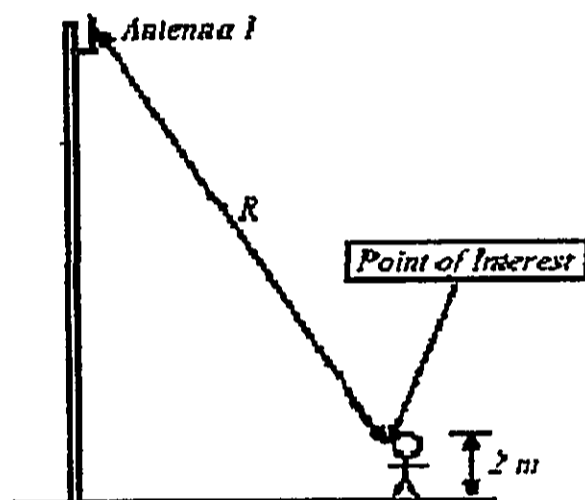
T-Mobile

Calculation.

Compliance with SAR limits can be demonstrated by laboratory measurement techniques or by computational modeling, as appropriate. Methodologies and references for SAR evaluation are described in technical publications including "IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave," IEEE C95.3-1991, and further guidance on measurement and computational protocols is being developed by the IEEE and others.

For T-Mobile site H101144, the field situation can be described by the Drawing

#1



Near-Field Region.

In the near-field, or Fresnel region, of the main beam, the power density can reach a maximum before it begins to decrease with distance. The extent of the near-field can be described by the following equation (1) having D and λ in same units:

$$R_{nf} = \frac{D^2}{4\lambda} \quad (1)$$

where: Rnf = extent of near-field

D = maximum dimension of antenna (diameter if circular)

λ = wavelength

Therefore,

Value	Ft
λ	= 0.518
D	= 6
Rnf	= 17.37

 (2)

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Table 1. LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time (E ² , H ² or S) (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	—	—	f/300	6
1500-100,000	—	—	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time (E ² , H ² or S) (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	—	—	f/1500	30
1500-100,000	—	—	1.0	30

f = frequency in MHz

*Plane-wave equivalent power density

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

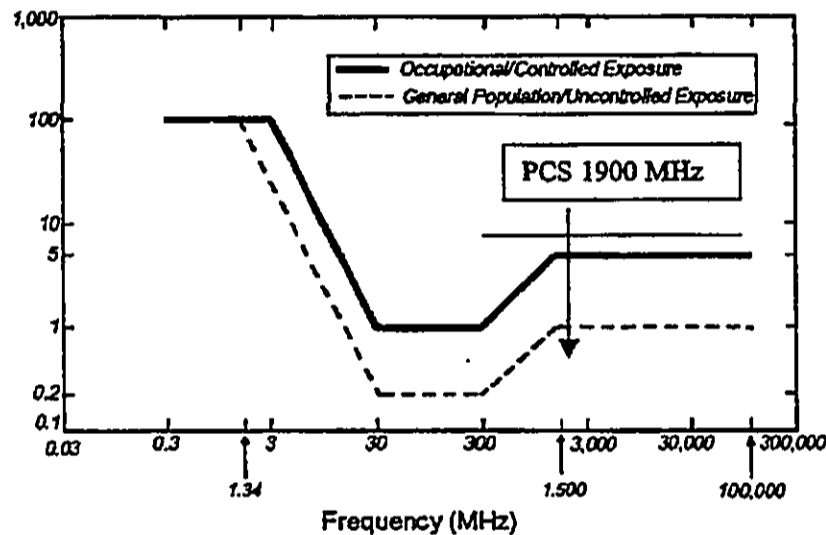
NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. As discussed later, the occupational/controlled exposure limits also apply to amateur radio operators and members of their immediate household.

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)
Plane-wave Equivalent Power Density



Limits for General Population/Uncontrolled exposure:

-0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube).

Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube).

General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure.

T-Mobile

for localized ("partial body") absorption that are used primarily for evaluating exposure due to transmitting devices such as hand-held portable telephones.

Implementation of the new guidelines for mobile and portable devices became effective August 7, 1996.

The FCC's MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP)⁶ and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines.⁷ Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC's limits, and the NCRP and ANSI/IEEE limits on which they are based, are derived from exposure criteria quantified in terms of specific absorption rate (SAR). The basis for these limits is a whole-body averaged SAR threshold level of 4 watts per kilogram (4 W/kg), as averaged over the entire mass of the body, above which expert organizations have determined that potentially hazardous exposures may occur. The new MPE limits are derived by incorporating safety factors that lead, in some cases, to limits that are more conservative than the limits originally adopted by the FCC in 1985. Where more conservative limits exist they do not arise from a fundamental change in the RF safety criteria for whole-body averaged SAR, but from a precautionary desire to protect subgroups of the general population who, potentially, may be more at risk.

Tower-mounted ("non-rooftop") antennas that are used for PCS telephone warrant a somewhat different approach for evaluation. While there is no evidence that typical installations in these services cause groundlevel exposures in excess of the MPE limits, construction of these towers has been a topic of ongoing public controversy on environmental grounds, and we believe it necessary to ensure that there is no likelihood of excessive exposures from these antennas.

Although we believe there is no need to require routine evaluation of towers where antennas are mounted high above the ground, out of an abundance of caution the FCC requires that tower-mounted installations be evaluated if antennas are mounted lower than 10 meters above ground and the total power of all channels being used is over 1000 watts effective radiated power (ERP), or 2000 W ERP for broadband PCS.

These height and power combinations were chosen as thresholds recognizing that a theoretically "worst case" site could use many channels and several thousand watts of power. At such power levels a height of 10 meters above ground is not an unreasonable distance for which an evaluation generally would be advisable.

For antennas mounted higher than 10 meters, measurement data for cellular facilities have indicated that ground-level power densities are typically hundreds to thousands of times below the new MPE limits.

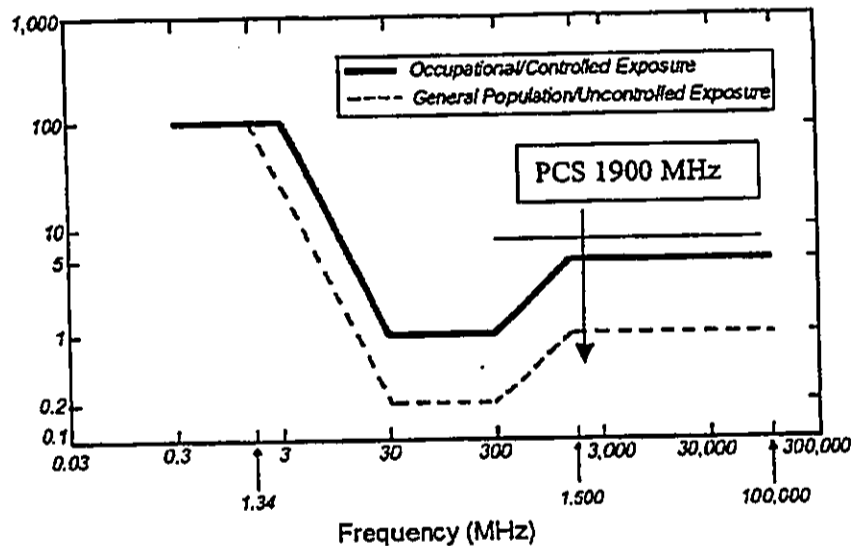
Appendix B
VoiceStream RF Engineering Electromagnetic Radiation Hazards Analysis

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General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. As discussed later, the occupational/controlled exposure limits also apply to amateur radio operators and members of their immediate household.

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)
Plane-wave Equivalent Power Density



Limits for General Population/Uncontrolled exposure:

-0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube).

Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube).

General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure.

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Table 1. LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time (E ² , H ² or S) (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time (E ² , H ² or S) (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz

*Plane-wave equivalent power density

NOTE 1: *Occupational/controlled* limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

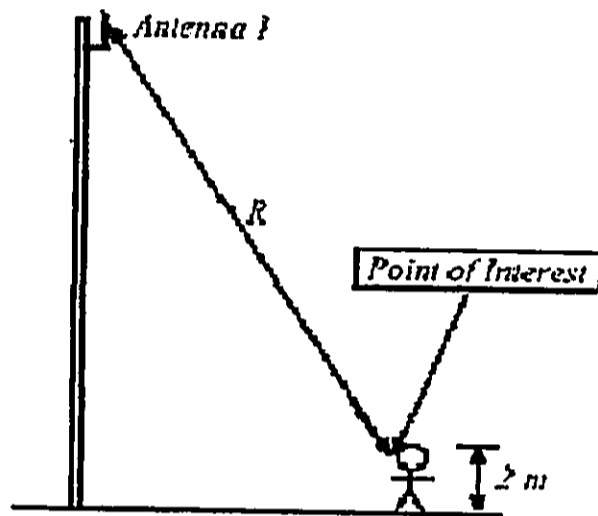
NOTE 2: *General population/uncontrolled* exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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Calculation.

Compliance with SAR limits can be demonstrated by laboratory measurement techniques or by computational modeling, as appropriate. Methodologies and references for SAR evaluation are described in technical publications including "IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave," IEEE C95.3-1991, and further guidance on measurement and computational protocols is being developed by the IEEE and others.

For T-Mobile site HI01144, the field situation can be described by the Drawing #1



Near-Field Region.

In the near-field, or Fresnel region, of the main beam, the power density can reach a maximum before it begins to decrease with distance. The extent of the near-field can be described by the following equation (1) having D and λ in same units:

$$R_{nf} = \frac{D^2}{4\lambda} \quad (1)$$

where: R_{nf} = extent of near-field
 D = maximum dimension of antenna (diameter if circular)
 λ = wavelength

Therefore,

Value	Ft
λ	0.518
D	6
R_{nf}	17.37

(2)

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For sector-type antennas, power densities can be estimated by dividing the net input power by that portion of a cylindrical surface area corresponding to the angular beam width of the antenna. Mathematically, this can be represented by Equation (3) in which the angular beam width, θ_{BW} , can be taken as the appropriate azimuthal "power dispersion" angle for a given reflector.

$$S = \left(\frac{180}{\theta_{BW}} \right) \frac{P_{net}}{\pi R h} \quad (3)$$

where:

- S = power density
- Pnet = net power input to the antenna
- θ_{BW} = beam width of the antenna in degrees
- R = distance from the antenna
- h = aperture height of the antenna

For example, for the case of a 60-degree azimuthal beam width, the surface area should correspond to 1/6 that of a full cylinder. This would increase the power density near the antenna by a factor of three over that for a purely omni-directional antenna. For example, a conservative estimate could be obtained by using the 3 dB (half-power) azimuthal beam width for a given sectorized antenna. Equation (3) can be used for any vertical collinear antenna, even omni-directional ones.

In case of T-Mobile site HI01144, antennas will be installed at 8 ft above roof level or approx. 243 cm. Therefore, a person standing 2 feet 1 (121.92cm) below the antenna the formula (3) returns:

Pnet = 9300	mWatt	
θ_{BW} = 65	3dB degree	
R = 121.92	cm	
h = 243	cm	
MPE = 0.739258		mW/cm²
FCC Exposure Limit = 1.00		mW/cm²

Fig.1

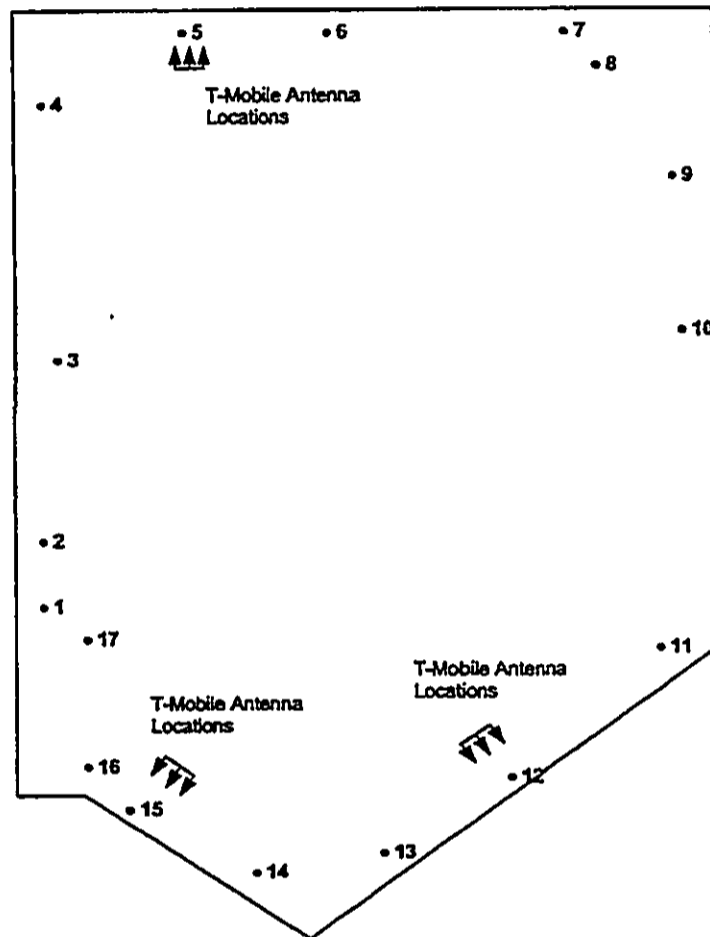
The results of the analysis indicate that the actual exposure received by an individual standing for 30 minutes at the base of T-Mobile facility will be only 73.92% of the Maximum Permissible Exposure.



Measured Data at UH Social Science Bldg with On Air T-Mobile Site.

Measured MPE Procedures

All measurements were taken with a Narda 8718 Meter & the A8742D probe. Measurements & calibration procedures were followed as explained in the user's manual. The area in which any person may be subjected to RF Exposure was measured & data points were recorded throughout the area. These data points can be cross-referenced between the measured MPE Table and the area drawings. Measurements are cumulative reading from T-Mobile, KTUH Radio Station, UH Microwave and other RF Emission located on the roof top of the UH Social Science Building.





Measured Data Table for On Air T-Mobile Site at UH Social Science Bldg.

Location Point	Approximate Distance from Antenna	Measured Field Strength (% of Occupational Standard)	Measured Field Strength (mW/cm ²)
1	20 ft.	0.00	0
2	25 ft.	0.00	0
3	35 ft.	0.30	0.003
4	25 ft.	0.92	0.0092
5	5 ft.	0.73	0.0073
6	12 ft.	0.66	0.0066
7	35 ft.	0.71	0.0071
8	38 ft.	0.68	0.0068
9	40 ft.	0.66	0.0066
10	40 ft.	0.81	0.0081
11	35 ft.	1.26	0.0126
12	5 ft.	0.84	0.0084
13	20 ft.	0.84	0.0084
14	20 ft.	3.51	0.0351
15	5 ft.	1.39	0.0139
16	10 ft.	0.96	0.0096
17	15 ft.	0.96	0.0096

Measured MPE Data for T-Mobile On Air Site HI01136 located at UH Social Science building can be used as a reference for the MPE that would be produced by the proposed East West Gateway T-mobile site. BTS and antennas planned at the East West Gateway site location would be very similar to the existing equipment currently installed on the UH Social Science building.

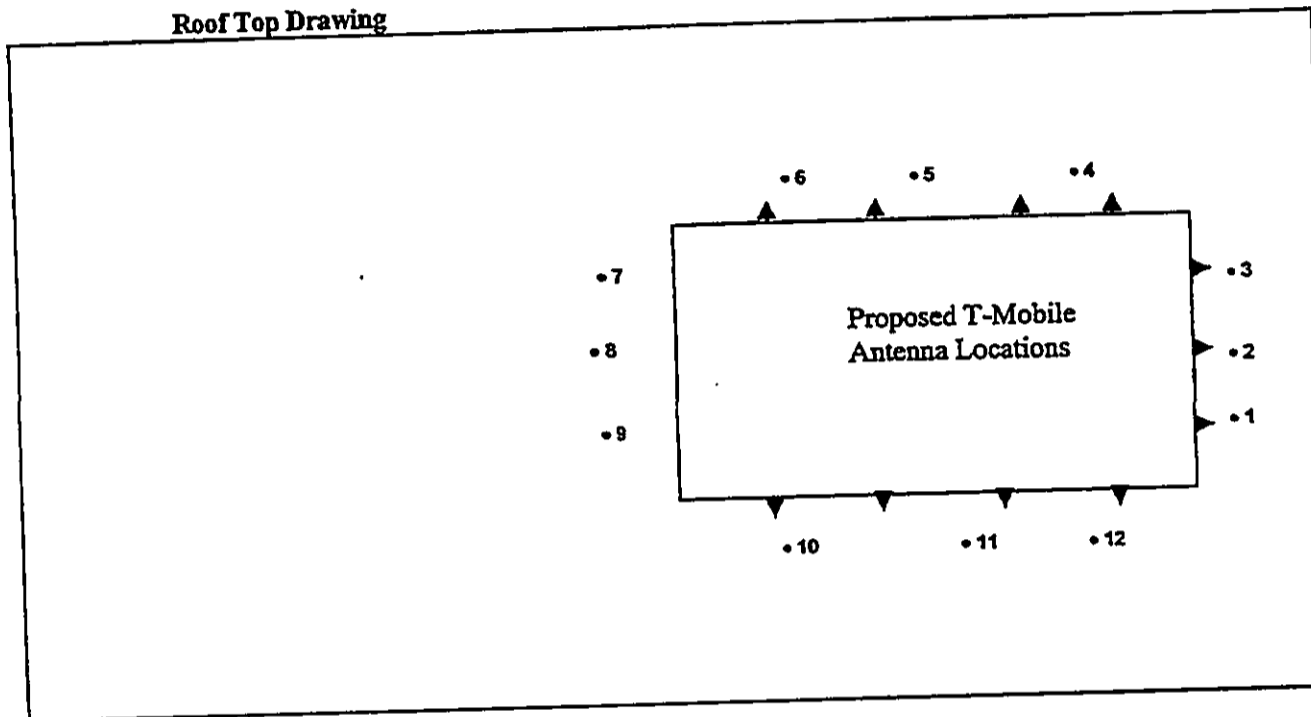


Predicted & Measured Data for the Proposed site at East West Gateway House

Measured MPE Procedures

All measurements were taken with a Narda 8718 Meter & the A8742D probe. Measurements & calibration procedures were followed as explained in the user's manual. The area in which any person may be subjected to RF Exposure was measured & data points were recorded throughout the area. These data points can be cross-referenced between the measured MPE Table and the area drawings. Measurements are cumulative reading from of all RF Emission located at the site location prior to construction of the T-Mobile Site.

Roof Top Drawing



Measured MPE Table at site location without T-Mobile RF Emissions

Location Point	Approximate Distance from proposed Antenna	Measured Field Strength (% of Occupational Standard)	Measured Field Strength (mW/cm ²) pre - installation
1	4 ft.	0.11%	0.0011
2	4 ft.	0.26%	0.0026
3	4 ft.	0.04%	0.0004
4	4 ft.	0.15%	0.0015
5	4 ft.	0.68%	0.0068
6	4 ft.	0.69%	0.0069
7	4 ft.	0.81%	0.0081
8	4 ft.	0.60%	0.006
9	4 ft.	0.64%	0.0064
10	8 ft.	0.38%	0.0038
11	13 ft.	0.58%	0.0058
12	8 ft.	0.58%	0.0058



Predicted MPE Procedures

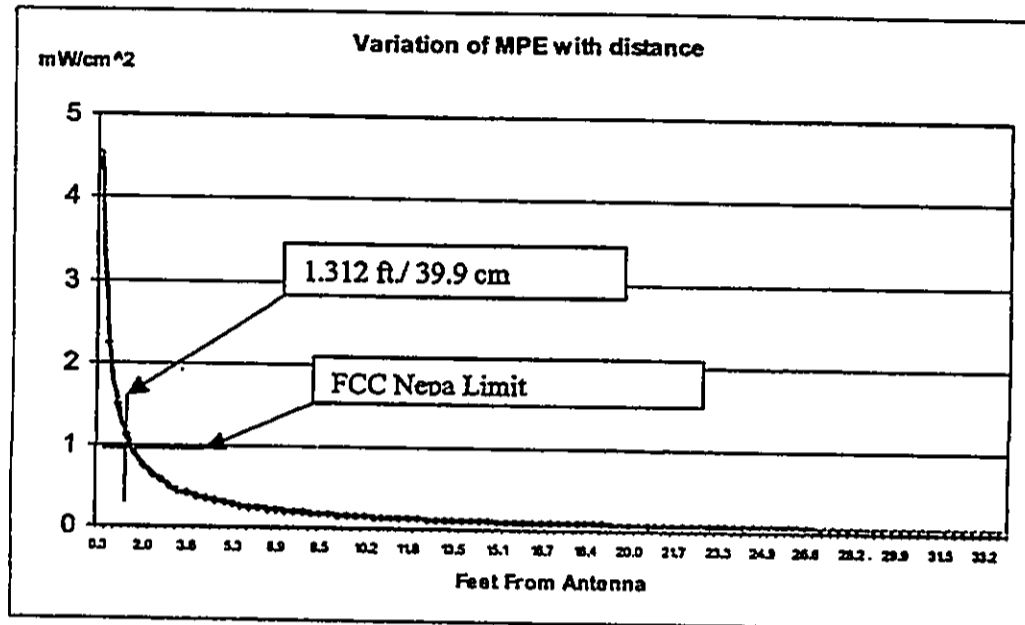
All Predictions were calculated with the above formula (3). These data points can be cross-referenced between the Predicted MPE Table and the area drawings. Predictions are calculated for the T-Mobile RF Emission located at the site location after construction.

Predicted MPE Table at site location with T-Mobile RF Emissions

Location Point	Approximate Distance from proposed Antenna	Predicted Field Strength (% of Occupational Standard)	Predicted Field Strength (mW/cm ²)
1	4 ft.	36.96%	0.369629059
2	4 ft.	36.96%	0.369629059
3	4 ft.	36.96%	0.369629059
4	4 ft.	36.96%	0.369629059
5	4 ft.	36.96%	0.369629059
6	4 ft.	36.96%	0.369629059
7	4 ft.	36.96%	0.369629059
8	4 ft.	36.96%	0.369629059
9	4 ft.	36.96%	0.369629059
10	8 ft.	18.48%	0.18481453
11	13 ft.	11.37%	0.113732018
12	8 ft.	18.48%	0.18481453

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Based on equation (3) the results are plotted to the following graph. This will indicate how close to a T-Mobile antenna a person placed for more than 30 minutes will receive an electromagnetic exposure greater than the MPE specified by FCC rules.



General Population/uncontrolled exposure limits are specified by FCC at a value of 1 mW/cm². In order to exceed the above limit a person should be placed closer than 1.312 ft (or 39.9 cm) in front of the antenna. This situation is very unlikely to occur since T-Mobile antennas are mounted (in case of site HI01144) more than 8ft above roof level.

Study performed as of today , December 23, 2003 by

RF Engineer: Troy Terazono

Verified by:

RF Manager : Jamin Kau

Appendix C

V. Peterson Statement Regarding Electromagnetic Radiation Levels

STATEMENT
Regarding Electromagnetic Radiation Levels
Associated with Proposed KTUH FM Radio Transmission
by
Prof. Vincent Z. Peterson
Department of Physics, UHM

INTRODUCTION:

At the request of ASUH I agreed to review the proposed increase in power of KTUH's FM radio CW (continuous-wave) transmission in order to calculate the expected FM radiation power levels in the top-floor offices of Porteus Hall.

I agreed to do this, on a "pro-bono" basis, since I am impressed with the dedication and hard work of the students concerned, who hope to have KTUH reach a wider audience than can now be reached with the present power limitation (100 watts). Although the proposed increase in radiated power (to 3000 watts) may seem major (30x factor), it is really quite modest --in comparison with power radiated by commercial FM stations. Yet it is also prudent to be concerned with possible effects of electromagnetic radiation on nearby members of the campus community. Since I've been involved in advising the State Department of Health, and the National Weather Service/FAA, on the effects of electromagnetic radiation, ASUH asked me --- as a member of the Physics faculty at UHM -- to calculate the expected maximum radiation intensity which KTUH might project, and compare that with accepted standards.

Since ASUH already has competent electronic engineering advice from Mr. Dale Machado of KSSK (knowledgeable on FCC regulations for FM radio) I will confine my remarks to the "physics and biophysics" of electromagnetic radiation in the FM radio band (specifically, at about 90 Megahertz, or 90 MHz).

Standards of permissible radiation exposure of human to electromagnetic fields (EMF) are determined by ANSI (American National Standards Institute) for a wide range of frequencies, including FM radio. The Federal Communications Commission (FCC) had adopted the ANSI standards. The FCC OST-Bulletin No. 65 "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation" also included useful graphs and tables for determining the minimum height of antenna.

MY QUALIFICATIONS AS AN "EXPERT" ON ELECTROMAGNETIC RADIATION:

Besides a PhD in Physics (UC-Berkeley, 1950), I have 38 years of experience in teaching physics courses, at CalTech and (since 1964) at UHM. I have taught the full range of courses in Electricity and Magnetism (E&M), including the most advanced physics courses in Electromagnetic Fields (EMF). Radiation of electromagnetic waves is a prime topic in these courses. While involved with research at the Caltech Electron Synchrotron (1950-1962) I served part-time as Radiation Safety Officer. I also was a member of the CalTech campus Health and Safety Committee, chaired by George Beadle (Nobel prize in genetics).

In recent years, a series of articles in the New Yorker aroused public concern over "Does EMF cause cancer?". The UH School of Public Health was asked (by the Hawaii Legislature) to convene a Symposium on "Electromagnetic Fields: Scientific Facts and Community Concerns". I was asked to participate, as a physicist with expertise on EMF. In 1993 Dr. Bruce Anderson (State Board of Health Deputy Director for Environmental Health) asked me to serve on an Advisory Committee concerned with possible health effects of powerline frequency EMF. Other members of the panel included medical doctors, two EEs, a HECO official, and community group representatives. My role was nominally as a physicist but it turned out I was the only member with personal contact with scientists directly involved in setting national radiation exposure standards. The data obtained covered potential medical effects of radiation over a wide range of frequencies. Our panel achieved unanimous agreement on the lack of convincing evidence that ordinary powerline frequency EMFs provide a serious hazard to human health. This advice was accepted by the Legislature.

Later on (in 1994) I was asked to serve as a Consultant to a group of National Weather Service/FAA officials in charge of explaining the impact of installing the new "NEXRAD" Weather radars (pulsed Doppler radars) at four different sites in the State of Hawaii. My role was to explain the "physics of electromagnetic radiation (and its relationship to biophysical parameters)" to the Boards of Supervisors of the Counties of Maui/Molokai, Kauai, and the Big Island. (My testimony was complementary to that of a medical radiologist from the East Coast.) Despite some initial concerns about the possible health effects of NEXRAD's pulsed radar by various Supervisors, and after substantial discussion, all the Boards of Supervisors declared themselves satisfied that NEXRAD radar would not pose a danger to human health in their communities.

Although I am NOT a medical doctor, I've been stimulated to learn more about the potential effects on the human body by EMFs at various frequencies and power levels. Fortunately, several of my close friends in physics and biophysics are national figures in Radiation Protection and I have corresponded regularly with them regarding the basis for the ANSI (American National Standards Institute) radiation levels for "maximum permissible exposures". For example, Dr. E. Adair of Yale Biophysics is co-chairperson of COMAR (Committee on Man and Radiation) which included representatives from ANSI, NCRP (National Committee on Radiation Protection) and the EPA. Dr. Adair has provided me with detailed information on these matters, for EMF frequencies extending from 60 Hz to ultra-high frequencies (radar).

ELECTROMAGNETIC RADIATION EFFECTS ON HUMANS: (simplified summary)

There are two major aspects to consider:

(a) Damage caused by ionizing radiation (radiation able to ionize atoms knocking electrons free from their atomic bonds). Ionization is the most direct way electromagnetic fields (of sufficient strength) can cause biological damage and is capable of modifying DNA in the human body.

(b) The local heating of human flesh, such that local body temperatures are raised beyond acceptable limits (i.e., beyond the range which natural body mechanisms can control, a few degrees Fahrenheit from 98.6)

Let us consider each aspect in turn.

Ionization of atoms in the body: Fortunately, in dealing with EMFs at FM-radio frequencies (KTUH operates at 90.3 Megahertz), we don't need to worry about KTUH radiation ionizing any atom: KTUH's frequency is much too low to ionize even the least tightly-bound electron. (The energy of the smallest "packet" of EMF -- called the "photon" -- is given by $E = hf$, where f = frequency, and h = Planck's constant.) Since electromagnetic waves can be labelled by wavelength (λ) as well as by frequency (f), it is useful to write down the simple formula relating the two:

$$f \times \lambda = c = \text{velocity of light} = 186,300 \text{ miles/second} \\ = 300,000,000 \text{ meters per second.}$$

Thus, 90 MHz frequency corresponds to a wavelength of 3.3 meters = 330 cm. In general, high frequencies (short wavelengths) pack more "power" into each photon. (Example: in sunbathing, UV photons can be dangerous and cause skin cancer directly (by ionization), whereas IR (infrared) photons are not dangerous unless incident at high intensity (lots of photons/second per unit area of skin)).

To illustrate the frequency (or wavelength) dependence of EMF, Figure 1 displays the of various bands of frequencies, on a logarithmic scale (linear in powers of 10), with labels for various types of B radiation.

(Project Figure 1 at this point, and explain the Figure, pointing out where KTUH frequency lies relative to UV, IR, etc).

In particular, note that all ionizing radiations have frequencies above about 10^{14} Herz (or cycles/second), the lowest ionizing frequency corresponding to the least tightly-bound electron.

Since KTUH's frequency is $> 10,000$ times lower than the threshold frequency for ionizing radiation, we can dismiss any worry about direct (ionizing) damage to human flesh from KTUH radiation.

Local heating of human flesh: from thorough studies of the effects of EMF on human biology, all other (non-ionizing) effects on mammalian flesh (human or otherwise) can be attributed to local heating, which raises the local temperature of the body more than a critical amount (ΔT_c). For the human body it is well known

that a fever of more than a few degrees Fahrenheit can be serious, since it causes the body's natural heat-regulating system to lose control. The (very conservative) ANSI standards for Maximum Permissible radiation intensity, in the non-ionizing EMF range, roughly correspond to $\Delta T = 0.1$ deg. Fahrenheit, for exposures sustained for at least 6 minutes. (The body can handle higher intensity radiation for shorter exposures, since the body fluids distribute the heat fairly rapidly over a large volume.)

One example (from NEXRAD radar, whose frequency closely matches those of microwave ovens, yet is non-ionizing): It is the average power/unit area, averaged over some seconds exposure, which is important. Microwave ovens (HIGH power consumption of 300 watts) can "cook" meat very efficiently by raising the meat's temperature by hundreds of degrees. Yet the NEXRAD radar, pulsed at high power (450,000 watts in a narrow beam) for very short time intervals (a few microseconds for about 1000 times per second), has very low average power, even in the main beam. The radiation intensity (in milliwatts per square centimeter) is less than one milliwatt/square centimeter at the nearest accessible distance. (The radiation from a home "nightlight", used to illuminate the hallway at night, is more dangerous than NEXRAD radiation outside the perimeter fence around the transmitter/antenna).

The FCC regulations for radiated power levels include the ANSI limits on radiation intensity levels wherever humans are involved. Thus, the radiation intensity from KTUH must be less than 1.0 mW/cm^2 (one milliwatt per square centimeter) at all regions where humans might possibly occupy.

ESTIMATE OF RADIATION INTENSITY FROM THE PROPOSED KTUH
ANTENNA \hookrightarrow
(on top of Porteus Hall), at a power level of 3000 watts:

The present KTUH transmitting, located on top of Porteus hall, radiates a maximum of 100 watts of electromagnetic power. It is proposed to increase the power to 3000 watts (a factor of 30). A new "4-bay" FM antenna would be installed, to emit FM power in a relatively narrow beam pattern (vertically) but distributed over all azimuthal directions in a horizontal plane.

A rough sketch (not to scale) of the KTUH antenna, mounted on top of Porteus, is shown in Figure 2. Dimensions are in meters. Note that the center of the antenna would be 15.75 meters (52 feet) above the roof of Porteus. The smallest vertical angle of radiation which would impact any portion of the top floor of Porteus Hall would be about 45-degrees.

The angular distribution (in the vertical plane) of the electric field (E) from a 4-bay antenna is shown in Figure 3. Note that the value of the E-field in the secondary peaks does not exceed 0.25 of the maximum value of the E-field in the main beam. Since the power (or intensity) in the beam varies as the square of the electric field, this means that the intensity reaching Porteus' to floor will always be less than (0.25)-squared times that in the main beam, or 1/16th the main beam power.

The radiation intensity in the main beam can be calculated from the standard antennae formula,

$$S = \frac{K \cdot P \cdot G}{4\pi R^2}$$

where P = total radiated power (in watts), R = radial distance from antenna to observation point, G = antenna "gain" (r.m.s. value), and "K" takes into account beam polarization and time-averaging effects. For KTUH the power is 3000 watts, and R = 16 to 24 meters (various distances from Antenna midpoint to Porteus rooftop points). If the power were radiated in an exactly spherical pattern, and if K = 1, the radiation intensity over a spherical surface of radius R would be just $P/(4\pi R^2)$ --- "isotropic radiation".

The antenna concentrates the radiation in a fairly narrow horizontal plane, in order to reach greater distances with a detectable signal. The "antenna gain factor, G" is a measure of this concentration of power into the main beam; i.e., G is how much more intense the FM intensity is at zero degrees than a completely isotropic radiation pattern. A detailed calculation for this 4-bay turnstile antenna yields G = 2.1, so that the main beam intensity is 2.1 times greater than it would be for an isotropic radiation pattern.

The factor $K/4 = 0.64$, so that the formula for the radiation intensity (power per unit area) in the main beam becomes:

$$S = 0.64 \frac{P \cdot G}{\pi R^2}$$

showing that the intensity falls off as the square of the distance from the antenna (if R is at least several wavelengths). For a nominal distance of R = 15 meters, P = 3000 watts, and G = 2.1, the FM radiation intensity in the main beam calculates to be:

$$S (0 \text{ deg}) = 0.57 \text{ mW/cm}^2,$$

FCC permissible radiation intensity (for 24-hr. continuous exposure of humans) is 1.0 mW/cm², so that even in the main beam (15 meters distant) the KTUH beam is within the FCC limit of "maximum permissible intensity".

The angular distribution (in the vertical plane) of the electric field (E) from a 4-bay antenna is shown in Figure 3. Note that the value of the electric-field in the secondary peaks does not exceed 0.25 of the maximum value of the E-field in the main beam. Since the power (or intensity) in the beam varies as the square of the electric field, this means that the intensity reaching Porteus' to floor will always be less than (0.25)-squared times that in the main beam, or 1/16th the main beam power. Thus the maximum intensity on Porteus' roof will be

$$S (\text{max, roof}) = (0.57/16) = 0.035 \text{ mW/cm}^2$$

Which is 30x lower than FCC-acceptable radiation levels of 1.0 mW/cm².

I conclude, therefore, that the FM radiation from KTUH 4-bay antenna as described, with 3000 total radiated power, does NOT constitute a radiation hazard to occupants of the top floor (or ANY floor) of Porteus Hall.

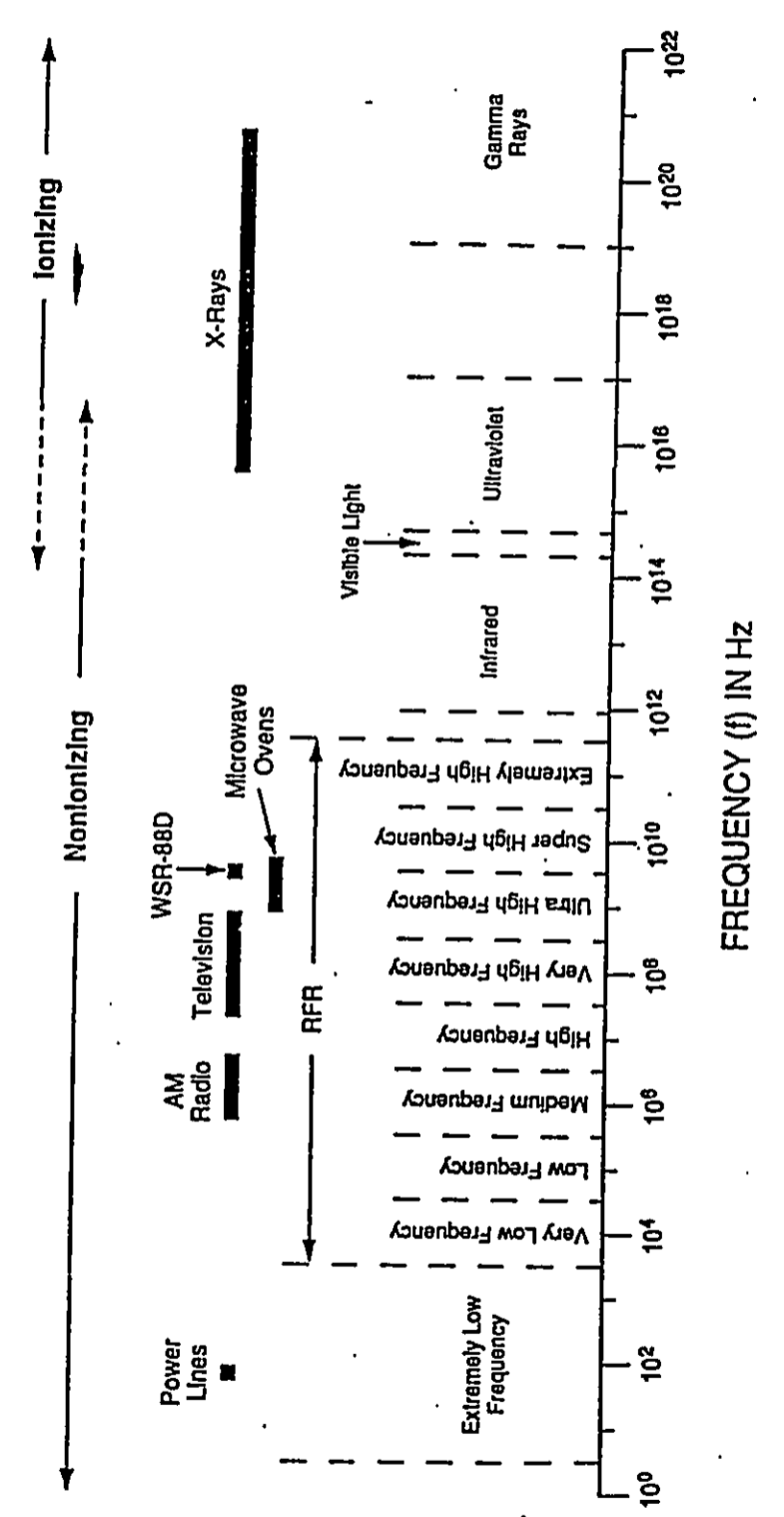
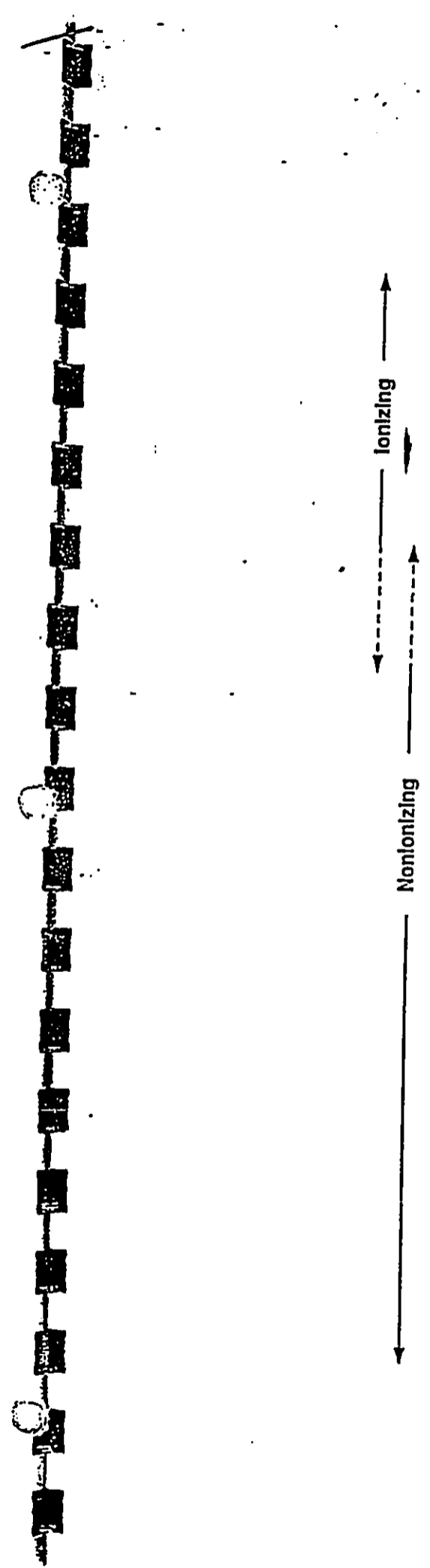
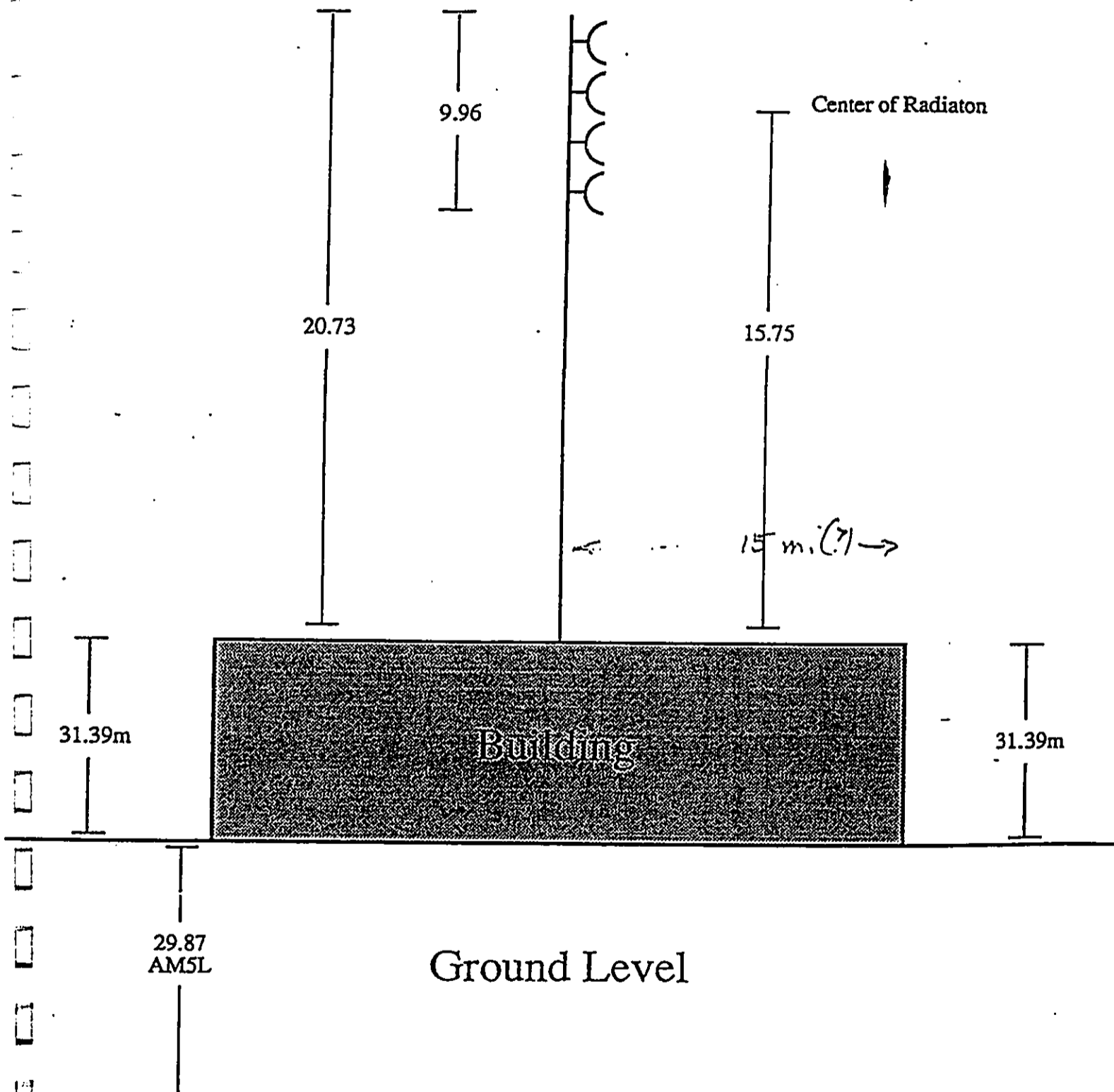


FIGURE 1 The Electromagnetic Spectrum

PROPOSED INSTALLATION OF KTUH ANTENNA ON PORTEUS HALL



All data in meters

Fig. 2



ELEVATION PATTERN
JSCP - 4

DATE: 9/1/79
RMS GAIN: 2.1

BEAM TILT= 0
NULL FILL= 0%

