HPD 800 MHz Communication System Upgrade

BUILDING DEPARTMENT

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

RECEIVED
JAN 10 P2:00
OFC. OF ENVIRONMENTAL
QUALITY CONTROL

RANDALL K. FUJIKI
DIRECTOR AND BUILDING SUPERINTENDENT

ISIDRO M. BAQUILAR
DEPUTY DIRECTOR AND BUILDING SUPERINTENDENT

PB 97-26

January 8, 1997

Mr. Gary Gill, Director
Office of Environmental Quality Control
State Office Tower
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813-2437

Dear Mr. Gill:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

The Building Department has reviewed the comments received on the Draft Supplemental Environmental Assessment for the subject project during the thirty-day public review period which began on November 23, 1996 and has determined that this project will have no significant environmental effect and with this letter, issues a finding of no significant impact.

We request that you publish this notice of determination in the January 23, 1997 issue of the Environmental Notice.

Enclosed is a completed OEQC Bulletin Publication Form and four copies of the Final Supplemental Environmental Assessment.

Should there be any questions, please have your staff contact Clifford Morikawa at 527-6350.

Very truly yours,

RANDALL K. FUJIKI
Director and Building Superintendent

Attach.
cc: Gerald Park, Urban Planner

8

1997-01-23-OA-FEA- Honolulu Police Department 800 MHz Communication System Upgrade, Pali & Wilson Tunnels

JAN 23 1997

FILE COPY

FINAL
Supplemental Environmental Assessment

Honolulu Police Department 800 MHz Communication System Upgrade Pali and Wilson Tunnels

Proposed by:
City and County of Honolulu
Building Department
650 South King Street
Honolulu, Hawaii 96813

Prepared by:
Gerald Park Urban Planner

In association with:
SCHEMA Systems, Inc.
Ericsson Private Radio Systems

January, 1997

SUMMARY INFORMATION

PROPOSED ACTION:	Honolulu Police Department 800 MHz Communication System Upgrade Pali and Wilson Tunnels
PROPOSING AGENCY:	Building Department City and County of Honolulu 650 South King Street Honolulu, Hawaii 96813
DETERMINING AGENCY:	Building Department
LOCATION:	Nuuanu and Kalihi Valleys
TAX MAP KEY:	State Highway Rights-of-Way
LAND AREA:	Undetermined
LAND OWNER:	State of Hawaii
CONTACT PERSON:	Clifford Morikawa Building Department City and County of Honolulu 650 South King Street Honolulu, Hawaii 96813 Telephone: 527-6350

Note: Revisions to the text of the Draft Environmental Assessment appear in ***bold italic*** type. Deleted text is shown in brackets.

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LIST OF FIGURES

PHOTOGRAPHS

SECTION 1 DESCRIPTION OF THE PROPOSED ACTION

A. Introduction

The Building Department, City and County of Honolulu, is in the process of upgrading the city's existing public safety radio communication system. The new upgraded system is supported by facilities at 26 sites on the island of Oahu, 22 of which are existing sites.

A Draft Environmental Assessment for the proposed system was prepared in 1991 and published by the Office of Environmental Quality Control (OEQC) in the OEQC Bulletin of September 8, 1992 and September 23, 1992. A Final Environmental Assessment was published in the OEQC Bulletin of December 23, 1992 and January 8, 1993.

A Supplemental Environmental Assessment was prepared for the Diamond Head Communications Facility when it was relocated from the slopes of Diamond Head to the roof of Leahi Hospital. A Draft Supplemental EA for the Leahi Communications Facility was published in the OEQC Bulletin of December 23, 1996 and January 8, 1994. The Final Supplemental EA was published in the OEQC Bulletin of June 8, 1994.

This Draft Supplemental EA has been prepared for proposed improvements to the radio system at the Pali and Wilson Tunnels (See Figure 1). Currently, radio signals are weak and coverage is poor both in the tunnels and on the Honolulu side of the tunnels. The proposed improvements will provide reliable radio frequency communication signals within the tunnels and on the Honolulu side of the tunnels.

B. Proposed Radio System Improvements at Pali Tunnel

Approximately 1,080 LF of 1" diameter radiating cable will be run through the Kailua outbound tunnel No. 1 and 1,000 LF of 1" radiating cable through the Honolulu inbound tunnel No. 1. The cables will be secured to the concrete tunnel wall about 19 feet above road grade with nylon and stainless steel clamps. Where the cable emerges from the Kailua outbound tunnel, it will be placed inside 2½ inch PVC conduit and routed to and above the Honolulu inbound portal. The conduit routing is shown in Figure 2. Both sets of cable will be routed into a bi-directional amplifier to be installed inside the electrical equipment building adjacent to the Honolulu inbound portal. The amplifier will amplify radio signals through the radiating cable which also functions as an antenna for transmitting and receiving radio signals inside the tunnels.

A 6-foot diameter grid dish antenna will be mounted on a mast (pipe) attached to the exterior wall of the electrical building. The mast is approximately 9 feet in height. When mounted to the mast, the grid dish antenna will stand about 6-feet above the roof of the electrical building. The antenna will be located about 16 feet from the edge of the right lane of the highway. The dish antenna is known as a "donor antenna". The antenna captures signals from a donor site then re-radiates the signals to mobile and portable units within the tunnel. The donor antenna can also receive signals radiated from mobile and portable units inside the tunnel and transmit them to the donor site.

On the Honolulu side of the Honolulu inbound portal, an 18" W X 18" H corner reflecting type antenna will be mounted on an existing mast outside of and above the center of the portal about 30

feet above road grade. This antenna will provide radio coverage, both receiving and transmitting signals, to the area leading to the tunnel entrances on the Honolulu side of the tunnel. Antenna elevations are shown in Figure 3.

The grid dish and corner reflecting antenna, masts, and all mounting brackets will be painted green.

C. Proposed Radio System Improvements at Wilson Tunnel

Approximately 1,900 LF of 1" diameter radiating cable will be run through the Kaneohe outbound tunnel No. 1 and 1,900 LF of 1" diameter radiating cable through Honolulu inbound tunnel No. 1. The cables will be secured to the concrete tunnel wall with nylon and stainless steel clamps mounted about 19 feet above road grade (See Figure 4). Where it emerges from the Kaneohe portals, both sets of cable will be routed inside an existing soffit and into an electrical equipment building between both portals. The cables will connect to a new radio amplifier to be installed inside the building. Because of the length of both tunnels, a second amplifier will be installed about mid-way inside the Kaneohe outbound tunnel. The amplifiers will assure there is adequate radio signal strength in the tunnels.

On the Kaneohe side of the tunnels, a 6-foot diameter grid dish antenna will be mounted behind a 10-foot high parapet wall that rises above both portals and the electrical building. The antenna will be mounted on a 10-foot high galvanized steel mast. The mast will be welded to a steel plate and anchored in an existing concrete gutter behind the parapet. The antenna is approximately 32 feet above road grade.

On the Kalihi side, an 18" L X 18" W corner reflecting antenna will be mounted above the portal of the Honolulu inbound tunnel about 23 feet above road grade. The grid and corner reflecting antenna, pipe masts, and all mounting brackets will be painted to blend with their surroundings. Antenna elevations are shown in Figure 5.

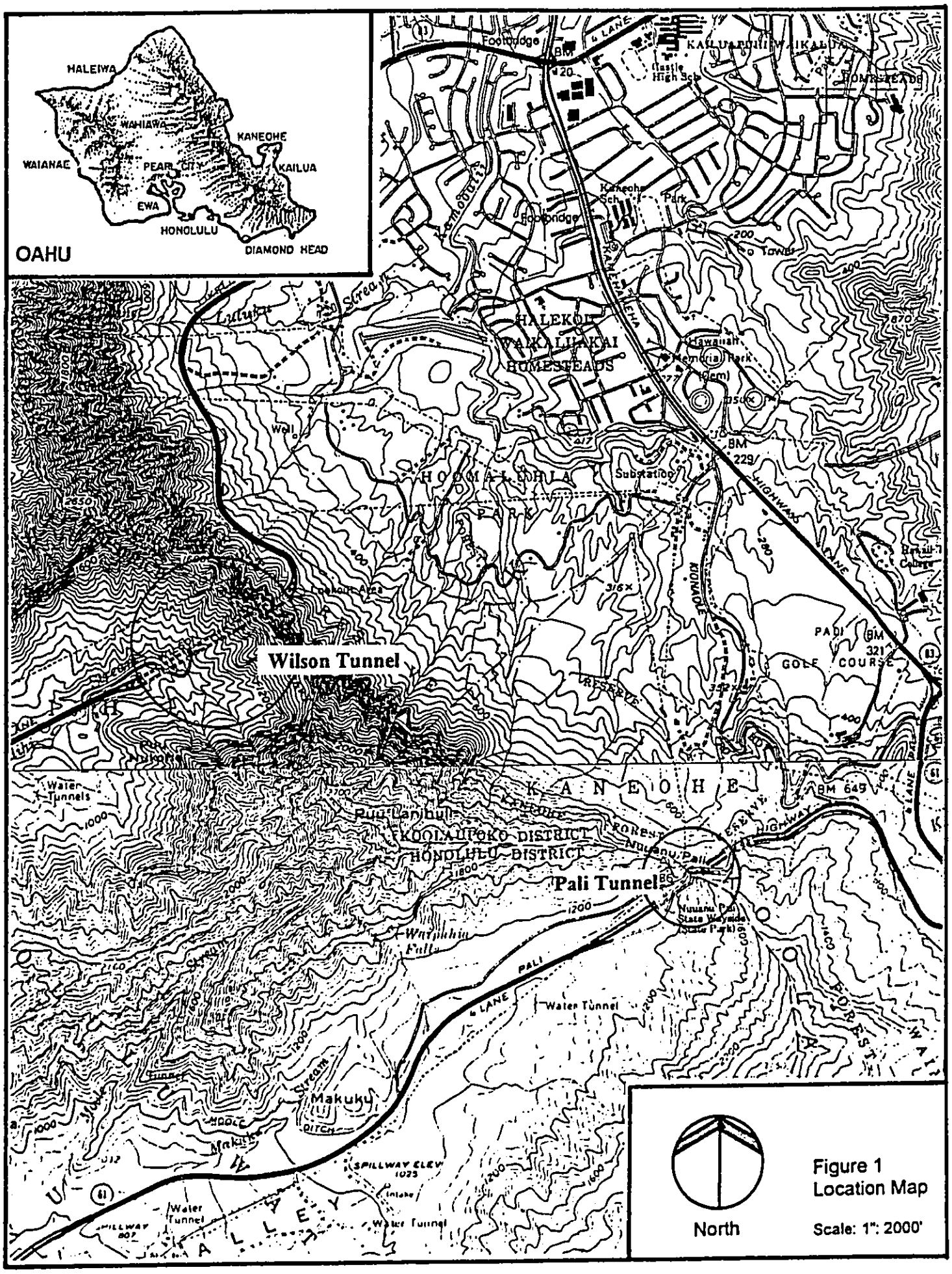
D. Economic Characteristics

The cost of the project is estimated at $50,000.00 for improvements at the Pali Tunnel and $100,000.00 for improvements at the Wilson Tunnel. The project is funded by the City and County of Honolulu.

Installation of the proposed improvement should take two weeks at the Pali Tunnel and four weeks at the Wilson Tunnel. The work requires closing one bore at a time. The Pali Tunnel will require closing each bore for one week and each bore will be closed for two weeks at the Wilson Tunnel. Work will be scheduled during nighttime hours to minimize inconveniences to motorists. A traffic control plan is being prepared by the radio contractor for review and approval by the appropriate highway authorities.

E. Social Characteristics

The proposed improvements will not displace any residential, commercial, recreational, or industrial activities. Commuters using the Pali and Wilson Tunnels during night-time hours may be temporarily inconvenienced by the installation of the improvements..


HALEIWA
WAHIAWA
KANEOHE
WAIANAE
PEARL CITY
KAILUA
EWA
HONOLULU
DIAMOND HEAD
OAHU
Footbridge
BM
LANE
KAILUA
Hassle High Sch
HOMESTEADS
Kaneohe Sch
Park
Footbridge
Tower
HALEKOU
PAKALUAKAI
HOMESTEADS
Hawaiian Memorial Park
Substation
BM 229
HIGHWAY
H O O M A L U H I A
P A R K
Wilson Tunnel
Lookout Area
PADI
BM 321
GOLF COURSE
RESERVE
K A N E O H E
BM 649
Water Tunnels
Puu Lanihuli
KOOLAUPOKO DISTRICT
HONOLULU DISTRICT
Pali Tunnel
Nuuanu Pali State Wayside State Park
Waihee Falls
PALI
LANE
Water Tunnel
Makuku
ditch
SPILLWAY ELEV 1025
Intake
Water Tunnel
Water Tunnel
V A L L E Y
Figure 1
Location Map
North
Scale: 1": 2000'

8 7 6 5 4

D C B A

1" RADIATING CABLE, ATTACH TO WALL 36" O.C., SEE DETA

RC

TO HONOLULU

97 98

BARE CABLE

CORNER REFLECTOR ANTENNA ABOVE PORTAL, SEE D/E-4

RC

TO KAILUA

PORTAL 1
96+50

101+50

MAUKA LINE

1" RADIATING CABLE, ATTACH TO WALL 36" O.C., SEE DETAIL D/E-4

RC

TO HONOLULU

1" RADIATING CABLE

RC

TO KAILUA

KEYED NOTES:

① 12"W x 18"H x 4"D WEATHERPROOF JUNCTION BOX.

② WEATHERPROOF CONNECTION, SEE DETAIL B/E-4

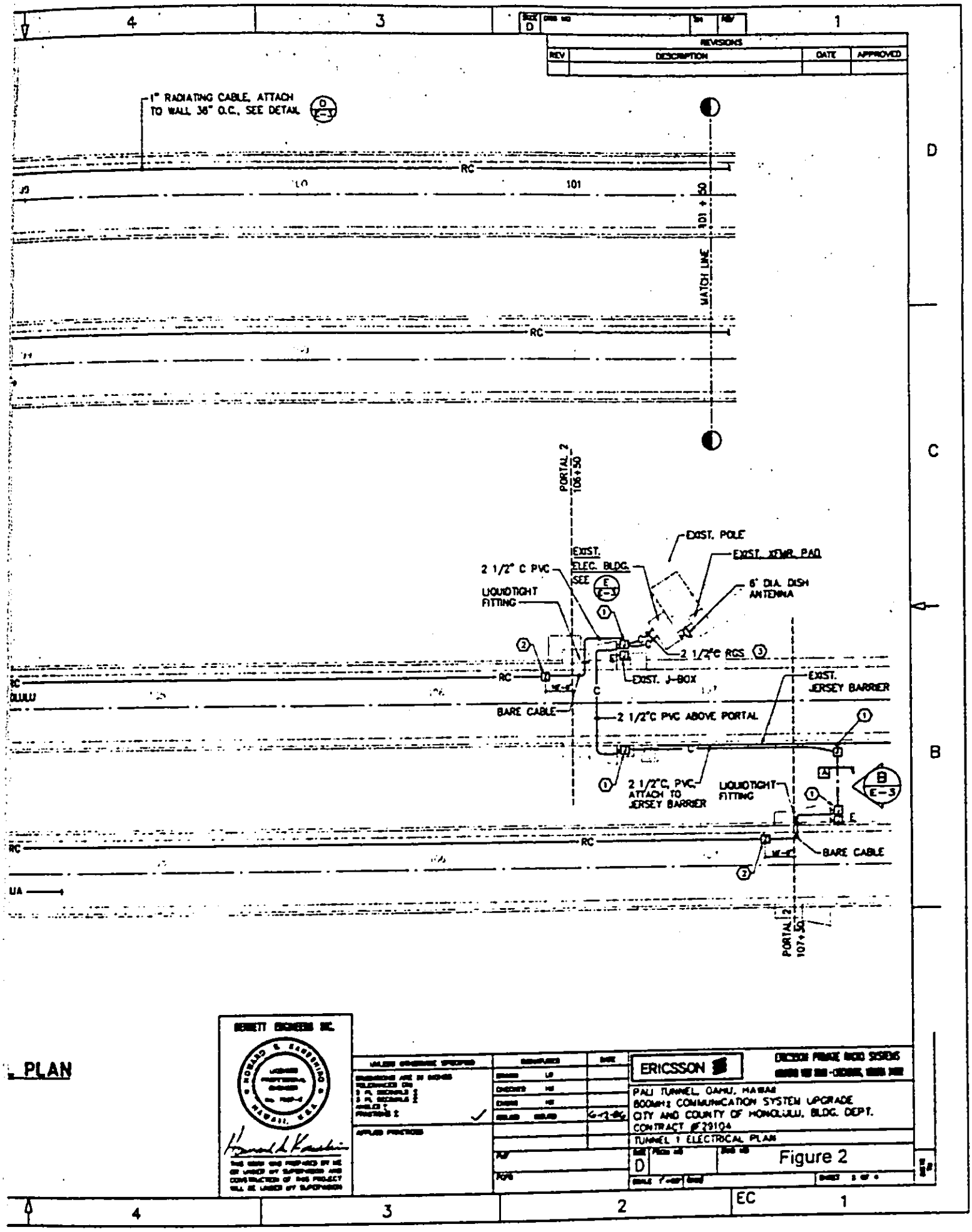
③ SPAN RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE BETWEEN BOTTOM OF ROOF OVERHANG OF ELECTRIC BUILDING TO TOP OF PYLON.

NORTH

TUNNEL 1 ELECTRICAL PLAN

SCALE: 1" = 20'

8 7 6 5 4



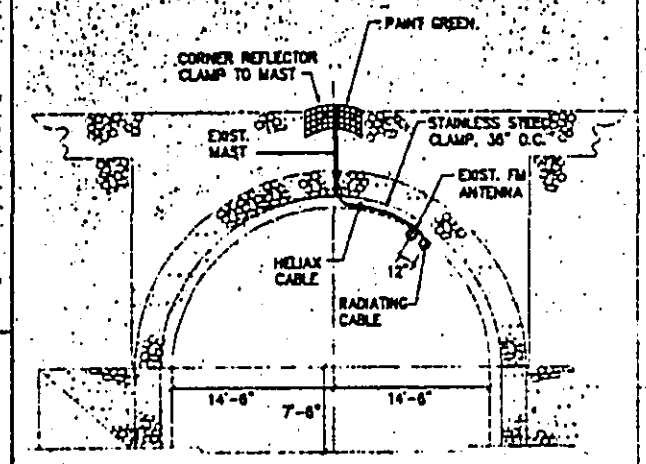
PLAN

BENNETT ENGINEERS INC.
HOWARD K. KAWAHIRA
LICENSED PROFESSIONAL ENGINEER
HAWAII, U.S.A.

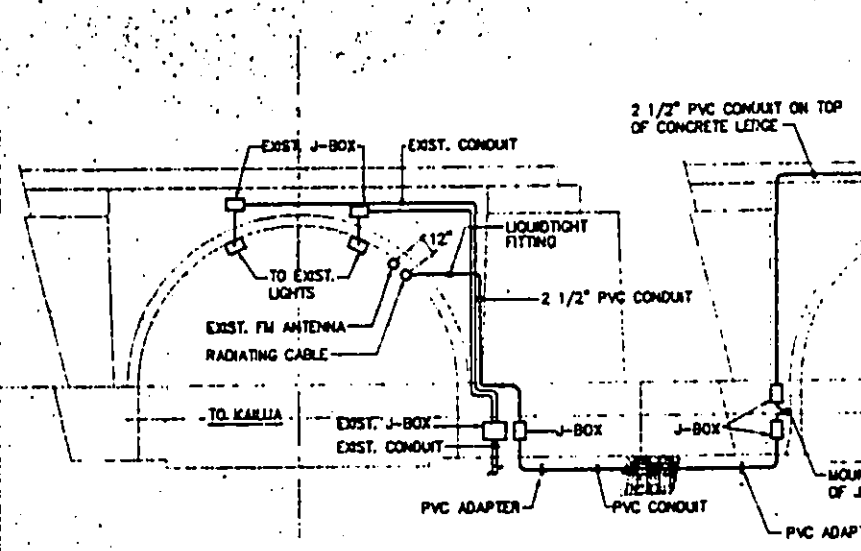
ERICSSON

PALI TUNNEL, OAHU, HAWAII
800MHz COMMUNICATION SYSTEM UPGRADE
CITY AND COUNTY OF HONOLULU, BLDG. DEPT.
CONTRACT #29104
TUNNEL 1 ELECTRICAL PLAN

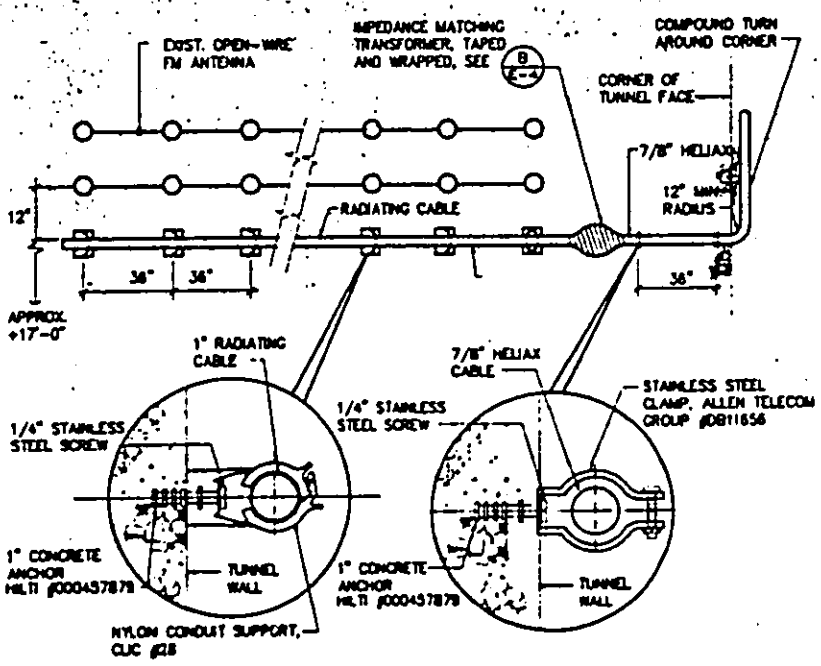
Figure 2



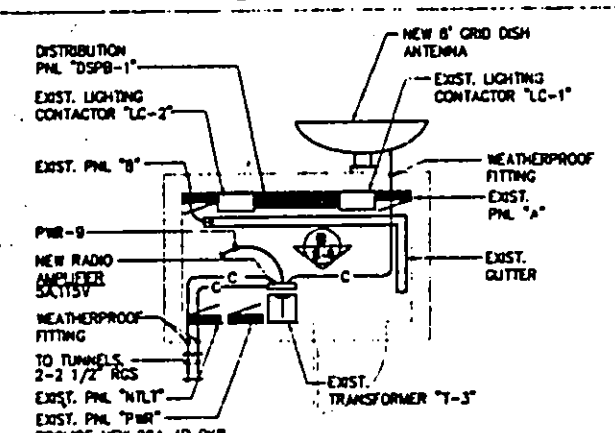
A E-3 **PORTAL 1 ELEVATION**
SCALE: 1/8" = 1'-0"



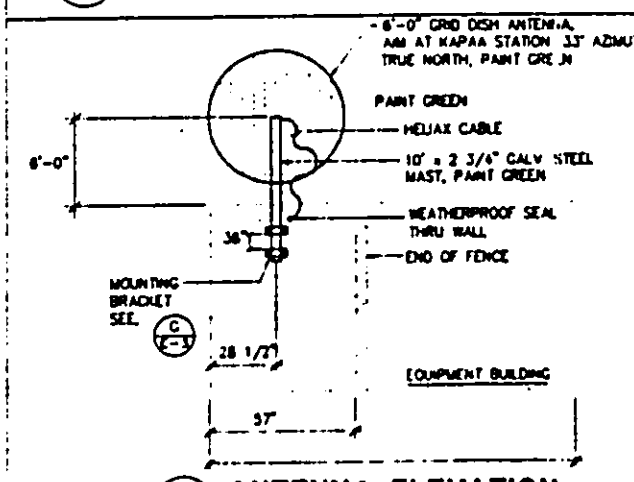
B E-3 **PORTAL 2 ELEVATION**
SCALE: 1/8"=1'-0"



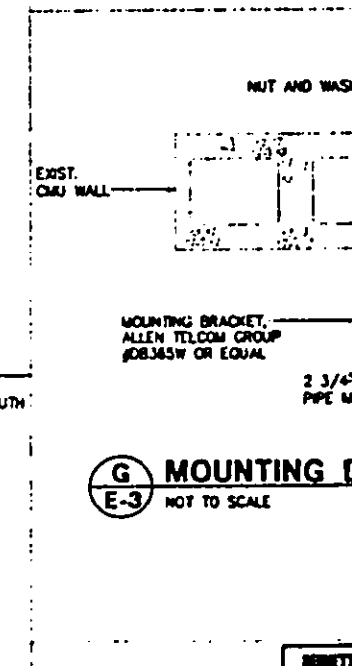
D E-3 **TYPICAL CABLE MOUNTING DETAIL**
NOT TO SCALE



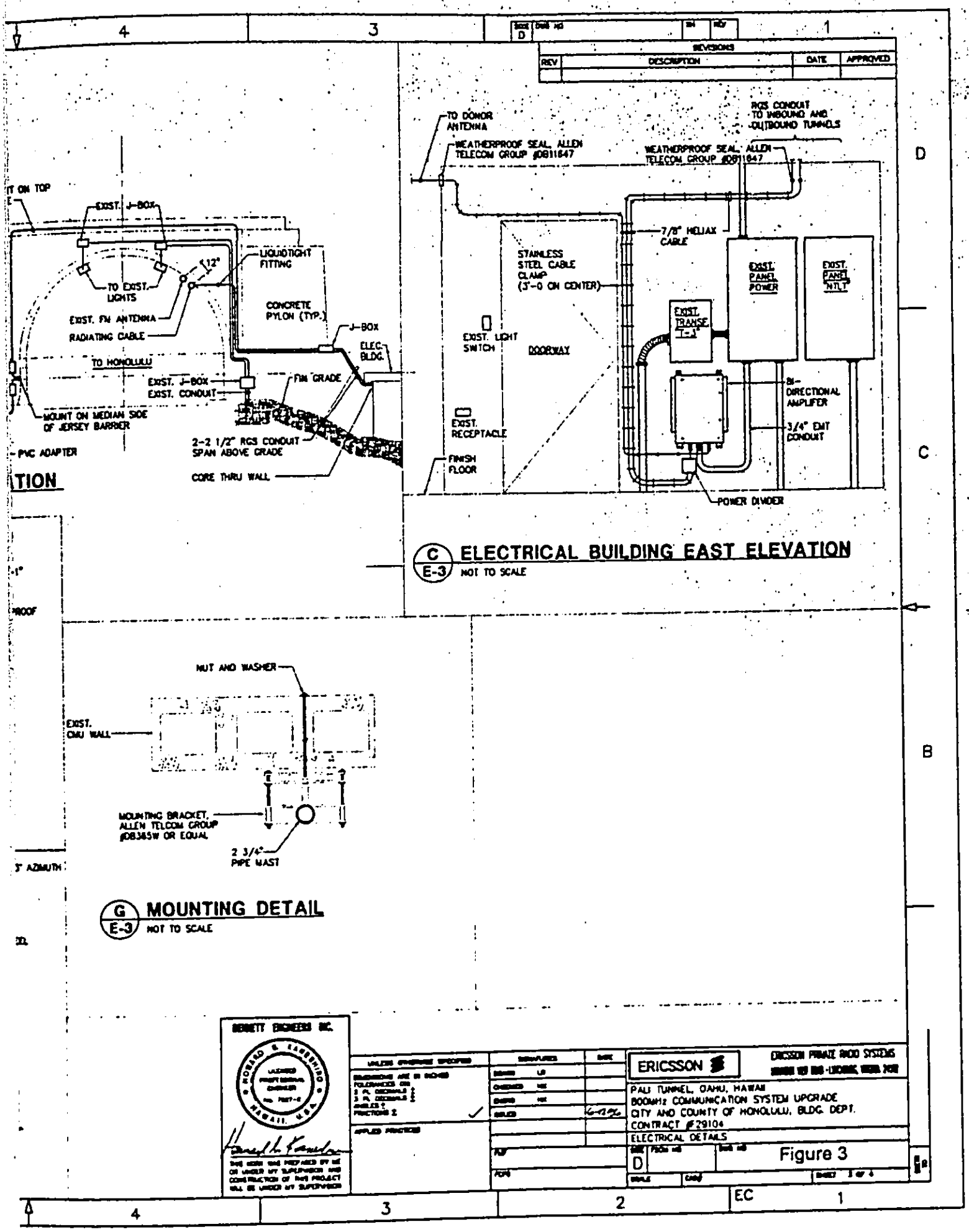
E E-3 **ELECTRICAL BUILDING PLAN**
SCALE : 1/4" =1'-0"



F E-3 **ANTENNA ELEVATION**
NOT TO SCALE



G E-3 **MOUNTING**
NOT TO SCALE


4
3
1
REVISIONS
REV
DESCRIPTION
DATE
APPROVED
TO DONOR ANTENNA
WEATHERPROOF SEAL, ALLEN TELECOM GROUP #0811647
RGS CONDUIT TO INBOUND AND OUTBOUND TUNNELS
7/8" HELIAX CABLE
STAINLESS STEEL CABLE CLAMP (3'-0 ON CENTER)
EXIST. PANEL POWER
EXIST. PANEL NTT
EXIST. TRANSF. T-1
EXIST. LIGHT SWITCH
DOORWAY
EXIST. RECEPTACLE
FINISH FLOOR
BI-DIRECTIONAL AMPLIFER
3/4" EMT CONDUIT
POWER DIVIDER
T ON TOP
EXIST. J-BOX
LIQUIDTIGHT FITTING
12"
TO EXIST. LIGHTS
EXIST. FM ANTENNA
RADIATING CABLE
CONCRETE PYLON (TYP.)
J-BOX
ELEC. BLDG.
TO HONOLULU
EXIST. J-BOX
EXIST. CONDUIT
FIN GRADE
MOUNT ON MEDIAN SIDE OF JERSEY BARRIER
PVC ADAPTER
2-2 1/2" RGS CONDUIT SPAN ABOVE GRADE
CORE THRU WALL
TION
ROOF
3° AZIMUTH
C
E-3
ELECTRICAL BUILDING EAST ELEVATION
NOT TO SCALE
NUT AND WASHER
EXIST. CMU WALL
MOUNTING BRACKET, ALLEN TELCOM GROUP #DB345W OR EQUAL
2 3/4" PIPE MAST
G
E-3
MOUNTING DETAIL
NOT TO SCALE
D
C
B
BENNETT ENGINEERS INC.
HONOLULU, HAWAII, U.S.A.
ERICSSON
ERICSSON PRIVATE RADIO SYSTEMS
PALI TUNNEL, OAHU, HAWAII
800MHz COMMUNICATION SYSTEM UPGRADE
CITY AND COUNTY OF HONOLULU, BLDG. DEPT.
CONTRACT #29104
ELECTRICAL DETAILS
D
Figure 3
EC
4
3
2
1

8 7 6 5 4

D C B A

MATCH LINE "A" 24+80

CORNER REFLECTOR ABOVE PORTAL SEE C/E-5

HONOLULU BOUND

A/E-4

EXIST. PARKING

EXIST. PORTAL BUILDING

EXIST. PHL "2HAD", PROVIDE NEW 20A-1P BKR FOR SPACE 20

2HAD-20

EXIST. 2"C. EXIST. 12#8, 1#10 GRD. PULL NEW 2#8

EXIST. CONDUIT IN AIR DUCT ABOVE TUNNEL

KANEOHE BOUND

24+80.05

NORTH

KALIHI PORTAL ELECTRICAL PLAN

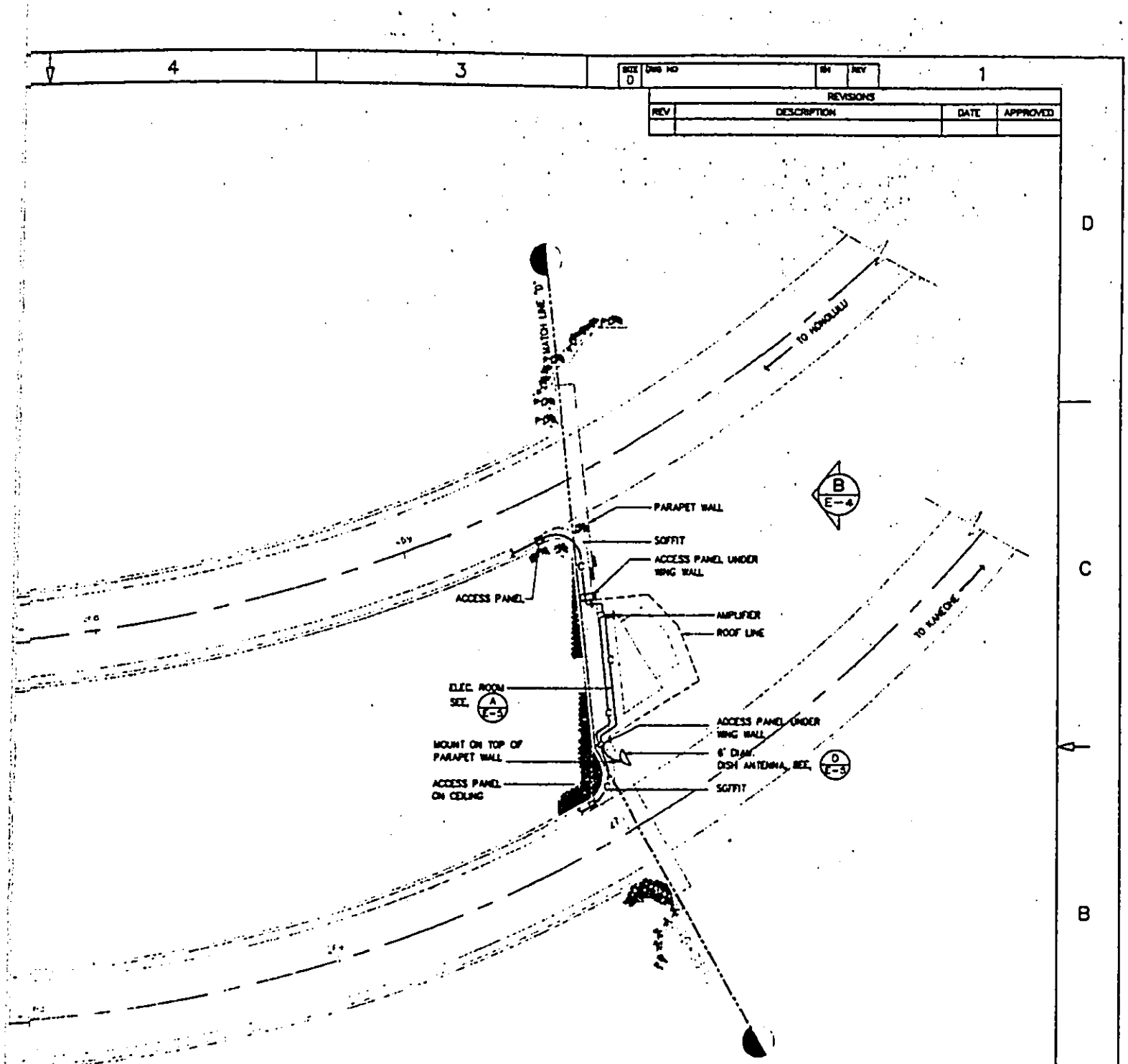
SCALE : 1" = 20'-0"

KANEOHE

SCALE : 1" = 20'

BENNETT

8 7 6 5 4



KANEOHE PORTAL ELECTRICAL PLAN

SCALE : 1" = 20'-0"

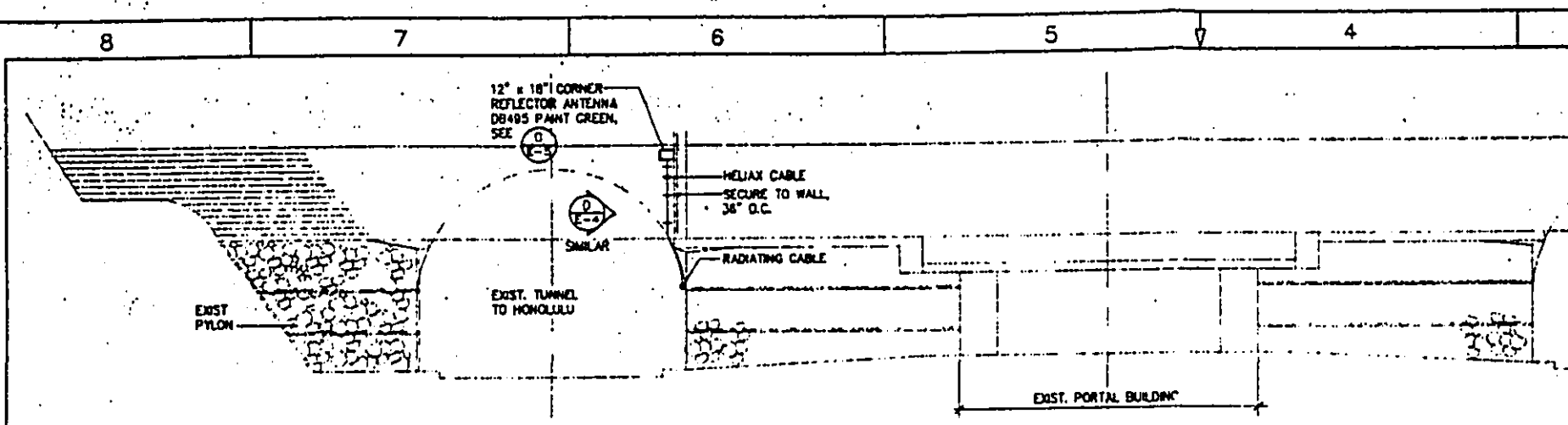
BENNETT ENGINEERS INC.

ERICSSON

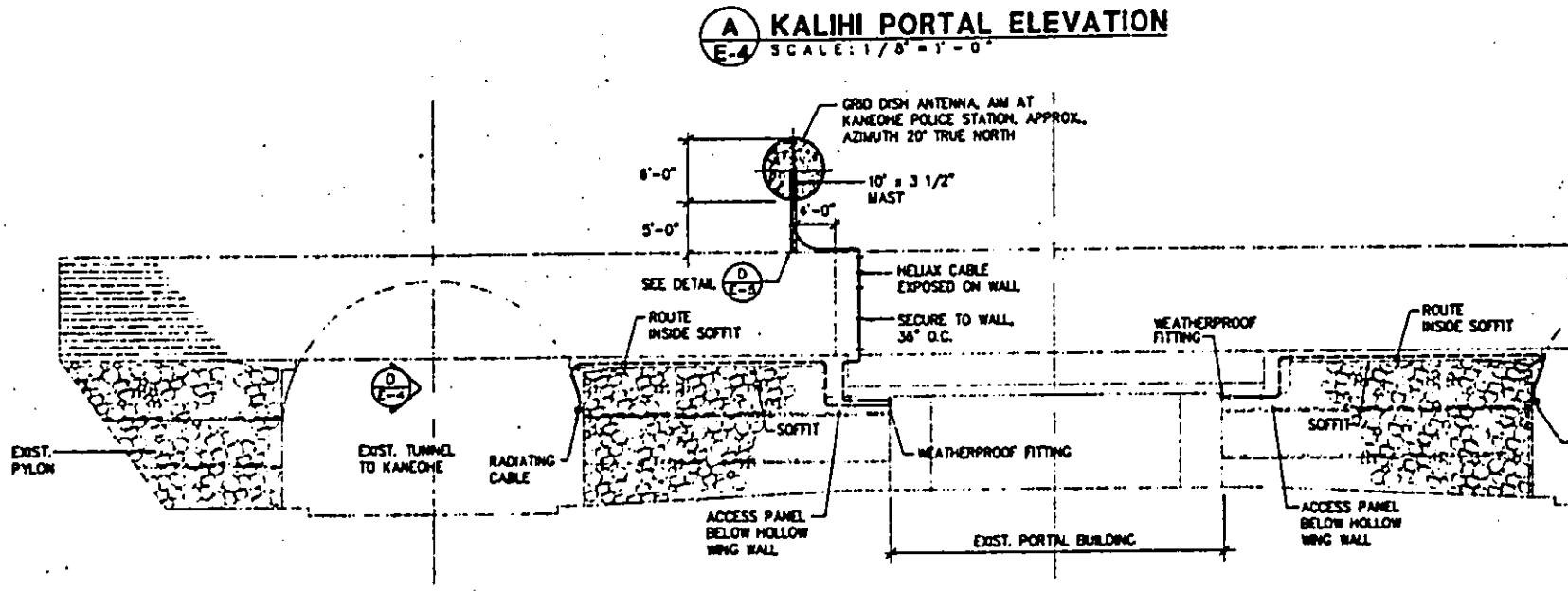
ERICSSON PRIVATE RADIO SYSTEMS

WILSON TUNNEL, OAHU, HAWAII
800MHz COMMUNICATION SYSTEM UPGRADE
CITY AND COUNTY OF HONOLULU, BLDG DEPT.
CONTRACT # 29104
PORTAL ELECTRICAL PLANS

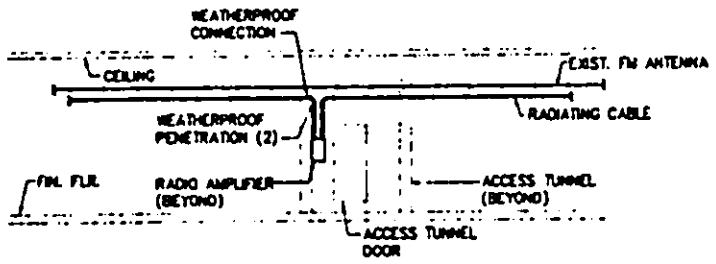
Figure 4



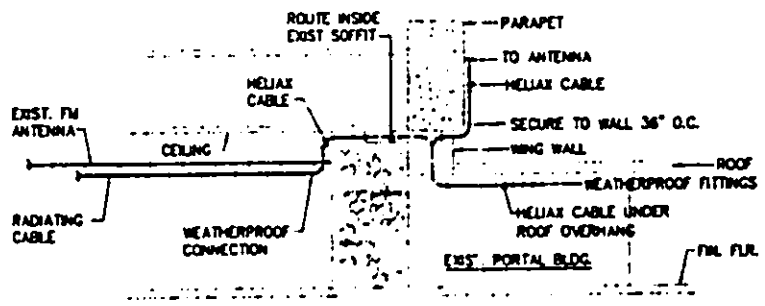
A E-4 **KALIHI PORTAL ELEVATION**
SCALE: 1/8" = 1'-0"



B E-4 **KANEOHE PORTAL ELEVATION**
SCALE: 1/8" = 1'-0"

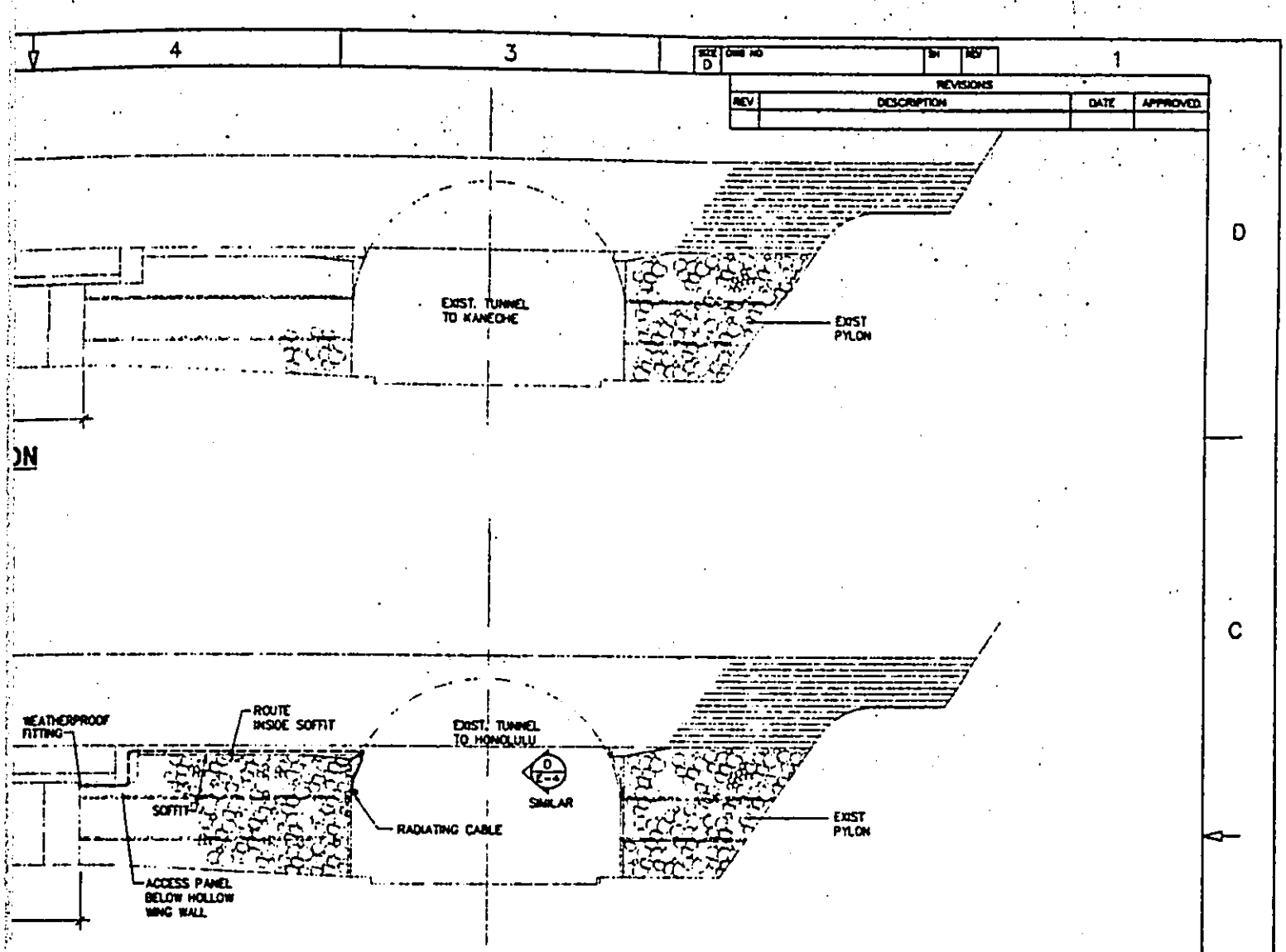


C E-4 **TUNNEL ELEVATION**
SCALE 1/8" = 1'-0"



D E-4 **TUNNEL ENTRANCE ELEVATION**
SCALE: 1/8" = 1'-0"

THIRD ANGLE PROJECTION



ON

TION

VATION

- PARAPET
- TO ANTENNA
- HELIAX CABLE
- SECURE TO WALL 36" O.C.
- WING WALL
- ROOF
- WEATHERPROOF FITTINGS
- HELIAX CABLE UNDER ROOF OVERHANG
- PORTAL BLDG.
- FIN. FLR.

BENNETT ENGINEERS INC.

HOWARD S. KANESHIRO
LICENSED PROFESSIONAL ENGINEER
No. 7977-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY SUPERVISION

ERICSSON

ERICSSON PRIVATE RADIO SYSTEMS

WILSON TUNNEL, OAHU, HAWAII
800MHz COMMUNICATION SYSTEM UPGRADE
CITY AND COUNTY OF HONOLULU, BLDG. DEPT.
CONTRACT #29104

TITLE SHEET, ELECTRICAL LEGEND AND NOTES

SIZE D

Figure 5

SHEET 4 OF 6

4 3 2 EC 1

PALI TUNNEL

Tax Map Key: State Highway Right-of-Way

Area of Site: Not Determined
Area of Use: Unknown

Land Owner: State of Hawaii

Existing Use: Highway Right-of-Way,
Trans-Koolau Tunnel

State Land Use District: Conservation
Subzone: Protective (Honolulu Portal)
Resource (Kailua Portal)

Development Plan Area: Primary Urban Center and Koolaupoko
Land Use Map: Preservation
Public Facilities Map: No Symbol

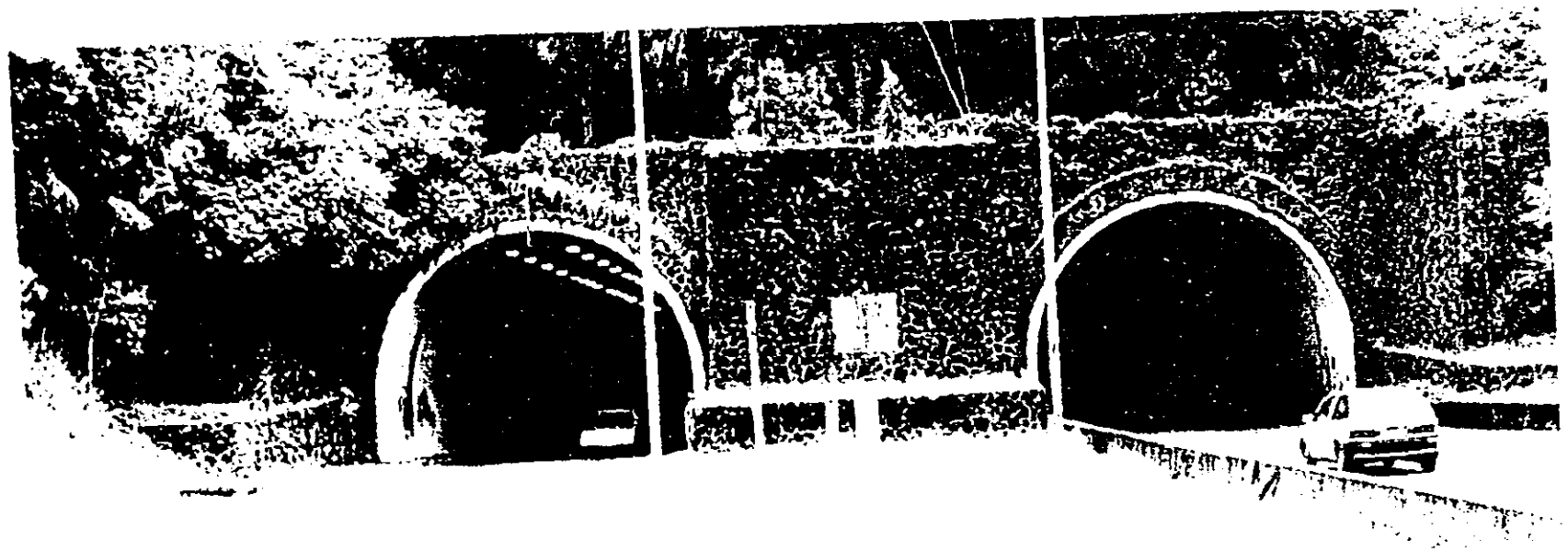
Zoning: P-1

The Pali Highway Tunnels consist of two tunnels through the Koolau Mountains: a Kailua outbound tunnel and a Honolulu inbound tunnel. A gap in the mountain divides both tunnels into two sections thus there are four separate tunnels. The Kailua outbound section consists of Tunnel No. 1 on the Honolulu side and Tunnel No. 2 on the Kailua side; the Honolulu inbound section consists of Tunnel No. 1 on the Honolulu side and Tunnel No. 2 on the Kailua side.

The physical environment consists of two of the trans-Koolau tunnels, the Pali Highway and improvements, and two electrical buildings. One building is located between the tunnels on the Honolulu side and the second building is on the Kailua side of Honolulu Inbound Tunnel No. 1. The environment has been extensively modified by man and there is little of the natural environment that would be affected by the proposed improvements (See Photographs 1 and 2). A 70-foot tall guyed tower is sited between the Honolulu side portals. The State of Hawaii, Honolulu Cellular, and GTE Mobilnet cohabit the tower.

Upper Nuuanu Valley and the upper Windward slopes of the Koolau Mountains receive in excess of 150 inches of rainfall annually. These lands comprise part of the Honolulu Watershed Forest Reservation, a restricted watershed where entry is restricted except by permit.

Flood Insurance Rate Maps classify upper Nuuanu Valley Zone D which is defined as "areas where flood hazards are undetermined" (Federal Emergency Management Agency, 1990).



Photograph 1. View of Honolulu Portals, Pali Tunnel.

Photograph 2. View of Electrical Building From Old Pali Road.
Honolulu Inbound Tunnel No. 1, Pali Tunnel.

Although surrounded by a mid-level rainforest, the project site is relatively devoid of flora because of man-made improvements.

Historic site maps at the State Historic Sites Division depict no archaeological sites immediately on either side of the tunnels nor are the tunnels considered historic structures. A recorded feature---The Pali Complex (Site No. 50-80-14-1174)---is located between the "U" formed by the hairpin curve on the Kailua side of the tunnels. This site is valuable for its agricultural significance and the possibility of a heiau being located within the complex.

The Pali Tunnel is part of the Nuuanu Pali, a 3+acre State wayside. The most prominient feature of the wayside is the Pali Lookout which is situated directly over the Honolulu and Kailua Tunnels No. 1. The Pali Lookout is one of the premier visitor attractions on Oahu. From the windy lookout, visitors are treated to spectacular panoramic views of the Koolau Mountain cliffs and the windward Oahu landform and coastline.

Although not listed as a historic site, the pali played a significant milestone in the history of the Hawaiian Islands. It was here in 1795 that the invading army of Kamehameha I defeated the forces of Kalanikupule, King of Oahu. In the battle of Nuuanu, Kamehameha's army pushed the warriors of Oahu to the end of the valley which "terminated in a precipice of 600 feet, nearly perpendicular height . . ." (Sterling and Summers, p 319). Accounts of the battle differ but the invaders either pushed the defenders over the pali or the defenders, rather than surrendering, leaped to their death. The battle of Nuuanu established the Kamehameha dynasty and led to the unification of the islands under one chief.

The project site is located in the State land use Conservation District. The Honolulu portals are in the Protective subzone of the Conservation District and the Kailua portals in the Resource subzone. A Conservation District Use Application is not required to construct or install the proposed improvements. Work within the State highway right-of-way is under the jurisdiction of the State Department of Transportation.

The Pali Highway is one of two existing trans-Koolau highways linking Windward Oahu with Honolulu and other parts of the island. On the approaches to the tunnels, the Pali Highway is a one way, two-lane separated highway in Honolulu and Kailua directions. The posted speed limit is 35 miles per hour through the tunnels.

Recent 24-hour traffic counts taken on the Honolulu side of the tunnels are shown below.

Date	Honolulu Bound	Kailua Bound	Total
1/18-19/95	30,196	28,485	58,861
2/16/95	29,013	28,562	57,575
7/27/95	29,778	29,630	59,408

Every year, the tunnel is closed for cleaning. Utility installation or repair also necessitates closing. Cleaning may take two weeks to complete and the work is performed during non-peak commuting hours. Typically either the Kailua Outbound or Honolulu Inbound tunnel is closed and traffic rerouted to the other lanes and tunnel. The closing date is publicized well in advance by the local newspapers and on radio and television. Traffic cones and barriers are positioned to divert traffic onto the other lanes and off-duty police officers posted for traffic control.

JOHN H. WILSON TUNNEL

Tax Map Key:	State Highway Right-of-Way
Area of Site:	Not Determined
Area of Use:	Unknown
Land Owner:	State of Hawaii
Existing Use:	Highway Right-of-Way, Trans-Koolau Tunnel
State Land Use District:	Conservation
Subzone:	Protective (Kalihi Portal) Resource (Kaneohe Portal)
Development Plan Area:	Primary Urban Center and Koolaupoko
Land Use Map:	Preservation
Public Facilities Map:	No Symbol
Zoning:	P-1

The John H. Wilson Tunnel consists of two tunnels through the Koolau Mountains: a Kaneohe outbound tunnel and a Kalihi inbound tunnel. Both tunnels are approximately 2,775 feet in length.

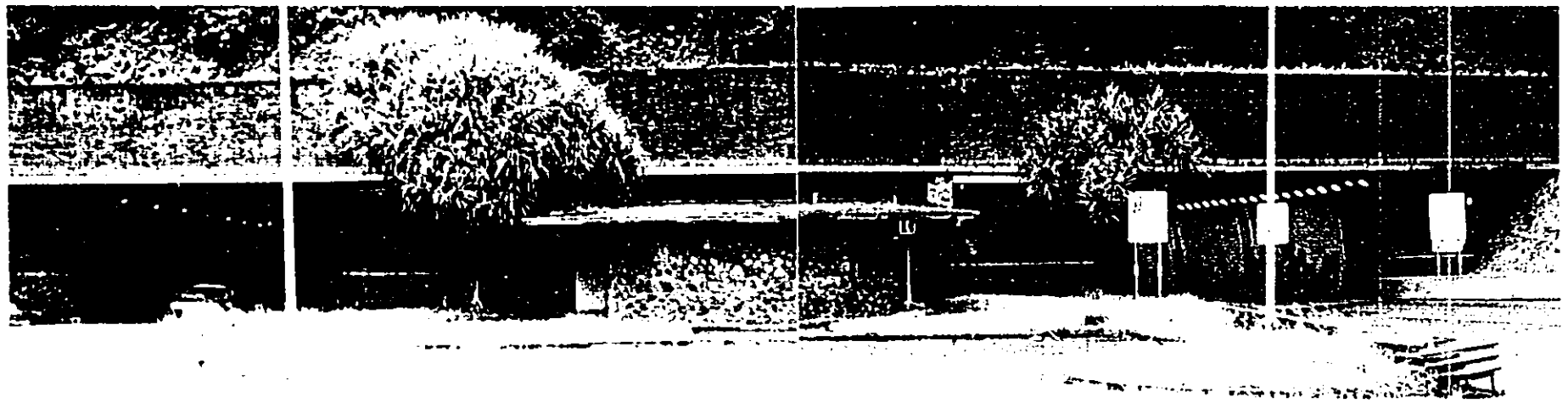
The physical environment consists of the two trans-Koolau tunnels, the Likelike Highway and improvements, and two electrical buildings. The buildings are located between the portals on both the Kaneohe and Kalihi sides of the tunnel (See Photographs 3 and 4). This environment has been extensively modified by man and there is little of the natural environment to be affected by the proposed improvements . Two grid type reflecting antennas are located above the portals on the Kaneohe side of the tunnel. One antenna is owned by Honolulu Cellular and the other GTE Mobilnet.

Upper Kalihi Valley and the upper windward slopes of the Koolau Mountain receive in excess of 150 inches of rainfall annually. These lands comprise part of the Honolulu Watershed Forest Reservation, a restricted watershed where entry is restricted except by permit.

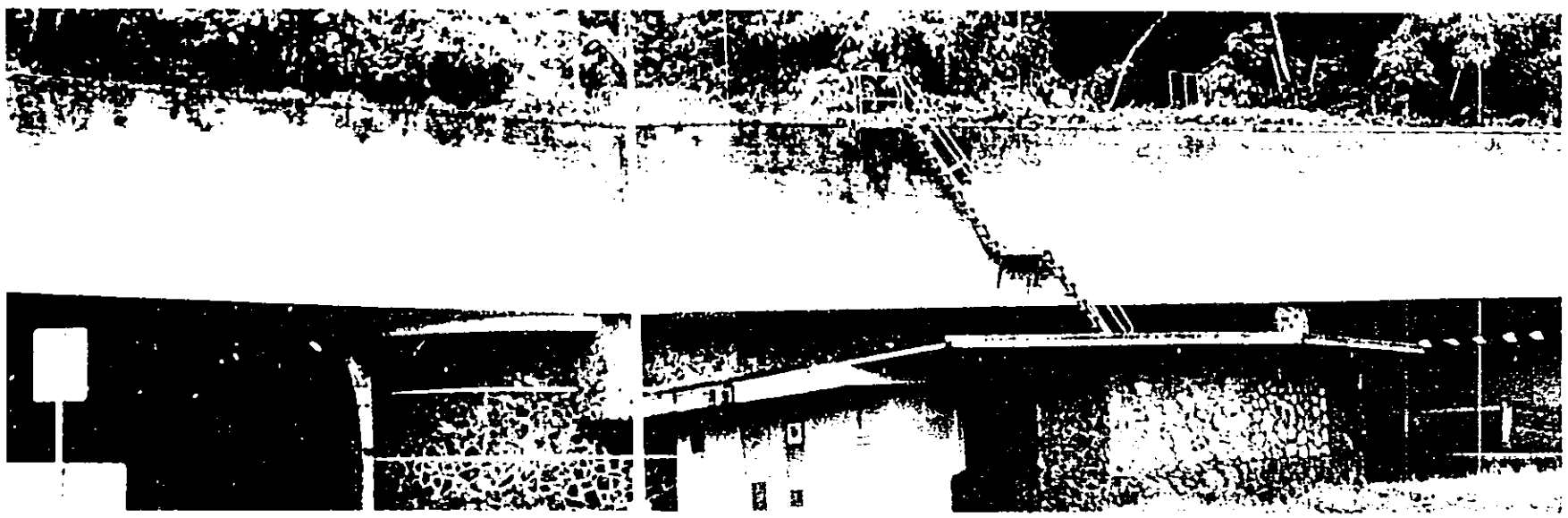
Flood Insurance Rate Maps classify upper Kalihi Valley Zone D which is defined as "areas where flood hazards are undetermined" (Federal Emergency Management Agency, 1990).

According to historic site maps at the State Historic Sites Division there are neither archaeological sites or cultural resources on either side of the tunnel nor is the tunnel considered a historic structure.

Flora is rather sparse fronting the Kalihi side of the tunnel. The ground surrounding the equipment building is planted with grass with several hau adjacent to the portals. On the Kaneohe side, vegetation consists primarily of shrubs and mid-level trees growing behind the parapet. Shrubs include ti, lau'ae fern, and papyrus. Kukui and guava are the dominant tree type.



Photograph 3. View of Kalihi Portals and Electrical Building, Wilson Tunnel.



Photograph 4. View of Kaneohe Portals and Electrical Building, Wilson Tunnel.

The project site is located in the State land use Conservation District. The Kalihi portals are in the Protective subzone of the Conservation District and the Kaneohe portals in the Resource subzone. A Conservation District Use Application is not required to construct or install the proposed improvements. Work within the State highway right-of-way is under the jurisdiction of the State Department of Transportation.

Likelike Highway is one of two existing trans-Koolau highways linking Windward Oahu with Honolulu and other parts of the island. On the approaches to the tunnels, the Likelike Highway is a one way, two-lane separated highway in Kalihi and Kaneohe directions. The posted speed limit is 35 miles per hour through the tunnels.

Recent 24-hour traffic counts taken on the Honolulu side of the tunnels are shown below.

Date	Honolulu Bound	Kaneohe Bound	Total
2/16/95	28,567	27,389	55,956
3/16-17/95	29,006	27,688	56,694
7/27/95	28,659	27,799	56,548

Like the Pali Tunnel, the Likelike Tunnel is closed for cleaning every year. Utility installation or repair also necessitates closing. Cleaning may take two weeks to complete and the work is performed during non-peak commuting hours. Typically either the Kaneohe Outbound or Kalihi Inbound tunnel is closed and traffic rerouted to the other lanes and tunnel. The closing date is publicized well in advance by the local newspapers and on radio and television. When closed, traffic cones are used to direct traffic onto the other lanes and police officers posted for traffic control.

SECTION 3 SUMMARY OF ENVIRONMENTAL IMPACTS AND MEASURES TO MITIGATE ADVERSE EFFECTS

A. Assessment Process

The scope of the project was discussed with telecommunications specialists with the Building Department, Schema Systems Inc., the City's communication consultants, and engineers with Ericsson Private Radio Systems, the radio contractor. State and County agencies were contacted for information relative to their areas of expertise. Time was spent in the field recording site conditions and conditions in the vicinity of each radio site. The discussions and field investigations allowed us to identify features which could affect or be affected by the proposed project. While acknowledging that both sites exhibit different physical and environmental characteristics, there are some characteristics common to both. These similar conditions and characteristics are:

- *o* Each site has been modified by man's activities and highway structures.
- *o* There are no rare, threatened, or endangered flora on either site;
- *o* There are no archaeological features on either site;
- *o* Both tunnels are not located near fresh water bodies such as streams, natural water reservoirs, or wetlands;
- *o* Both tunnels are located within the Honolulu Protected Watershed Forest Reservation; and
- *o* Both sites are not located within a flood hazard area.

B. Land Alteration

Minimal land alteration is necessary to accommodate the planned facilities. Cabling will be secured to the walls of the tunnels and antennas mounted above the portals or on the side of electrical buildings. Approximately 25 feet of excavation is required to install a conduit from the Kailua outbound tunnel No. 1 to the electrical building on the Kailua side of the Honolulu inbound tunnel No. 1. The excavated area will be restored to pre-construction conditions after the conduit is installed. This activity should not adversely affect the environment. No land altering activities are proposed at the Wilson Tunnel.

C. Air Quality and Noise

Concrete dust will be raised by drilling holes for the clamps and construction machinery will elevate noise levels. Dust and noise levels will affect primarily construction workers because traffic will be routed away from the work site. Workers will wear respirators and hearing protectors. All construction activities will comply with state Department of Health Air Quality Regulations and conditions attached to all approved construction plans.

D. Flora

There are no rare, threatened, or endangered flora in the vicinity of the proposed improvements. Installation of the antennas and cabling at both tunnels should not adversely affect the flora. One of the hau trees at the Wilson Tunnel may have to be trimmed or removed otherwise it could interfere with radio signals.

E. Public Services and Facilities

Electrical power is currently available to energize communications equipment at both locations. Water, wastewater disposal, or other public utilities are not required.

The project will have direct beneficial impacts on public services provided by the County. The Police and Fire departments and local government agencies will benefit as shortcomings in the existing system are eliminated. Other agencies can hook into the system at a later time.

F. Economic

Construction of the proposed radio microwave system will generate short-term employment opportunities for the Contractor, subcontractors, and material suppliers. Following completion, the sites will be unmanned but routinely maintained by technicians from the Telecommunications Systems Section of the Honolulu Police Department radio shop.

G. Scenic Views

The Development Plan Special Provisions identifies the Pali in its designation of significant public views in the Koolaupoko Development Plan Area. The public views are:

> Panoramic views of the Pali and views of Puu O Ehu Ridge and Olomana from Kaelepulu Pond area; and
>
> Pali Views from Pali Highway.

The Primary Urban Center Special Provisions do not specifically name the Pali as a significant public view but identifies public views of Oahu's two mountain ranges as significant:

> Panoramic, mauka and makai, and continuous views of the Koolau and Waianae mountain ranges, ridges, valleys, and coastline and the sea.

The antennas will neither interfere with public views of the Koolau Mountains on any approach to the Pali and Wilson Tunnels nor obstruct panoramic views of Kailua and Kaneohe from the tunnels or the highway, respectively. Initially, the antennas will be new objects to be seen by occupants of cars approaching the tunnels and should not be seen by occupants of cars exiting the respective tunnels. The visibility of the antennas will be minimized by painting them a shade of green that blends with the natural setting or a hue to blend with the parapet walls. In addition, the antennas to be installed on the Honolulu (or Kalihi) sides of both tunnels are grid type antennas. The gridwork allows the background to be seen through the grid thus helping to camouflage the antenna from view. Over time, the antennas will become another addition to the improved landscape and should not become a distraction to motorists.

H. Radio Frequency Radiation

The City and County of Honolulu is proposing to install bi-directional amplifier (BDA) systems in the Wilson and Pali Tunnels. The BDA is often called a "signal extender" or "signal booster". BDAs are very low power devices designed to extend radio coverage of a primary radio system, such as the City's trunked 800 MHZ system, into specific areas that have deficient radio coverage. These areas include, but are not limited to, inside buildings, hospitals, basements, sub-level parking, subways, tunnels, and small geographical areas that are shielded by local terrain.

The type of BDAs proposed for the tunnels are broad band, bi-directional devices meaning that they can relay or extend several individual 800 MHZ radio channels in two different direction at the same time. The first direction is where signals are picked up from a primary donor site in the main radio system, amplified, and passed through the extender system into the tunnel. The second direction is reversed where signals from mobile or portable radios operating inside the tunnel are picked up, amplified, and passed through the extender system back to the donor site.

Microwave and two-way radios, cellular telephones, AM and FM radios, and television all radiate radio waves in the form of electromagnetic energy to transmit information from one location to another. This radio frequency (RF) radiation is called *non-ionizing electromagnetic radiation* (NIER).

The term non-ionizing is used because the energy levels are so low that they produce negligible molecular changes in matter which they travel through. The greatest effect of high energy NIER is related to localized heating of body tissue. This occurs at high energy levels, such as those in a microwave oven.

Conversely, nuclear radiation is *ionizing radiation*. Nuclear radiation differs from RF radiation in that it has the capability to dislodge the atomic structure in the matter it travels through. As such, it can damage living tissue. The underlying physics between non-ionizing and ionizing radiation is completely different.

With RF radiation, the intensity of received non-ionizing radiation depends on the output level of the source and distance of the subject from the source. Given the effective radiated power from the antenna and distance from the antenna to the subject, the received field intensity that pass through a unit are of one square centimeter can be calculated fairly accurately.

It should be noted that radiated RF energy from a given source decreases rapidly as distance is increased. In fact, the level decreased according to the inverse square law-i.e. it is inversely proportional to the square of the distance. Simply stated, as the distance doubles, the level decreases by a factor of four.

Radio Frequency (RF) Radiation Exposure Guidelines

The calculations used herein are based on protection guidelines adopted in 1992 by the American National Standards Institute (ANSI). The 1992 standards replaced an earlier version adopted in 1982. ANSI is a non-profit organization that develops recommended standards for a variety of applications. Compliance with the ANSI standards is voluntary but they are widely used by the telecommunications industry.

The 1992 ANSI/IEEE guidelines specify two sets of exposure limits based on the "environment" in which the exposure takes place. These environments are classified as either "controlled" or "uncontrolled." There is essentially no change from the 1982 ANSI guidelines for the controlled environment, which are based on a six minute exposure. However, the guidelines for general public or uncontrolled environment are more stringent but cover a 30 minute exposure.

Controlled environments are defined as locations where "there is exposure that may be incurred by persons who have knowledge of the potential for exposure". Persons in this category are generally described as workers or technicians.

Uncontrolled environments are defined as "locations where there is the exposure of individuals who have no knowledge or control of their exposure". The general public falls into this category. The exposures may occur in living quarters or workplaces where there are no expectations that the exposure levels may exceed the exposure levels permitted for uncontrolled environments.
The 1992 ANSI maximum permissible exposure (MPE) standards for controlled and uncontrolled environments are shown in the following tables.

Controlled Environments

Frequency Range (MHz)	Power Density (mW/cm^2)
100-300	1.0
300-3000	f/300 (frequency/300)
3000-15,000	10
15,000-30,000	10

Uncontrolled Environments

Frequency Range (MHz)	Power Density (mW/cm^2)
100-300	0.2
300-3000	f/1500 (frequency/1500)
3000-15,000	f/1500 (frequency/1500)
15,000-30,000	10

Using the standards and conversion formulas shown in the above tables, the maximum permissible exposures in milliwatts-per-square-centimeter (mW/cm^2) for controlled and uncontrolled environments at the proposed City signal booster frequencies are as follows:

Frequency	Controlled (mW/cm^2)	Uncontrolled (mW/cm^2)
850 MHZ	2.8	0.57

AM, FM, and TV stations broadcast on various radio frequencies, ranging from .5 to 1.6 MHZ for AM, 88 to 106 MHZ for FM, and 56 to 800 MHZ for VHF and UHF television stations. The City's 800 MHZ frequencies are in the same portion of the radio spectrum as some of the higher channeled UHF television stations. Radiated power from these broadcast and television stations can range from a few hundred watts upwards to several million watts and many of the stations operate continuously on a 24-hour per day basis.

The radiated power levels from terrestrial two-way radio transmitters are relatively low. Typical two-way radio transmitters operate with a power output from 10 to 350 watts. Depending on transmitter power and the antenna gain, the effective radiated power (ERP) of two-way radios can range from a hundred to over a thousand watts. However, the exposure levels resulting from these stations are usually below the ANSI guidelines.

It should be noted that bi-directional amplifiers or signal boosters, such as those proposed for the Wilson and Pali tunnels, operate with very low transmit power. The power output is generally one watt or less.

Analysis of the Signal Booster Systems-Wilson and Pali Tunnels

6-Foot Grid Dish Antenna

The calculated ERP for the 6-foot grid dish antenna is 9.9 watts (39.9 dB). At this power level, the calculated distance for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

Environment	ANSI Permissible Exposure	Safe Distance
Controlled	2.8 mW/cm²	1.10 feet
Uncontrolled	.57 mW/cm²	2.50 feet

The calculated field densities in mW/cm² for the 9.9 watts ERP at other distances from the 6-foot dish antenna are shown below.

ERP in Watts	Distance from Antenna (FT)	Density in mW/cm²
9.9	5	0.1425
9.9	10	0.0356
9.9	25	0.0057

Pali Corner Reflector

The calculated ERP for the 9.0 dB gain corner reflector is 7.95 milliwatts (.00795 watts). Using this power level, the calculated distance for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

Environment	ANSI Permissible Exposure	Safe Distance
Controlled	2.8 mW/cm²	.032 feet
Uncontrolled	.57 mW/cm²	.071 feet

The calculated field densities in mW/cm² for the 7.95 milliwatts ERP at other distances from the 9.0 dB corner reflector are shown below.

ERP in Watts	Distance from Antenna (FT)	Density in mW/cm²
.00795	5	0.000114
.00795	10	0.000027
.00795	25	0.0000043

Signal Distribution System

The signal distribution system utilizes radiating or "leaky heliax" cable throughout the tunnel. The radiated power along the cable varies from a high of approximately 14 milliwatts (11.5 dB) at feed point near the BDA to roughly 0.795 milliwatts (-1dB) at the terminating end. At any location along the radiating cable, there is a loss factor of -70 dB at a 20-foot distance away.
To demonstrate the exposure level anywhere along the cable is significantly less than the ANSI standard, calculations were completed for the highest power level of 14 milliwatts. The calculations at this power level for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

Environment	ANSI Permissible Exposure	Safe Distance
Controlled	2.8 mW/cm²	0.042 feet
Uncontrolled	.57 mW/cm²	0.0943 feet

The calculated field densities in mW/cm² for the 14 milliwatts for other distances from the radiating cable are shown below.

Radiated Power in Watts	Distance from Cable (FT)	Density in mW/cm²
.014	5	0.0002
.014	10	0.00005
.014	25	0.000008

Wilson Tunnel 800 MHZ Booster System

6-Foot Grid Dish Antenna

The calculated ERP for the 6-foot grid dish antenna is 7.5 watts (38.8 dB). The calculated distance for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

Environment	ANSI Permissible Exposure	Safe Distance
Controlled	2.8 mW/cm²	0.975 feet
Uncontrolled	.57 mW/cm²	2.183 feet

The calculated field densities in mW/cm² for the 7.5 watts ERP at other distances from the 6-foot dish antenna are shown below.

ERP in Watts	Distance from Antenna (FT)	Density in mW/cm²
7.5	5	0.1080
7.5	10	0.0270
7.5	25	0.0043

Wilson Corner Reflector

The calculated ERP for the 9.0 dB gain corner reflector is 12.0 milliwatts (.012 watts). The calculated distance for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

Environment	ANSI Permissible Exposure	Safe Distance
Controlled	2.8 mW/cm²	.039 feet
Uncontrolled	.57 mW/cm²	.088 feet

The calculated field densities in mW/cm² for the 12.0 milliwatts ERP at other distances from the 9.0 dB corner reflector are shown below.

ERP in Watts	Distance from Antenna (FT)	Density in mW/cm²
.012	5	0.000175
.012	10	0.000043
.012	25	0.000007

Signal Distribution System

The signal distribution system in the Wilson tunnel differs slightly from the Pali in that there are two bi-directional amplifiers, one for each section. However, both sections still utilize radiating or "leaky heliax" cable within the tunnels.

The radiated power from the cable along the 1900-foot tunnel section varies from a high of approximately 12 milliwatts (10.7 dB) to roughly 0.1 milliwatts (-9.9 dB) at the terminating end where it connects to a section of 7/8-inch transmission line that feeds the second BDA.

From the second BDA, the radiated power from the cable along the 900-foot section varies from a high of approximately 12 milliwatts (10.7 dB) at the feed end to about 1.58 milliwatts (1.9 dB) at the terminating end at the junction of the transmission line feeding the 9.0 dB gain antenna.

To demonstrate the exposure level anywhere along the cable is significantly less than the ANSI standard, calculations were completed for the highest power level of 12 milliwatts. The calculations at this power level for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

Environment	ANSI Permissible Exposure	Safe Distance
Controlled	2.8 mW/cm²	0.390 feet
Uncontrolled	.57 mW/cm²	0.0873 feet

The calculated field densities in mW/cm² for the 14 milliwatts for other distances from the radiating cable are shown below.

Radiated Power in Watts	Distance from Cable (FT)	Density in mW/cm²
.012	5	0.000720
.012	10	0.000043
.012	25	0.0000069

The City and County of Honolulu does and will continue to operate its radio systems according to all rules, regulations, frequencies, and transmitter power levels allowed by all Federal Communications Commission licenses issued to the City.

The greatest concern regarding the proposed operation of the City's tunnel booster systems is to the general public (uncontrolled environment). Given the heights above ground and the extremely low effective radiated power from the antennas and the radiating distribution cables, the calculations show that the electromagnetic radiation exposure levels from the two booster systems are profoundly below the current ANSI guidelines and the operation of these systems in the Wilson and Pali tunnels pose absolutely no health hazard to the general public.

Therefore, the impact of RF radiations exposure to the uncontrolled environment or general public is negative.

SECTION 4 ALTERNATIVES TO THE PROPOSED ACTION

A. No Action

The no action alternative poses an unacceptable risk to public safety because of unreliable and poor coverage in the tunnels and the area around the Honolulu portals. A no action alternative would preclude the occurrence of environmental impacts short and long-term, beneficial and adverse described in this assessment.

B. Alternative Methods of Tunnel Coverage

Two alternative methods of providing coverage in the tunnels were considered: Radios and Radiax Cable System and Radios and Distributed Antenna Radiating System. Both systems would require work in and at the tunnel entrances beyond that proposed and would require more maintenance.

SECTION 5 LIST OF PERMITS AND APPROVALS

Permit/Approval	Authority
City and County of Honolulu	
Environmental Assessment	Director and Building Superintendent
Building Permit (Various)	Building Department
Grading Permit	Department of Public Works
State of Hawaii	
Perform Work Upon State Highway	Department of Transportation

SECTION 6 AGENICIES AND ORGANIZATIONS CONSULTED DURING THE ENVIRONMENTAL ASSESSMENT REVIEW PROCESS

*Notice of the Draft Supplemental Environmental Assessment for the Honolulu Police Department 800 MHz Communication System Upgrade Pali and Wilson Tunnels was published in the Office of Environmental Quality Control Environmental Notice of November 23, 1996 and December 8, 1996. Copies of the Draft Environmental Assessment were mailed to the agencies and organizations listed below. Publication in the Environmental Notice initiated a 30-day public comment period which ended on December 23, 1996. An asterik * identifies agencies and organizations that submitted written comments. Comment letters and responses are found in Appendix B of the Final Supplemental Environmental Assessment.*

Federal

None

State of Hawaii

Department of Land and Natural Resources
- *Historic Sites Division
- *Division of Forestry and Wildlife
- *State Parks

*Department of Health
*Department of Transportation
*State Civil Defense

City and County of Honolulu

*Board of Water Supply
*Planning Department
*Department of Land Utilization
*Department of Public Works
*Department of Transportation Services
*Department of Wastewater Management
*Oahu Civil Defense Agency
*Police Department
*Fire Department

Organizations

Nuuanu Punchbowl Neighborhood Board 12
Kalihi-Palama Neighborhood Board 15
Kalihi Valley Neighborhood Board No. 16
Kaneohe Neighborhood Board No. 30
Kailua Neighborhood Board No. 31(Presentation to Board)*
GTE Mobilnet
Honolulu Cellular

SECTION 7 DETERMINATION OF SIGNIFICANCE

Chapter 200 (Environmental Impact Statement Rules) of Title 11, Administrative Rules of the State Department of Health, prescribes criteria for determining whether an action may have significant effects on the environment (11-200-12). The relationship of the proposed project to these criteria is discussed below.

1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

   No natural or cultural resources exist within the vicinity of both tunnels thus no effect on cultural or natural resources are anticipated.

2) Curtails the range of beneficial uses of the environment;

   The project will not curtail the range of beneficial uses of the environment. The immediate environment comprising the project areas have been improved since the late 1960s.

3) Conflicts 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;

   The proposed project does not conflict with the state's long-term environmental policies.

4) Substantially affects the economic or social welfare of the community or State;

   The project will not substantially affect the economic welfare of the community or State.

5) Substantially affects public health;

   Public health will not be affected in the short and long-term.

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

   Substantial secondary impacts are not anticipated. A RF radiation study concluded that no adverse impacts resulting from RF radiation from the antennas and radiating cable are anticipated.

7) Involves a substantial degradation of environmental quality;

   Both projects are proposed at locations that have been modified by man's activities.

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

   The project does not involve a commitment for larger actions.

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

No rare, threatened, or endangered flora or fauna or habitat were observed at either location.

10) Detrimentally affects air or water quality or ambient noise levels;

Air quality, water quality, and ambient noise levels will not be adversely affected by the project. Short-term construction impacts such as dust and noise will generally be confined to within the tunnels. Work is tentatively scheduled for nighttime hours in areas well removed from human occupation.

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

Although located within the State Conservation District, the proposed action will not affect protected natural resources on conservation lands.

12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies; or,

The two six-foot diameter grid dish antennas, which are the most visible components of the proposed action, will not interfere with important scenic viewplanes of the Koolau Mountains or views of the Windward coastline from the respective highways. In comparison to its surroundings, the antennas are very small objects to be viewed by Honolulu bound motorists on both highways. Painting the antennas to blend with the background vegetation will mitigate some visual concerns and the gridwork will also help camouflage the antenna from public view.

13) Requires substantial energy consumption.

Not determined.

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APPENDIX A

NON-IONIZING ELECTROMAGNETIC RADIATION ANALYSIS FOR THE CITY AND COUNTY OF HONOLULU 800MHZ SIGNAL BOOSTER SYSTEMS, WILSON AND PALI TUNNELS

NON-IONIZING ELECTROMAGNETIC RADIATION ANALYSIS

FOR THE CITY AND COUNTY OF HONOLULU

800 MHZ SIGNAL BOOSTER SYSTEMS

WILSON AND PALI TUNNELS

Prepared By

Schema System, Inc.
October 21, 1996

INTRODUCTION

This report provides calculations for the estimated radio signal levels emitted from the City and County of Honolulu's bi-directional amplifier (BDA) systems that are to be installed in the Wilson and Pali tunnels. The BDA is often called a "signal extender" or "signal booster". In this *document, these terms are all synonymous.*

BDAs are very low power devices designed to extend radio coverage of a primary radio system, such as the City's trunked 800 MHZ system, into specific areas that have deficient radio coverage. These areas include, but are not limited to, inside buildings, hospitals, basements, sub-level parking, subways, tunnels, and small geographical areas that are shielded by local terrain.

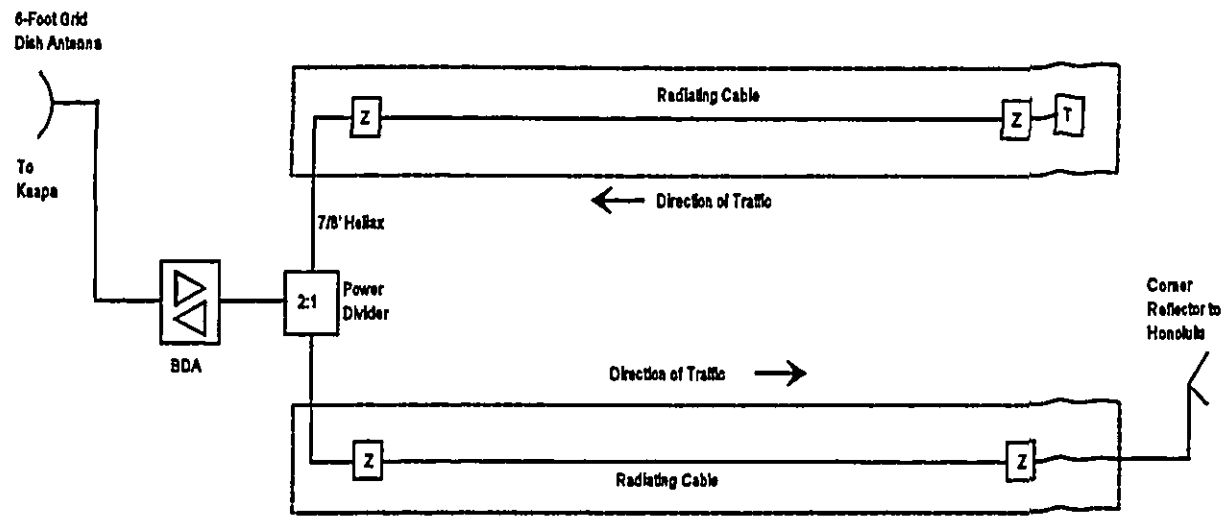
The type of BDAs proposed for the tunnels are broad band, bi-directional devices meaning that they can relay or extend several individual 800 MHZ radio channels in two different directions at the same time. The first direction is where signals are picked up from a primary donor site in the main radio system, amplified, and passed through the extender system into the tunnel. The second direction is reversed where signals from mobile or portable radios operating inside the tunnel are picked up, amplified, and passed through the extender system back to the donor site.

Over the last several decades, the proliferation of radio transmitters in the environment has spurred considerable *public concern* over the biological and health effects of radio frequency (RF) radiation. Familiar applications involving transmitters include, but are not limited to, broadcast radio, television, two-way radio, point-to-point microwave radio, and cellular telephone.

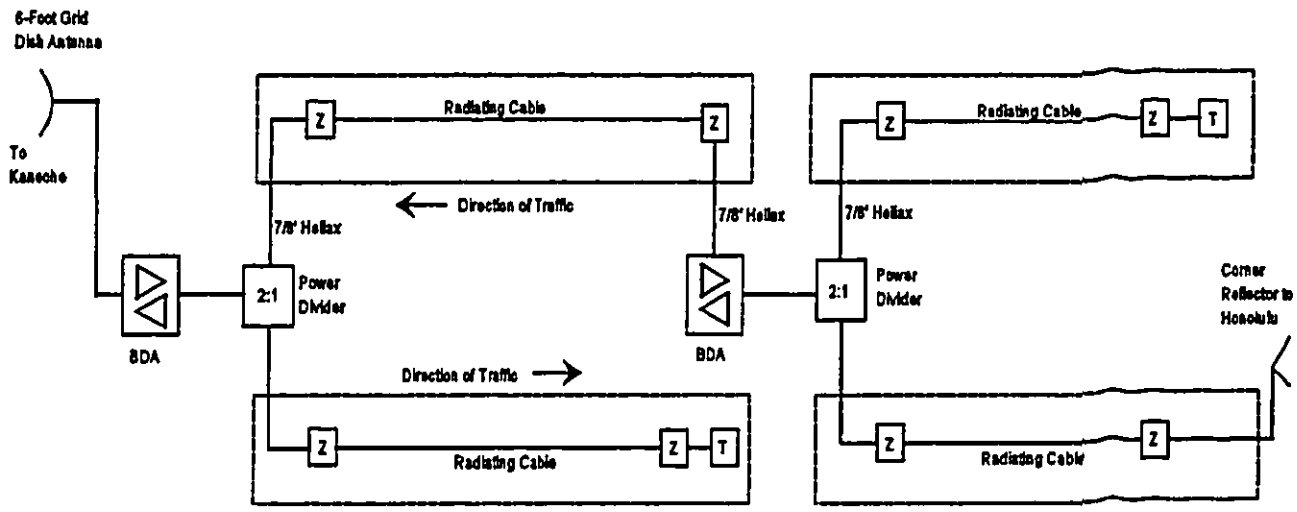
The City's signal booster system for the two tunnels falls into the two-way radio category and is the subject of this RF radiation analysis. The purpose of the analysis is to determine if the emitted power levels from the booster systems pose a risk to the general public.

The signal calculations contained within this document were completed for the systems proposed for both the Wilson and Pali tunnels and the results are shown in a later section entitled *Analysis of the Signal Booster Systems -Wilson and Pali Tunnels.* Block diagrams of the tunnel systems are shown in Figure 1.

Figure 1 - Tunnel Block Diagrams



SYSTEM BLOCK DIAGRAM - PALI TUNNEL



SYSTEM BLOCK DIAGRAM - WILSON TUNNEL

RADIO FREQUENCY (RF) RADIATION

Microwave and two-way radios, cellular telephones, AM and FM radios, and television all radiate radio waves in the form of electromagnetic energy to transmit information from one location to another. This radio frequency (RF) radiation is called *non-ionizing electromagnetic radiation* (NIER).

The term non-ionizing is used because the energy levels are so low that they produce negligible molecular changes in matter which they travel through. The greatest effect of high energy NIER is related to localized heating of body tissue. This only occurs at high energy levels, such as those in a microwave oven.

Conversely, nuclear radiation is *ionizing radiation*. Nuclear radiation differs from RF radiation in that it has the capability to dislodge the atomic structure in the matter it travels through. As such, it can damage living tissue. The underlying physics between non-ionizing and ionizing radiation is completely different.

With RF radiation, the intensity of received non-ionizing radiation depends on the output level of the source and the distance of the subject from the source. Given the effective radiated power from the antenna and distance from the antenna to the subject, the received field intensity that passes through a unit area of one square centimeter can be calculated fairly accurately.

It should be noted that radiated RF energy from a given source decreases rapidly as distance is increased. In fact, the level decreases according to the inverse square law - i.e, it is inversely proportional to the square of the distance. Simply stated, as the distance doubles, the level decreases by a factor of four.

RADIO FREQUENCY (RF) RADIATION EXPOSURE GUIDELINES

The calculations used herein are based on protection guidelines adopted in 1992 by the American National Standards Institute (ANSI). The 1992 standards replaced an earlier version adopted in 1982. ANSI is a non-profit organization that develops recommended standards for a variety of applications. Compliance with the ANSI standards is voluntary but they are widely used by the telecommunications industry.

The 1992 ANSI/IEEE guidelines specify two sets of exposure limits based on the "environment" in which the exposure takes place. These environments are classified as either "*controlled*" or "*uncontrolled.*" There is essentially no change from the 1982 ANSI guidelines for the controlled environment, which are based on a six minute exposure. However, the guidelines for general public or uncontrolled environment are more stringent but cover a 30 minute exposure.

Controlled environments are defined as locations where "there is exposure that may be incurred by persons who have knowledge of the potential for exposure". Persons in this category are generally described as workers or technicians.

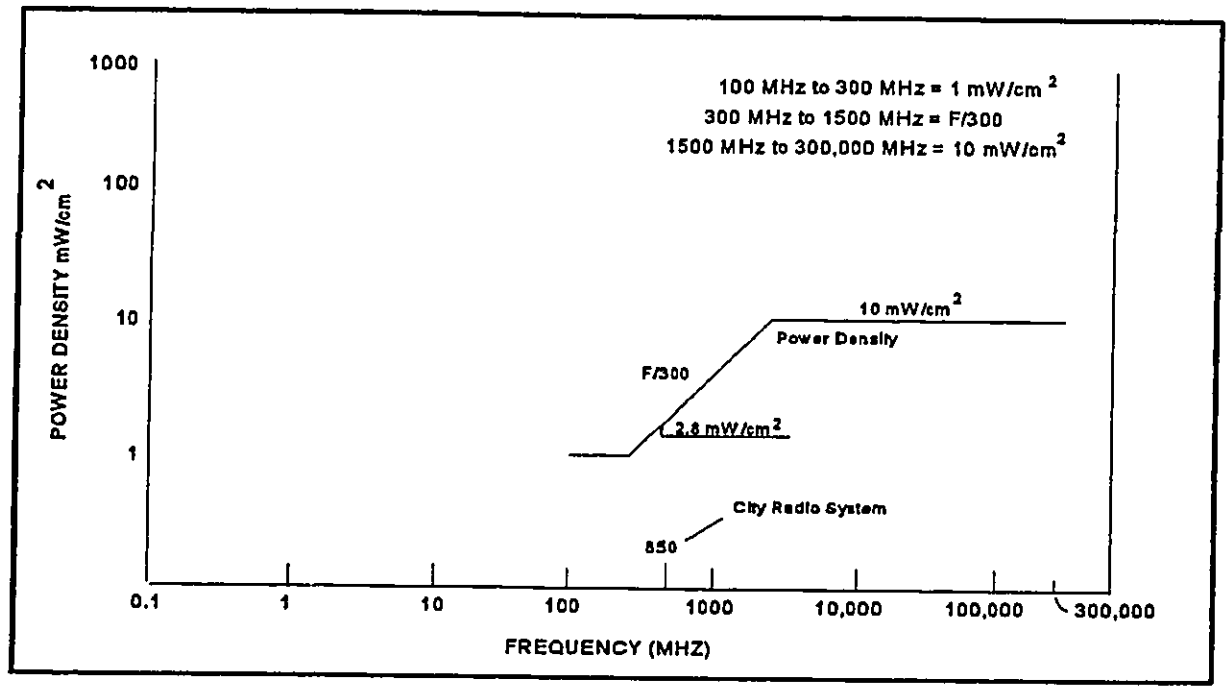
Uncontrolled environments are defined as "locations where there is the exposure of individuals who have no knowledge or control of their exposure". The *general public* falls into this category. The exposures may occur in living quarters or workplaces where there are no expectations that the exposure levels may exceed the exposure levels permitted for uncontrolled environments.

The details of the 1992 ANSI standard are very complicated and too complex for this report. However, the basic exposure limits, as they apply to the City's frequencies and transmitting equipment, are utilized in this report.

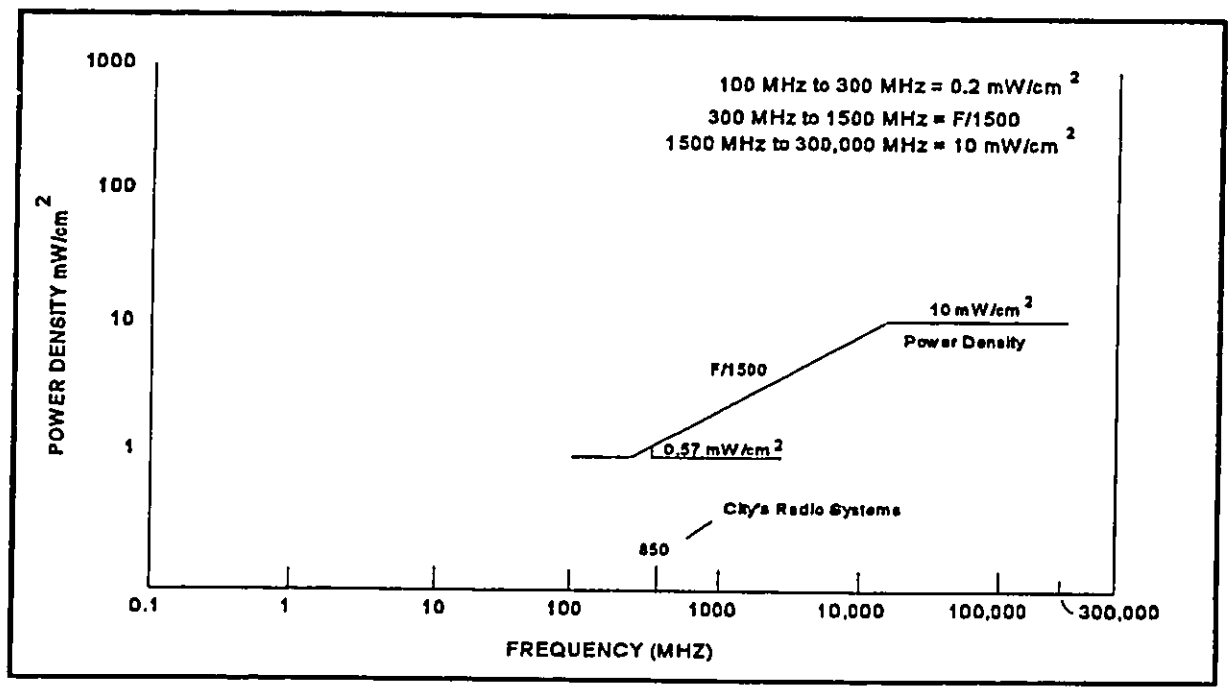
A graphical representation of the 1992 ANSI standards for controlled and uncontrolled environments is shown in the following charts. The charts also show the area of the frequency spectrum where the City's radio systems are to operate along with the ANSI permissible exposure levels for each.

1992 ANSI STANDARDS

GRAPHICAL REPRESENTATION OF MAXIMUM PERMISSIBLE EXPOSURE
CONTROLLED ENVIRONMENT - 6 MINUTE EXPOSURE
SHOWING 100 MHz to 300,000 MHz



GRAPHICAL REPRESENTATION OF MAXIMUM PERMISSIBLE EXPOSURE
UNCONTROLLED ENVIRONMENT - 30 MINUTE EXPOSURE
SHOWING 100 MHz to 300,000 MHz



The tables below show chart information in tabular form for ANSI maximum permissible exposure (MPE) for controlled and uncontrolled environments.

Controlled Environments

Frequency Range (MHZ)	Power Density (mW/cm^2)
100-300	1.0
300-3000	f/300 (frequency/300)
3000-15,000	10
15,000-300,000	10

Uncontrolled Environments

Frequency Range (MHZ)	Power Density (mW/cm^2)
100-300	0.2
300-3000	f/1500 (frequency/1500)
3000-15,000	f/1500 (frequency/1500)
15,000-300,000	10

Using the standards and conversion formulas shown in the above tables, the maximum permissible exposures in milliwatts-per-square-centimeter (mW/cm^2) for controlled and uncontrolled environments at the proposed City signal booster frequencies are as follows:

Frequency	Controlled (mW/cm^2)	Uncontrolled (mW/cm^2)
850 MHZ	2.8	0.57

It should be noted that AM, FM, and TV stations broadcast on various radio frequencies, ranging from .5 to 1.6 MHZ for AM, 88 to 106 MHZ for FM, and 56 to 800 MHZ for VHF and UHF television stations. The City's 800 MHZ frequencies are in the same portion of the radio spectrum as some of the higher channeled UHF televisions stations. Radiated power from these broadcast and television stations can range from a few hundred watts upwards to several million watts and many of the stations operate continuously on a 24-hour per day basis.

The radiated power levels from terrestrial two-way radio transmitters are relatively low. Typical two-way radio transmitters operate with a power output from 10 to 350 watts. Depending on transmitter power and the antenna gain, the effective radiated power (ERP) of two-way radios can range from a hundred to over a thousand watts. However, the exposure levels resulting from these stations are usually below the ANSI guidelines.

It should be noted that bi-directional amplifiers or signal boosters, such as those proposed for the Wilson and Pali tunnels, operate with very low transmit power. The power output is generally one watt or less.

ANALYSIS OF THE SIGNAL BOOSTER SYSTEMS - WILSON AND PALI TUNNELS

The calculations shown below were developed from spreadsheets that utilize complex but standard formulas to calculate signal level versus distance. The spreadsheet results are automatically calculated to derive the signal level at any power rating and distance.

The accuracy of the calculations, such as antenna height above ground, power level, type of transmission line, antenna gain, and type of radiating cable are based solely on data provided by Ericsson and Allen Telecom Group, the latter the manufacturer of the BDA equipment to be installed in the tunnels. Calculations were completed for both *controlled* and *uncontrolled* environments.

PALI TUNNEL 800 MHZ BOOSTER SYSTEM

6-Foot Grid Dish Antenna

The calculated ERP for the 6-foot grid dish antenna is 9.9 watts (39.9 dB). At this power level, the calculated distance for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

ENVIRONMENT	ANSI PERMISSIBLE EXPOSURE	SAFE DISTANCE
Controlled	2.8 mW/cm²	1.10 feet
Uncontrolled	.57 mW/cm²	2.50 feet

The calculated field densities in mW/cm² for the 9.9 watts ERP at other distances from the 6-foot dish antenna are shown below.

ERP in WATTS	DIST FROM ANTENNA (FT)	DENSITY in mW/cm²
9.9	5	0.1425
9.9	10	0.0356
9.9	25	0.0057

Pali Corner Reflector

The calculated ERP for the 9.0 dB gain corner reflector is 7.95 milliwatts (.00795 watts). Using this power level, the calculated distance for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

ENVIRONMENT	ANSI PERMISSIBLE EXPOSURE	SAFE DISTANCE
Controlled	2.8 mW/cm²	.032 feet
Uncontrolled	.57 mW/cm²	.071 feet

The calculated field densities in mW/cm² for the 7.95 milliwatts ERP at other distances from the 9.0 dB corner reflector are shown below.

ERP in WATTS	DIST FROM ANTENNA (FT)	DENSITY in mW/cm²
.00795	5	0.000114
.00795	10	0.000027
.00795	25	0.0000043

Signal Distribution System

The signal distribution system utilizes radiating or "leaky heliax" cable throughout the tunnel. The radiated power along the cable varies from a high of approximately 14 milliwatts (11.5 dB) at feed point near the BDA to roughly 0.795 milliwatts (-1 dB) at the terminating end. At any location along the radiating cable, there is a loss factor of -70 dB at a 20-foot distance away.

To demonstrate the exposure level anywhere along the cable is significantly less than the ANSI standard, calculations were completed for the *highest power level of 14 milliwatts*. The calculations at this power level for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

ENVIRONMENT	ANSI PERMISSIBLE EXPOSURE	SAFE DISTANCE
Controlled	2.8 mW/cm²	0.042 feet
Uncontrolled	.57 mW/cm²	0.0943 feet

The calculated field densities in mW/cm^2 for the 14 milliwatts for other distances from the radiating cable are shown below.

RADIATED POWER in WATTS	DIST FROM CABLE (FT)	DENSITY in mW/cm^2
.014	5	0.0002
.014	10	0.00005
.014	25	0.000008

WILSON TUNNEL 800 MHZ BOOSTER SYSTEM

6-Foot Grid Dish Antenna

The calculated ERP for the 6-foot grid dish antenna is 7.5 watts (38.8 dB). The calculated distance for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

ENVIRONMENT	ANSI PERMISSIBLE LEVEL	SAFE DISTANCE
Controlled	2.8 mW/cm^2	0.975 feet
Uncontrolled	.57 mW/cm^2	2.183 feet

The calculated field densities in mW/cm^2 for the 7.5 watts ERP at other distances from the 6-foot dish antenna are shown below.

ERP in WATTS	DIST FROM ANTENNA (FT)	DENSITY in mW/cm^2
7.5	5	0.1080
7.5	10	0..0270
7.5	25	0.0043

Wilson Corner Reflector

The calculated ERP for the 9.0 dB gain corner reflector is 12.0 milliwatts (.012 watts). The calculated distance for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

ENVIRONMENT	ANSI PERMISSIBLE LEVEL	SAFE DISTANCE
Controlled	2.8 mW/cm²	.039 feet
Uncontrolled	.57 mW/cm²	.088 feet

The calculated field densities in mW/cm² for the 12.0 milliwatts ERP at other distances from the 9.0 dB corner reflector are shown below.

ERP in WATTS	DIST FROM ANTENNA (FT)	DENSITY in mW/cm²
.012	5	0.000175
.012	10	0.000043
.012	25	0.000007

Signal Distribution System

The signal distribution system in the Wilson tunnel differs slightly from the Pali in that there are two bi-directional amplifiers, one for each section. However, both sections still utilize radiating or "leaky heliax" cable within the tunnels.

The radiated power from the cable along the 1900-foot tunnel section varies from a high of approximately 12 milliwatts (10.7 dB) to roughly 0.1 milliwatts (-9.9 dB) at the terminating end where it connects to a section of 7/8-inch transmission line that feeds the second BDA.

From the second BDA, the radiated power from the cable along the 900-foot section varies from a high of approximately 12 milliwatts (10.7 dB) at the feed end to about 1.58 milliwatts (1.9 dB) at the terminating end at the junction of the transmission line feeding the 9.0 dB gain antenna.

To demonstrate the exposure level anywhere along the cable is significantly less than the ANSI standard, calculations were completed for the *highest power level of 12 milliwatts.* The calculations at this power level for the ANSI maximum permissible exposure for the controlled and uncontrolled environments are:

ENVIRONMENT	ANSI PERMISSIBLE LEVEL	SAFE DISTANCE
Controlled	2.8 mW/cm²	.0390 feet
Uncontrolled	.57 mW/cm²	.0873 feet

The calculated field densities in mW/cm² for the highest power level of 12.0 milliwatts for other distances from the radiating cable are shown below.

RADIATED POWER in WATTS	DIST FROM CABLE (FT)	DENSITY in mW/cm²
.012	5	0.000720
.012	10	0.000043
..012	25	0.0000069

CONCLUSION

The City and County of Honolulu does and will continue to operate its radio systems according to all rules, regulations, frequencies, and transmitter power levels allowed by all Federal Communications Commission licenses issued to the City.

The greatest concern regarding the proposed operation of the City's tunnel booster systems is to the general public (uncontrolled environment). Given the heights above ground and the extremely low effective radiated power from the antennas and the radiating distribution cables, the calculations show that the electromagnetic radiation exposure levels from the two booster systems are *profoundly below the current ANSI guidelines and the operation of these systems in the Wilson and Pali tunnels pose absolutely no health hazard to the general public.*

Therefore, the impact of RF radiations exposure to the uncontrolled environment or general public is negative.

APPENDIX B

COMMENT LETTERS AND RESPONSES

OAHU CIVIL DEFENSE AGENCY
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4121

JEREMY HARRIS
MAYOR

JOSEPH D. REED
ADMINISTRATOR

RECEIVED
11-15-96

November 13, 1996

Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Honolulu Police Department
800 Mhz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for the opportunity to comment on the Environmental Impact Statement for subject project. We have no comments at the present time

Our point of contact concerning this project is Mr. Wayne Jones, Communications Officer, telephone 523-4679.

Sincerely,

JOSEPH D. REED
Administrator

JDR:ms

GERALD PARK
Urban Planner
■
Planning
Land Use
Research
Environmental
Studies
■
1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021
■
Phone/Fax
(808) 942-7484

January 6, 1997

Joseph D. Reed, Administrator
Oahu Civil Defense Agency
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Reed:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of November 13, 1996 indicating that your department has no comments on the subject Draft Supplemental Environmental Assessment. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

JEREMY HARRIS
MAYOR

MICHAEL S. NAKAMURA
CHIEF

HAROLD M. KAWASAKI
LEE DONOHUE
DEPUTY CHIEFS

OUR REFERENCE OK-CA

November 20, 1996

11.21.96

Mr. Gerald Park
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

The Honolulu Police Department has reviewed your November 13, 1996, request for comments on the proposed telecommunications project and the Draft Environmental Assessment and offers the following.

We support the antenna installations and BDA systems at the Wilson and Pali tunnels. The proposed installation will provide reliable radio coverage inside the tunnels and on the Honolulu side of the tunnels. Radio coverage within this area is very critical for public safety operations should any emergency or life threatening situation arise.

We also concur with the 1992 ANSI/IEEE guidelines. Radio frequency exposure to the public will not be detrimental to their health and radiation exposure will be significantly less than the ANSI standard.

Should you have any questions or require additional information, please contact Mr. Osame Kobayashi, Radio Engineer, at 831-7200.

Sincerely,
MICHAEL S. NAKAMURA
Chief of Police

By
JAMES FEMIA
Assistant Chief of Police
Support Services Bureau

GERALD PARK
Urban Planner
■
Planning
Land Use
Research
Environmental
Studies
■
1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021
■
Phone/Fax
(808) 942-7484

January 6, 1997

Michael S. Nakamura
Chief of Police
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813

Dear Chief Nakamura:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of November 20, 1996 (OK-CA) indicating the support of the Honolulu Police Department for the subject project. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR • HONOLULU, HAWAII 96813
PHONE (808) 523-4361 • FAX (808) 527-5857

JEREMY HARRIS
MAYOR

KENNETH E. SPRAGUE
DIRECTOR AND CHIEF ENGINEER

DARWIN J. HAMAMOTO
DEPUTY DIRECTOR

ENV 96-283

November 21, 1996

RECEIVED
11-29-96

Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Draft Supplemental Environmental Assessment (DSEA)
800 MHz Communication System Upgrade
Pali and Wilson Tunnel
TMK: 1-4-18, 2-2-54, 4-2-10, and 4-5-41

We have reviewed the subject DSEA and have no comments to offer at this time.

Should you have any questions, please contact Alex Ho, Environmental Engineer, at 523-4150.

Very truly yours,

KENNETH E. SPRAGUE
Director and Chief Engineer

GERALD PARK
Urban Planner

Planning
Land Use
Research
Environmental
Studies

1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021

Phone/Fax
(808) 942-7484

January 6, 1997

Kenneth E. Sprague
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Sprague:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of November 21, 1996 (ENV96-283) indicating your department has no comments on the subject Draft Supplemental Environmental Assessment. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

RECEIVED
11.26.96

MICHAEL D. WILSON
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT S. COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT
WATER RESOURCE MANAGEMENT

November 22, 1996

Mr. Gerald Park
Urban Planner
1400 Rycroft Street, Ste. 876
Honolulu, HI 96814-3021

Dear Mr. Park:

Subject: **Honolulu Police Department, 800 MHz Communication System Upgrade, Pali and Wilson Tunnels, Honolulu, HI**

We have reviewed the subject matter and have ascertained that the project will not affect any of our programs or projects within the vicinity. Thank you for the opportunity to comment.

Very truly yours,

Michael G. Buck

Michael G. Buck

cc: Oahu Branch
Land Division

GERALD PARK
Urban Planner

Planning
Land Use Research
Environmental Studies

1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021

Phone/Fax
(808) 942-7484

January 6, 1997

Michael G. Buck, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Buck:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of November 22, 1996 indicating that the project will not affect any of your programs or projects. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869

JEREMY HARRIS
MAYOR

RECEIVED
11.26.96

ANTHONY J. LOPEZ, JR.
FIRE CHIEF

ATTILIO K. LEONARDI
FIRE DEPUTY CHIEF

November 25, 1996

Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Honolulu Police Department
800 MHz Communication System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

The Honolulu Fire Department has no comments to offer at this time and appreciates the opportunity to participate in the review process.

Should you have any questions, please call Assistant Chief Arthur Ugalde of our Administrative Services Bureau at 831-7774.

Sincerely,

ANTHONY J. LOPEZ, JR.
Fire Chief

AJL/MPN:ay

Attachment

GERALD PARK
Urban Planner
■
Planning
Land Use
Research
Environmental
Studies
■
1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021
■
Phone/Fax
(808) 942-7484

January 6, 1997

Anthony J. Lopez, Jr., Fire Chief
Fire Department
City and County of Honolulu
3375 Koapaka Street, Suite H425
Honolulu, Hawaii 96819-1869

Dear Chief Lopez:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of November 25, 1996 indicating that your department has no comments on the subject Draft Supplemental Environmental Assessment. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

DEPARTMENT OF WASTEWATER MANAGEMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET 3RD FLOOR • HONOLULU HAWAII 96813
PHONE (808) 527-6663 • FAX (808) 527-5879

RECEIVED
11-26-96

FELIX B. LIMTIACO
DIRECTOR

CHERYL K. OKUMA SEPE, LSW
DEPUTY DIRECTOR

In reply refer to:
WCC 96-133

November 26, 1996

Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: **DRAFT SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT**
HONOLULU POLICE DEPARTMENT
800 MHz COMMUNICATION SYSTEM UPGRADE
PALI AND WILSON TUNNELS, HONOLULU, HAWAII
TMK: 1-4; 1-9

We have reviewed the subject report and have no comments. Municipal sewer lines are not located in the area and the proposed upgrades will not generate any new wastewater flows.

If you have any questions, please contact Mr. Scott Gushi of the Service Control Branch at 523-4886.

Very truly yours,

Cheryl K. Okuma-Sepe

FELIX B. LIMTIACO
Director

GERALD PARK
Urban Planner
Planning
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Environmental
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1400 Rycroft Street
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96814-3021
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(808) 942-7484

January 6, 1997

Felix B. Limtiaco, Director
Department of Wastewater Management
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Limtiaco:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of November 26, 1996 (WCC96-133) indicating that your department has no comments on the subject Draft Supplemental Environmental Assessment. Your letter and our response will be included in the Final Supplemental public Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843
PHONE: [illegible]
FAX (808) 533-2714

November 26, 1996

JEREMY HARRIS, Mayor
WALTER D. WATSON JR., Chairman
MAURICE H. YAMASATO, Vice Chairman
KAZU HAYASHIDA
MELISSA Y.J. LUM
FORREST C. SUBINO
[illegible]
RAYMOND H. SATO
Manager and Chief Engineer

RECEIVED
11-27-96

Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Your Letter of November 13, 1996 on the Draft Supplemental Environmental Assessment for the Honolulu Police Department's 800 MHz Communication System Upgrade at the Pali and Wilson Tunnels, Honolulu, Oahu

Thank you for the opportunity to review and comment on the Draft Supplemental Environmental Assessment for the communication system upgrade for the Police Department.

We have no objections to the proposed project. We have no water system facilities in the project areas.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

FOR RAYMOND H. SATO
Manager and Chief Engineer

cc: Clifford Morikawa, Building Department

GERALD PARK
Urban Planner
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1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021
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(808) 942-7484

January 6, 1997

Raymond H. Sato
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Sato:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of November 26, 1996 indicating that your department has no objections to the subject project. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF STATE PARKS
P. O. BOX 621
HONOLULU, HAWAII 96809

CHAIRPERSON
MICHAEL G. WILSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY DIRECTOR
GILBERT S. COLOMA-AGARAN

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

November 21, 1996

RECEIVED
12-3-96

Mr. Gerald Park
Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

We have reviewed your November 13, 1996 Environmental Assessment for a Honolulu Police Department Communications Upgrade at the Wilson and Pali Tunnels.

Our only interest is in the Honolulu portals of the Pali Tunnel since the Nuuanu Pali State Wayside is located in the same area. Fortunately these portals are not normally seen by park visitors and as long as any proposed antennas will not interfere with public views within the park, as stated on page 15, we have no concerns.

Sincerely,

RALSTON H. NAGATA
State Parks Administrator

GERALD PARK
Urban Planner

Planning
Land Use
Research
Environmental
Studies

1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021

Phone/Fax
(808) 942-7484

January 6, 1997

Ralston Nagata, Administrator
Division of State Parks
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Nagata:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels

Thank you for reviewing the Draft Supplemental Environmental Assessment prepared for the subject project. We concur with your assessment that the Honolulu portals of the Pali Tunnel are not normally seen by visitors to the Nuuanu Pali State Wayside. As such, the antennas to be placed outside of the Honolulu portals should not interfere with public views within the park and should not be viewed by visitors.

Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
JERRY M. MATSUDA
GLENN M. OKIMOTO

IN REPLY REFER TO:
HWY-PS
2.2721

DEC -4 1996

RECEIVED
12-5-96

Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814

Dear Mr. Park:

Subject: Honolulu Police Department
800 MHz Communication System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for transmitting the above project's Draft Environmental Assessment for our review and comments.

We require the applicant to submit plans for work done within our highway rights-of-way especially at the Pali and Wilson Tunnels for our review and approval.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

GERALD PARK
Urban Planner
•
Planning
Land Use
Research
Environmental
Studies
•
1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021
•
Phone/Fax
(808) 942-7484

January 6, 1997

Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of December 4, 1996 (HWY-PS 2.2721). The Building Department will submit plans for your review and approval for work to be performed within the highway rights-of-way at the Pali and Wilson Tunnels. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

PLANNING DEPARTMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET 8TH FLOOR • HONOLULU HAWAII 96813-3017
PHONE (808) 523-4711 • FAX (808) 523-4730

JEREMY HARRIS
MAYOR

12-7-96

CHERYL D. SOON
CHIEF PLANNING OFFICER

CAROLL TAKAHASHI
DEPUTY CHIEF PLANNING OFFICER

TH 11/96-2235

November 27, 1996

Mr. Gerald Park
Gerald Park Urban Planner
1245 Young Street, Suite 201
Honolulu, Hawaii 96814

Dear Mr. Park:

Draft Supplemental Environmental Assessment (SEA)
for the Proposed Honolulu Police Department
800 MHz Communication System Upgrade
at the Pali and Wilson Tunnels

We have reviewed the subject draft SEA and have no objections to the proposed project.

Thank you for the opportunity to comment on this matter. Should you have any questions, please contact Tim Hata of our staff at 527-6070.

Sincerely,

Cheryl D. Soon

CHERYL D. SOON
Chief Planning Officer

CDS:js

GERALD PARK
Urban Planner

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Studies

1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021

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(808) 942-7484

January 6, 1997

Cheryl Soon, Chief Planning Officer
Planning Department
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of November 27, 1996 (TH11/96-2235) indicating that your department has no objections to the subject project. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

RECEIVED
12.7.96

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
Gilbert Coloma-Agaran

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

December 5, 1996

Gerald Park
Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

LOG NO: 18578 ✓
DOC NO: 9611EJ23

Dear Mr. Park:

SUBJECT: Honolulu Police Department, 800 MHz Communication System Upgrade,
Pali and Wilson Tunnels
Nuuanu, Kona, O'ahu
TMK: 2-2
Kalihi, Kona, O'ahu
TMK: 1-4-18

Thank you for the opportunity to review this project which proposes improvements to radio systems at the Pali and Wilson tunnels. Improvements include mounting antenna dishes to existing buildings and placing cables within the existing tunnels. A review of our records shows that there are no known historic sites at the project locations. Because improvements will be contained to existing facilities and areas which have been extensively modified, and it is unlikely that historic sites will be found, we believe that this project will have "no effect" on historic sites.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

EJ:jk

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(808) 942-7484

January 6, 1997

Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of December 5, 1996 (LOG NO:18578, DOC NO: 9611EJ23) indicating that the project will have "no effect"on historic sites. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

BENJAMIN J. CAYETANO
Governor

MAJOR GENERAL EDWARD V. RICHARDSON
Adjutant General

ROY C. PRICE, SR.
Vice Director of Civil Defense

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

PHONE (808) 733-4300
FAX (808) 733-4287

RECEIVED
12.10.96

December 6, 1996

TO: Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street
Honolulu, Hawaii 96814-3021

FROM: Mr. Roy C. Price, Sr.
Vice Director of Civil Defense

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT (DSEA), HONOLULU POLICE DEPARTMENT, 800 MHz COMMUNICATION SYSTEM UPGRADE, PALI AND WILSON TUNNELS, HONOLULU, HAWAII

We appreciate this opportunity to comment on the DSEA for the City and County of Honolulu, Building Department, 800 MHz Communications System Upgrade, Pali and Wilson Tunnels, Oahu, Hawaii.

The Office of Environmental Quality Control (OEQC) publication, "The Environmental Notice," dated November 23, 1996, lists a project by applicants' Western PCS II Corp., PrimeCo Personal Communications L.P., Pocket Communications, Inc., Honolulu Cellular Telephone Co., GTE Mobilnet, and Hawaii Wireless, Inc., requesting a site use permit very close to this application.

This presents an opportunity for both accepting authorities, the City and County of Honolulu, Department of Land Utilization, and the State Department of Transportation, to study the feasibility of joint/shared use of assets: antenna towers, grid dish, paraflector and yagi antennas, radiating cables, etc., (compatibility permitting), to provide the coverage desired at the Pali Communication Site. A 70-foot guyed tower is already cohabited by three of the applicants/users. An intensive Electromagnetic Field (EMF) evaluation should also be conducted as part of the feasibility study.

State Civil Defense (SCD) recommends that the consultant, with the approval of the City and County of Honolulu, discuss the communication system upgrade with the State of Hawaii, Department of Budget and Finance, Information and Communications Services Division (ICSD), and SCD. It is also recommended that ICSD handle any communications needs on State property when the applicants require such assistance.

Both the Wilson and Pali Tunnel sites are located in valleys with windward slopes on the opposite sides of the valleys and are subject to 150 inches of rainfall annually. While flooding is addressed, the proposed installation sites are also subject to other natural hazards such as earthquakes and tropical cyclones. The impact of the potentially destructive winds resulting from orographic amplification associated with tropical cyclones (tropical depressions, tropical storms, hurricanes) and the torrential rainfall that

accompanies these systems needs to be taken into account. Once the slope and elevation of the proposed sites are determined, structures/facilities and equipment can be sited, designed, constructed and selected to withstand the forces of the previously mentioned hazards.

If you have any further questions, please call Mr. Mel Nishihara of my staff at 733-4300.

c: Information and Communications
Services Division, Department of
Budget and Finance

GERALD PARK
Urban Planner
Planning
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Environmental Studies
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96814-3021
Phone/Fax
(808) 942-7484

January 6, 1997

Roy C. Price, Sr.
Vice Director of Civil Defense
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Mr. Price:

Subject: Honolulu Police Department
800 MHz Communication System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for reviewing the Draft Supplemental Environmental Assessment (DSEA) prepared for the subject project. In response to your comments, we offer the following information about the project.

The State of Hawaii, Department of Budget and Finance, Information and Communication Services Division (ICSD) has been apprised of the Honolulu Police Department's 800 MHz Radio System project since 1990. The project was advertised in June, 1993 and ICSD received a copy of the bid documents which contained the tunnel radio system.

On September 6, 1994, the City invited all City and State radio users to the 800 MHz Radio System meeting. Among those in attendance, were representatives from the ICSD and State Civil Defense. During the meeting, the Pali and Wilson tunnel radio systems were identified as part of the project.

Since the tunnels are under the jurisdiction of the State Department of Transportation (DOT), the City and its radio contractor have been working with the DOT on the tunnel radio installation. The DOT has specifically indicated that the Honolulu Police Department's 800 MHz Radio System, being for public safety services, will be independent and have priority over commercial radio systems.

The DSEA for the tunnel project contains radio frequency (RF) calculations showing that RF radiation is very low and well under the 1992 American National Standards Institute's Maximum Permissible Exposure levels. The tunnel radio systems will emit negligible electromagnetic field (EMF) with a maximum current of 14 milliwatts running in the tunnel cable system.

Each tunnel radio system will have minimal equipment exposed to the weather. The bi-directional amplifier equipment will be installed in existing buildings. The two antennas will be the grid-type to minimize wind loads to supporting structures.

We hope this information answers your concerns expressed in your letter of December 6, 1996. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

PACIFIC PARK PLAZA
711 KAPIOLANI BOULEVARD SUITE 1200
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

RECEIVED 12-18-96

CHARLES O SWANSON
DIRECTOR

December 16, 1996

11/96-05270R

Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street
Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Honolulu Police Department 800 MHz Communication System Upgrade, Pali and Wilson Tunnels

In response to your November 13, 1996 letter, the draft supplemental environmental assessment that was prepared for the subject project was reviewed. We have no comments to offer regarding the proposed project.

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

Respectfully,

for CHARLES O. SWANSON
Director

cc: OEQC
Mr. Clifford Morikawa,
Building Department

GERALD PARK
Urban Planner
■
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■
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Suite 876
Honolulu, Hawaii
96814-3021
■
Phone/Fax
(808) 942-7484

January 6, 1997

Charles O. Swanson, Jr., Director
Department of Transportation Services
City and County of Honolulu
Pacific Park Plaza
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Dear Mr. Swanson:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of December 16, 1996 (11/96-0527OR) indicating that your department has no comments to offer on the Draft Supplemental Environmental Assessment prepared for the subject project. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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

LAWRENCE MIIKE
DIRECTOR OF HEALTH

RECEIVED
12-19-96

In reply, please refer to

December 13, 1996 96-201/epo

Mr. Gerald Park
Gerald Park Urban Planner
1400 Rycroft Street, Suite 876
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Draft Supplemental Environmental Assessment
Honolulu Police Department
800 MHz Communication System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for allowing us to review and comment on the proposed project. We have no comments to offer at this time.

Sincerely,

BRUCE S. ANDERSON, Ph.D.
Deputy Director of Environmental Health

c: L. Au, HEER Office

GERALD PARK
Urban Planner

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1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021

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(808) 942-7484

January 6, 1997

Lawrence Miike, M.D., Director
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu. Hawaii 96801

Dear Dr. Miike:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of December 13, 1996 (96-201/epo) indicating that your department has no comments on the subject Draft Supplemental Environmental Assessment. Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD

DEPARTMENT OF LAND UTILIZATION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4414 • FAX (808) 527-6743

JEREMY HARRIS
MAYOR

RECEIVED
12-20-96

PATRICK T. ONISHI
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

96-008043(ST)
'96 EA Comments Zone 4

December 19, 1996

MEMORANDUM

TO: RANDALL K. FUJIKI, DIRECTOR AND BUILDING SUPERINTENDENT
BUILDING DEPARTMENT

ATTN: CLIFFORD MORIKAWA

FROM: PATRICK T. ONISHI, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA): HONOLULU POLICE DEPARTMENT 800 MHZ COMMUNICATION SYSTEM UPGRADE (PALI AND WILSON TUNNELS), HONOLULU, HAWAII

We have reviewed the DEA for the proposed project transmitted by your consultant on November 13, 1996, and find that the proposed project is not located within the Special Management Area (SMA) established by Chapter 25, Revised Ordinances of Honolulu.

Inasmuch as the project is located within the Land Use Conservation District administered by the State, we have no other comment to offer at this time. However, we do note that there is a typographical error on page 1, paragraph 3, relative to the publication date for the Draft Supplemental EA for the Leahi Communications Facility.

Should you have any questions, please contact the Environmental Review Branch at 523-4077.

PATRICK T. ONISHI
Director of Land Utilization

PTO:am

cc: Gerald Park Urban Planner

g:\960043.sat

GERALD PARK
Urban Planner

Planning
Land Use
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1400 Rycroft Street
Suite 876
Honolulu, Hawaii
96814-3021

Phone/Fax
(808) 942-7484

January 6, 1997

Patrick T. Onishi, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Onishi:

Subject: Honolulu Police Department
800 MHz Communications System Upgrade
Pali and Wilson Tunnels
Honolulu, Hawaii

Thank you for your letter of December 19, 1996 (96-008043/ST) informing us that the proposed project is not located with the Special Management Area established by Chapter 25, Revised Ordinances of Honolulu.

We have corrected the typographical error on page 1, paragraph 3 to read December 8, 1993.

Your letter and our response will be included in the Final Supplemental Environmental Assessment. We appreciate your interest and participation in the environmental assessment review process.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

xc: C. Morikawa, BD