ENVIRONMENTAL IMPACT ANALYSIS PROCESS

FINAL ENVIRONMENTAL ASSESSMENT
CONSTRUCTION AND OPERATION OF
REVISED PACBAR III RADAR STATION
SAIPAN, CNMI
JUNE 25, 1987

DEPARTMENT OF THE AIR FORCE

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REVISED PACBAR III RADAR STATION
SAIPAN, CNMI

June 1987

Prepared for: Department of the Air Force
Headquarters Space Division
Environmental Planning Division
Directorate of Acquisition Civil Engineering

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COSTRUCTION AND OPERATION OF REVISED PACBAR III RADAR STATION

SAIPAN, CNMI

INTRODUCTION

1. The U.S. Air Force proposes to install a radar facility and approximately two miles of Access Road on Mt. Petosukara, Saipan, Commonwealth of the Northern Mariana Islands (CNMI). This facility will used for three missions. The majority of the Access Road currently exists and will be improved. One portion will be paved Approximately 0.3 mil of the Access Road will be newly constructed. The Radar Site and most of the Access Road are located in the Marpi Commonwealth Forest, which will be leased by the Air Force from the Marianas Public Land Corporation (MPLC).

2. Many project design features have already incorporated environmental concerns. In addition, discussions with Saipan environmental agencies have resulted in mitigation measures, which have been added to the design.

3. A major environmental improvement in the scope of the facility was made in June 1986 when the U.S. Air Force decided to eliminate construction of the Boresight Tower and its related additional Access Road from the project. That decision has eliminated the majority of the project construction which would have impacted endangered species habitat in the area.

IMPACT

1. Primary potential impacts associated with the project include:

    - The effects of nonionizing radiofrequency emissions on humans and wildlife.
    - The effects of project activities on an endangered wildlife species.
    - The visual effect of the antenna.
    - The considerable reduction of existing soil erosion at the Access Road.
    - The potential demand for above-average housing.
    - The increased opportunity for employment of local residents.

Of these potential impacts, nonionizing radiofrequency emissions, endangered species, and visual impact issues are most important.

2. Normally, the antenna will operate at angles above the horizon, and power density levels at ground level are not expected to exceed permissible values for human (and wildlife) exposure. A single exception could occur at a small area on the northeast side of the top Mt. Petosukara, if the antenna is recording splashdowns on the horizon. However, elevation and azimuth limit switches will be installed to achieve personnel and public protection. Angles below the horizon could also be acceptable in some direction, depending on: (1) the rate which the land sloped away, and (2) locations of human access or normal wildlife habitat.

    Exposure level outside the site boundary will be below the Air Force standard of 5 mW/cm2 so public access will not be limited due to RF radiation. Due to sue of elevation and azimuth limit switches, restricted access areas will not need to be established.

3. Access Road widening and construction activities will occur in areas of potential endangered species habitat, specifically that of the Micronesian Megapode, a ground dwelling bird. Mitigation measures will include:

    - Placement of the majority of the road along existing road along existing road alignments or on grassland.

Less than 14 percent of the road will be through existing forest.

- Vegetation along cliff bases will not be removed (Kosaka 1984 and Schmitt 1985).
- Vegetation alongside the Access Road will not be removed unless required for road widening.
- Construction contractor work limits will be specified, in order to avoid disturbance to habitat of the Micronesian megapode.
- Coordination of location of scenic viewpoint, trailhead, and final road alignment with a CNMI Department of Natural Resources Forester (WSMC 1985).
- Establishment of a habitat enhancement area away from the project site.
- Prior to start of construction and during initial construction (cleaning), the project area will be field-checked by a DNR Fish and Wildlife biologist to ensure that the megapode or mound nests are not present in the area to be affected (WSMC 1985).
- The pathways bulldozed in1985, which will be abandoned, will be mitigated in a manner agreed upon with appropriate island and government agencies.

4. The visual impact of the antenna is difficult to mitigate since it must be painted white, be lighted at night for aircraft warning, and be located at a higher elevation to function properly. Siting of the facility, including the original Boresight Tower, included recommendations based on a seen-area analysis performed by the U.S. Fish and Wildlife Service. Siting also considered the presence of a radio broadcasting company on the northern end of the island with its large antennas, and other development projects which lessen the impact of the radar facility since the visual characteristics of the northern end of the island already have been altered.

5. Soil erosion in the Access Road areas will be mitigated by paving the initial, approximate 0.3 mile, portion of the improved road and by providing appropriate drainage and erosion control measures along the entire road (DEQ 1986b). This will provide a beneficial effect, since it will help to a large extent to control existing erosion.

6. The demand for above average housing by the imported employees may be an adverse impact; however, developers are expected to anticipate the demand. New housing may be constructed in association with several development projects in the area, further helping to mitigate any housing problem.

7. A beneficial impact will be the employment of qualified local residents in both technical and nontechnical positions for operation of the radar facility.

8. Other, less significant impacts include:

   - Construction noise
   - Increased safety risk by workers being exposed to unidentified, unexploded ordnance during construction.
   - Benefits of revenues for public purposes and in money brought to the island.
   - Increased demand on non-electrical public services.

9. Several potential impacts such as soil and ground water contamination and effects on historical items have been mitigated through project design. Mitigation measures include;

   - Secondary containment of waste oil storage tank, proper design of septic facilities, spill containment for above ground diesel fuel tanks, and spill containment for a flammable material storage building (Smith, Young and Hida 1987a).

- Appropriate plans for hazardous waste disposal.

- Hazardous materials spill containment and spill plan procedures.

- Avoidance of historical items (i.e., U.S. ordnance storage buildings) during construction activities.

10. Three additional area of potential impact, which were studied but found to be non-issues, are air quality, effects on flood plain/wetlands, miscellaneous socioeconomic/land use concerns. Theses impacts are expected to be minimal for the following reasons:

    - Air emissions, although expected, will not adversely affect island air quality due to the natural topography of the site (high elevation) and typical weather conditions (windy).

    - Impacts to flood plains/wetlands are not expected because these sorts of areas are located distant from the project area, and runoff from the site is not expected to reach these areas.

    - Schools, emergency services (police/fire/medical), and transportation on the island are adequate for both construction and operations employees and their families.

ALTERNATIVES

1. Eight site alternatives were considered for this project. One site was located on Guam, two on Tinian, and five on Saipan. The seven sites which were considered and then eliminated in favor of Mt Petosukara on Saipan are listed below with a brief explanation of the more significant reasons for their elimination:

    - Guam, NASA Dandan Tracking Station. This existing station is not a viable option because it will not be available for use by the time PACBAR III is due to operate. Further, it is not able to satisfy one of the three mission objectives.

    - Tinian Sites, Maga Plateau and Massalog. These sites have blockage limitations toward the north, which significantly reduce their effectiveness to satisfy the mission objectives in comparison to the Mt. Petosukara site. The Tinian sites would also have higher construction and operating costs because that island is less developed in comparison to Saipan. Locating the Radar Site at either of the Tinian sites poses potential conflict with naval activities planned for the area. Environmental impacts at the Tinian sites are judged to be comparable to those at the selected site especially since the Boresight Tower has been removed form the project.

    - Saipan, Mt. Tagpochau. Three reasons for eliminating this site included lease uncertainties, mission objective limitations due to the requirement to increase radar blockage to ensure public safety, and aesthetic impacts to this frequently visited tourist attraction.

    - Saipan, Suicide Cliff. This site is currently a tourist attraction. It was eliminated as an alternative due to lease uncertainties, reduced aesthetic value as a tourist attraction, and the requirement to increase radar blockage to ensure public safety.

    - Saipan, Osko Talufofo. This site is located near local housing. Therefore, impacts such as air quality emissions, noise, and the requirements to increase radar blockage to ensure public safety were concerns contributing to eliminating the site.

2. Project equipment alternatives included: (1) use of an onsite Boresight Tower versus other calibration techniques, (2) use of onsite versus offsite powers, and (3) several telecommunications options. The Boresight Tower option for calibration was eliminated to reduce environmental impacts of the project. Other calibration techniques to be used may include a combination of calibration spheres (balloons), satellites, ships and airplanes and/ or a transmitter fixed to an existing structure such as a radio tower. Onsite power and a microwave link telecommunications service were chosen due to cost, reliability, and aesthetic considerations.

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3. A “No Project” alternative, if chosen, could adversely affect the ability of the U.S. AIR FORCE to fully comply with National Space Policy, execute treaty monitoring support, execute U.S. AIR FORCE missions, and satisfy Space Surveillance goals and requirements. None of the adverse or beneficial impacts resulting from the PACBAR III Radar Station would be realized by the No Project alternative.

LOCAL AGENCY REQUIREMENTS

1. Preliminary discussions with CNMI government agencies resulted in the following items added to the project design:

   - Addition of one scenic viewpoint and one trailhead.
   - A seen-area analysis to evaluate the areas of least visual impact for the Radar and Boresight Tower Sites (Newell 1984). That analysis was primarily accomplished for the Boresight Tower, which was originally part of the project.
   - Assurance that vegetation along cliff basses will not be removed (Kosaka 1984 and Schmitt 1985).
   - Establishment of a habitat enhancement area located away from the project, upon recommendation of and negotiations with CNMI DNR Fish and Wildlife.
   - Paved road from Beach Road to the entrance of the Marpi Commonwealth Forest (DEQ 1986b).
   - Drainage diversion designs, where necessary, along project access roads (DEQ 1986b).
   - Requirements that equipment and supplies delivered to Saipan be free of introduced organisms, especially snakes (Glass 1986).
   - Requirements that road areas bulldozed in 1985 be mitigated as negotiated with appropriate island and government agencies (Culbert 1986c).

2. Permitting requirements from Saipan agencies will be coordinated through the local Coastal Resources Management Office (CRM). It is expected that four permits will be required, a CRM permit an erosion control permit, a sanitary waste discharge permit, and an archaeological permit.

FINDINGS

1. In view of the above, a finding of no significant impact is made. Negative impacts of the project are not significant and are greatly reduced by the mitigation measures incorporated into the project design. Positive impacts are also not significant, but do help to balance the negative impacts.

2. A Final Environmental Assessment for the Revised PACBAR III Project dated June 23, 1987 is on file at:

HQ SPACE DIVISION
P.O. Box 92960
Worldway Postal Center
Los Angeles, California 90009
ATTENTION: Mr. John R. Edwards, SD/DEV

25 Jun 1987

Raphael O. Roig
Chairman, Space Division
Environmental Protection Committee

Date

PREFACE

PACBAR III CHRONOLOGY

This section recaps the events leading up to this Final EA, starting with early scoping studies, the Boresight Tower elimination decision, and ending with the submittal of the Coastal Permit Application for construction of the facility.

1. In October/ November 1982, an Air Force team traveled to Guam and Saipan to assess alternative sites for the PACBAR III Project and to discuss the potential project with Guam and CNMI environmental and government agencies. The sites receiving preliminary consideration at that time were in the vicinities of Dandan, Guam and Mt. Tagpochau, Saipan. The Mt. Tagpochau area was preferred due to the ability to support more mission functions than the Guam site. Based on available environmental data, the Air Force determined that an Environmental Assessment (EA) would be needed for either site and that the EA process would result in recommended mitigation measures. The Air Force recommended several mitigation measures for each project site. At that time, the main elements of the project were: (1) a radar station covering approximately five acres, (2) a Boresight Tower located at least 2,000 feet from the station for radar antenna calibration, and (3) the related access roads.

2. In October 1984, the Air Force traveled to Hawaii and Saipan to (1) perform additional data collection for environmental issues, and (2) participate in scoping meetings with environmental agencies to determine the types of environmental concerns which should be considered for environmental impact analysis and engineering design of the facility. Mt. Tagpochau, Saipan was selected as the set for conceptual design efforts, pending formal alternative site evaluations as part of the final project feasibility and EA processes.

3. In November/December 1984, the Air Force traveled to the Northern Mariana Islands to evaluate potential sites for consideration. Several additional sites on Saipan and two sites on Tinian were incorporated into the selection process. At this tie, the Mt. Petosukara, located within the Marpi Commonwealth Forest, was identified as being a better site than Mt. Tagpochau, based on a superior ability to support the mission functions. Discussions were iniated with CNMI environmental agencies to determine the scope of items requiring study and to identify potential mitigation measures, which might be appropriate. Areas identified included: (1) performance of a scene-area analysis to identify locations with minimal visual impact, (2) flora and fauna impacts, (3) potential effects on tourism, and (4) access requirements, including both detrimental effects and potential benefits for improved access usage of some areas. Particular considerations for the Mt. Petosukara site included: (1) road turn-outs with parking areas along the access roads at locations recommended by CNMI DNR Forestry personnel, and (2) inclusion of an Access Road to the Boresight Tower, which would provide access to a new campground site in the Marpi Commonwealth Forest. Special consideration for the Tinian sites were related to: (1) socioeconomic and existing

infrastructure considerations for this less developed island, and (2) potential conflict with Naval activities planned for the areas.

4. In February 1985, the Air Force discussed the project with EPA Region IX personnel in San Francisco to obtain additional data regarding permit requirements and previous Eas and EISs, which may have been prepared for the area. The Air Force also identified the important potential impact areas. The EPA suggested that secondary (e.g., socioeconomic) effects of the project be addressed in the Air Force environmental documentation.

5. During the spring of 1985, the Air Force had narrowed their site preference to Mt. Petosukara, Saipan and the two sites on Tinian, based upon mission performance, expected land lease availability, and anticipated agency acceptance. Additional island ad site inspections by the Air Force led to the conclusion that Mt. Petosukara was the best overall location. To verify engineering feasibility at this site, a contractor was hired to drill geotechnical borings at the expected locations of the radar station and the Boresight Tower. That contractor obtained a permit from the CNMI Department of Public Health and Environmental Services, Division of Environmental Quality, to bulldoze paths to these locations and drill the borings.

6. In August 1985, Environmental Solutions, Inc. was chosen to prepare the EA for the PACBAR III project. The Air Force preferred Mt. Petosukara for the project location and had retained Smith, Young and Hida as the design engineer. The 35 percent design, part of the normal design process, would produce drawings necessary to describe the development of the site for both EA and detailed cost estimating purposes. The EA was to consider the proposed site, four other sites on Saipan, two sites on Tinian, one site on Guam and the No Project alternative. The EA scope was to include the scoping items identified by the Air Force during numerous agency meetings and site visits.

7. By the end of September 1985, the format of the EA was established, and areas requiring information that is more detailed were identified. This document was used as a basis for collecting data during a 4-week site investigation program by the Air Force and Environmental Solutions on Saipan and Tinian in October/November 1985. This activity included site observations and mapping and furthers discussions with CNMI government agencies to review mitigation measures suggested by these agencies. The archaeological site survey was also performed during this time by local Historic Preservation Office employees who were retained as local experts.

8. Information from the October/November 1985 trip data was used to complete the Draft EA in January 1986. On the basis of the Draft EA, the Air Force prepared a FONSI and had the Draft EA completed in March 1986. CNMI agencies did not receive copies of the Draft EA for review because NEPA process delegated to the Air Force, Regulation 19-2, does not require public review except in unusual circumstances and because of potential classification of the report as secret. The draft of the Revised EA has been distributed for public review and comment.

9. During March 1986, 40 copies of the “PACBAR III Final Environmental Assessment” were distributed to various CNMI and Federal government agencies and private organizations.

10. A public hearing, for the Air Force’s Coastal permit application for the Mt. Petosukara site was scheduled by the CNMI Coastal Resources Management Office (CRM) for April 24, 1986. That hearing was conducted by the CRM and the Air Force and was attended by approximately 60 people. The Final EA was used as the basis for many of the public comments. Also, written comments from four agencies and two private organizations were mailed to the Air Force during April and May 1986.

11. Environmental Solutions biological personnel took advantage of the Public Hearing period to return to Saipan for an additional biological site visit, and to specifically consider the Micronesian Megapodes during the Spring of the year.

12. Based on the public Hearing comments and written comments to the EA, the Air Force determined that an amended EA would be prepared and submitted for review. The major actions undertaken for the amended EA would be:

    - Expansions of the alternatives site discussions, including presentation of a more quantified analysis to illustrate relative capabilities of the sites to satisfy mission objectives and to compare relative environmental impacts.

    - Further evaluation of flora and fauna conditions at the Mt. Petosukara and Tinian sites in response tolerated comments and questions.

    - Modifications to the EA text to:

      (1) Reflect additional, agreed upon mitigation measures such as paving a portion of Access Road, and

      (2) Clarifications in response to comments or questions.

13. During the process of amending the EA, it was recommended tot he Air Force that the potential for adverse environmental impacts at the Mt. Petosukara site could be significantly reduced if the Boresight Tower and its Access Road could be relocated or eliminated. Because of the advantages of this site to satisfy the mission objectives, the Air Force decided to eliminate the Boresight Tower, and to use other onsite-related means to calibrate the radar antenna.

14. Elimination of the Boresight Tower reduced the project scope. It was, therefore, determined that the amended EA should reflect this modification and be retitled: “Draft EA, revised PACBAR III Radar Station”.

15. The revised Draft EA (July 1986) was prepared and circulated for public comment during the summer of 1986. The primary revisions involved documentation of the reduced impacts of the project, due to elimination of the Boresight Tower, an expansion of the alternatives analysis, and inclusion of certain mitigation’s relative tot he Access Road.

16. In February 1987, a Federal Consistency Determination (FCD) was prepared in accordance with 15 CFR 930.41. The FCD addressed the project’s consistency with the CNMI Coastal Zone Management Program. The FCD was approved in a letter form CRM, dated March 16, 1987.

17. In response to the CRM request for further evaluation of mitigation measures for the existing erosion of the Access Road, the Air Force and Environmental Solutions personnel visited the project site with CRM representatives in December 1986. The outcome of this site meeting was an agreed upon conceptual design approach for reducing largely the erosion occurring along the Access Road. The proposed access road drainage and erosion occurring along the Access Road. The proposed access road drainage and erosion control conceptual approach was summarized and submitted to the CRM on December 16, 1986.

18. In May 1987, the Air Force met with CRM personnel in Saipan and submitted the Coastal Permit Application for construction of the radar station. The submittal included the Permitting Plans for the access road drainage and erosion control 90 percent design package. The permit application was deemed complete in a letter from the CRM, dated May 20, 1987.

19. In June 1987, the Final Environmental Assessment (EA) was prepared. The Final EA incorporates the comments received on the Revised Draft EA (July 1986) and the Air Force responses to those comments (Appendix J). The Final EA also includes revisions and additions to the Qualifications of Preparers (Appendix D) and Contacted Persons, Agencies and Organizations (Appendix F). The text was revised to reflect agency comments and to incorporate the 90 percent radar station design and the 90 percent access road drainage and erosion control design features.

1.1 PROJECT DESCRIPTION

1.1.1 PURPOSE AND NEED

1. The U.S. AIR FORCE proposes to construct and operate a radar station in the Northern Mariana Islands that will serve the following three new missions which cannot be satisfied using existing resources:

   - Space surveillance for acquisition of new foreign space launches.
   - Catalog resident space objects as tasked by United States Space Command.
   - Record splashdown locations [(1)] of test launches.

   This collection of information will specifically locate and track space objects such as shuttles, surveillance satellites and communication satellites. The radar will also be used to gather information on objects with decaying orbits. This data will be used to determine if these objects could land in inhabited areas necessitating appropriate warnings (Rentschler 1986a).

   The Project is known as PACBAR III, an acronym for Pacific Barrier III.

2. The mission for PACBAR III will provide coverage for a blind area between two other DOD radar stations: PACBAR I (ALTAIR) at Kwajalein, in the Marshall Islands, southeast of the Northern Mariana Islands (1982); and PACBAR II (GPS-10) located in the Philippine Islands, west of the Northern Mariana Islands (1983), as shown in Figure 1.1. The inability to provide space surveillance coverage between PACBAR II and I result in the loss of critical data on newly launched orbital vehicles (U.S. AIR FORCE 1985b).

1.1.2 OVERVIEW

1. The facility is proposed to be located on Mt. Petosukara, a low peak located on Saipan, a Northern Mariana Island more than 100 miles northeast of Guam as shown in Figures 1.1 and 1.2 Saipan was previously a part of the United Nations' U.S. Trust Territory of the

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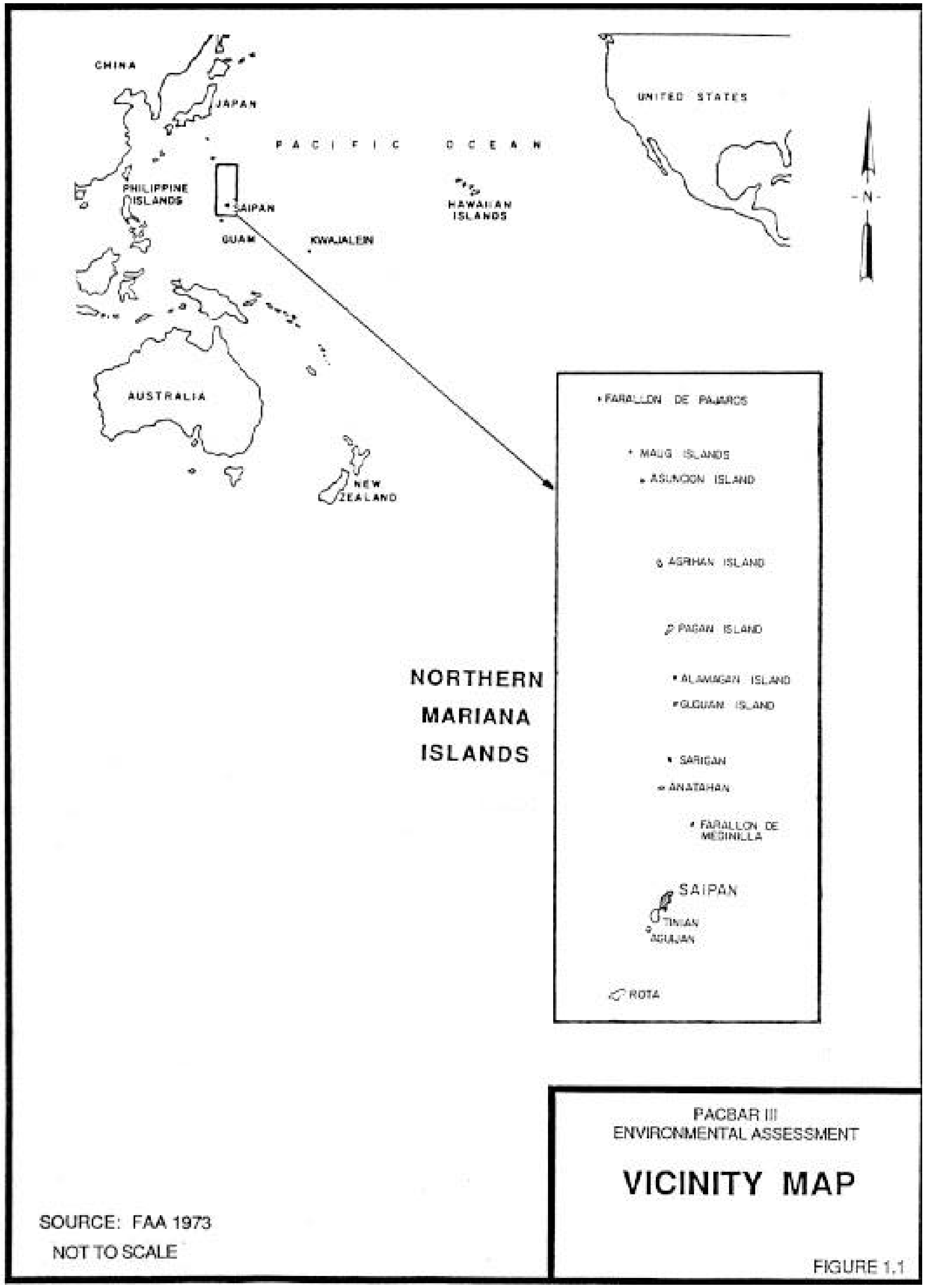
(1) The actual test mission of the radar station is to track missiles which have been teat flown on the Western Test Range into a test target area known as the Broad Ocean Area (BOA) 1, located more than 250 miles northeast of Saipan. This data will be used to determine the impact or "splashdown" location, and other characteristics of the re-entry flight. The radar cannot actually observe the impact of the missile with the ocean because of the great distance and the curvature of the earth. However, the closer the radar is to the splashdown location, the more accurate will be the calculated splashdown point, and the more complete will be the radar observations of the re-entry flight. In this document, the term "Record Splashdown locations" is used to refer to the monitoring of re-entry tests by the Saipan radar.



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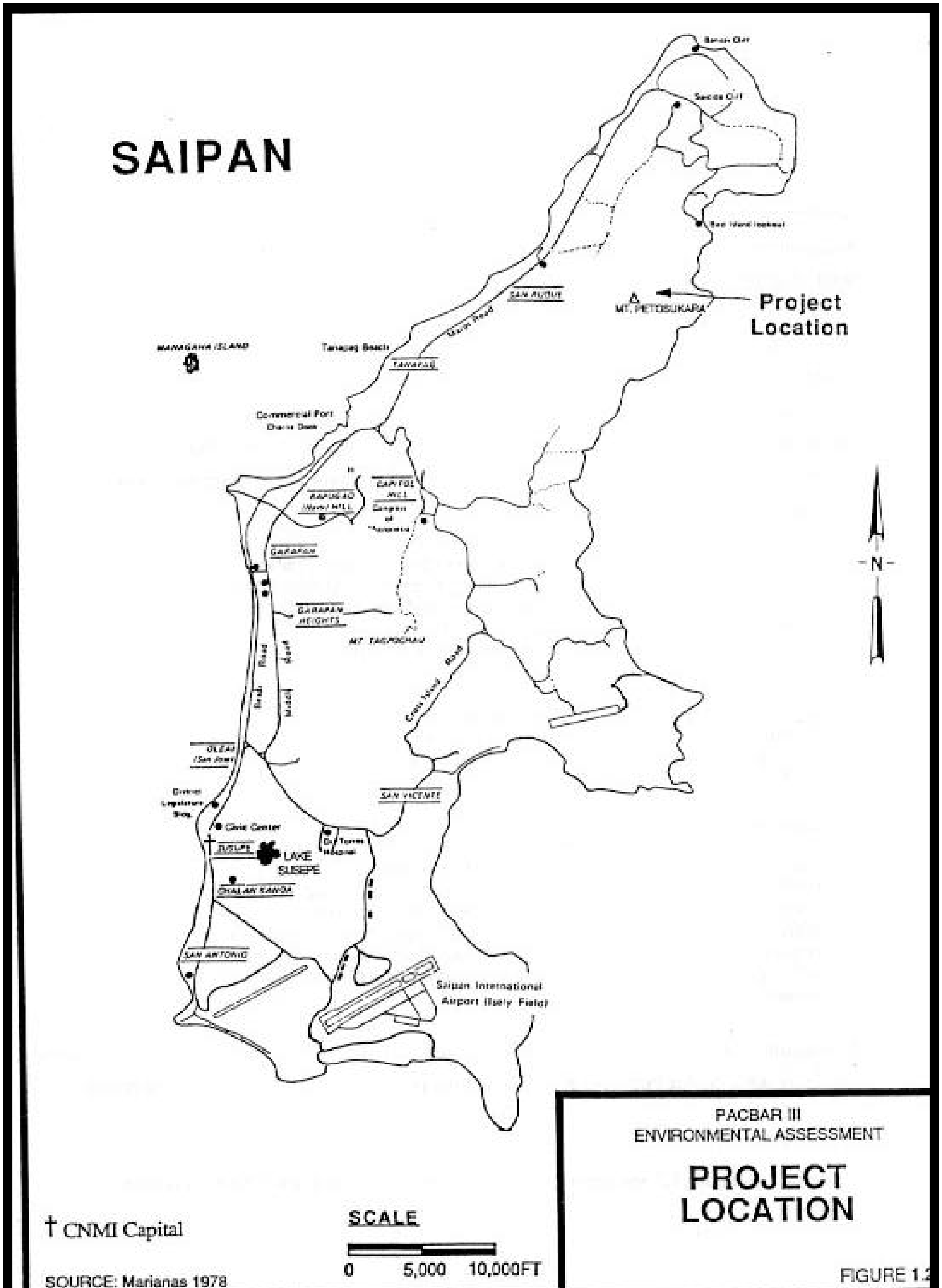
VICINITY MAP

FIGURE 1.1



PACBAR III
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PROJECT LOCATION

FIGURE 1.2

Pacific Islands. As of November 4, 1986, it is a United States Commonwealth, the commonwealth of the northern Mariana Islands (CNMI) (Federal Register, Vol.51, No. 216, and Friday, November 7, 1986).

2. See further discussion of the Trust Territory/ Commonwealth status in Chapter 9.0. Environmental considerations for the project are generally based on U.S. regulations as well as on local Saipan regulations as noted in Chapter 9.0.

3. Alternative siting locations were considered and are primarily discussed in Chapter 4.0. Three additional alternatives, which were initially considered, yet soon eliminated are discussed below. Air Force Regulation 19-2 directs that those alternatives which are considered, yet are soon determined to be unsatisfactory, may be discussed in a project description rather than in a detailed project alternatives section. These alternatives were (Rentschler 1986a,b):

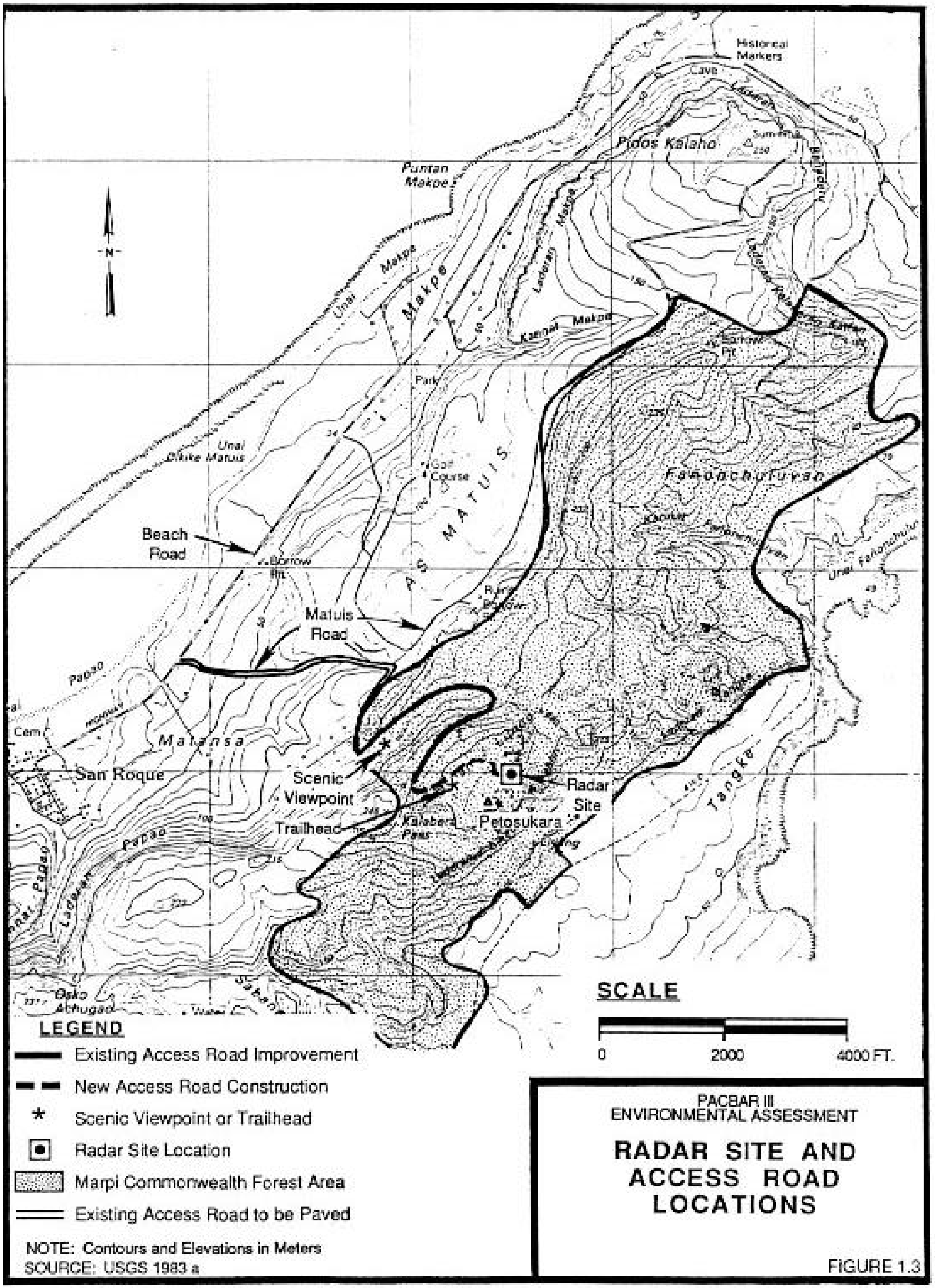
   Shipboard Radars. One ship was considered for a potential radar location. This was the USNS Vandenberg, recently deactivated due to excessive operating and maintenance costs. For comparison purposes, a similar ship, the Observation Island, currently operates with manual operating and maintenance costs more than $15 million, about five times the operating cost of a land based facility.

   Anderson Air Force Base in Northern Guam. This location was considered, yet eliminated due to various activities, which would interfere with radar operation. These activities included (1) large amounts of air traffic, and (2) electromagnetic interference.

   Less Developed and Uninhabited Islands. Use of less developed or unhibitated islands was considered, but eliminated due to costs and socioeconomic consideration. It was estimated that expenses for operating a station on such an island could approach the ship operating and maintenance costs. In addition, many more capital costs for new facilities sucha as access roads, a port and/ or employee housing would be required. Construction on an island with low population or on an unihabitated island would also impact the basic population or pristine nature of the island.

4. Evaluation of the “No Project” option is discussed in Section 4.6. This option is not considered viable by the U.S. AIR FORCE because the required project missions could not be otherwise satisfied.

5. As shown in Figure 1.3 and described in the following sections, PACBAR III is proposed to consist of:


Historical Markers
Cave
Pidos Kalaho
Puntan Makpe
Makpe
Unai Makpe
Kannat Makpe
Borrow Pit
Park
Unai Dikike Matuis
Golf Course
AS MATUIS
Fañonchuluyan
Unai Fañonchulu
Beach Road
Borrow Pit
Matuis Road
Papao
Cem
Matansa
San Roque
Scenic Viewpoint
Trailhead
Radar Site
Petosukara
Kalaberi Pass
Tangke
Papao
Oako Achugao
SCALE
0
2000
4000 FT.
LEGEND
Existing Access Road Improvement
New Access Road Construction
Scenic Viewpoint or Trailhead
Radar Site Location
Marpi Commonwealth Forest Area
Existing Access Road to be Paved
NOTE: Contours and Elevations in Meters
SOURCE: USGS 1983 a
PACBAR III
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RADAR SITE AND
ACCESS ROAD
LOCATIONS
FIGURE 1.3

- An access roadway which primarily consists of improvements to an existing roadway. About 1,500 feet of the roadway would be new construction.

- A Radar Site facility located on about four acres of land.

- Related service facilities, including:

  -Onsite diesel generators
  -A microwave link telecommunications service
  - An onsite rainwater collection system for non-potable water
  - An onsite septictank and leach field sewage system
  - Aa flammable materials storage building
  - Onsite fire suppression capability

6. The PACBAR III facility originally proposed included a Boresight Tower and a related 0.7-mile Access Road, which would have been located in relatively undisturbed forest. In June 1986, the U.S. Air Force decided to eliminate the Boresight Tower portion of the project to reduce environmental impacts.

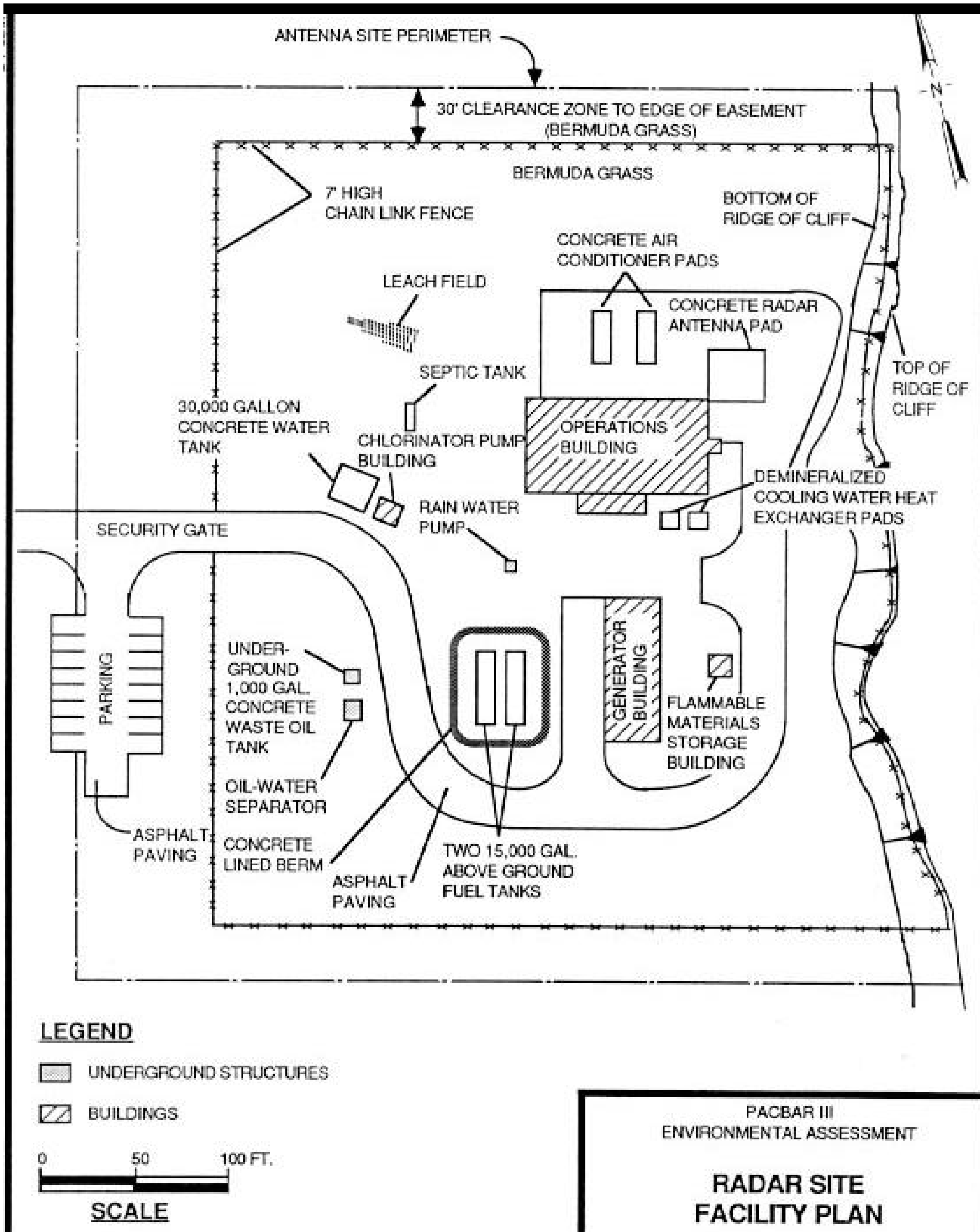
7. PACBAR III, as currently planned, will be operated by a Contractor to the U.S. AIR FORCE. Operations will be on a 24-hour, 7-day per week basis.

8. Construction is planned to begin in 1987 and continue for about 18 months. The facilities will be operational in 1990. The total estimated cost of the construction is approximately 5.2 million dollars.

1.1.3 RADAR SITE FACILITY

1. The radar site, as shown in Figure 1.4, will consist of a 370- by 480- foot area (approximately 4 acres), enclosed on 4 sides by a 7-foot high chain-link security fence (Smith, Young & Hida 1987b). The East Side will be at the top edge of a cliff. A 30-foot wide clear zone, planted with common Bermuda grass, will surround the outside perimeter of the fence. The zone is used for security purposes. A 16- car parking lot will be provided outside the fence near the secured facility entrance. A manually operated 26-foot wide vehicle gate will be included.

2. Inside the fence, the primary structures will be the Operations Building, the Generator Building, and the Radar Antenna. Secondary structures also located within the fence will include: a guardhouse, flammable materials storage building, pump/ chlorinator building, 30,000-gallon concrete water storage tank, two air conditioners, two demineralized water heat exchangers, and two steel 15,000- gallon aboveground diesel fuel storage tanks. Underground items will include a 1,000-gallon waste oil storage tank; septic tank, leach field, and raw rainwater silt catchment basin.



Source: Smith, Young & Hida, Inc. 1987a

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RADAR SITE FACILITY PLAN

FIGURE 1.4

3. The parking area and roadway within the radar station will be paved with asphalt concrete. The Access Road will be constructed of compact coral, a common road construction material on the island. The initial, approximate 0.3-mile section, from Beach Road to where the major drainage areas combine into the main storm ditch, will be paved with asphalt. See section 1.1.4 for more Access Road construction details.

4. The Operations Building will be a 6,000 square-foot, single-story, air-conditioned building, constructed of concrete masonry units. It will house offices, the control center, and a data handling area and a transmitter room. Part of the facility will be Electromagnetic Interference (EMI) shielded. The building will be designed to withstand 155-mph wind conditions and seismic loads of Zone 4 intensity. The Mariana Islands are located in a Zone 3 earthquake area and Zone 4 design standards include all requirements for Zone 3 and more.

5. The Generator Building will be a 2,600 square-foot, single-story building, constructed of concrete masonry units. This building will house three 500-kW diesel generators, shop/warehouse space, and an air-conditioned office. The diesel generators will be provided with vibration dampners, exhaust silencers and soundproof insulation on the exhaust ducting. No special air quality control features are provided because local island wind conditions disperse air emissions quickly. Further, the emissions are well below the allowable limits (see Section 3.1). The office door and interior windows are also soundproofed. This building is designed to withstand 155-mph wind conditions and seismic loads of Zone 4 intensity.

6. The 130-ton radar antenna and pedestal will be mounted on a 30-by 30-foot concrete foundation. The radar is the refurbished T-AGM-9 C BAND radar, which was removed from the U.S.N.S GENERAL H.H. ARNOLD, a decommissioned range instrumentation ship. The antenna consist of three sections: a pedestal (60 tons), a yoke (65 tons), and a 30-foot diameter dish (5 tons). The bottom of the antenna will stand 22 feet above the ground, and will be equipped with elevation and azimuth switches to protect personnel and the public from radiofrequency emissions. The transmitter receiver, signal processing and ancillary equipment will be housed in the Operations Building. Table 3.2, in Section 3.5, summarizes the antenna characteristics used to estimate potential radiofrequency emissions.

7. Power will be generated onsite by one of three 500-kW diesel generators. The second and third generators will provide standby power. Diesel fuel will be stored in two 15,000-gallon, steel, aboveground storage tanks. The two storage tanks will be placed in

a concrete-paved berm which will be large enough to contain more than twice the capacity of both tanks if a spill should ever occur.

8. Potable water will be bottled and transported to the station by truck. Non-potable water for washing, toilets and demineralized circulation water makeup, will be obtained from rainwater collected by roof gutters along both the Operation and Generator Buildings. The rainwater will flow from the gutters to an underground raw water sump for solids removal and chlorination. The chlorinated rainwater will be pumped to an aboveground 30,000-gallon (30-day supply) concrete storage tank, from which it will be distributed for use in facility. The cathcment basin will be supplied with an overflow discharge line.

9. The sanitary sewer system will consist of a 2-compartment, concrete septic tank and a leach field. Wastewater from the Operations and Generator Buildings at the radar station will gravity flow to the septic tank, be treated by biological oxidation, and then gravity flow to the perforated pipe leach field for percolation into the soil.

10. Telephone service will be provided by a microwave link to Guam.

11. Calibration of the radar antenna will be accomplished by a combination of:

    - Small boresight equipment located on an existing tower or towers
    - Boresights on ships and/or aircraft
    - Calibration spheres (balloon-like spheres) and/or
    - Satellites

12. The flammable materials storage building will be a commercially manufactured metal storage unit specifically designed for the storage of flammable materials and as a hazardous waste accumulation point. The unit will be designed with a self-contained sump with sufficient capacity to contain leakage from 55-gallon drums stored in the unit.

13. The 1,000-gallon underground concrete waste oil tank will be designed according to U.S. EPA regulations for secondary containment. The tank will be placed in a trench lined with a synthetic impermeable liner and backfilled. A 4-inch diameter observation pipe will be used for leak detection in the backfilled region.

14. Fire suppression capability will consist of individual halon protection units on each generator and a complete subfloor halon system for the Operations Building.

1.1.4 ACCESS ROAD

1. Access Road work, shown in Figure 1.3, will include improvements for approximately 1.9 miles of existing roadway and construction of approximately 0.3 mile of new roadway (Smith, Young & Hida 1987a and 1987b). The initial section of improved roadway will be paved as described below. The planned access roadway work consists of:

   - Re-grading of 1.9 miles and paving the lower 0.3 mile of existing Matius Road between Beach Road and the Access Road into Marpi Commonwealth Forest. This section will have a grade of 8% to 10% and will be 26 feet wide, including shoulders.

   - Widening approximately 1.3 miles of existing roadway from entry of the Marpi Commonwealth Forest toward the radar Site, and constructing approximately 0.3 mile of new roadway from the Access Road tot he Radar Site. These sections will have a preferred maximum grade of 8%, which occasional short lengths in excess of 8%, and will be 20 to 26 feet wide, including shoulders.

2. A significant feature of both the new and improved roads segments will be the engineered drainage control system; designed to maintain storm runoff flows in controlled, vegetated and rock-protected ditches. This will greatly reduce erosion potential, which presently exists, and will also reduce the velocities of high runoff flows. Hard limestone riprap, or equivalent materials, will be used as the primary material for erosion protection because: (1) rock can be used to fit the existing terrain without excessive grading and vegetation removal, (2) riprap will tend to cause flow velocities to be reduced due to the rough surface, and (3) rock is relatively easy to maintain.

3. The Access Road to the Radar Site will be designed for normal traffic plus one-time use of a heavy equipment transporter, which will be used to haul the radar sections to the site.

4. In cooperation and coordination with the Department of Natural Resources, the location of one scenic viewpoint and one trailhead will be established along the Access Road at the approximate locations shown in Figure 1.3 (Culbert 1986c). Parking for 5 to 10 vehicles will be made available at the scenic viewpoint.

5. An expanded description of the Access Road drainage and erosion control features is presented in Appendix K.

1.1.5 CONSTRUCTION CONSIDERATIONS

1. It is expected that most construction materials will be brought onto the island. The contractor will be rewired to insure that any equipment or supplies delivered to Saipan are free of any introduced organisms, especially brown tree snakes (Glass 1986). This requirement will include, but will not be limited to, quarantine activities and posting signs. The docking and unloading will occur at Charlie Dock in tanpang Harbor on the west side of the island Temporary storage will be provided on site.

2. Construction equipment, which may also be moved to the island, includes a coral crusher, a heavy crane, earthmoving equipment, and temporary generators.

3. It is anticipated that successful contractors will use local crews and equipment to the extent possible.

4. Road modifications and construction will be completed first in order to transport materials and equipment tot he sites. It is not anticipated that any physical improvements will be required at the existing quay, bridge, and five culverts, which are along the haul route. An engineering study will be performed by the Air Force to determine if temporary measures such as one-time use of temporary steel plated may be used for temporary worker strengthening (Rentschler 1986a). Two areas of tree cover may have to be trimmed, and 22 sets of utility lines may have to be temporarily removed for overweight loads. Current plans are to use a multiwheeled tank mover (heavy equipment transporter) which distributes weight sufficiently in order to avoid damage to the road, bridge or culverts.

5. The construction specifications will require site practices to minimize environmental impacts. Work limits will be indicated on site drawings. Dust and erosion control will be forced during grading operations, and exposed graded areas will be replanted with common Bermuda grass or fast-growing, local trees immediately after grading (Smith, Young & Hida 1987b and U.S. EPA 1977). Removed vegetation will be hauled to acceptable disposal sites in accordance with federal and local regulations (Smith, Young & Hida 1987b). Removed vegetation will not be burned.

6. After grading is completed and prior to pouring concrete slabs, the soil will be treated with water-based pesticides to protect wooden structures from subterranean termites. The pesticides will be registered with the U.S. Environmental Protection Agency (U.S. EPA).

In Addition pesticide concentrations will not exceed values specified in NAVFAC Specification No. 41-84-0229, Division 2, Section 02250 (Smith, Young & Hida 1987b). No restricted-use pesticides are planned to be used.

7. Use of explosives during construction will not be permitted, as specified in NAVFAC Specification No. 41-84-0229, Division 2, Section 02102.

8. A special ordnance survey will not be conducted to find ordnance in addition to that found by the archaeological survey team. However, a site ordnance removal plan will be utilized by the construction contractor to assure contractor safety.

1.1.6 OPERATIONS

1. PACABAR III is currently planned to be operated by a contractor hired by the U.S. AIR FORCE. About 30 personnel will operate the radar station on a 24-hour, 7-day per wwk basis. Except for maintenance personnel, the station personnel will be highly skilled engineers and technicians. Supervisory Air Force personnel may also be on sites (Rentschler 1985a).

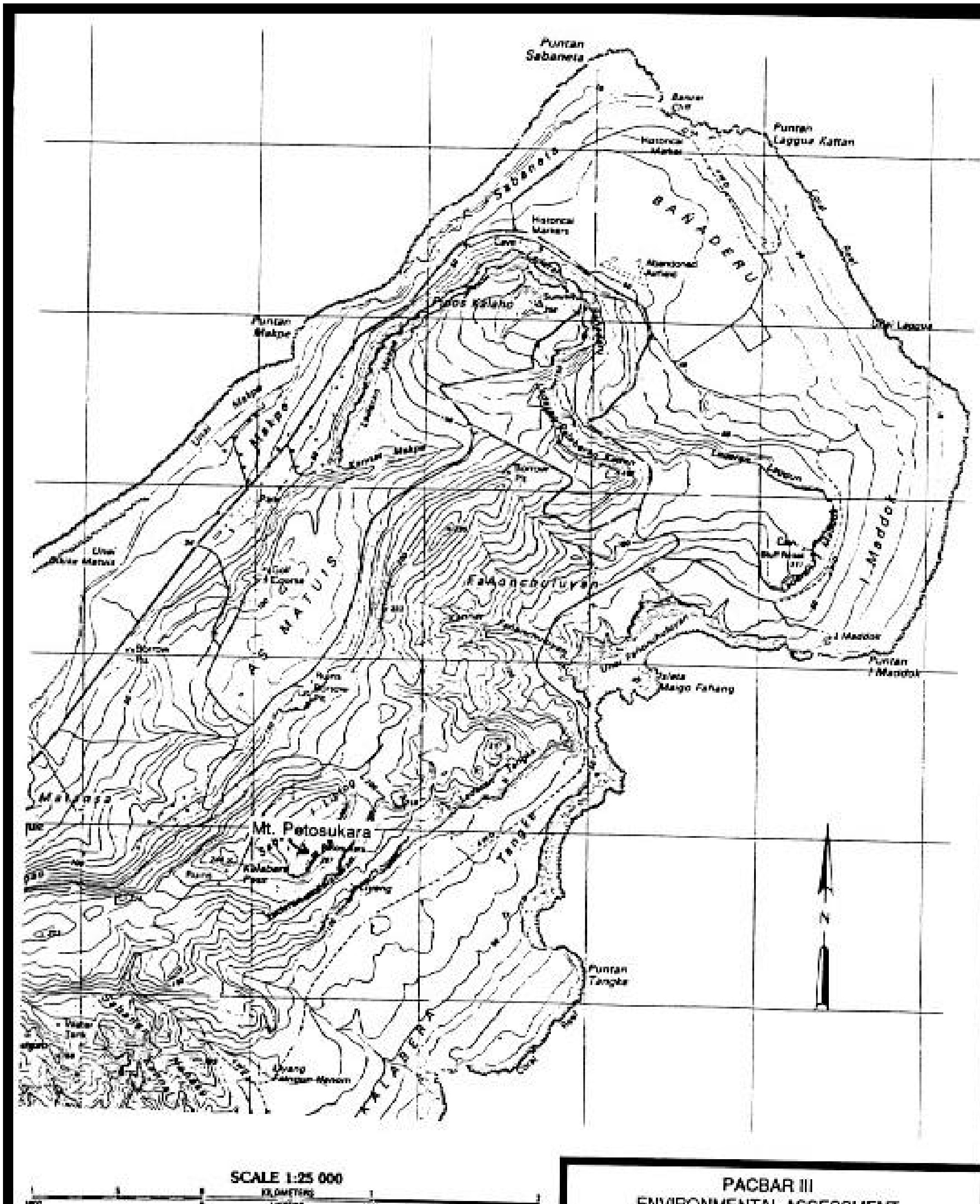
2. The operational period is planned to last for 25 years (U.S. Navy 1985a).

1.2 EXISTING SITE CHARACTERISTICS

1.2.1 TOPOGRAPHY

1. The island of Saipan is approximately 13 miles long and averages approximately three miles in width. It is the second largest island in the Mariana archipelago, with an area of approximately 29,800 acres (Perry 1984). A main mountain mass runs north and south through the island and is referred to as axial upland (coastal Resources 1980). The highest point, located near the center of the island, is Mt. Tagpochau (also referred to as Ogso tagpochau, Osko Takpochao, and Mt. Tapochau) at 1,555 feet. The proposed project location is on another mountain peak toward the northern end of the island, named Mt. Petosukara at 942 feet, which is shown in figure 1.5.

2. In addition to the axial uplands. Located on two-thirds of the central northern part of the island, the islands are characterized by five other predominant physiographic features shown in Figure 1.6. These features are:



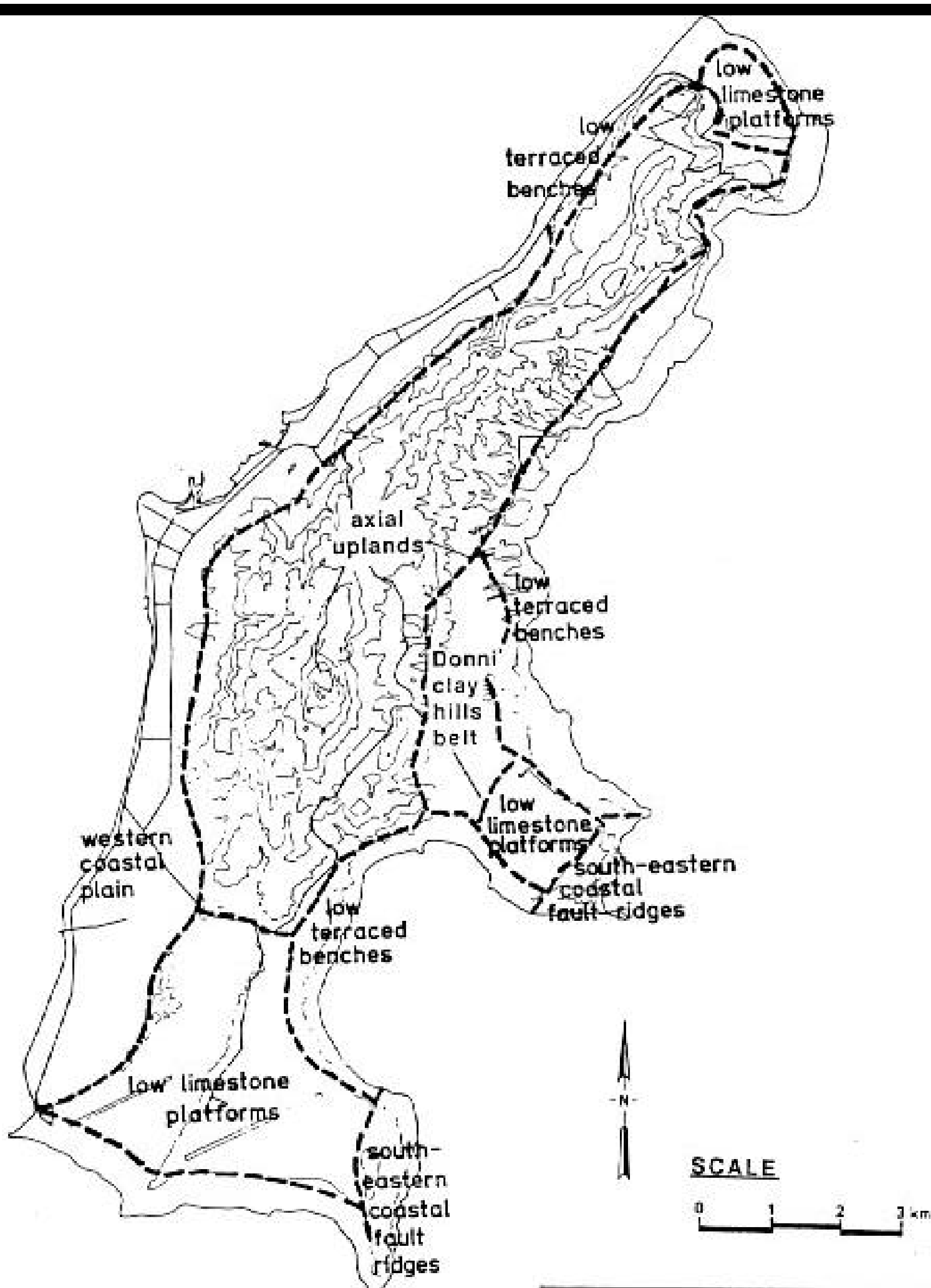
NOTE: Contours and Elevations in Meters Interval - 10 Meters

SOURCE: USGS 1983 a

PACBAR III
ENVIRONMENTAL ASSESSMENT

NORTHERN SAIPAN TOPOGRAPHY

FIGURE 1.5



NOTE: Contour Interval 50 Meters

SOURCE: Coastal Resources 1980

PACBAR III
ENVIRONMENTAL ASSESSMENT

SAIPAN PHYSIOGRAPHY

FIGURE 1.6

- Low terraced benches located primarily along the northwestern and eastern coastlines.

- A western coastal plain located along the entire western coastline, excluding the far northern section.

- Southeastern coastal fault ridges located along the eastern coastline.

- Low limestone platforms found in three locations near the coastlines: at the northern tip of the island, and on the central eastern tip of the island, known as Kagman Peninsula. Air field landing strips, some abandoned and one active, are located on each of these limestone platforms.

- A donni clay hills belt located between the axial uplands and low terraced benches in the central eastern part of the island.

3. The proposed project location is in the axial upland region bordering the northeastern low terraced benches.

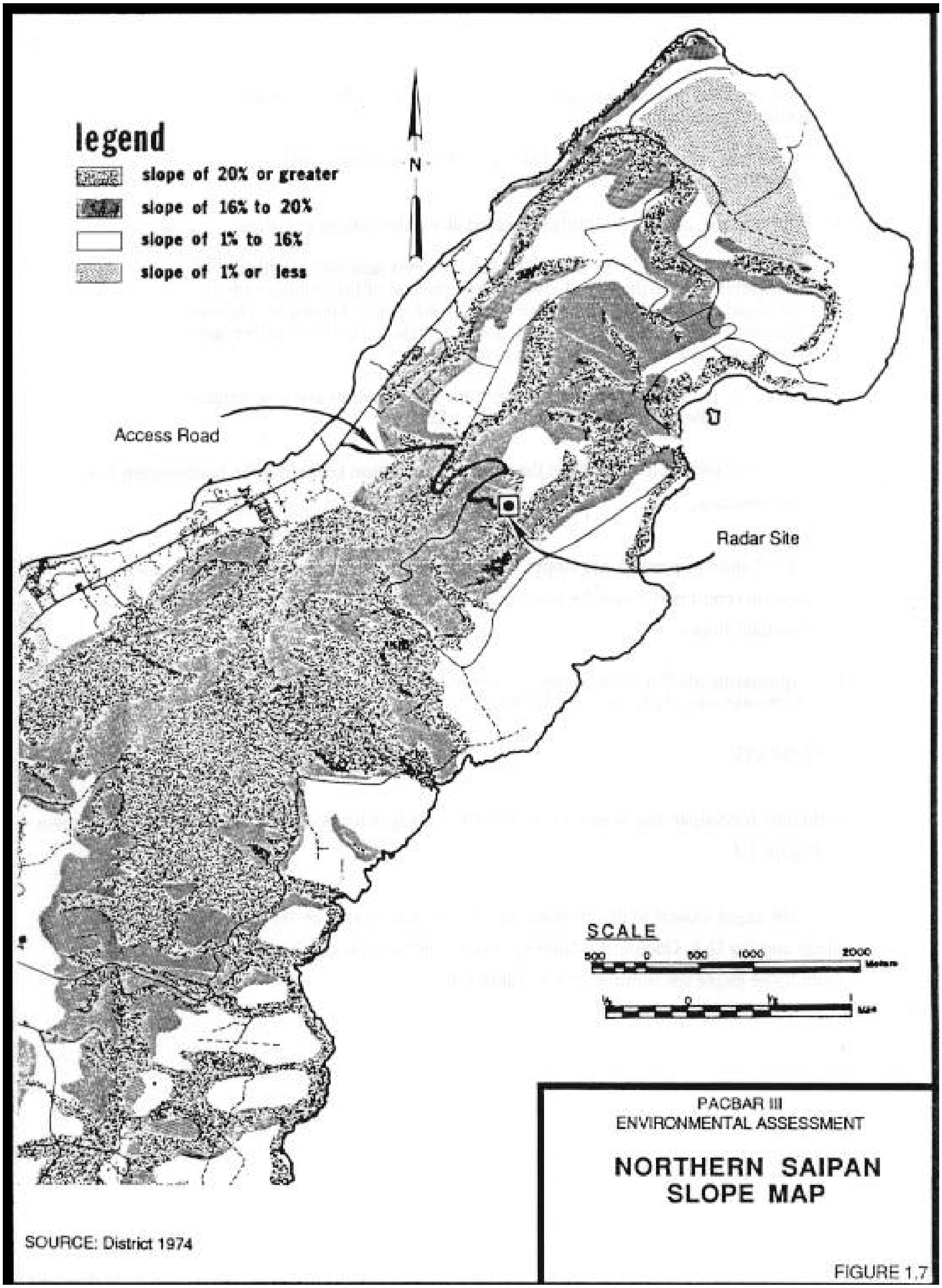
4. Figure 1.7 shows approximate slopes in the vicinity of the project. In addition, a soil exploration report performed for the project area (Lum 1985) indicates the following approximates slopes:

- Approximately 5 to 20% along the proposed access roads, and
- Approximately 12% at the Radar Site.

1.2.2 CLIMATE

1. Rain data for Saipan has been collected at 14 rain gages located throughout the island as shown in Figure 1.8.

2. The rain gages closest to the proposed project location are The Japanese Mt. Talufofo Rain Gage and the U.S. Geological Survey, 9-Mgal (million gallon) Reservoir Rain Gage. Data from these gages are summarized in table 1.1.

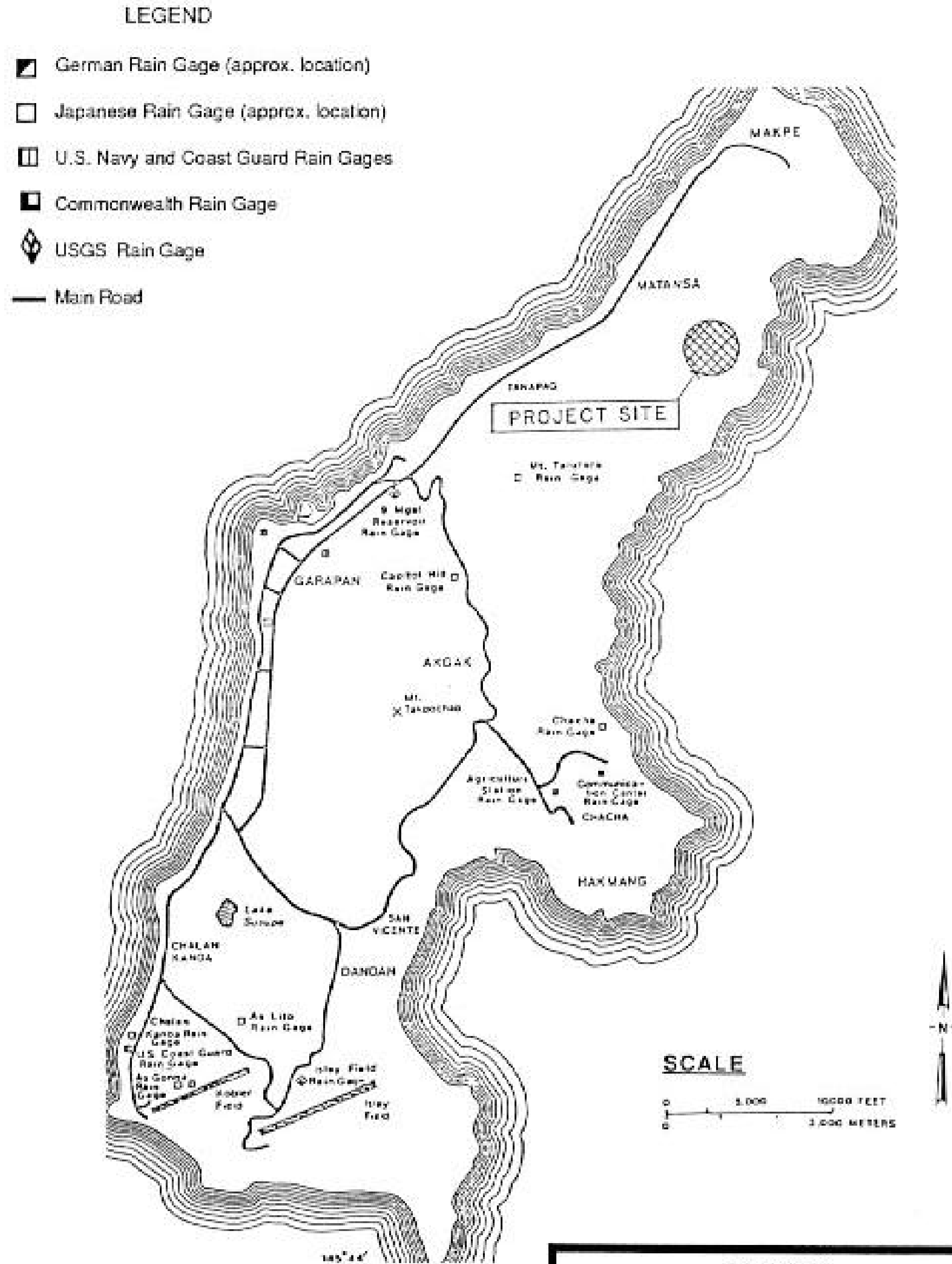


SOURCE: District 1974

PACBAR III
ENVIRONMENTAL ASSESSMENT

NORTHERN SAIPAN SLOPE MAP

FIGURE 1.7



SOURCE: USGS 1985

PACBAR III
ENVIRONMENTAL ASSESSMENT

SAIPAN RAIN GAGE STATION LOCATIONS

FIGURE 1.8

TABLE 1.1

SAIPAN
RAIN GAGE DATA FOR
PROPOSED PROJECT LOCATION

AVERAGE MONTHLY DISTRIBUTION OF RAINFALL[1]	WEATHER STATION[2] MT. TALUFOFO	USGS 9-Mgal RESERVOIR
Period of Record	1926-1941	1977-1983
Station Elevation (feet)	680	60
January	5.36”	2.37”
February	3.39”	2.37”
March	2.69”	1.60”
April	2.49”	1.86”
May	4.29”	2.49”
June	5.26”	3.03”
July	11.36”	7.72”
August	13.06”	10.22”
September	15.76”	12.40”
October	10.29”	11.91”
November	6.30”	9.77”
December	4.95”	3.66”
TOTAL	85.20”	69.40”

3. Saipan’s climate is tropical marine (Coastal Resources 1980). Temperatures range from 75° to 85°F, and rainfall is abundant. Saipan’s mean annual rainfall is approximately 81 inches. Records for the Mt. Talufofo Rain Gage, located approximately three miles from the project, show average annual rainfall of approximately 85 inches (USGS 1985). There are distinct wet and dry season, the dry season lasting from about December to June. Trade winds are pronounced and persistent from January through May, blowing from the east or northeast. Wind directions are more variable from July through October.

4. Two kinds of storms contribute to Saipan’s climate: thunderstorms and squalls, and tropical storms and typhoons. Typhoons have occurred in all months of the year, but are more frequent the rainy season. Typhoon winds may be from 60 mph to 200 mph. Two typhoons have caused major destruction on the island in the past 20 years: Typhoon Jean in 1968 and Super typhoon Pamela in May 1976. Thunderstorms most frequently occur during the rainy season (FAA 1973).

---

(1) Source: USGS 1985.
(2) See Figure 1.9 for Satin Locations.

1.2.3 AIR QUALITY

1. Air quality on the island is under the jurisdiction of the Department of Public Health and Environmental Services (DEQ 1984). The air quality of Saipan is described as “pristine”, and the entire island is classified as a Class I “attainment” area for all criteria pollutants. A Draft State Implementation Plan (SIP) is currently being reviewed for final approval by the Region IX Environmental Protection Agency. Open burning practices (i.e., at the Puerto Rico Dump) are of concern; however, these practices will not be used at the Radar Site.

2. The relatively small size of the island and normal wind conditions prevent concentrations of any emissions which would create air quality degradation common to larger areas with larger populations.

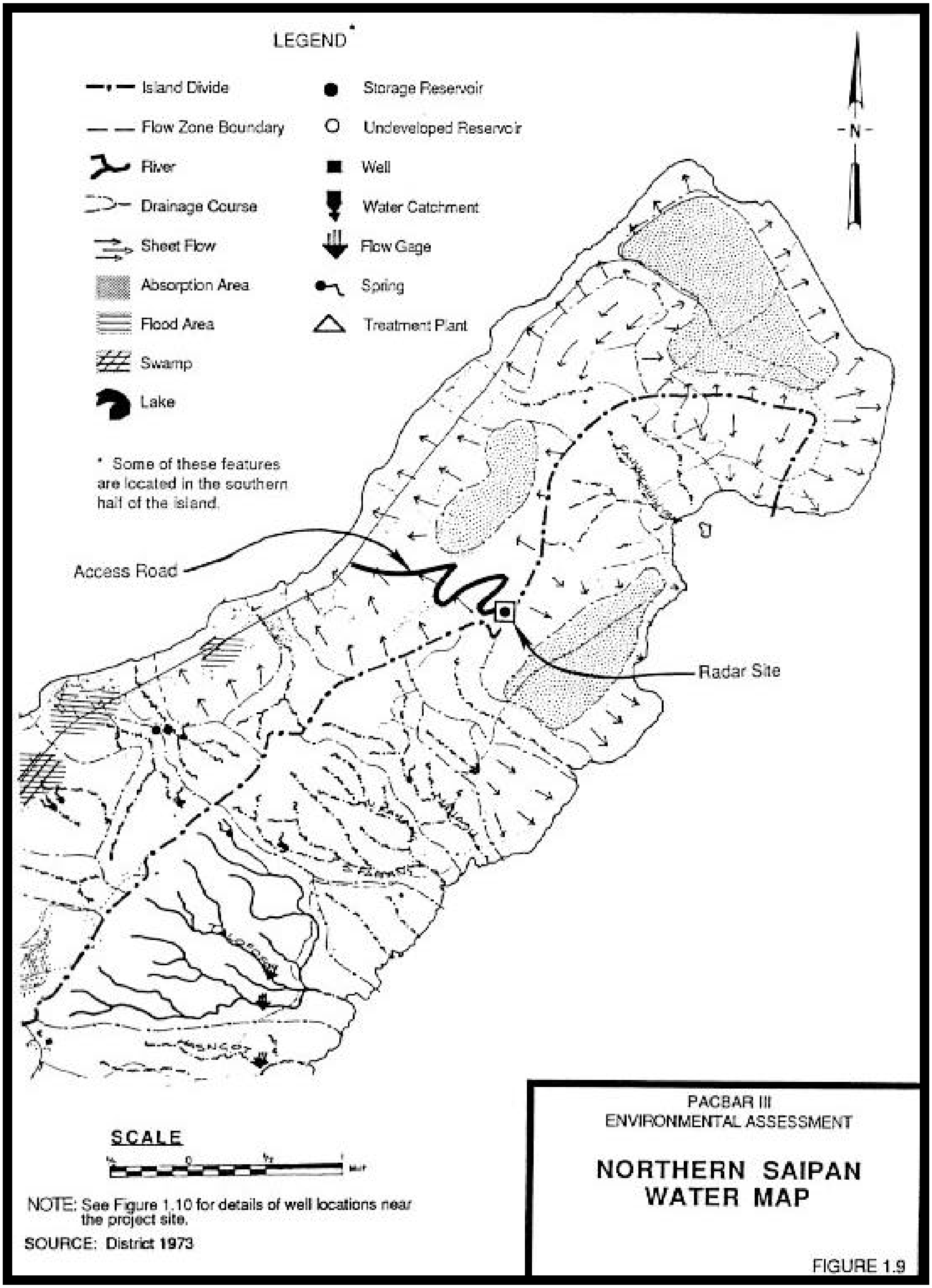
1.2.4 HYDROLOGY

1. Surface water resources on the northern end of saipan are illustrated in Figure 1.9. This map shows rivers, drainage courses, flood and swamp areas, lakes, reservoirs, wells, water catchments, and water absorption areas on the island. The term “absorption area” refers to infiltration zones, flat areas where water percolates quickly into the ground through limestone formations.

2. The majority of the proposed project activities will be on areas of the western facing slope, which discharges into drainage courses, which flow along roadways. These eventually flow toward the Philippine Sea. Flow on these locations has an existing negative effect on beaches and adjacent coral reefs. This existing impact will be mitigated by paving a portion of the roadway and by providing drainage diversion and erosion control features for the entire road under the proposed project contract (U.S. EPA 1977)(see Section 5.2.3).

3. The eastern edge of the proposed Radar site may be in an area where runoff flows to an absorption area on the eastside of the island. This is a very small portion of the total project.

4. No lakes, perennial streams, spring, flood or swamp areas are located in the proposed project area or the drainage zones associated with this area.


LEGEND*
Island Divide
Flow Zone Boundary
River
Drainage Course
Sheet Flow
Absorption Area
Flood Area
Swamp
Lake
Storage Reservoir
Undeveloped Reservoir
Well
Water Catchment
Flow Gage
Spring
Treatment Plant
* Some of these features are located in the southern half of the island.
N
Access Road
Radar Site
SCALE
NOTE: See Figure 1.10 for details of well locations near the project site.
SOURCE: District 1973
PACBAR III
ENVIRONMENTAL ASSESSMENT
NORTHERN SAIPAN WATER MAP
FIGURE 1.9

5. Although not used as a source of water for the proposed project, ground water is the major source of water for the island residents. The ground water meets National Interim Primary Drinking Water Standards. However, it does not meet National Secondary Drinking Water Standards (Coastal Resources 1980). The water is high in salinity, probably due to bomb action during World War II and overdraft by developments. The closest wells to the proposed project are shown in Figure 1.10. These wells are private and located near the Access Road to the entrance of the Marpi Commonwealth Forest, at the nearby Mariana Country Club Golf Course, and Hotel Nikko. Public wells are not located in the area.

6. The test borings drilled for the facility (Lum 1985) were dry, and shallow ground water does not exist at the site.

1.2.5 GEOLOGY AND SOILS

1.2.5.1 Geology

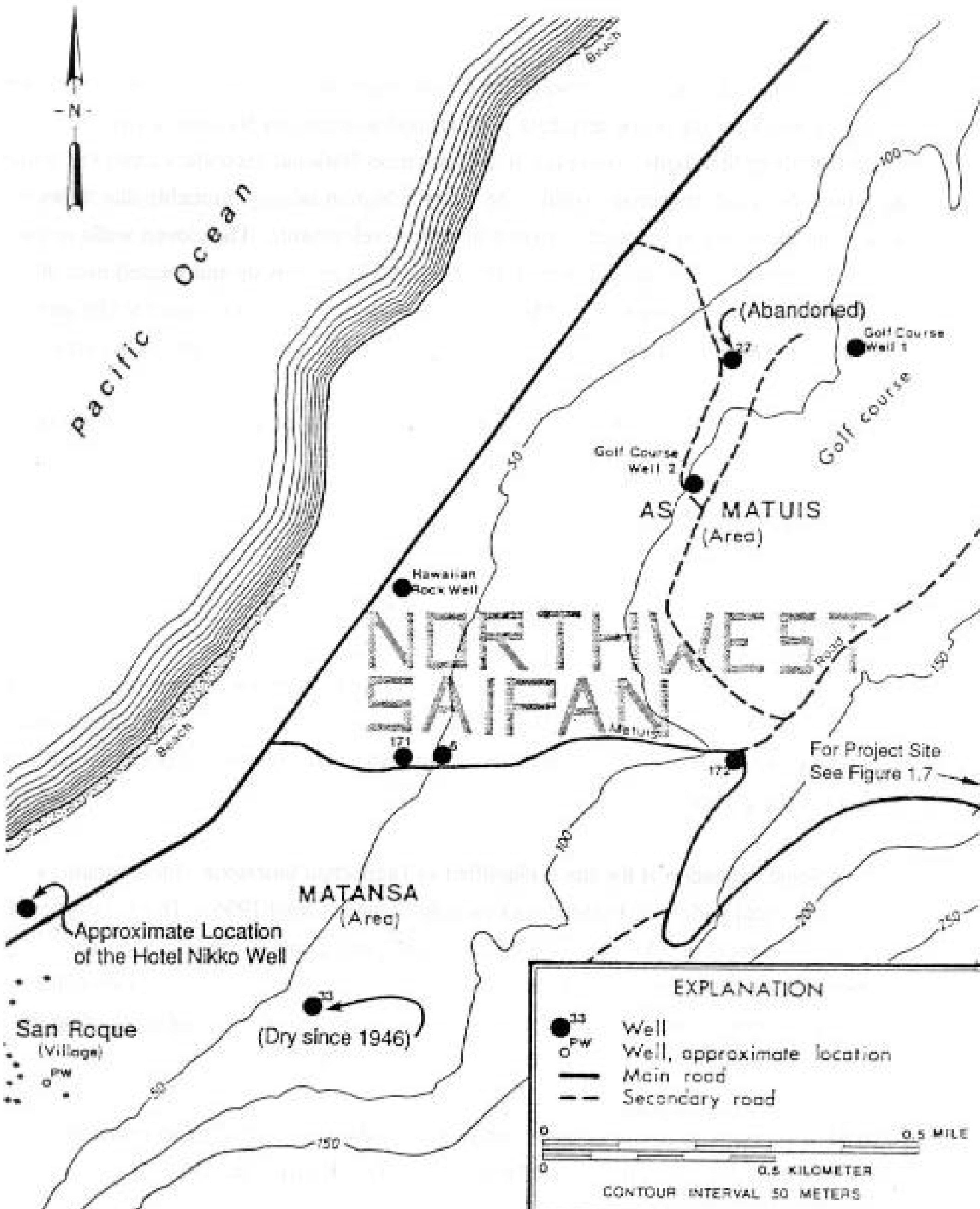
1. The island is composed of weathered volcanic rock and high peaks of limestone. Some of the geological formations are of mixed volcanic and calcareous materials. Mt. Tagpochau, mentioned in Section 1.2.1, is an extinct volcano. No active volcanoes are located on the island (Fosberg 1960).

2. The geological formation at the site is classified as Tagpochau limestone-Inequigranular Facies, the most widely distributed rock type on Saipan (Cloud 1956). This rock type, of thickness in excess of 900 feet, is the bedrock over almost one-third of Saipan. The proposed Radar Site and Access Road are located on a coral reef formation. Boreholes drilled in the project area indicate that the soil above the coral extends to a depth of up to 12 feet, increasing in thickness toward the west (Lum 1985).

3. The Mariana Islands are classified as Zone 3 earthquake area, indicating that seismic activity would probably cause moderate damage (M&E Pacific, Inc. 1985).

1.2.5.2 Soils

1. A soil map of the proposed project area in Saipan, by advance draft copy (Young 1985), is presented as Figure 1.11 and shows that the predominant soils in the area of the proposed

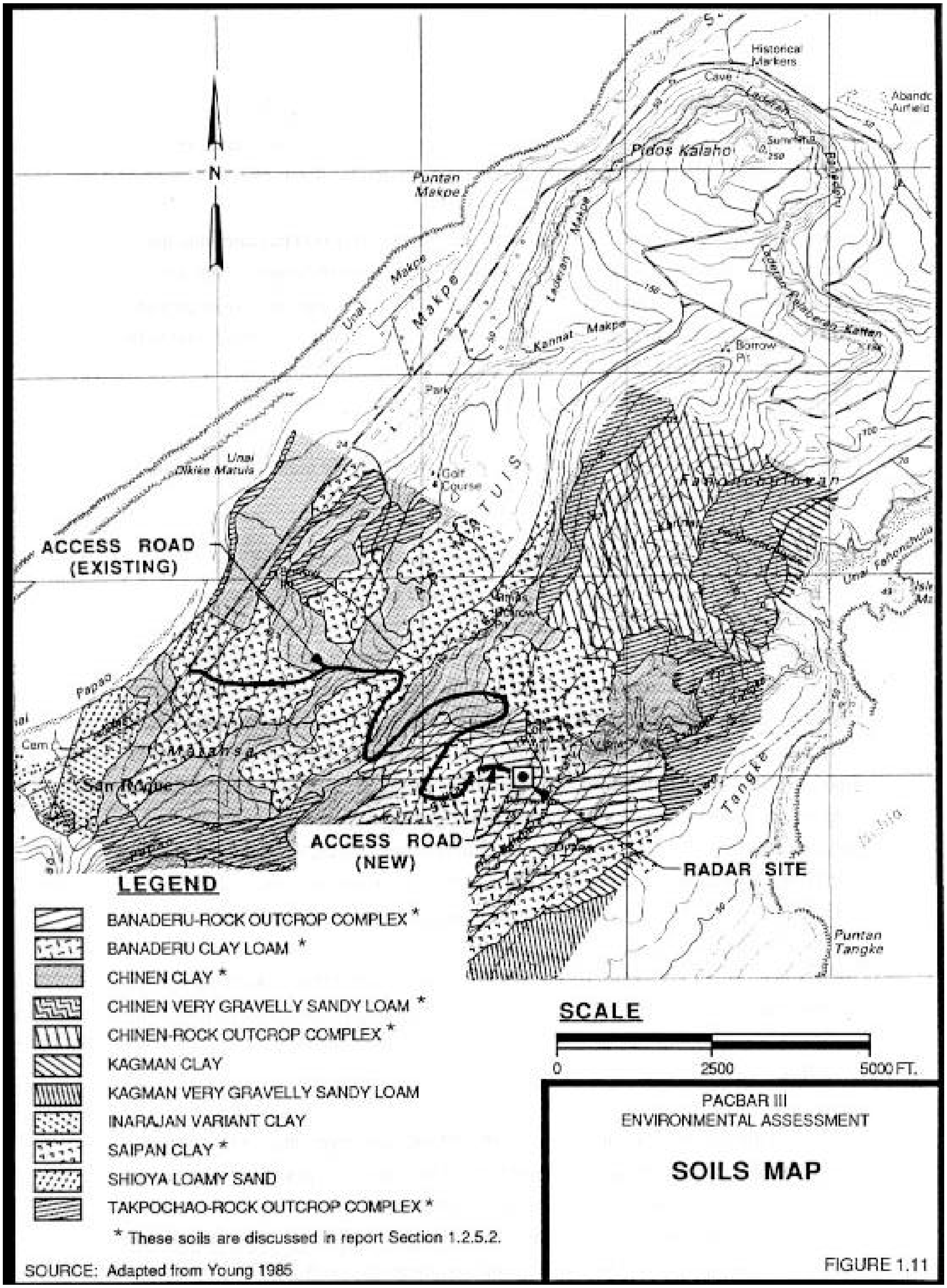


SOURCE: DEQ 1986 a

PACBAR III
ENVIRONMENTAL ASSESSMENT

GROUND WATER WELLS IN NORTHWEST SAIPAN

FIGURE 1.10



PACBAR III
ENVIRONMENTAL ASSESSMENT

SOILS MAP

FIGURE 1.11

project are clays or rock outcrop complexes. Soils along the Access Road and at the Radar Site are Banaderu, Chinen, and Saipan. In general, these soils are formed from sediments overlying limestone and are characterized by slopes of 3 to 30 percent.

2. A soil exploration report prepared for the project area (Lum 1985) indicates that the soil profile consists of a surface layer of dark brown to reddish-brown clayey soil about 1 to 12 feet thick; underlain by a slightly to highly fractured, very light pink to white coral limestone breccia. The contact between the soil and coral was found very distinct with the coral surface being irregular but relatively smooth. No noticeable zone of decomposition between soil and coral was observed.

3. The stability of the surface soils will depend upon how the site is graded and drained, both at and below the surface.

4. Bulldozer paths were cut for surveying of the proposed project in 1985 (see Figure 4.6). The activity was performed by the Air Force engineering subcontractor in order to do soil testing. The DEQ was notified and a permit was obtained for this activity (CNMI, DEQ, May 17, 1985). However, the exact area to be bulldozed was not specifically discussed and minor soil erosion may have occurred. Wood-rose has grown in the cleared areas, replacing some limestone forest important to area wildlife. Affects of the cleared path to the radar Site will be mitigated in a manner to be agreed upon with the appropriate island and government agencies. It should be noted that the majority of the road to the Radar Site and the originally proposed Boresight Tower location was in existence in 1958 (Saipan Photo Contour Maps, APWO Drawing Nos. 11612 and 11613, Department of the Navy, Bureau of Yards and Docks, July 1, 1958). Bulldozer paths cut in 1985 were primarily over existing pathways.

5. As reported by the Soil Conservation Service, the project area is not located in a “severe erosion” area (Perry 1984).

1.2.6 NOISE

1. Background noise levels for the proposed project site vary depending on the location. Noise levels near Beach Road are affected by the number and types of vehicles driving on the road, and the time of day. Noise levels for most of the existing access roads, away for Beach Road, are those similar to uninhabited forestland. Few vehicles per week are estimated to travel the existing unpaved forest Access Road.

2. Saipan International Airport, located approximately 10 miles south of the project, is a source of intermittent noise levels at the project site, due to airplane landings and takeoffs. However, noise observations at the project in April 1985 showed intermittent noise levels due to airplane traffic to be nominal. Higher levels are not expected because flight patterns for usual airplane traffic cross the southern end of the island rather that the northern end near the project location.

1.2.7 RADIOFREQUENCY EMISSIONS

1. A radio broadcasting company is located approximately two miles to the north of the project area (Far East Broadcasting Co., Inc.-FEBC) and broadcasts over a frequency range of 6 to 17 megahertz (springer 1985). FEBC operations are not expected to interfere with PACBAR III operations, and PACBAR III operations are not expected to interfere with FEBC operations.

2. Telephone transmissions on the island will not be affected by radar operations (see Section 3.5).

1.2.8 FLOOD PLAINS/WETLANDS

1. Figure 1.9 shows that flood areas are located on the western coast of the island away from the proposed project.

2. The Marpi area in the northern central portion of Saipan is characterized by excessive slopes and does not include any wetland areas (Perry 1984).

3. During construction activities, the multiwheel transport vehicle will cross two natural drainageways. One of these drainageways, consisting of a series of seven small culverts, has been known to flood.

1.2.9 FLORA/FAUNA

1.2.9.1 Flora

1. Historically, the vegetation of Saipan has been altered by foreign cultures and was destroyed during World War II. Island vegetation generally consists of mature tangantangan trees, the result of post-war reseeding, plus other exotic, yet well-adapted species of trees, shrubs, and grasses. Due to the recent disturbance to island vegetation, it is difficult to specify the climax vegetation for the area (Culbert 1986a).

2. Most of the project is located in the Marpi Commonwealth Forest, a 1,150-acre area of public land established by the local Marianas Public Land Corporation (MPLC) and managed by the local Department of Natural Resources (DNR) for the protection and enhancement of forest resources. The goals of this conservation area include recreation and reforestation activities, improvement of wildlife habitat, watershed and soil protection, conversion of grasslands to forest, and diversification of the existing tangantangan forest to mixed forest. Current reforestation activities include planting breadfruit trees.

3. Site visits and an assessment of vegetative resources was conducted in October 1985 and is included in Figure 1.12 and Appendix A. In general, vegetation in the proposed project location consist of three plant communities:

   - Tangantangan Monoculture
   - Savannah/Grassland
   - Farmland

   Tangantangan is the dominant vegetation over most of the project area, especially alongside access roads. Some limestone forest is located to the north of the Radar Site in the area originally planned for the Boresight Tower and is described in Appendix A.

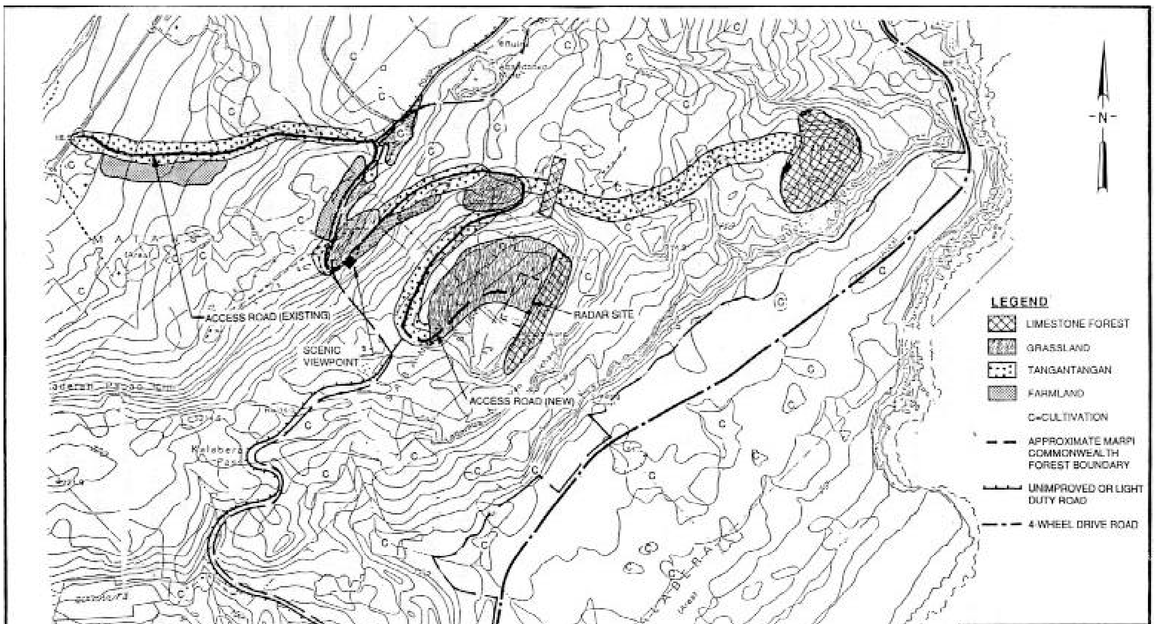
4. Results of the site visits are summarized in Figure 1.12 and show that:

   - The Radar Site and the new portion of Access Road are covered predominantly by grassland. This area has been burned (probably by hunters) within the past several years.

   - The existing portion of the Access Road is bordered primarily by tangantangan trees and grassland except where wood-rose has grown in small areas bulldozed in 1985 (see Figure 4.7).

5. None of the plants found in the three communities at the project site are classified as endangered, threatened, or special status by the U.S. Fish and Wildlife Service or the CNMI Department of Natural Resources.

6. An approximate 0.7-mile length of bulldozer pathway was cleared in early 1985 to an area originally planned for a project boresight tower, shown in Figure 4.6. Soil testing was performed in this area. The current vegetation in this cleared path is dominated by wood-rose, includes wild papaya, and is bordered by tangantangan.



NOTE 1: The limits of vegetation shown indicate the extent of discussions with the CNMI DNR Commonwealth Forester and field observations. The types of vegetation shown extend beyond the indicated areas.

NOTE 2: The indicated vegetation is in the area of the Boresight Tower and its Access Road which are eliminated from the project.

SOURCE: Appendix A

PACBAR III
ENVIRONMENTAL ASSESSMENT

SITE VEGETATION MAP

FIGURE 1.12

1.2.9.2 Fauna

1. Wildlife on the island consists primarily of birds and land animals including many introduced species. Nearly all land birds in the Marianas have evolved endemic subspecies. Two of the five endemic species, which occur in the CNMI, are found on Saipan. These are the Mariana FruitDove and Golden Honeyeater. Two endemic species, which are not found on Saipan, are the Tinian Monarch and the Mariana Crow. A fifth endemic species is extinct on Saipan, the Mariana Mallard. The Mariana Fruit Bat, a mammal, is also endemic to the Marianas.

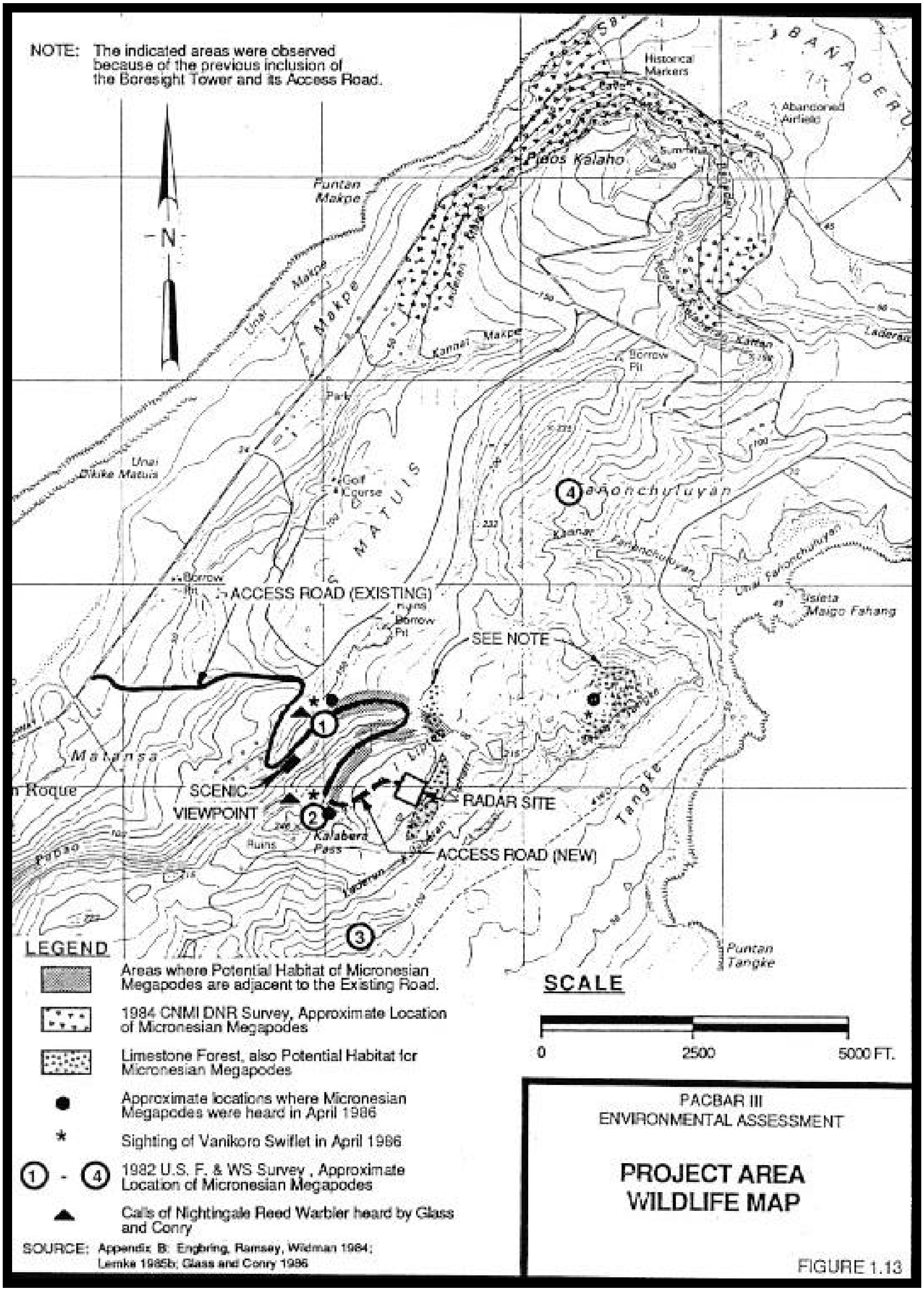
2. Four federally listed endangered land species are found on Saipan. These are the Micronesian Megapode, Nightingale Reed Warbler, Vanikoro Swiftlet and the Marianas Gallinule. A fifth federally listed endangered species is the marianas Mallard, which is now extinct. The Mariana Fruit bat is also a federally listed endangered species in some locations in the CNMI such as Guam, but not on Saipan. The status of the Saipan population of Mariana Fruit bats is presently being considered for listing (Engbring 1986).

3. The Sambar Deer and Coconut Crab, which are protected by CNMI hunting regulations, are also of interest in the vicinity of the project. These species, as well as the Fruit Bat, are scarce due to excessive local hunting and poaching.

4. Results of site visits conducted in October/November, 1985 are included in Appendix B. Results of subsequent April 1986 site visits are discussed in Appendix G. Figure 1.13 summarizes known observations and potential habitat of endangered species near the project area. In addition, the Golden Honeyeater exists in the project area.

5. The Micronesian Megapode is considered to be the species most sensitive to site modifications, because this bird: (1) primarily lives on the ground, and (2) is potentially sensitive to habitat disturbance, as the species is considered to be territorial with a relatively limited home range. This characteristic is important for the sites chosen for the Access Road and Radar Site, which are primarily along existing roadways or on grassland, which are not Megapode habitat.

6. On the other hand, the Boresight Tower Site and its Access Road locations, which have been eliminated from the project, have significantly greater potential to be habitat for the Micronesian Megapode, especially the tower site which is surrounded by mature limestone forest. The major reason for eliminating the Boresight Tower from the project was to eliminate the majority of potential impacts to the Megapode and the other wildlife.


NOTE: The indicated areas were observed because of the previous inclusion of the Boresight Tower and its Access Road.
N
Puntan Makpe
Unai Makpe
Makpe
Historical Markers
Abandoned Airfield
Pieos Kalaho
Kannat Makpe
Borrow Pit
Park
Unai Dikike Matuis
Golf Course
MATUIS
Fanonchuluyan
Unai Fanonchuluyan
Isleta Maigo Fahang
ACCESS ROAD (EXISTING)
Borrow Pit
SEE NOTE
Matansa
Roque
SCENIC VIEWPOINT
RADAR SITE
Kalabera Pass
Ruins
ACCESS ROAD (NEW)
Tangke
Puntan Tangke
LEGEND
Areas where Potential Habitat of Micronesian Megapodes are adjacent to the Existing Road.
1984 CNMI DNR Survey, Approximate Location of Micronesian Megapodes
Limestone Forest, also Potential Habitat for Micronesian Megapodes
Approximate locations where Micronesian Megapodes were heard in April 1986
Sighting of Vanikoro Swiflet in April 1986
1 - 4 1982 U.S. F. & WS Survey, Approximate Location of Micronesian Megapodes
Calls of Nightingale Reed Warbler heard by Glass and Conry
SOURCE: Appendix B: Engbring, Ramsey, Wildman 1984; Lemke 1985b; Glass and Conry 1986
SCALE
0
2500
5000 FT.
PACBAR III
ENVIRONMENTAL ASSESSMENT
PROJECT AREA
WILDLIFE MAP
FIGURE 1.13

7. The abundant rainfall and sunshine at the site results in a rapid growth of trees and underbrush in disturbed areas, so that new wildlife habitat may develop within a relatively short period. This characteristic is particularly evident considering that practically none of the existing vegetation existed at the end of World War II.

8. As shown in Figure 1.13, the Vanikoro swiftlet frequents part of the proposed project area. Sitings of this bird were noted in the area in October 1985 and April 1986. The Vanikoro Swiftlet appears to be common to the interior valleys of Saipan, where it nests and roosts in caves.

9. The Nightingale Reed Warbler species is found in forests on the island, which are typical of those in the vicinity of the project site. However, it is more common to find the species in the southern portion of the island (Kosaka 1984).

10. There is no areas designated as critical habitat for endangered species in the project area (Aldan 1985).

11. The hunting of game birds, such as doves, occurs on Saipan and is considered a minor sport.

12. Soaring seabirds such as the White Tern and White-tailed Tropicbird have been observed over the project area. These seabirds utilize cliff sides for nesting. The project location is approximately ¼ mile from the central border of the Bird Island Conservation Area. This area has been designated for protection and preservation of the narrow band of native forest along the nearby shoreline, which is inhabited by native birds. “Bird Island” was selected to protect Saipan’s largest seabird nesting area, located on “Bird rock” (Palacios 1986).

13. As directed by Section 7 of the Endangered Species Act of 1973, “Interagency Cooperation regulations, “ the U.S. fish and Wildlife Service (USFWS) was consulted regarding the effects of the proposed project on the three Federally listed endangered species of concern:

    - Micronesian megapode (Megapodius laperouse)
    - Vanikoro swiftlet (Aerodramus vanikorensis bartschi)
    - Nightingale reed warbler (Acrocephalus luscinia)

The consultation was iniated August 2, 1986, and completed by September 9, 1986. Results of this Section 7 Consultation are discussed in Sections 3.7.1 and 5.2.7 of this document. A complete copy of the USFWS response is included as Appendix H.

1.2.10 AESTHETICS

1. New construction portions of the proposed project are located primarily within the boundaries of the Marpi Commonwealth Forest. The proposed Access Road is primarily along an existing unpaved roadway. Few structures are found along the project route other than four World War II ordnance storage bunkers covered by vegetation (see Section 1.2.11). The area is currently used by hikers, hunters and poachers. Part of the surrounding area is sued for farming. For more details on land use, see Section 1.2.14.6 and Chapter 2.0.

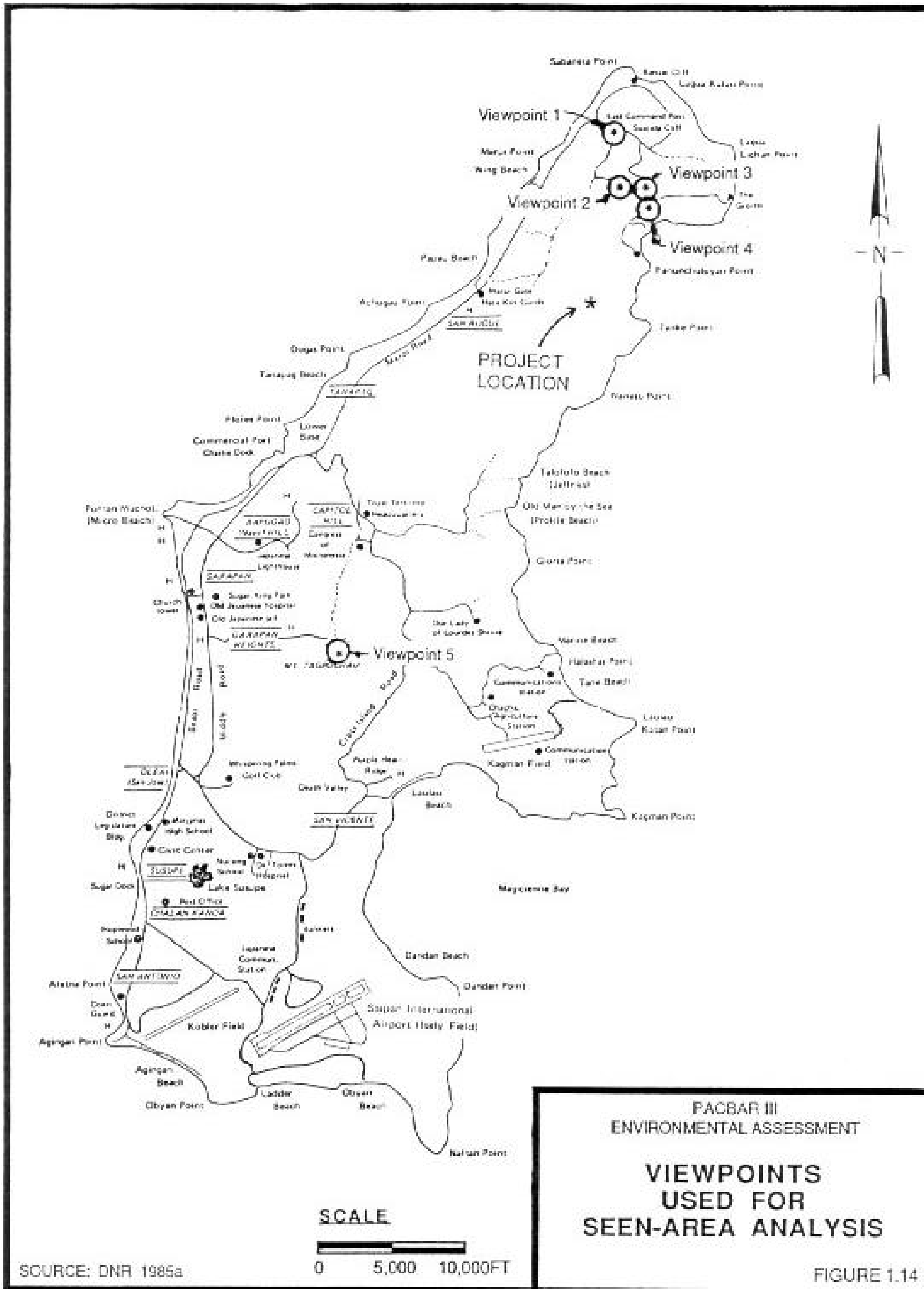
2. The elevation of the proposed Radar Site allows it to be seen from significant distances (DNR 1985a), including locations on Saipan and Managaha Island. The 150-foot tall Boresight Tower originally planned to be part of the project would also have been visible. Because of these conditions, a seen-area analysis using topographic data and a computer which stimulates views in three-dimensional form was performed by the U.S. Forest Service (Boynton 195 and Newell 1985) at the request of the CNMI DNR Commonwealth Forestry (DNR 1985a).

3. The seen-area analysis viewed the proposed project site from each of five chosen scenic viewpoints (See Figure 1.14) and recommended the Boresight Tower site location, which was previously, considered (Boynton 1985). Because the Boresight Tower is no longer a part of the project, the analysis is less important. However, for completeness, more information about the seen-area analysis is included in Sections 3.8, 4.2 and 5.2.8.

1.2.11 ARCHAELOGICAL/HISTORICAL RESOURCES

1. An archaeological/historical inventory and report were completed for the project by Michael A. Fleming and Scott Russell of the CNMI Community and Cultural Affairs, Historic Preservation Office. This report is included in Appendix C. Figure 1.15 and the following paragraphs briefly summarize the key findings.

2. The archaeology of Saipan is characterized by two periods: The Prelatte and the latte Periods. It was believed that evidence of the latte period would only be found in shallow areas and, therefore, would perhaps be totally disturbed by twentieth century land activities.



PACBAR III
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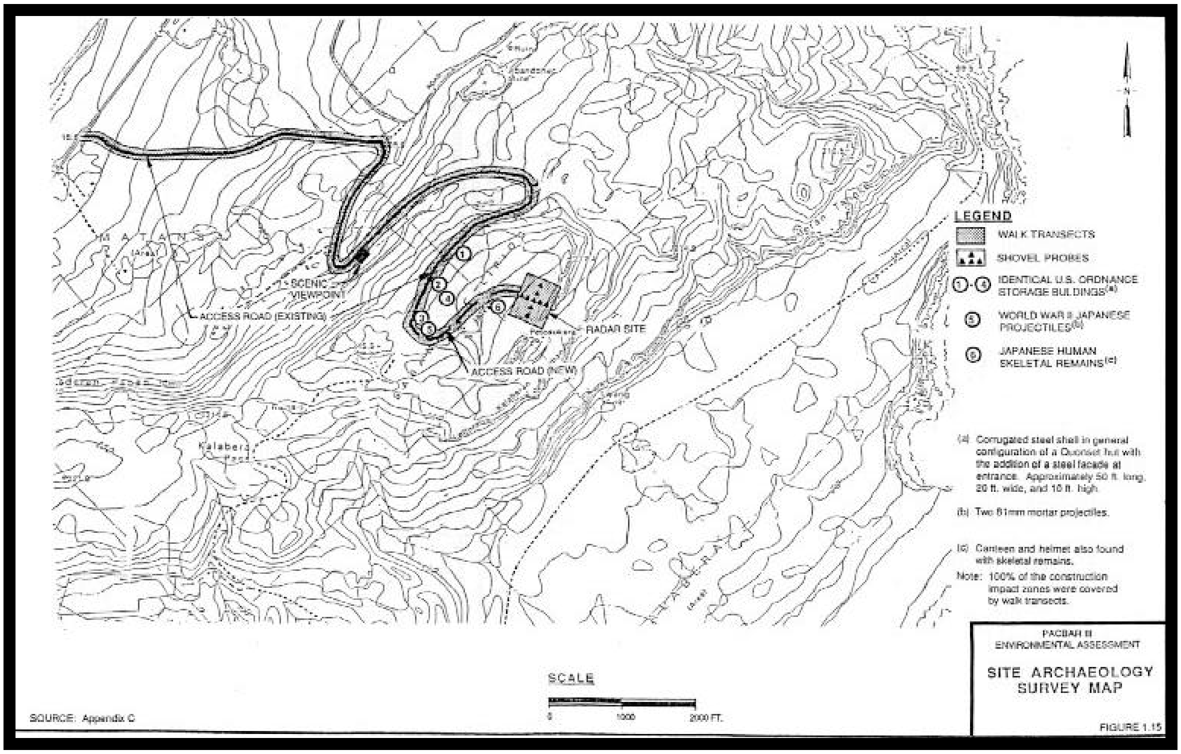
VIEWPOINTS USED FOR SEEN-AREA ANALYSIS

FIGURE 1.14



SITE ARCHAEOLOGY SURVEY MAP

FIGURE 1.15

Evidence of the Latte period is represented by pottery scatters, middens, rock shelters, pictographs, and human burials. The onsite survey performed in Octobers/November, 1985 found only a light scatter of ceramic sherds, observed in new road cuts and in burned areas. Evidence of the Prelatte period was not expected and was not found. This period was characterized by settlements situated in optimal coastal areas rather than in the inland areas of the proposed project.

3. The history of Saipan is characterized by rule by foreign powers and world events, including Spain (1818-1899), Germany (1899-1914), Japan (1914-1940), and World War II (1941-1945). Historical land uses for the project are include:

   - Possible hunting and reforestation during the Spanish and German administrations.

   - Field cultivation by the Japanese prior to World War II.

   - Possible Japanese defensive installations during World War II, including a possible radar installation at the southern edge of the project area cliff line, Sabanan Lipiog.

   - An American advance supply base including four bomb storage buildings and a crushed coral Access Road in the vicinity of the project area.

   - The majority of the road to the Radar Site and the originally proposed Boresight Tower location was in existence in 1958 (saipan Photo Contours Maps, APWO Drawing Nos. 11612 and 11613, Department of the Navy, Bureau of Yards and Docks, July 1, 1958).

4. Result of the survey for the Access Road and Radar Site included observations of four identical sites and two clusters of objects, all evidence of historical land uses. These findings are noted in Figure 1.15. The four identical sites are U.S. ordnance storage buildings covered with soil and vegetation. The two clusters of objects consisted of the following:

   - Two World War II Japanese 81 mm mortar projectiles near Radar Site area.

   - Incomplete skeletal remains of a Japanese soldier killed during World War II, including a canteen and helmet. (These have since been removed by the Japanese consulate.)

   Two World War II Japanese 81mm mortar projectiles were also observed near the former Boresight Tower location, which has been eliminated from the project design.

5. Based on findings of the survey, it was determined by the survey authors that no properties within the survey areas were eligible for inclusion in the U.S. National Register of Historic Places. However, the four ordnance buildings are probably eligible for inclusion in the CNMI Register of Historic Places. Neither the Japanese ordnance nor the Japanese skeletal remains were recommended for inclusion in the U.S. or CNMI Registers.

1.2.12 HAZARDOUS WASTE

1. There are no Class I landfills on Saipan or Guam. Hazardous wastes, typically pesticides and ordnance, are transshipped to an appropriate hazardous waste landfill or treatment facility off the island.

1.2.13 SAFETY

1. All areas of Saipan have some potential for unexploded remnants of World War II activities. Onsite observations indicated that evidence of ammunition storage sites, as well as several unexploded ordnance, were located within the proposed construction area.

1.2.14 SOCIOECONOMICS/LAND USE

1.2.14.1 Population and Employment

1. Based on 1986 projections from 1980 census data prepared by the CNMI Department of Commerce and Labor, the population of the CNMI is about 21,000. Saipan's population is approximately 18,500, about 1,500 persons are on Rota, and about 1,000 are on Tinian. According to the office of the Attorney General, Chief of Immigration, there are 9,786 registered aliens in the CNMI (based on 1986 Annual Aliens Registration, completed 2/24/87) (Kalvo 1987). Of these, about 9,083 are on Saipan, 424 are on Tinian, and 279 are on Rota. Of the total number of registered aliens, there are about 71% Filipino, 13% Korean, 10% Chinese, 3% Japanese, 2% Thai, and 1% all others.

2. In mid-1985, the CNMI labor force was estimated to be about 6,000 (CNMI Department of Commerce and Labor 1985). Of these, about 12% were non-Micronesian, primarily Filipino, and "other". Unemployment estimates vary, from about 12% (M&E Pacific, Inc. 1985) to 10% (CNMI Department of Commerce and Labor 1985). There is concern that non-Micronesian workers are in jobs, which could be filled by CNMI citizens, particularly in the private sector. It is estimated that 80% of positions for skilled laborers, technicians, foremen, and other construction professionals are held by non-Micronesians (OEDS 1984). Overall, the percent of the labor force estimated to have electronics or mechanical background is small.

3. The Resident Workers Act (Public Law 3-66) passed in 1983 requires that Saipan residents must be considered first for employment for any project development on the island (Salas 1985). The regulations allow alien labor to be imported to meet demonstrated needs, but only after the determination that qualified local labor is not available (OEDS 1984).

1.2.14.2 Schools

1. There are both the public and private schools available. The Commonwealth Public School System consists of seven elementary schools, one junior high, and one high school. There are also four private schools, serving grades 1 through 12. There are about 5,000 students in the public and 950 in the private schools, respectively. Enrollments are projected to increase as much as 15% to 7,180, by 1990. Attrition is a serious problem in the CNMI school system. Between 1978 and 1984, about 35% of the students who entered 9^{th} grade failed to finish 12^{th} grade, and the median number of school years completed is only 6.2 for the Northern Marianas (OEDS 1984).

2. There is also a public junior college, the Northern Marianas College (Perry 1984). This college offers a variety of liberal arts programs, as well as electronics and computer courses. It is considered a good source of employees for various government and technical jobs on the island, including the proposed radar station.

1.2.14.3 Housing

1. Adequate housing is available on the island; however, it may not be of a quality desired by imported personnel. A 1977 island housing survey indicated that approximately 14% of the total homes were considered “good” housing. In contrast, approximately 64% of the housing was considered “poor’ (EDD 1977).

1.2.14.4 Economics

1. The estimated gross island product in 1982 dollars was $165 million. The major contribution was from tourism, accounting for 35% of the gross island income (Perry 1984).

2. The island government collects about $28.8 million annually in taxes. Most of the monies received are from personal income taxes, excise taxes, utilities, and interest income from Department of Defense lease agreements (Ripple 1986).

3. Annual salaries in the CNMI averaged about $6,500 in 1983 and only 30% of the work force received salaries above this average. Overall, non-Micronesian earned approximately 11% more than Micronesians ($7,016 vs. $6,238). Government workers earned significantly more that these in the private sector, with Micronesians earning $9,549 while non-Micronesians earned $23,192. Total CNMI wage and salary earnings for 1982 were $63.7 million, a 1485 increase over 1977 (OEDS 1984).

4. Land values on the island vary from about $1 to $30 per square meter (Williams 1985). The proposed project area land is public land, within the Marpi Commonwealth Forest, managed by the Marianas Public Land Corporation (MPLC).

5. Land is leased near the proposed project area at a 1980 rate of \$0.24/m^2/ month (Chock 1985).

1.2.14.5 Police/Fire/Medical Services

1. The island police force has 80 policemen located in the towns of Susupe and Garapan. The nearest police station to the project site in Garapan. Crime on Saipan is mostly misdemeanors with a per capita rate similar to New York City. There is racial tension directed at alien labor (Degallie 1985).

2. Fire protection is provided by 16 salaried firemen with stations located in Susupe and Garpan (Degallie 1985). The nearest fire station to the project site is Garapan. However, fire equipment is not operational. The project will have onsite fire suppression capability.

3. One government hospital (Dr. Torres Hospital) is located on the island with total bed occupancy of about 40 and four staff physicians. Medical services include maternity, pediatrics, hemodialysis and mental health. Additional hospital facilities facilities for special or complicated procedures are located and utilized on Guam at Guam Memorial Hospital and Guam Naval Hospital. Tripler Army General Hospital on Oahu, Hawaii is also utilized in Saipan's medical referral system. Emergency cases are often flown by commercial or military flights to Guam Naval Hospital. Tripler Army General Hospital on Oahu, Hawaii is also utilized in Saipan's medical referral system. Emergency cases are often flown by commercial or military flights to Guam or Hawaii (Villagomez 1985). A new hospital, the Commonwealth Health Center in Garapan, opened in 1986. The 74-bed facility has a staff of about 10 physicians (Villagomez 1985).

4. There are two dental clinics on Saipan which employ approximately six dentists (Villagomez 1985). There are no other doctors or dentists in practice on the island. When necessary, specialists are imported on a case-by-case basis (Villagomez 1985). Outbreaks of disease have not recently occurred on Saipan, as diseases such as malaria have been eradicated (Villagomez 1985).

1.2.14.6 Land Use

1. A master plan, proposed for Saipan in 1973 (FAA 1973), is shown in Figure 1.16. It is shown in this plan that the land in the proposed project area is intended for agricultural and conservation uses, such as forestland, as confirmed by the site visits of October and November 1985.

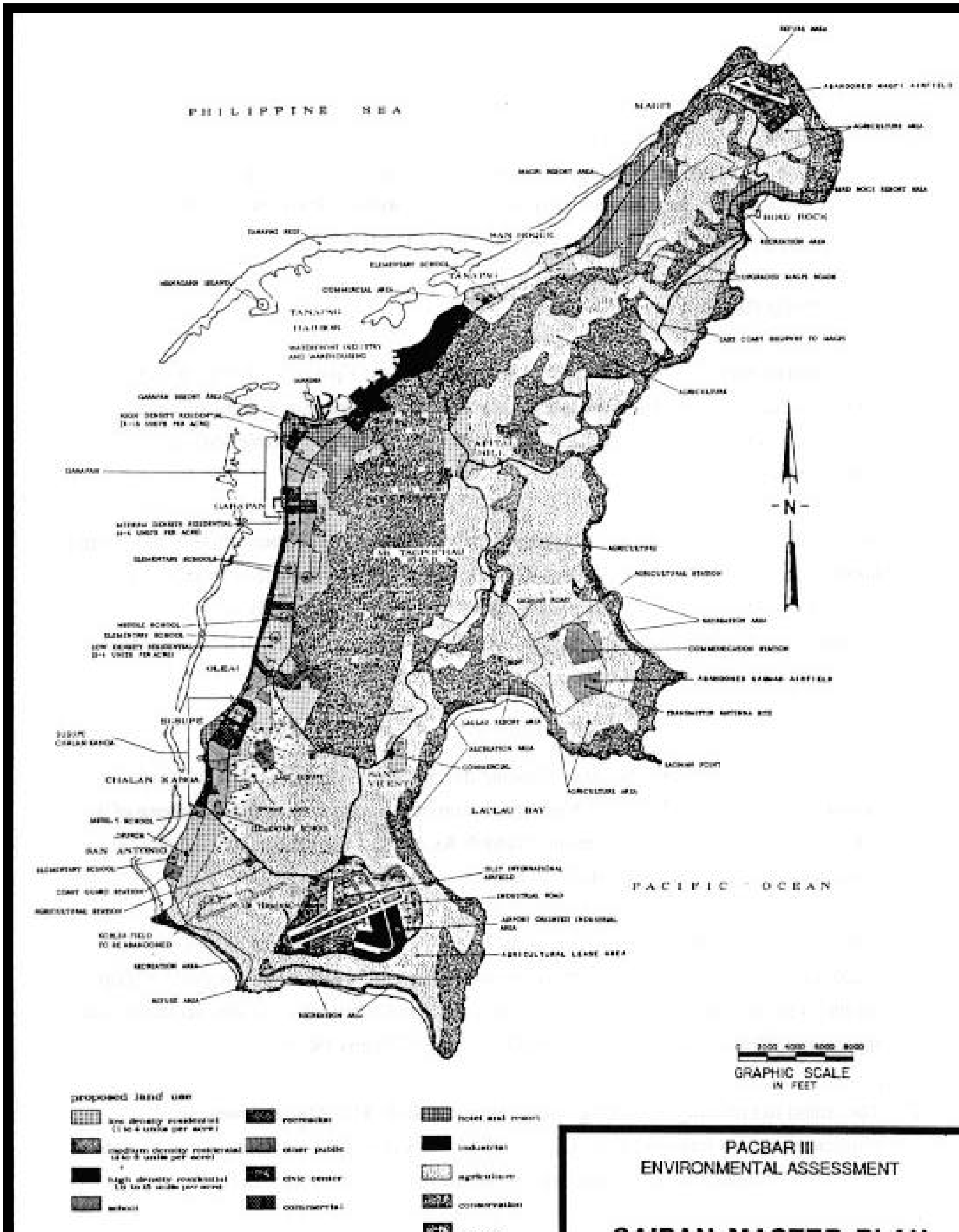
2. A 1978 Census of Agriculture by the MPLC and Commonwealth Forestry reported the following land uses (Perry 1984):

   - Approximately 78% forestland
   - Approximately 10% urban and built-up land
   - Approximately 8% rangeland
   - Approximately 4% cropland and forested urban and built-up land

3. Public lands are managed by the Marianas Public Land Corporation (MPLC) and only CNMI citizens may own Commonwealth land. No land is owned by the federal government (Perry 1984).

4. The proposed project location is in the approximately 1,150-acre Marpi Commonwealth Forest in the northern portion of the island shown in Figure 1.3. Use of the forest is determined by the Department of Natural Resources (DNR) and the Marianas Public Land Corporation (MPLC). Details of forest-related activities are included in Section 1.2.9.1.

5. Chapter 2.0 discuss a draft agreement that has been discussed between the DNR, MPLC, and U.S. Air Force which will: (1) permit use of the sites for the PACBAR III radar station, and (2) provide one new scenic viewpoint and one new trailhead (WSMC 1985 and Culbert 1986c).



NOTE: The figure shown is the most recent for showing many land uses.

SOURCE: FAA 1973

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ENVIRONMENTAL ASSESSMENT

SAIPAN MASTER PLAN

FIGURE 1.16

6. Most existing development on Saipan is toward the southern half of the island, especially in the communities of San Antonio, Garapan and Susupe. Additional development toward the north is occurring, especially in the form of resort hotels (i.e., Japan Air Lines Hotel Nikko) and Far East Broadcasting Company on the coastline. Projects in northern Saipan are discussed further in Section 3.14 and are shown in Figure 3.2.

1.2.14.7 Transportation

1. The island of Saipan is served by approximately 60 miles of paved road and about 120 miles of unpaved road (Williams 1985). Most roads on Saipan show signs of erosion, including numerous potholes and gullies. Many such roads are passable only by four-wheel drive vehicles.

2. Recent traffic studies estimate that approximately 100 vehicles per hour utilize Beach Road north of San Roque (Williams 1985). This section of the road is utilized by sightseers, by employees of the Mariana Country club, Black Construction Company, Far East Broadcasting Company, and by construction vehicles going to and from coral borrow pit on Matuis Road. There is currently construction at the Hotel Nikko and Far East Broadcasting Company.

3. Beach Road is known to experience flooding during periods of excessive rain at two culvert locations along the road. A site inspection of the areas revealed the presence of a concrete box culvert at the first stream (Saddok As Agatan) and seven small cylindrical conduits at the second stream (Boobo Achugao).

4. There are about 7,400 registered cars within the CNMI. About 18% of the population (3,200) are licensed drivers, each traveling an average of 24,600 miles per year (10,000mi. /yr./car). In 1984, there were five fatal accidents and 135 nonfatal injury accidents. Of the latter, 90% were associated with drunk drivers (Williams 1985).

5. The island has recently received grants of approximately $162,000 to develop and implement a mass transit system (OED 1984). However, such a system would operate only during normal business hours and would not serve the project area (Udui 1985).

1.2.15 SERVICE AND UTILITIES

1. Power, water, sewer and communications utilities are not available at the project location.

2. The nearest power source is a public generator facility located on the coast in Tanapag, approximately four miles from the project location. This power source is reported to have occasional shutdowns for extended periods and, therefore, is not reliable for critical facilities. In addition, the utility is operating at maximum capacity.

3. Potable water is available and can be purchased from island merchants. Water will not be treated onsite for potable uses.

4. Most of Saipan's sewage is handled by individual private septic tanks or primary sewage treatment plants.

5. The nearest communication system is an above ground telephone cable located along beach Road, directly west of the project location.

2.0 RELATIONSHIP TO LAND USE PLANS AND POLICICES

1. The Access Road is designated as a federal highway for public use from Beach Road tots the boundary of the Marpi Commonwealth Forest. The remainder of the Access Road and the Radar Site are in the forest, which has been designated by the Marianas Public Land Corporation (MPLC) for management by the CNMI Department of Natural Resources (DNR) (U.S. Navy 1985a). The forest is an area of approximately 1,150 acres, as shown in Figure 1.3. which has been established for the protection and enhancement of natural resources? Objectives for use of this area include recreation and reforestation activities, improvement of wildlife habitat, watershed, and soil protection. Current reforestation projects include conversion of grasslands to forest and diversification of the existing tangantangan forest to mixed forest. Mixed forest vegetation includes wood and fruit trees and fast-growing acacias. Habitat improvement projects include planting breadfruit trees.

2. The project is not land use consistent with forest activities, but it is land use compatible with certain forest objectives. Measures recommended by CNMI agencies, which are now incorporated in the project design and discussed further in this Chapter positively, contribute to the forest objectives of recreation, soil protection and reforestation activities. In addition, the amount of forest acreage occupied by the project site and new Access Road is less than 1% of the total forest area. Also, to further reduce the amount of forest area affected, the Boresight Tower Site has been eliminated from the project.

3. The U.S. AIR FORCE proposes to rent approximately 0.6% of the forest land from the MPLC for an initial one-year term with an option to extend for 24 additional one-year terms. A draft land use agreement was submitted by the U.S. AIR FORCE to the MPLC and DNR in April 1985 (WSMC 1985). This agreement incorporated certain CNMI agency requests, which were identified in early discussions with these agencies. An official lease has not been signed at this time (June 1987).

4. At this time, it is anticipated that the land area to be utilized for the proposed project represents the maximum potential Air Force utilization of the area. Future Air Force expansion into the forest is not likely, because the U.S. AIR FORCE recognizes and respects the strict conversational goals of the forest established by the CNMI Coastal Resources Management Office. Therefore, the land area to be disturbed by the PACBAR III project represents the maximum area to be disturbed.

5. During various planting stages of this project, the Air Force has corresponded with CNMI agencies in order to incorporate special concerns into the project design. Many design measures have been added to the project as a result of CNMI concerns. These measures are described in the following paragraphs.

6. Correspondence between the Air Force and the DNR Commonwealth Forestry in early 1985 (U.S. Navy 1985b) resulted in the following requests by the DNR to mitigate impacts of the project (Newell 1984):

   - Perform a seen-area analysis to locate the best location on Petosukara for siting the installation. A major element of the investigation was the former Boresight Tower site, which has subsequently been eliminated from the project.

   - Construct scenic viewpoints along the access roadway, consisting of road turnouts with parking for 5 to 10 cars. (This agreement has since been changed to one scenic viewpoint and one trailhead. DNR Forester James Culbert has chosen the final viewpoint and trailhead locations, and these are incorporated in the project design drawings.)

7. In October/November 1985, recommendations were made to the Air Force by DNR representatives (Schmitt 1985). These measures were:

   - Do not remove vegetation along cliff bases (also suggested by Kosaka 1984).

   - Established a habitat enhancement area located away from the project where breadfruit trees may be planted.

   The Air Force has agreed to these recommendations and the DNR Division of Fish and Wildlife has identified the abandoned Boresight Tower site as a suitable habitat enhancement area (see Section 5.2.7, Flora/Fauna).

8. In April 1986, the CNMI DEQ, the DNR Commonwealth Forestry and the DNR Division of Fish and Wildlife requested additional mitigation measures, which have been incorporated into the project design. These requests include:

   - Pave the Access Road form the Beach Road tot he entrance of the Marpi Commonwealth Forest (DEQ 1986b).

   - Construct drainage diversion and erosion control measures along project access roads, where appropriate (DEQ 1986b).

- Replant cleared areas with fast-growing, local trees rather than native grasses (Culbert 1986b). Cleared areas will be mitigated in a manner agreed upon with appropriate island and government agencies. Grass should be planted only where required around the project site for security purposes.

- Assure that equipment and supplies delivered to Saipan are free of introduced organism, especially brown snakes (Glass 1986).

The Air Force has agreed to incorporate each of these requests into the project plans and to include impact restriction provisions in purchase orders for equipment, supplies, and materials. One modification was made to the extent of the Access Road paving (reduced the total length of pavement to 0.3 mile from Beach Road) and agreed upon with the CRM (Environmental Solutions, Inc. 1986).

9. A major project modification was made in response to concerns raised at a Public Hearing for this project on April 24, 1986 and written comments from the DNR Division of Fish and Wildlife, DNR, DEQ, and Marianas Audubon Society. This change is the elimination of the Boresight Tower and its Access Road from the project. This change has eliminated more than 75% of that portion of the project, which would be located in forested portions of the Marpi Commonwealth Forest. The remaining project activities are concentrated in areas already disturbed by the existing road and in grassland, which has recently been burned.

10. A Federal Consistency Determination (FCD) was submitted to the CRM on February 25, 1987, in accordance with the Federal Coastal Management Act of 1972, as amended. The FCD found the proposed PACBAR III project to be consistent to the maximum extent practicable with the Commonwealth of the Northern Mariana Islands Coastal Resources Management Program, as amended. The CRMP agreed with this finding in a letter dated March 16, 1987 (see Appendix I).

3.0 PROBABLE IMPACTS ON THE ENVIRONMENT

3.1 AIR QUALITY

1. No unusual air quality impacts are expected to occur from construction activities. Dust will be controlled by site watering, and burning of vegetation or trash will only be accomplished in accordance with requirements of the Department of Environmental Quality (DEQ 1984).

2. One operation activity that may affect air quality is the use of diesel engines for the onsite generators at the Radar Site. Exhaust from the diesel engines is expected to contain the approximate emissions shown in Table 3.1, which were calculated based on performance records of similar diesel generators currently in use at the NASA Tracking Station in Dandan, Guam. The diesel fuel sulfur content will not exceed 2.5 weight percent as specified by the proposed local air pollution control regulations (DEQ 1984). As shown in Table 3.1, the estimated emissions are well below the 250-ton/yr./ pollutant Prevention of Significant Deterioration (PSD) permit requirements. No significant changes in air quality are anticipated due to favorable wind conditions and site elevation. Air emissions are not expected to be visible from other island locations, and opacity levels will be less than 20%, as required by federal regulations.

TABLE 3.1

SUMMARY OF EXPECTED DIESAL GENERATOR EMISSIONS

POLLUTANT	EMISSION RATE(ton/yr.)[1]
Particles	7
Sulfur Dioxide	8
Carbon Monoxide	17
VOC[2]	2
Nitrogen Oxides	66

[1] Emission rates were obtained by multiplying a continuos hourly fuel consumption rate of 30 gal/hr (Guam generators) by AP-42 Emission Factors for internal combustion engine sources (AP-42 Section 3.3.4.2). The emission rates shown are for one generator since only one is expected to operate at a time.

[2] VOC stands for Volatile Organic Compounds. The number shown is a total for methane plus nonmethane components.

3.2 HYDROLOGY

1. The primary potential adverse impact on surface water during construction would be associated with the effects of erosion form disturbed areas before they are revegetated. This impact may be minimized by controlling construction activities during the wet periods and by using hay or other appropriate materials to protect the areas while the new vegetation becomes established.

2. Operational activities with the potential to impact surface water are associates with accidental spills of diesel fuel, paint, oils or hypochlorite. This potential is minimized by normal safety practices required of the transporter and user and implementation of a spill containment and cleanup plan.

3. No significant impacts to ground water are anticipated during operations because: (1) the underground septic tank and leach field will be designed and located according to specifications that are assure ground water contamination will not occur, (2) the aboveground diesel fuel tank will be constructed with concrete berm spill containment, (3) the flammable materials storage building will be constructed with spill containment, (4) the underground waste oil tank is designed with secondary containment and leak detection according to EPA requirements, and (5) the project will use and implement a spill containment and cleanup plan.

3.3 GEOLOGY AND SOILS

1. Minor soil erosion may have occurred in areas where roads were bulldozed in 1985 (see Figure 4.4). However, wood-rose has now grown in the cleared areas. Additional planned mitigation measures are proposed as discussed in Section 5.2.3.

2. The project design is expected to cause a significant positive impact on soil erosion in the existing Access Road area. The extensive erosion that exists will be significantly reduced as a result of the improvements to be made to this Radar Station Access Road beginning at Beach road. The improvements will include drainage and erosion control features that significantly reduce the siltation of Beach Road and discoloration of the lagoon.

3.4 NOISE

1. Noises such as heavy equipment engine noise during the grading and site preparation activities, hammering and portable generators will occur during the temporary construction period. Normally, these activities will occur between the hours of 8 a.m. and 5 p.m., five days per week. However, multiple construction shifts are common on Saipan and will be subject to contractor schedule. When appropriate, these sources will satisfy Air Force Regulation 161-35 which specifies a maximum time-weighted-average of 84 dBA for worker occupational noise exposure, a level more stringent than U.S. Occupational Safety and Health Administration (OSHA) standards.

2. Hauling of equipment or construction supplies through nearby towns may cause temporary inconvenience and disruptions to local traffic flows in these areas, but is not expected to create a significant impact to noise levels.

3. The primary noise source during operation activities is associated with the diesel engines. The diesel engines are located within a building, and exhausts are supplied with noise attenuation devices as described in Section 5.2.4 (MacMahon 1985). Occupational exposure will not exceed Air Force Regulation 161-35 standards for operating personnel. These Air Force noise standards are more stringent than federal standards established by OSHA.

3.5 RADIOFREQUENCY EMISSIONS

1. Radiofrequency (RF) emissions also referred to as RF radiation, refer to electromagnetic radiation ranging in frequency from 300 kHz to 300 GHz. The RF portion of the electromagnetic spectrum is classified as nonionzing radiation, which is different from ionizing radiation such as x-rays and gamma rays. Radiation in these frequencies will not affect radio broadcasting or telephone transmissions on the island (Rentschler 1986a).

2. Unlike ionizing radiation and its cumulative biological effects, the only confirmed harmful effects from nonionozing RF radiation are thermal, which indirectly affect human tissues through temperature increases. There is little evidence for direct or nonthermal biological effects of RF radiation. Many of the effects that have been observed are not biologically significant, and are reversible after exposure is ended.

3. Permissible exposure levels (PELs) have been set to protect people from heating effects of RF radiation. Several organizations have developed standards including:

- Occupational Safety and Health Administration (OSHA)
- National Institute of Occupational Safety and Health (NIOSH)
- American National Standard Institute (ANSI)

The criteria for evaluating the radiofrequency emission exposure levels for this project are based on U.S. AIR FORCE standard AFOSH 161-9. This standard specifies the following permissible exposure limits (PELs), expressed as power densities, averaged over an exposure time of six minutes for the range of operating frequencies 1,500 to 300,000 megahertz:

- 10 milliwatts per square centimeter (mW/cm^2) for facility personnel

- 5 milliwatts per square centimeter (mW/cm^2) for the public, including small children

The AFOSH standard is as stringent as other standards regarding occupational worker exposures, and additionally specifies a public PEL of 5 mW/cm^2, a level considered safe and recommended by the American National Standard Institute. The Air Force PELs are frequency dependent as mentioned above and are based on threshold limit values established by the American Conference of Governmental Industrial Hygienists.

4. The actual power densities radiated from any antenna will depend on facility and site specific characteristics. Therefore, the actual exposure levels (site-specific “footprint”) are usually determined by field measurements after installation. For Air Force installations, these measurements will be accomplished in accordance with AFOSH 161-9 standards.

5. For evaluating possible environmental impacts, it is possible to calculate estimated exposure levels. For this case, the calculations were performed using the parameters summarized in Table 3.2 and the following assumptions:

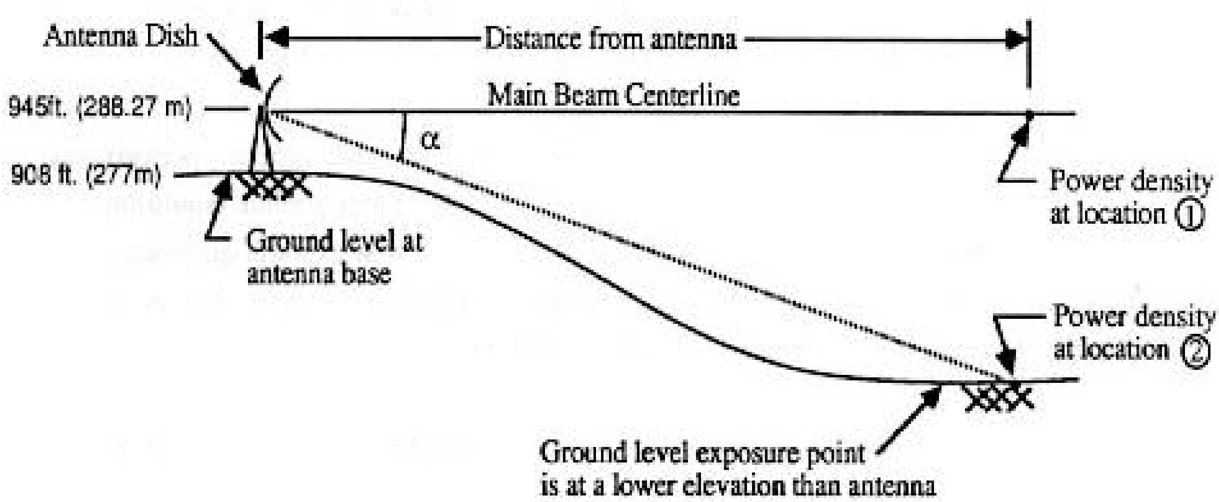
- The far field distribution at points on the ground can be conservatively estimated considering a Hansen one-parameter circular aperture distribution.

- Near field corrections are added for the on-axis power density, for the main beam broadening, and for changes in the sidelobe envelope.

TABLE 3.2

ANTENNA CHARACTERISTICS

CHARACTERISTIC	VALUE	
Antenna Diameter	30	feet
Centerline Height (above ground)	37	feet
Frequency	5400-5650	megahertz
Average Power	7680	Watts
Antenna Gain	52.5	dB
Antenna Gain Factor	1.788×10^5	Dimensionless
Wavelength	0.182	Feet
Half Power Beam Width	0.4	Degrees
Look Angle- Elevation	Transmission disabled below Adjustable elevation threshold And where exposure levels may Exceed public exposure standards.	
Look Angle- Azimuth	0-360	Degrees
	Look Angle will be restricted where exposure levels may exceed public exposure standards.	
Time vs. Angle Estimates	Antenna may be stationary for 6 minutes or more.	



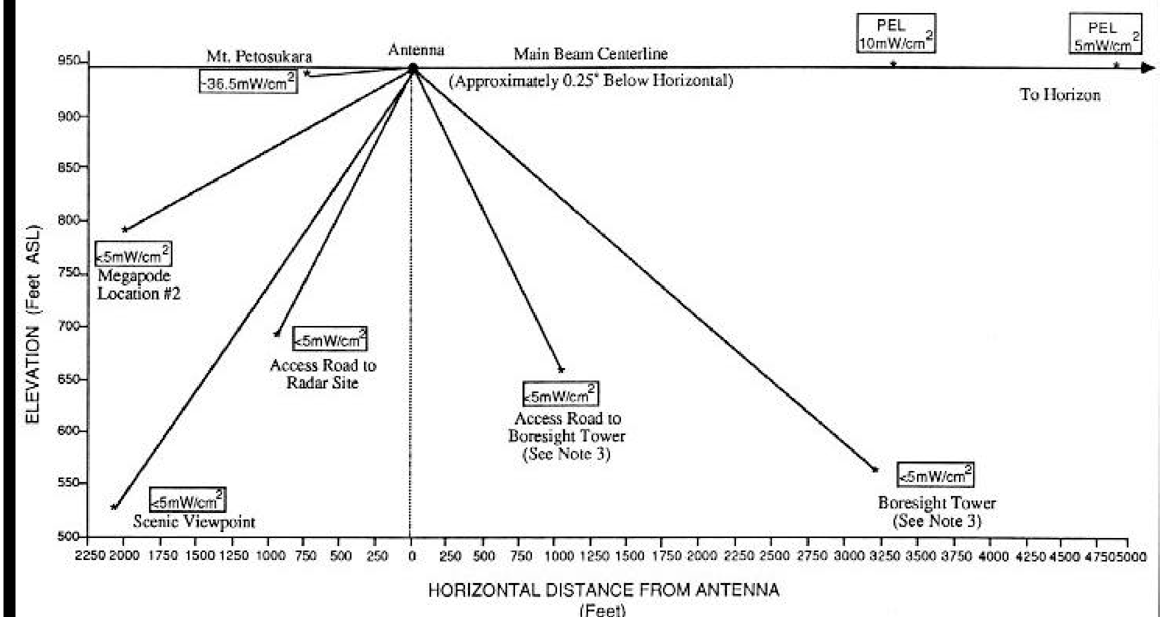
6. Figure 3.1 shows estimated potential exposure levels for essential points of public access or wildlife habitat, if the beam is directed toward the horizon while recording a splashdown. In each case of direct access, the estimated level is well below the PELs. The calculations do show that the public and personnel exposure PELs may be exceed if the beam were directed toward the horizon during a splashdown, but in the direction of the northeast side of the top of Mt. Petosukara. This location will require measurements after antenna installation to determine if any special action (e.g., beam stops) will be required at this small location.

7. Calculations were also performed to estimate potential exposure levels if the beam was aimed at much lower angles directly toward the ground, although elevation and azimuth limit switches (beam stops) will be installed to assure the public access PEL to main beam radiation will not be exceeded outside the boundary of any site. The PEL criteria could be exceeded at public access and wildlife areas if these switches were not in place.

8. RF emissions impacts to tree-nesting or soaring birds are expected to be minimal for the following reasons: (1) ver few, if any trees are tall enough in the project area to result in large numbers of birds being affected while on a perch, (2) the different movements of a bird flying and of a radar beam tracking would not coincide long enough for the bird to be exposed to harmful amounts of RF emissions, (3) 99% of nonionizing radiation is reflected by bird feathers and does not reach the body of a bird (H.A.I.R. 1984), and (4) the frequency at which RF absorption would have the greatest effect on typical birds (1,000-2,000 megahertz), is much less than the operating frequency of the radar (5,400-5,650 megahertz (H.A.I.R. 1984).

9. The actual limitation only angle operation will vary with actual antenna performance and site conditions in each direction. For example, natural topographic conditions should preclude the need for any low angle control in the east to south quadrants. Public access roads and shallower slopes probably ill require a controlled angle slightly above ground intersection in other directions.

10. Due to use of elevation and azimuth limit switches, which will prevent accidental exposure to main radiation, restricted access areas for the public will not be necessary.



NOTE: 1. The level shown for Mt. Petosukara would occur if the antenna is recording a splashdown in the direction of Mt. Petosukara.
2. Due to the differences in the horizontal and vertical axis scales, the angles shown are exaggerated for the purpose of this diagram.
3. Although the Boresight Tower is eliminated from the project, the prior data is still provided to show estimated densities in those areas (Fig.E.1) which have public walking access.

SOURCE: Appendix E Calculations

PACBAR III
ENVIRONMENTAL ASSESSMENT

APPROXIMATE POWER DENSITY LEVELS FOR BEAM NOT DEPRESSED BELOW HORIZON

FIGURE 3.1

3.6 FLOOD PLAINS/WETLANDS

1. No wetlands or flood plains exist within watersheds that encompass the Access Rod or Radar Site locations.

2. Construction-related traffic will occur on roads, which drain to wetlands and flood plains. This traffic will consist of the one-time transport of equipment and the daily transport of personnel to the site. Due to the weight of the radar antenna, it may be necessary to modify existing road culverts along the haul route. These activities are not expected to create conditions, which would adversely affect any wetlands or flood plains.

3.7 FLORA/FAUNA

1. During construction activities, approximately 7.0 acres of vegetation, which represent about 0.6% of the total Marpi Commonwealth Forest area, will be removed for construction of the Radar Site and a short portion (0.3 mile) of the Access Road. The majority of the vegetation removed will be grassland. Less than 3.0 acres of the Access Road (from Beach Road tot he radar site) trees will be graded to widen the existing road and build the new Access Road to the site. Exposed graded areas such as the 30-foot clearance zone around the Radar Site (Smith, Young & Hida 1987b) will be replanted with Common Bermuda Grass immediately after grading. Fast-growing local trees, such as Narra or *Pterocarpus indicus,* will be planted in areas to be agreed upon with appropriate island and government agencies.

2. Removal of 0.1 to 3 acres of forest vegetation may displace some ground-dwelling wildlife, including the Micronesian megapode and coconut crab, which rely on this vegetation for food or habitat. There could also be loss of habitat for forest birds such as the endemic golden honeyeater. These impacts are expected to be very small since: (1) the former Boresight Tower and Access Road have been eliminated, and (2) the majority of the Radar Site and Access Road are not in forested land.

3. A small amount of coconut crab hunting could be adversely impacted by project activities. However, because of the existence of the radar facility, there might be a reduction in the extensive local poaching which has already reduced the number of crabs in the area.

4. Some localized disturbance to wildlife will occur during operations due to increased traffic to and from the area by personal and forest visitors using the scenic viewpoint and trailhead. The improved roadway will provide easier access for hunters and poachers, but the presence of the facility probably would result in a reduced amount of illegal hunting and poaching in the area. Presence of additional vehicles, persons, and noise in the forest may displace wildlife from surrounding areas. Operational activities such as shift changes may affect nocturnal activities of coconut crabs and fruit bats.

5. The effects of nonionizong radiofrequency emissions on wildlife are expected to be minimal. Elevation and azimuth level switches will be used to protect personnel and the public. These switches may also be used to protect certain wildlife areas if the "footprint" of radiofrequency emissions, determined after installation of the antenna, indicated levels would be elevated in these areas. Section 3.5 discusses the potential effects of radio frequency on wildlife.

6. Impacts to some seabirds may be possible due to the proximity of the project to the Bird Island Conservation Area. No direct relation at the facility to these birds is evident.

7. Reductions in existing siltation problems resulting from Access Road drainage and erosion control improvements will have a positive impact on aquatic life in the Tangan coral lagoon. Present frequent siltation is covering the coral. This situation could modify the ecosystem of that area and reduce the recreation resources potential for the area.

3.7.1 SECTION 7 CONSULTATION

1. The Office of the U.S. Fish and Wildlife Service (USFWS) in Honolulu, Hawaii was consulted, per the Endangered Species Act of 1973, under Section 7, Interagency Cooperation Regulations. As a result of the consultation, the USFWS has stated, "…the PACBAR III Radar Station, Saipan, is not likely to jeopardize the continued existence of any of the three reference listed species". The complete response by the USFWS is included, as Appendix H.

2. According to the USFWS, neither the swiftlet nor the reed warbler would be expected to be affected to any significant degree by the proposed project. Possible effects to the Micronesian megapode, however, may be considerably more significant. With an island-wide population estimated at only 40 individuals, almost any impact has the potential to affect the chances of this species recovery on Saipan. However, because of the small percentage of habitat in the Marpi Commonwealth Forest which would be lost as a result of the proposed project, the USFWS determined that the project"…will not be likely to jeopardize the continued existence of the Micronesian megapode".

3. According to the USFWS, there is no designated critical habitat within or near the project area. Therefore, no destruction or adverse modification of critical habitat would occur as a result of implementing the proposed project.

3.8 AESTHETICS

1. The antenna must be painted white in order to function properly and will be visible from each of the five scenic viewpoints discussed in Section 1.2.10 (Figure 1.14) including Mt. Tagpochau. The antenna will have aircraft warning lights that will be visible at night. These impacts will be subjective to various viewers, but cannot be mitigated.

2. There are other lighted towers, which currently exist in the area, such as the Far East Broadcasting Company tower. Therefore, the radar antenna is not the first visible man-made structure in a natural area. Its impact is considered less significant than if it were the initial disruption to the skyline. The building at the site will be painted a color compatible with the forest environment.

3. The inclusion of one scenic viewpoint to be constructed in conjunction with the Access Road will provide greater opportunity for visitors to observe coastal vistas from the Mt. Petosukara area.

3.9 ARCHAEOLOGICAL/HISTORICAL RESOURCES

1. The project does not adversely impact archaeological or historical resources. Based on findings of an archaeological survey (see Section 1.2.11) and (see appendix C), no properties within the project area are eligible for inclusion in the U.S. National Register of Historical Places.

2. Items observed during the onsite survey, specifically munitions ordnance and human skeletal remains, have either been removed or are recommended to be removed prior to construction activities (see Section 5.2.9). The large ordnance storage buildings will not have to be removed for construction activities, and the CNMI Office of Historic Preservation recommends leaving them in place.

3. Operational activities are not expected to impact archaeological r historical resources. However, the presence of additional persons in the area is considered as a potential impact to undiscovered resources.

3.10 HAZARDOUS WASTE

1. Waste materials generated at the site during the construction phase will consist of typical construction debris with used paint and paint solvent containers, used adhesive containers and possibly some pesticide containers. The construction contractor will be required to submit for approval tot he Government, a plan which specifies the proper handling, storage and disposal of waste material containers generated during construction. This plan will require the containers to be properly handled at the site to avoid environmental threats and disposal of the waste material shall be under manifest and hauled by a qualified waste hauler to an approved hazardous waste landfill or treatment facility. At present there are no hazardous waste treatment facilities or landfills on Saipan or Guam, so hazardous wastes will probably be transferred to a military transfer station on Guam and then taken to a licensed landfill or treatment facility elsewhere.

2. During the project operational period, small amounts of solvents waste oils, used paints will be generated, and appropriate procedures will be established for handling them. Included in the facility will be an EPA approved hazardous/flammable materials storage building for temporary storage of waste. Storage of the hazardous waste will be limited to less than 90 days in accordance to EPA regulation. An inventory of all chemicals used at the site will be made available to interested CNMI government agencies. These materials will be properly handled and hauled to an appropriate hazardous waste landfill or treatment facility.

3. Toxic or poisonous materials, other than those that are included in the previous paragraph, will not be used for this project. Nuclear waste will not be generated since none of the project equipment or activities utilize nuclear processes.

3.11 SAFETY

1. Nonionizing radiofrequency emissions from the radar operation are a health and safety consideration for this project and are specifically discussed in Section 3.5. Safety incidents related to radiofrequency emissions have not occurred to the knowledge of the Air Force. In the more than 30 years of Air Force radar operating experience, accidents that have occurred have been limited to a few incidents of personnel falling down steep stairs of the radar equipment. Section 5.2.11 presents safety mitigation measures (Rentschler 1986a).

2. Some potential for encountering unexploded ordnance during construction exists, typical of an location on the island. A site ordnance removal plan will be utilized during construction activities to assure contractor safety.

3.12 SOCIOECONOMICS/LANDUSE

3.12.1 POPULATION AND EMPLOYMENT

1. Project construction will last for approximately one year and provide full-time employment for a maximum of 20 persons at any one time. Most of these will be local, although, supervisory/technical personnel may be utilized. Project construction will have no discernible impact on the population of Saipan.

2. It is anticipated that the proposed project will have a life of about 25 years. This time span consist of the project start-up period and long-term operation. Project operation is expected to employ about 30 persons on a full time basis. During project start-up, technical personnel and their families will be imported from either Guam and/or the continental United States. Security personnel and skilled/unskilled labor will be hired locally to the maximum extent. Long-term operation of the radar station will provide full-time employment for about 15 Saipan residents who will have been selected and trained for technical jobs by the Air Force contractor in charge of the project. Station personnel will live on the island in existing housing.

3. The saipan hiring program will be in compliance with the Resident Workers Act of 1983. Positions will be advertised through the local newspaper and the junior college, primarily for persons with electronic/mechanical backgrounds. Applications will be screened, and the best prospects will be interviewed. Those who are selected will undergo a one-to-one, on-the –job training program of three months to one year. Hired personnel will receive full pay and benefits during the training period (Rentschler 1985a).

4. Over the long-term life of the project, operational activities will have minimal impact on the population of Saipan.

3.12.2 SCHOOLS

1. Project construction and operation activities are not expected to adversely impact the island schools system.

2. It is estimated that 20-30 school-aged children will be added to the population, compared to total school enrollments of 5,950. It is likely that these children will attend both public and private schools.

3.12.3 HOUSING

1. The project is expected to create a demand for above-average island housing during the initial project start-up period. Such housing is not currently available; however, it is anticipated that housing development in progress at that time will accommodate this demand, as well as demands of other projects.

3.12.4 ECONOMICS

1. The U.S. AIR FORCE will lease land for the proposed project from the Marianas Public Land Corporation. Payment of about $6,000 will be made annually, once the lease is finalized (Anderson, T. 1958a).

2. Project construction personnel will receive wages typical for the area since they will be hired by local contractors. An estimated range of wages for workers with approximately 2 years of experience is $1.50 to $2.25 per hour.

3. The purchase of goods and services for project construction is estimated to be $5.2 million almost 3% of the estimated 1983 Gross Island Product of $179 million for the entire CNMI.

4. Economic benefits to the island income are expected to accrue from employee personal income taxes and expenditures. It is anticipated that most money from employee wages and salaries will be spent on the island.

5. Operation and maintenance of the facility is estimated to add approximately $3 million per year to the island in salaries, wages and expenditures. This world result in an overall economic benefit to the island representing almost 5% of the $63.7 million reported 1983 wage and salary income for the entire CNMI (most recent data available).

3.12.5 POLICE/FIRE/MDICL SERVICES

1. Police services are not expected to be affected by the additional personnel to be located at the project site.

2. The project includes an onsite fire suppression capability and, therefore, is not expected to affect local firefighting services.

3. Project construction is not expected to significantly affect the demand for normal health care services. However, construction activities create the potential for accidents and injuries. Most of these needs could be met by existing emergency vehicles and hospital facilities. Persons with severe injuries could be transported by ambulance to Dr. Torres Hospital on Saipan.

4. Project operation not likely to significantly affect the demand for either health care or emergency services. The addition of approximately 15 persons and their families to the island over the life of the project will have an incremental effect, which can readily be accommodated by existing medical personnel and facilities.

3.12.6 LAND USE

1. Construction and operation of the proposed project are not compatible with current land use plans, policies, or regulations applicable to the project area. However, the rental agreement with the Marianas Public Land Corporation (MPLC) would provide for tradeoffs, which will result in both positive and negative impacts.

2. The project, including new access roadways, will directly affect about 7.0 acres. Construction activities will also temporarily affect use of the surrounding area by both human and wildlife populations.

3. During operation of the radar station, the recreational potential of the project area for sightseeing will be enhanced by one new scenic viewpoint and one trailhead located along the improved Access Road. The improved access will increase recreational utilization of the forest, although it may cause some additional disruption to wildlife.

4. Deterioration of the forest and grassland area along the existing Marpi Forest Road will be reduced considerably by the Access Road drainage and erosion control improvements to be implemented as part of this project.

3.12.7 TRANSPORTATION

1. Virtually all construction materials and project components will arrive at Charlie Dock at Tanapag Harbor during project construction. Given the current level of activity in Tanapag Harbor and at the port, impact from construction-related shipping is not expected. Tanapag Harbor currently is the port of entry for most of the island shipping, including fuel shipment by Mobil Oil Corporation.

2. Charlie Dock will not have to be strengthened for project construction activities; therefore, project operations will not adversely impact port facilities.

3. Transportation requirements for the project will generally no adversely affect the roads and highways between Tanapag Harbor and the project site. The one exception to this could be the transport of the radar pedestal (60 tons) and the yoke (65 tons). Transport of this equipment will be via the use of a multiwheel heavy equipment transporter designed to accommodate this type of load. Prior to delivery of the equipment to Saipan, the Air Force will evaluate the roads, bridge and culverts along the haul route to ensure they are adequate to accommodate this one time load. Any modification to the existing structures will be provided by the Air Force as required, in a manner, which minimizes environmental impacts. Damages to the existing roads and structures as a result of transporting the one-time heavy loads will also be repaired to the original condition by the Air force (Edwards 1987).

4. Project operations is not expected to create discernible impacts to local roadways as only a few additional cars will be added to the existing vehicular traffic. The greatest change will occur along the Access Road between Beach Road and the project site. This road will be used by project personnel and by visitors tot he Marpi Commonwealth Forest who utilize the new recreational and scenic areas. Project plans include the possible use of vans to transport employees to and from the site, which may alleviate potential traffic problems.

5. Neither project nor construction nor operation is expected to affect the existing vehicular traffic on the island.

3.13 SERVICES AND UTILITIES

1. The proposed project does not affect power, sewer, telecommunications, or water utilities on the island. Electrical power will be generated on site through the use of diesel generators. The sanitation disposal system for the project will utilize a septic tank/leach field design and, therefore, will not require a tie-in into an existing sewer system. Telecommunications to the project site will be via the use of a microwave link to Guam, and rainwater will be collected in a cistern type collection system at the site to supply the water requirements.

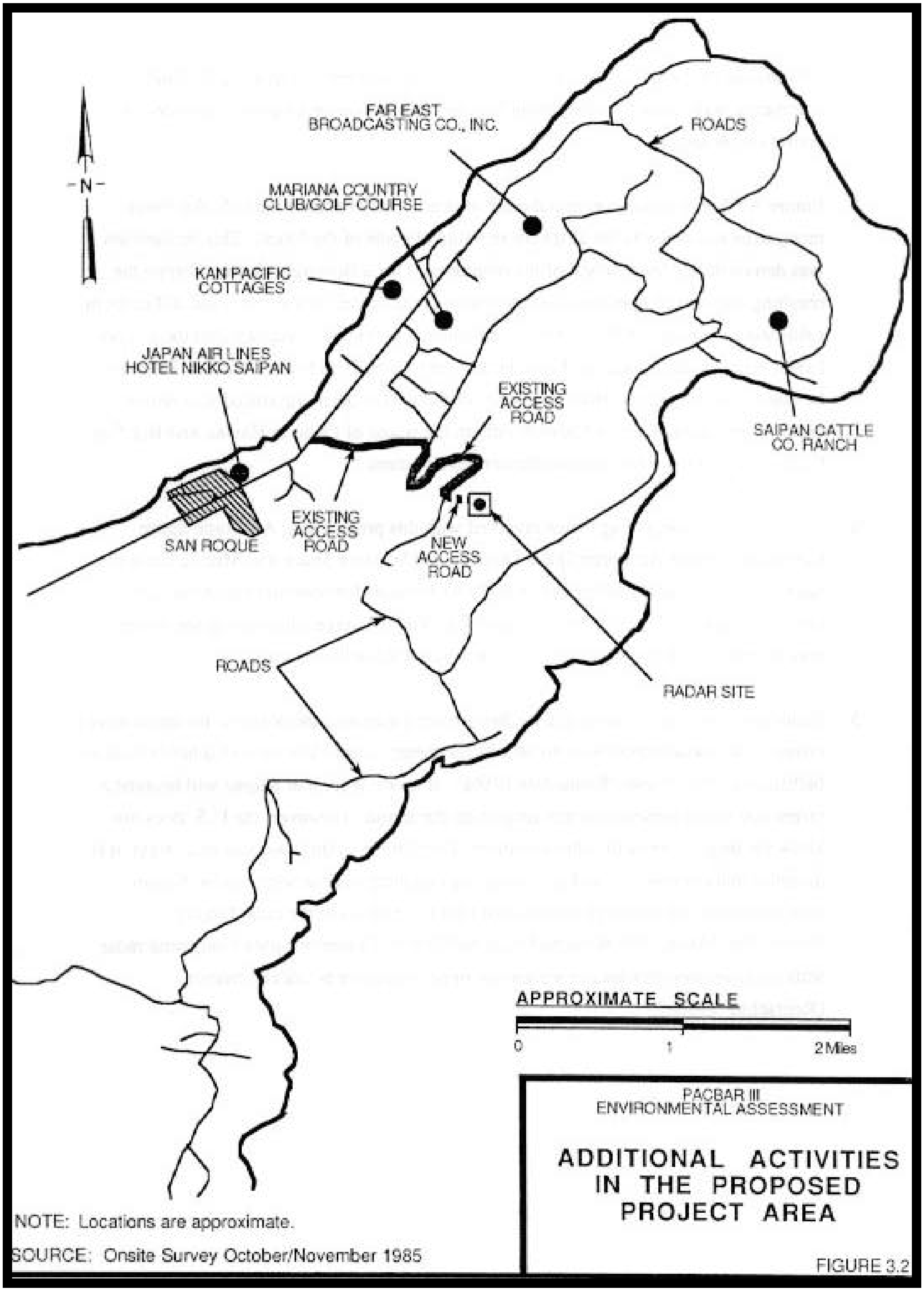
3.14 POTENTIAL CUMULATIVE EFFECTS

1. It is not expected that the proposed facility will generate any significant secondary or growth inducing effects on other types of development, such as hotels, on the island. Secondary impacts such as increased traffic and some development of new housing are expected to occur, but the overall effect of the proposed facility is expected to be minimal compared to other island projects. It appears that significant growth is currently underway in the northern section of the island as shown in Figure 3.2. Companies with projects on this end of the island include:

   - Mariana Country Club/Golf Course (existing).
   - Far East Broadcasting Co. Inc.'s Christian radios broadcasting station and housing (existing with additional facilities under construction).
   - Japan airlines' Hotel Nikko Saipan.
   - Kan Pacific's proposed 50 cottages, condominium units, and botanical garden (proposed).

2. There is potential for some cumulative effects if the proposed facility forms the basis for future additional U.S. Government facility installations on the island. However, it is expected that future significant installations would have increased difficulty for expansion into the Marpi Commonwealth Forest because:

   - The cumulative impacts would make environment mitigation more difficult.
   - The grassland being proposed for the Radar Site will no longer be available and expansion into the forested areas would have significantly greater potential impact on sensitive wildlife.



PACBAR III
ENVIRONMENTAL ASSESSMENT

ADDITIONAL ACTIVITIES IN THE PROPOSED PROJECT AREA

FIGURE 3.2

Elimination of the Boresight Tower from the proposed project, as a result of public comments, will establish a precedent for objections to future projects in forested or conservation areas.

3. Future Air Force expansion into the forest is not likely because the U.S. AIR FORCE recognizes and respects the strict conservational goals of the forest. This recognition was demonstrated by removal of the requirement for a Boresight Tower, despite the resulting increase in operating complexity and cost caused by the increased difficulty in calibrating the radar. After careful examination and review, it appears that there is no future need for additional Air Force utilization of the Marpi forest. Further, it should be noted that in the past, other Air Force systems have been introduced into remote, undeveloped areas such as Kaena Point, on the island of Oahu in Hawaii and Big Sur, California, and have not induced further development.

4. At the present time, the agencies involved with this project (i.e., Air Force Space Command and the Air Force Space Division and Western Space and Missile Center) have not been approached by any other DOD agencies for potential expansion and currently have no plans for future expansion. Small changes in office space, which may be required at some future date, would not affect adjacent areas.

5. Public comment to the initial EA for this project questioned the potential for cumulative effects if the radar station were to be likely enemy target. The project is not related to ballistic missile defense (rentschler 1986a). It is not likely that saipan will become a target due to the presence of this project on the island. However, the U.S. does not know the target criteria of other countries. Even in the event it were to be a target, it is doubtful that enemies of the U.S. would expend their nuclear weapons on Saipan when conventional sabotage would create the same effect to the radar facility (Rentschler 1986a). No Western Space and Missile Center or Space Command radar stations have been attacked or are known to be targets for political terrorists (Rentschler 1986a).

4.0 DESCRIPTION AND COMPARISON OF ALTERNATIVES

1. Alternatives considered for the PACBAR II radar facility are discussed in this section and include:

   - Siting
   - Facility Arrangement
   - Equipment
   - Access Road Location
   - Operations

2. Implications of the No Project alternative are also considered.

4.1 <u>SITING</u>

4.1.1 PROJECT CRITERIA

1. Three primary criteria were used for evaluating the PACBAR III siting alternatives. These include:

   - <u>Effective radar operation</u>
     - Mission objectives
     - Mission limitations

   - <u>Availability of support facilities and land</u>
     - Access roads
     - Utilities
     - Port facilities
     - Employee housing
     - Construction costs
     - Operating and maintenance costs
     - Trained and untrained workforce
     - Lease uncertainties

   - <u>Environmental impacts</u>
     - Air Quality
     - Hydrology
     - Geology/Soils
     - Noise
     - Radiofrequency Emissions
     - Flood Plains/Wetlands
     - Flora/Fauna
     - Aesthetics
     - Archaeology/Historical
     - Hazardous Waste
     - Safety
     - Socioeconomic/Land Use

2. Eight alternative locations were evaluated for the PACBAR II project, as shown in Figure 4.1 and 4.2 and listed below:

   - Guam. NASA Dandan Tracking Station, an existing facility, due to be deactivated because its function may be taken over by satellites.
   - Tinian. Maga Plateau on the northwestern side of the island on undeveloped land leased by the U.S. Department of Defense.
   - Tinian. Massalog, a high point on the central eastern part of the island on undeveloped land leased by the Department of Defense.
   - Saipan. Mt. Tagpochau, the highest elevation on the island.
   - Saipan. Ladern I Maddok, on the northeastern tip of the island.
   - Saipan. Suicide Cliff, on the northwestern tip of the island.
   - Saipan. Mt. Petosukara, the chosen project location.

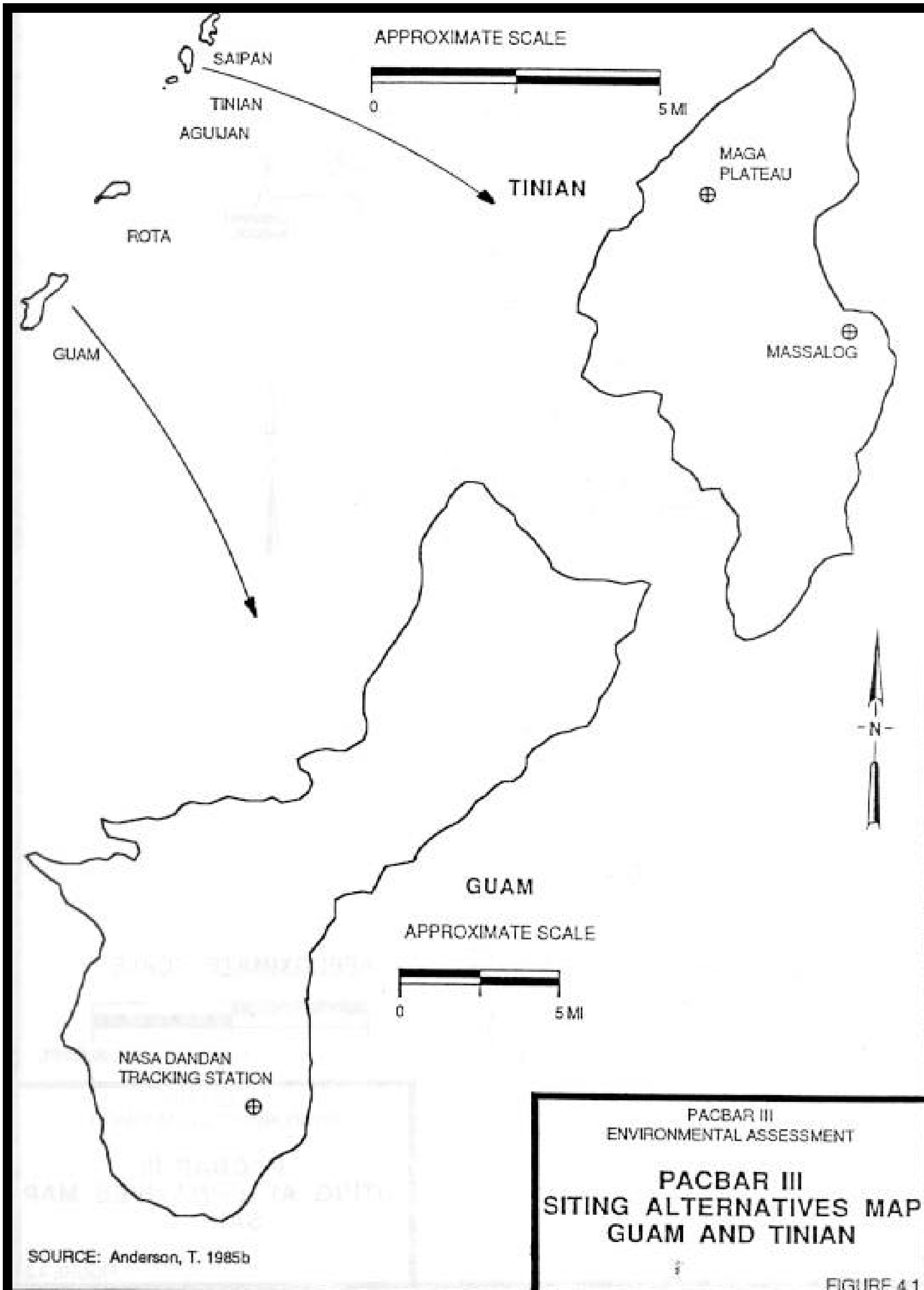
3. Three other alternatives were considered during early project planning stages: (1) Anderson Air Force Base in Northern Guam, (2) shipboard radar's, and (3) less developed and uninhabited islands. These alternatives were soon determined to be infeasible and were eliminated at the time, as discussed in Section 1.1.2.3.

4.1.1.1 Effective Radar Operation

1. Effective radar operation is a very important siting criterion in order to satisfy the national defense requirements of the project. In the original draft of the EA, the suitability of the candidate sites for satisfying the three mission objectives was presented as a simple Yes-No comparison, although the Air Force had internally evaluated the ability of each location to meet mission objectives on a qualitative basis (Rentschler 1986a).

2. The project mission objectives are to:

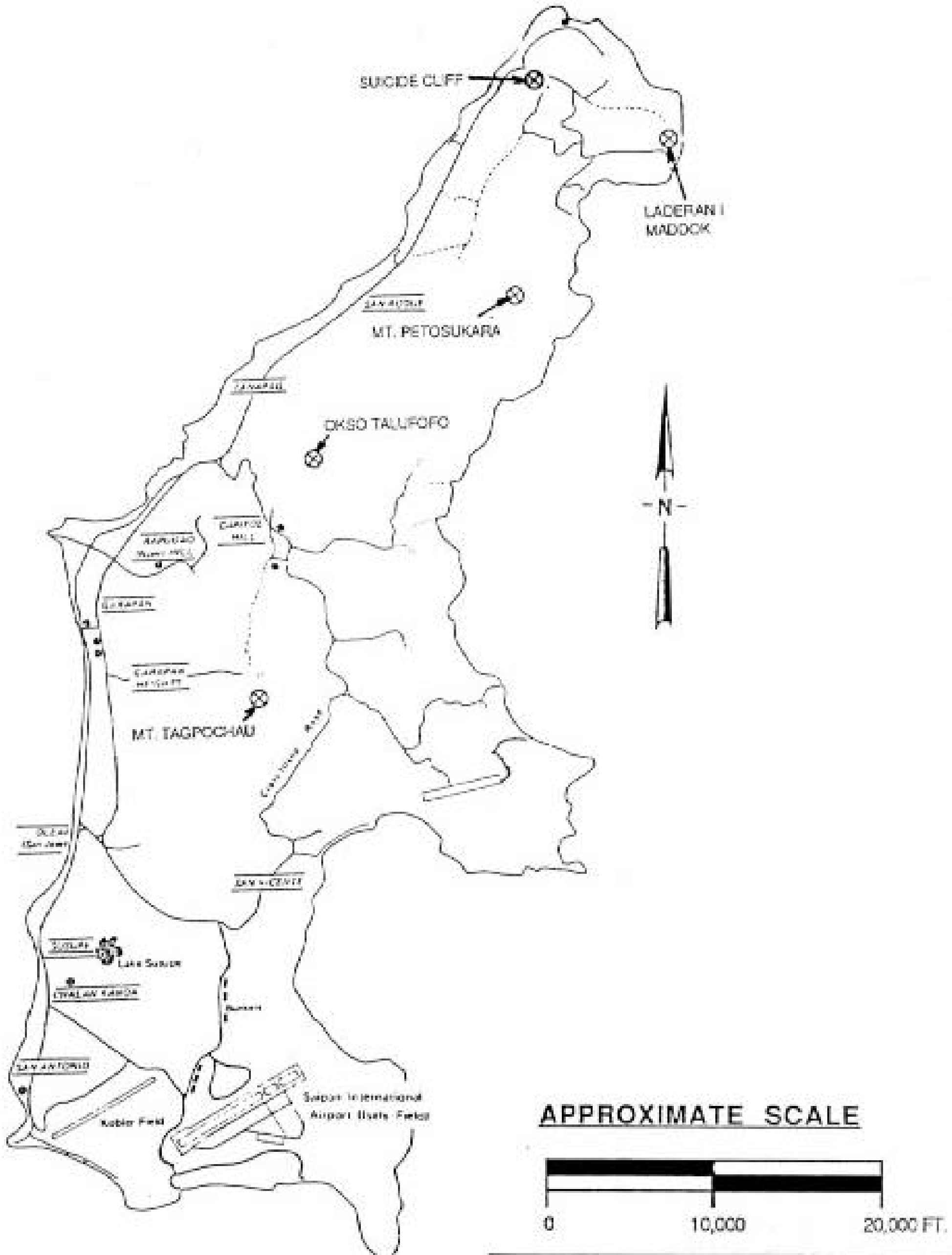
   - I – Provide space surveillance for new foreign space launches.
   - II- Catalog resident space objects.
   - III- Record splashdown locations of test launch from the Western Missile Test Range.



PACBAR III
ENVIRONMENTAL ASSESSMENT

PACBAR III
SITING ALTERNATIVES MAP
GUAM AND TINIAN

FIGURE 4.1



Locations are approximate.

SOURCE: Kilian 1984

PACBAR III
ENVIRONMENTAL ASSESSMENT

PACBAR III
SITING ALTERNATIVES MAP
SAIPAN

FIGURE 4.2

3. To more accurately describe the relative suitability of each of the sites, their capabilities to serve the objectives were numerically evaluated considering: (1) limitations which could reduce the accomplishments of one or more objectives, and (2) the degree to which a site is restricted by each limitation. This analysis is presented in the following illustrations:

   - Figure 4.3, Comparison of Limitations to Radar Operation: Objectives I
   - Figure 4.4, Comparison of Limitation to Radar Operation: Objectives III.
   - Table 4.1, which summarizes the relative capabilities of each candidate site to satisfy mission objectives and provide an overall site rating.
   - Figure 4.5, which show the capabilities of each site in graphic form.

4. The following paragraphs describe the method used to develop the comparisons and summarize the results.

5. Six potential limitations to radar operation for the Mission Objectives I and II were considered (Rentschler 1986a). These were:

   - A. <u>Natural blockage (270°- 90°).</u>

     Topographical obstructions, such as low peaks, that could interfere with the radar when tracking in the directions due west through due east (270°-90°).

   - B. <u>Safety blockage (270°-90°).</u>

     The number of elevation or azimuth switches that must be installed on the radar to limit its view angle or render the transmitter inoperable, to assure the safety of personnel and the public when the radar is tracking due west through due east (270°-90°).

   - C. <u>Natural blockage (90°-270°).</u>

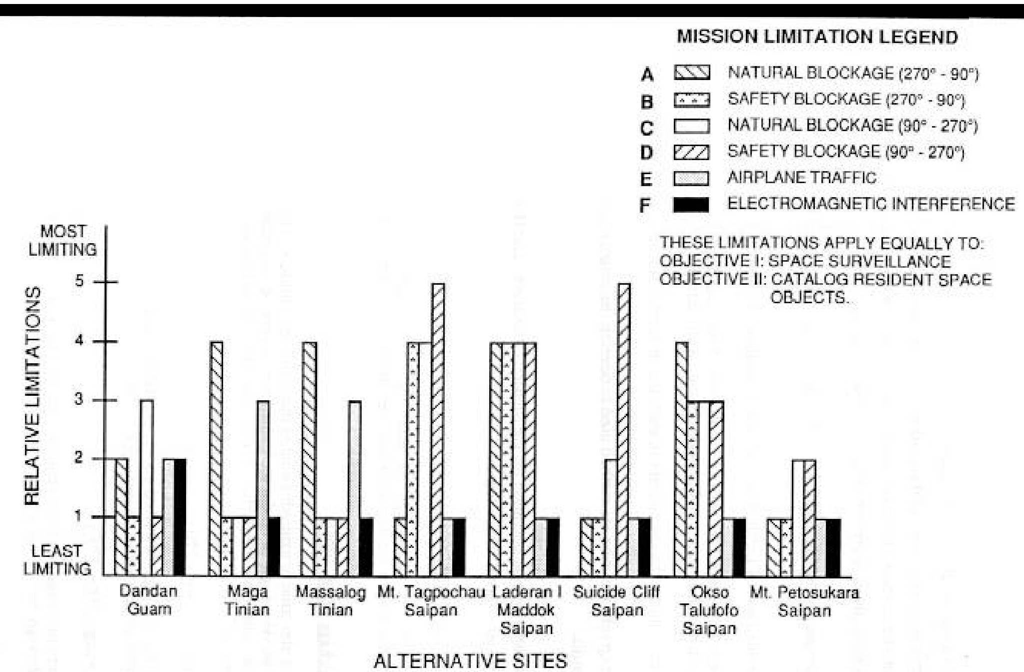
     The same natural blockage described above, but for the radar tracking in the due east through due west directions (90°-270°).

   - D. <u>Safety blockage (90°-270°).</u>

     The same safety blockage as described above, but for the radar tracking in the due east through due west directions (90°-270°).

   - E. <u>Airplane traffic</u>

     Excess airplane traffic in the vicinity (primarily in the northerly directions) that interferes with effective radar operations.

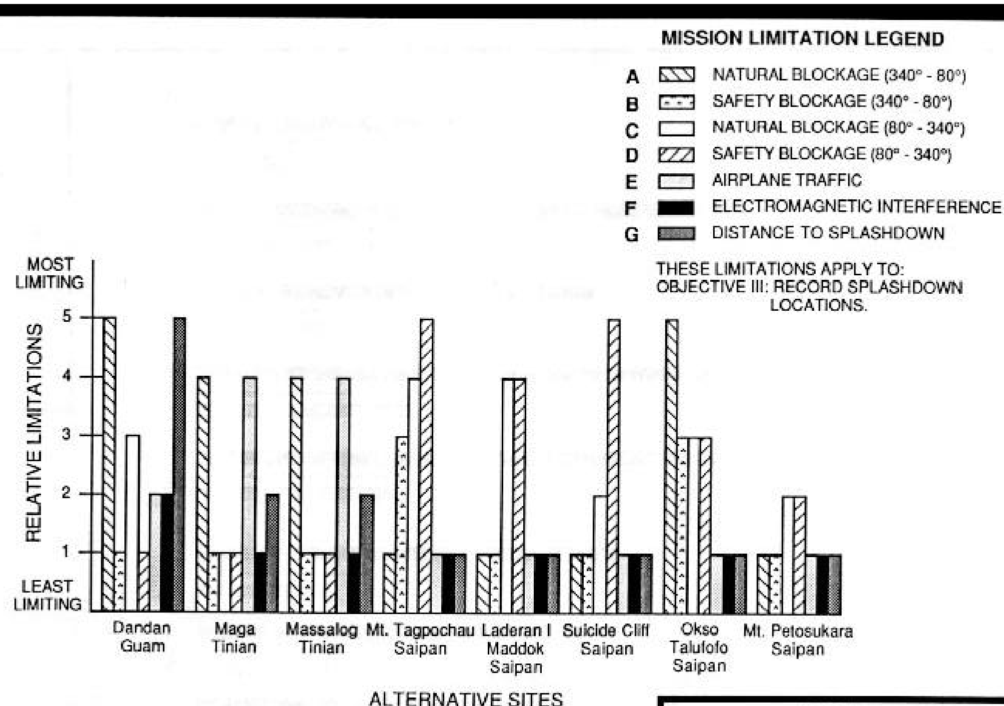


Example: Laderan I Maddok is a poorly suited site from the standpoint of effective radar operation. Four of the limitations are ranked as very limiting to radar operation (No. 4). Mt. Petosukara is a relatively good site for effective radar operation. Four of the six limitations are least limiting (No. 1), with the remaining two being only slightly more limiting (No. 2).

PACBAR III
ENVIRONMENTAL ASSESSMENT

COMPARISON OF LIMITATIONS TO RADAR OPERATION OBJECTIVES I AND II

FIGURE 4.3



Example: Mt. Petosukara is clearly a relatively good site for effective radar operation. Five of the seven limitations are least limiting (No. 1), with the remaining two being only slightly more limiting (No. 2). On the other hand, Dandan, Guam, is a relatively poor site for recording splashdown as two of the seven limitations are most limiting (No. 5).

PACBAR III
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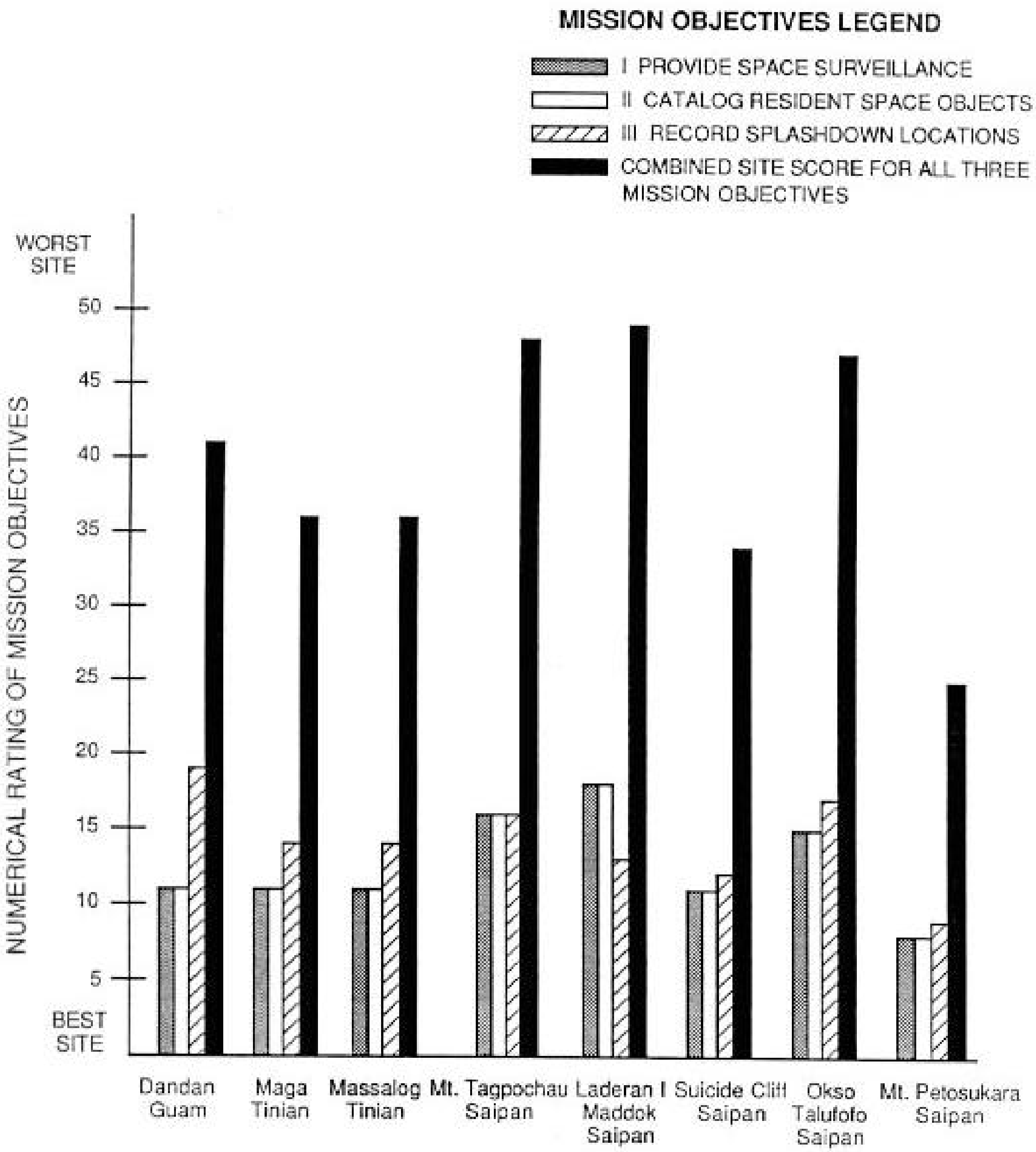
COMPARISON OF LIMITATIONS TO RADAR OPERATION OBJECTIVE III

FIGURE 4.4



SEE TABLE 4.1 FOR TABULAR SUMMARY OF THIS INFORMATION.

PACBAR III
ENVIRONMENTAL ASSESSMENT

SCORES OF SITES BASED ON EVALUATION OF OBJECTIVE LIMITATIONS

FIGURE 4.5

TABLE 4.1

PACBAR III SITING ALTERNATIVES
RELATIVE ABILITY TO MEET MISSION OBJECTIVES

SITE	OBJECTIVE			COMBINED SITE SCORE[3]
	I SPACE SURVEILLANCE [1][2]	II CATALOG RESIDENT SPACE OBJECTS[1][2]	III RECORD SPLASHDOWN LOCATIONS[1][2]	
Guam, Dandan	11	11	19	41
Tinian, Maga	11	11	14	36
Tinian, Massalog	11	11	14	36
Saipan, Mt. Tagpochau	16	16	16	48
Saipan, Ladern I Maddok	18	18	13	49
Saipan, Suicide Cliff	11	11	12	34
Saipan, Osko Talufofo	15	15	17	47
Saipan, Mt. Petosukara	8	8	9	25

[1] Each rating is equal to the sum of the six factors considered for Objectives I and II (Figure 4.3), plus the sum of the seven factors assessed for Objectives III (Figure 4.4).

[2]The fewer the points, the more suitable the site in meeting the requirements of each objective. The lowest scores are six, for Objectives I and II, and seven for Objective III.

[3]The combined site score is the sum of the scores for the three objectives. The lower the score, the better the site satisfies the three objectives overall. If a site had no limitations, the score would be 19.

- F. Electromagnetic interference.

  Significant other electromagnetic devices in the area of the radar that can reduce the effectiveness of radar operation.

6. The same six types of limitations also apply for evaluating Objective III except the angle through which blockage is critical is narrower. For limitations A and B, the critical tracking range is 340°-80°, north-northwest to east-northeast. Limitations C and D are not expected to be relevant to splashdown tracking, because splashdowns are not expected to occur toward the south of the PACBAR III site.

7. A seventh limitation (G) also exists for Objective III, splashdown observations. This additional limitation deals with distance from splashdowns, which will generally be to the north-northeast (340°-80°) of the sites evaluated. Distance determines how close to splashdown the object can be tracked, because of sighting distance to the horizon of the earth. The closet station would permit tracking to the lowest elevation, while the furthest would restrict tracking to the actual splashdown location.

8. Figures 4.3 and 4.4 show the factors which must be considered to determine how well any site meets a particular mission objective, and the bar graphs show the relative degree to which a limitation will restrict operations at each candidate site. The taller the bar, the more restrictive the limitation.

   An example is provided at the bottom of each figure to further illustrate the evaluation Procedure.

9. Figure 4.5 presents a graph summarizing the limitations ratings of each of the eight candidate sites to satisfy the three mission objectives. As shown, the selected site, Mt. Petosukara, best satisfies all three objectives.

10. Table 4.1 presents the results of the limitations analysis in tabular form. The combined site score further demonstrates the relative attractiveness of the Mt. Petosukara site.

    The following paragraphs summarize the main operational disadvantages of the other seven sites.

11. The Dandan Guam Site is least capable of tracking splashdown, primarily due to the distance from the splashdown area and the low elevation of the site. The Air Force considers this site to be incapable of completely satisfying Objective III (Rentschler 1986b). The Guam site also has significant limitations for Objectives I and II because of natural blockage in the 90°-270° direction, and more interference from airplane traffic than at other sites. Early acquisition of new foreign launches would also be difficult because o f the site is low elevation.

12. The two Tinian Sites have identical rankings with regard to satisfying mission objectives. The disadvantage of these sites are related primarily to natural blockage limitations in the 270°-90° and 340°-80° directions and increased airplane traffic at the airport on the south end of Saipan which affects the Tinian locations.

13. Both the Mt. Tagpochau and Ladern I Maddok Sites on Saipan have severe limitations for Objective II because of required safety blocking in essentially the entire south end direction. The Mt. Tagpochau Site also has significant blockage requirements in the northern direction.

14. The Oskso Talufofo Site has excessive blockage in the 270°-90° direction and marginal blockage in the 90°-270° direction.

15. The Suicide Cliff Site on Saipan is marginally suitable for Objectives I and II, and relatively well suited for Objective III. The main limitation of the Suicide Cliff site is for safety blockage in the 90°-270° because of the tourism activities in that area.

16. Based on these analyses, it is concluded that the selected site, Mt. Petosukara, best satisfies the purpose for constructing the PACBAR III radar station.

4.1.1.2 Availability and Cost of Support Facilities and Land

1. The availability of support facilities was the second criterion for evaluating the proposed sites. The support facilities consist of the items shown in Table 4.2 including access roads, utilities such as power, sewer, water supply and communications, port availability, and employee housing. Related issues include availability of an untrained or trained local workforce, construction costs, operation and maintenance costs, and project lease uncertainties.

TABLE 4.2

COMPARISON OF PACBAR III
SITING ALTERNATIVES
CONSTRUCTION/ OPERATIONS ISSUES

SITE	CONSTRUCTION REQUIRED							ESTIMATED COSTS		WORKFORCE REQUIRED		LEASE UNCERTAINTIES[1]
	Approximate Miles of Access Road	Onsite Power	Onsite Sewage	Onsite Water Supply	Onsite Communi-Cations	Port facilities	Employee Housing	Construction	Operation	Untrained Available	Trained Available	
Guam, Dandan	None	No	No	No	No	No	No	~ $1M	$2,300,000[2]	Yes	Yes	**Yes.** The current landowner is attempting Through legal channels to negotiate a new lease agreement with NASA, the present lessee. The outcome of the legal issues may be delayed for several months or even years. Also, the date which NASA could make the property available to the Air Force is not established.
Tinian, Maga	0.6	Yes	Yes	Yes	Yes	Yes	Possibly	(6)	>$3,000,000[2]	Yes	No	No.
Tinian, Massolog	0.6	Yes	Yes	Yes	Yes	Yes	Possibly	(6)	>3,000,000[2]	Yes	No	No.
Saipan, Mt. Tagpochau	(3)	Yes	Yes	Yes	No	No	Possibly[4]	~$5M	$3,000,000[2]	Yes	No	**Yes.** Land for access roads to this site would require negotiations with multiple "private" land owners. Legal questions could be raised with regard to legal responsibility in the event of an accident on these roads.
Saipan, Ladern I Maddok	0.3	Yes	Yes	Yes	Yes	No	Possibly[4]	(5)	$3,000,000[2]	Yes	No	**Yes.** Land is currently already leased for agricultural purposes (grazing).
Saipan, Suicide Cliff	0.1	Yes	Yes	Yes	Yes	No	Possibly[4]	(5)	$3,000,000[2]	Yes	No	**Yes.** Use of this site would require extensive negotiations with various Saipan agencies.
Saipan Osko Talufofo	(3)	Yes	Yes	Yes	Yes	No	Possibly[4]	(5)	$3,000,000[2]	Yes	No	**Yes.** The site and access road leases would require extensive negotiations with multiple landowners.
Saipan, Mt. Petosukara	1.9 Exist. 0.3 New	Yes	Yes	Yes	No	No	Possibly[4]	~$5M	$3,000,000[2]	Yes	No	No.

(1) Anderson, T. 1986

(2) An estimated operating cost for Mt. Petosukara is $\$3x10^6$ (Rentschler 1986a). Cost for the other Saipan locations are expected to be similar. Costs on Tinian are expected to be greater than Saipan costs, Primarily due to the need to supplement employee housing costs.

(3) New roadwork would not be required. However, extensive improvement to existing roads would be required.

CONTINUED

[4] This depends on employee preference for housing quality.

[5] These sites on Saipan were eliminated before construction costs were estimated. It is expected that their construction costs would be between the estimates for the Mt. Tagpochau and Mt. Petosukara sites.

[6] These sites on Tinian were eliminated before construction costs were estimated. It is expected that these costs would be significantly higher than the Mt. Petosukara site because of the need for improved port facilities and a temporary worker warehouse.

2. Based only on construction and basic operational activities, the Dandan, Guam, site presents the least logistical difficulties, because the facility would be in developed area. In particular, the Guam site would be significantly less costly to the Air Force. However, the timing for its availability and the legal status of the lease for this site makes its schedule questionable, thereby, clouding its feasibility. The schedule date for deactivation of the Dandan site by NASA is particularly complicated by the loss of one of the satellites planned to replace the need for the Dandan site when the Challenger Shuttle accident occurred on January 1986. Because of the schedule factors and the inability of the site to satisfy the third mission objective, the Air Force did not select this site.

3. The main differences in Table 4.2 between the Tinian and most of the Saipan sites are associated with: (1) the advantage of having an existing lease for the Tininan sites, and (2) the probability of increased construction and operation costs on the less developed island. Locating the radar site at either of the Tinian sites also poses a potential conflict with Naval activities planned for the area. Increased costs of either of the Tinian sites would be difficult to justify, considering that neither is capable of satisfying the, mission objectives in a manner comparable to the Mt. Petosukara, Saipan, site.

4. The costs for the unselected Saipna sites would be similar to or somewhat less than the Mt. Petosukara site, primarily because access road construction work would be less. However, each of the other Saipan sites has leasing questions, which could adversely affect schedule and/or costs. None of the other Saipan sites has potential cost or operational advantages, which could overcome the mission performance advantages of the Mt. Petosukara site.

4.1.1.3 Environmental Impacts

1. An assessment of the relative environmental impacts of the eight sites is summarized in table 4.3. For purposes of analysis, this table includes the Mt. Petosukara site both with and without the Boresight Tower.

2. In the original EA, when the Boresight Tower was still included in the project, the impacts at different sites were compared qualitatively as being: (1) less, (2) similar, or (3) more than those at the Petosukara site. In this revised EA, the comparisons have been quantified to the extent practical. The number ratings in Table 4.3 range from 1(no noticeable impact) to 4 (potentially significant impact).

TABLE 4.3

**COMPARISON OF PACBAR III
SITING ALTERNATIVES
ENVIRONMENTAL IMPACTS
COMPARED TO MT. PETOSUKARA**

SITE	ENVIRONMENTAL IMPACTS AS COMPARED TO MT. PETOSUKARA, THE REFERENCE ALTERNATIVE[(a)]													Total
	Air Quality	Hydrology	Geology/ Soils	Noise	RF Emissions	Flood Plains/ Wetlands	Flora/ Fauna	Aesthetics	Archaeology/ Historical	Hazardous Waste	Safety	Soci-economics	Land use	
Guam, Dandan	**2**	**1**	**1**	**1**	**3**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**17**
Tinian, Maga	**1**	**1**	**2**	**2**	**1**	**1**	**2**	**2**	**(1)[b]**	**1**	**2**	**3**	**1**	**20**
Tinian, Massalog	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**2**	**(1)[b]**	**1**	**2**	**3**	**1**	**19**
Saipan, Mt. Tagpochau	**1**	**1**	**2**	**1**	**3**	**1**	**2**	**3**	**(1)[b]**	**1**	**2**	**2**	**2**	**22**
Saipan, Ladern I Maddok	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**3**	**(1)[b]**	**1**	**2**	**2**	**2**	**20**
Saipan, Suicide Cliff	**1**	**1**	**2**	**4**	**3**	**1**	**2**	**4**	**(1)[b]**	**1**	**2**	**2**	**3**	**27**
Saipan, Oskso Talufofo	**3**	**1**	**2**	**4**	**3**	**1**	**2**	**1**	**(1)[b]**	**1**	**2**	**2**	**1**	**24**
Saipan, Mt. Petosukara														
A. With Boresight Tower	**1**	**1**	**2**	**2**	**1**	**1**	**4**	**3**	**1**	**1**	**2**	**2**	**4**	**25**
B. Without a Boresight Tower	**1**	**1**	**2**	**2**	**1**	**1**	**2**	**2**	**1**	**1**	**2**	**2**	**3**	**21**

(a) For comparison, the numbers range from 1 to 4, with 1 being “no noticeable impact” and 4 being a “potentially significant impact”.

(b) Archaeological/historical surveys were not performed in these areas. A rating of 1 was assigned to these sites to develop the overall rating. If any of these sites have special archaeological significance, the overall rating should be higher.

No attempt has been made to apply weighting factors to differentiate the relative importance of environmental issues because the importance of each will be different according to individual viewpoints and interests.

3. The last column in Table 4.3 shows a total for the combined individual site impacts. As expected, the Dandan site indicates the least impact, because it is an existing site, and Guam has the largest existing population. A next grouping of sites are the two Tinian sites and three of the Saipan sites, Mt. Tagpochau, Ladern I Maddok, and Mt. Petosukara (without the Boresight Tower). The locations with the greatest impacts would be:

- The Suicide Cliff and Osko Talufofo sites because of their relationship to tourists or population activities.
- The Mt. Petosukara site with the boresight Tower, primarily because of wildlife habitat and limestone forest impacts associated with the tower.

4. Discussion of the environmental impact evaluations for the sites, which were not selected, are included in the following Sections 4.1.2 through 4.1.4.

4.1.2 GUAM

1. Siting PACBAR III at the existing NASA Dandan Tracking, Station on Guam would have certain environmental advantages:

- A trained, available workforce (111 people) is already present and housed on the island.
- There is an existing facility with little construction and installation requirements needed to accommodate the radar.
- Loss of habitat from new construction would be minimal.

2. However, several endangered species occur at or in the area of the NASA Tracking Station (Anderson, R. 1985), as shown in Table 4.4 below:

TABLE 4.4
ENDANGERED SPECIES
NEAR GUAM NASA TRACKING STATION

	Common Name	Status
BIRDS	Mariana Gallinule	E
	Vanikoro swiftlet	E
	Micronesian starling	E^G
MAMMAL	Mariana fruit bat	E
PLANT	Tree Fern	E^G

E = Federal Endangered Species
E^G= Guam Endangered Species List

3. Although not currently designated, the area was recommended as critical habitat for the Vanikoro swiftlet, which has recently experienced almost complete disappearance on Guam (Engbring, Ramsey, and Wildman 1984). Although reasons for its disappearance have not bee determined, protection of caves, cliff ridges, and forest openings is recommended for habitat preservation.

   Small areas of wetlands are located on the facility site, and a larger wetland area exists south of the facility. Such wetlands are important habitat for species such as the Mariana gallinule.

4.1.3 TINIAN

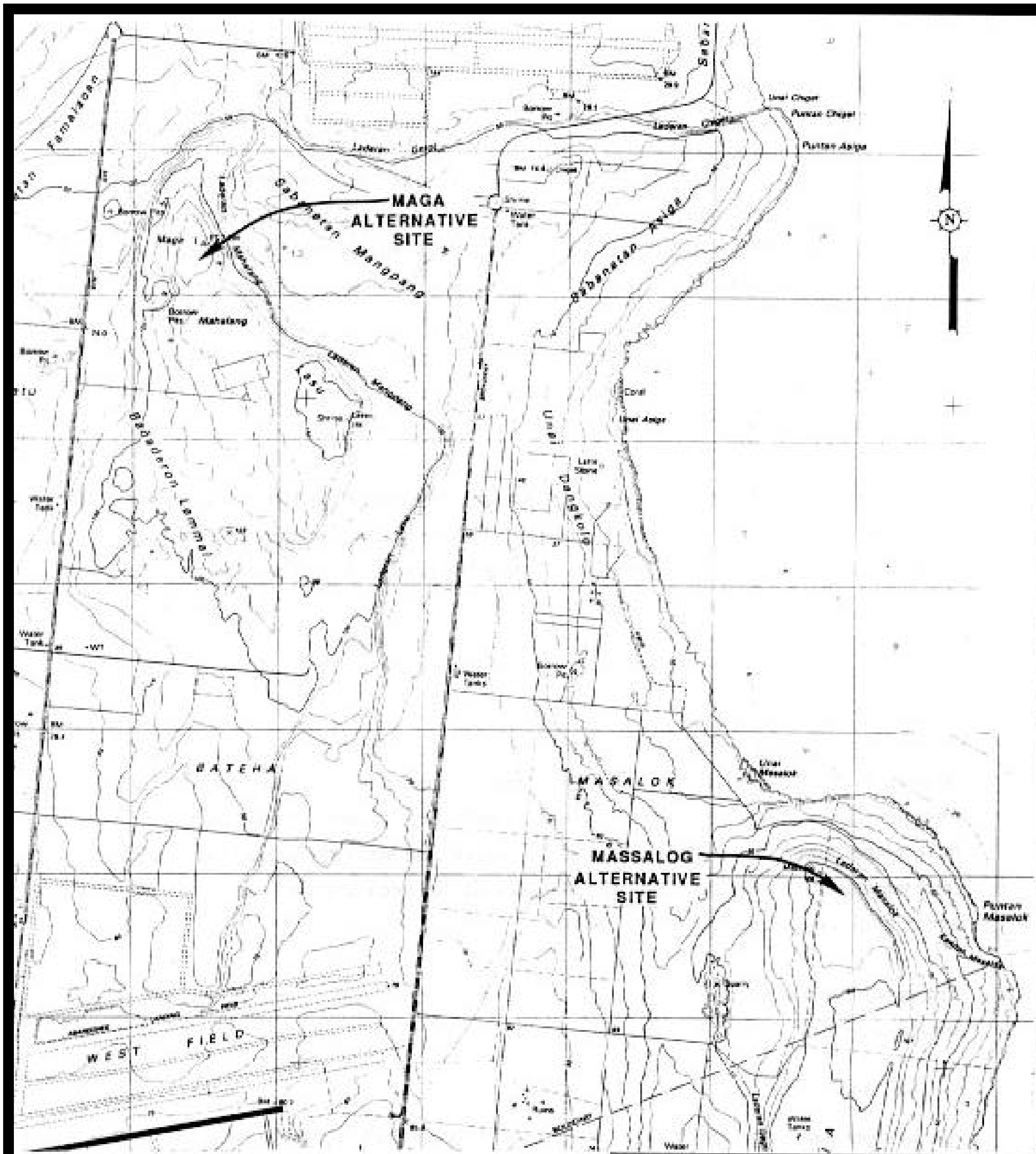
1. The two sites proposed for Tinian are located on property leased by the U.S. Department of Defense. The topography of the two sites, Maga and Massalog, is shown in Figure 4.6. Section 4.1.3.1 briefly describes the existing environment associated with these sites. Section 4.1.3.2 discusses the environmental analyses used to prepare Table 4.3.

4.1.3.1 Existing Tinian Site

1. Land use on Tinian is currently about two-thirds military, with the remainder consisting primarily of the following (Concepcion 1986a):

   - 10% urban

   - 40% long-term agricultural lease to one corporation, Jones and Guerrero used for cattle grazing.



SCALE

0 .5 1 MILE

SOURCE: USGS 1983 b

PACBAR III
ENVIRONMENTAL ASSESSMENT

TINIAN TOPOGRAPHY
MAGA AND MASSALOG

FIGURE 4.6

- 30% privately owned agriculture lands.

- 20% public land, primarily shorelines and rocky cliff lines

2. According to the Office of the Mayor of Tinian, the estimated 1986 population for the islands is 994, not including about 500 alien workers. This differs from the CNMI Department of Commerce and Labor estimate of a 1986 population of 960, based on 1980 census data (CNMI 1987). However, regardless of the exact number. Most of this population lives in the main urban area, San Jose Village, on the southwestern end of the island. The median age is 17. Very few local people are expected to have the electrical mechanical background required in order to be trained and hired in accordance with the Residence Worker's Act (Concepcion 1986b).

3. The exact number of homes on Tinian is not available (Ayuyu 1986). Housing on the island consists primarily of private homeowners. However, approximately 20 homes are being built as part of a federally funded low-rent housing project. These two- to four bedroom homes will average $500 per month rent. A family home loan program also has been iniated on the island. In general, there is a shortage of good standard housing on Tinian (Ayuyu 1986).

4. A flora and fauna survey recently completed for this area, under contract to the U.S. Navy (U.S. navy 1985c), indicates that the Maga site is covered by tangantangan forest and open fields cover the massalog site. Both of these sites are located in vegetation commonly found on the island. However, the Maha site is most likely to represent potential wildlife habitat. The Massalog site has been described as agricultural and grazing land (Perry 1984).

5. Tinian wildlife was also recently studied and the following federally listed endangered species were discussed (U.S. Navy 1985c):

- Micronesian mallard thought to be extinct.

- Micronesian megapode thought to be extinct since the 1800's but was heard during the recent survey.

- Mariana gallinule located primarily near Lake Hagoi, the only permanent wetland area on the island.

- Vanikoro swiftlet sighted north of Maga.

- Tinian monarch, an endemic bird and the second most abundant bird on the island.

- Mariana fruit bat, not seen during the recent survey (U.S. Navy 1985c) and considered rare on Tinian (DNR 1984).

- Sheath-tailed bat, not seen during the recent survey.

6. The endangered Tinian monarch (Monarcha takatsukasai) is endemic to the Marianas and found only on Tinian. Although reported to be abundant in most tree and shrub habitats throughout the island, it is a species of concern because of its limited distribution and vulnerability to impacts such as predators and loss of habitat (DNR 1984). Siting the project on either of the Tinian locations may result in some loss of habitat for this species. It should be noted, however, that several biologists agree that the endangered status of this species should be reassessed. Only a major change in its preferred forest habitat would appear likely to reduce this species to a truly endangered status. (U.S. Nay 1985c).

7. A Micronesian megaopode was sighted on a hillside north of Maga I 1985, and Vanikoro swiftlets were sighted north of Maga (U.S. Navy 1985 c).

8. Seabird roosting areas were sighted in 1985 along the coast north of Massalog (U.S. Navy 1985c).

9. The Maga Plateau site is located approximately one mile from the Hagoi lake/swamp type area, which supports a concentrated population of the endangered Mariana gallinule (Aldan 1985). However, this bird species would likely be unaffected by Maga Plateau activities.

4.1.3.2 Environmental Evaluation of Tinian Sites

1. Table 4.3 indicates that no significant impacts would be expected at either of the Tinian site. However, those impacts expected to be in the 2 or 3 range are discussed in the following paragraphs.

2. Construction of access roads and the Radar Site would cause some disturbance to existing soils. Normal amounts of erosion would be expected until construction and revegetation was completed.

3. The site activities and operations would cause some insignificant changes in noise levels at either site.

4. No impact to vegetation or wildlife would be expected at the Massalog site, which are presently open fields. However, construction at the Maga site would result in the loss of forested areas, which have some potential as habitat for endangered species. Because this loss would represent only a small percentage of the island's potential habitat, this loss would not be considered significant.

5. The antenna would be visible at either site, causing some aesthetic impacts. These are not considered significant in relation to the existing island land uses.

6. The socioeconomic impacts on Tinian, during both construction and operations, would be greater than for sites on Saipan or Guam, primarily because of Tinian's much smaller population. However, these impacts were not sufficient to eliminate consideration of these sites as viable alternatives.

4.1.4 SAIPAN SITES

1. This section summarizes those bases for assigning "some impact" levels to the Saipan alternative sites in Table 4.3.

2. The Mt. Tagpochau location is visited by tourists and other sightseers to observe a panoramic view of the entire island. This would increase the importance of both the potential for RF emission exposures and aesthetics of this site.

3. The Mt. Tagpochau site has been approved as a wildlife conservation area for the fruit bat and Sambar deer. In addition, recent surveys indicate the diminishing presence of the endangered Vanikoro swiflet in this mind-section interior valley of Saipan where important suitable habitat is located. The endangered Nightingale reed warbler is also present in this area, although it thrives in a variety of habitats in other island locations (Engbring, Ramsey, Wildman 1984).

4. The Laden I Maddok site is located in an existing grazing area on the northeastern tip of the island just south of Ranch Road. The only notable environmental impact associated with this site is related to aesthetics. The radar dish would be very noticeable from Suicide Cliff, a popular tourist location. Although the Ladern I Maddok site is located approximately one-half mile from the northern boundary of the Bird Island Wildlife Conservation Area, that conservation area would not be expected to be impacted by the Radar Site.

5. The Suicide Cliff site is judged to be the least attractive site based on environmental impacts, primarily because the site is actively used as a tourist attraction due to its aesthetic quality. Also, the facility would have to be situated on a nearby summit, very close to memorials and associated gravesites. Further, vegetation in the area probably is a habitat for the Micronesian megapode. Resulting adverse environmental impacts of the Suicide Cliff location include aesthetics, noise, RF emissions and potential impacts to the Micronesian megapode and Sambar deer, which combine to make this unacceptable.

6. The Okso Talufofo site is in the Capitol Hill area of Saipan on public land, with existing public access. Environmental impacts at this site are primarily related to the presence of nearby private homes and increased population in this area. Air emissions from the diesel generators, although minimal, may blow in the direction of these homes. Noise and radiofrequency emissions are considered potentially more adverse because of the population. Vegetation at the site consists of tangantangan and vine growth, and the area is designated as habitat for the Sambar deer (Lemke 1985a). The Vanikoro swiftlet and Nightingale reed warbler also occur in this section of Saipan (Engbring, Ramsey, Wildman 1984). The Okso Talufofo site is considered marginal from an environment impact viewpoint.

4.1.5 SUMMARY

1. The Mt. Petosukara site appears to be the most appropriate site for the PACBAR III radar facility, considering: (1) satisfaction of mission objectives, (2) facility operations, and (3) environmental impacts. This is especially true with elimination of the Boresight Tower and its Access Road, which greatly reduces the potential for adverse impacts to endangered species habitat.

2. The Dandan, Guam, site is not an acceptable alternative because of limitations to meetings mission objectives and because the schedule for land availability cannot be established.

3. The two Tinian sites have environmental impacts comparable to the Mt. Petosukara site (without the Boresight Tower). However, neither of these sites satisfies the mission objectives nearly as well as the Mt. Petosukara sites. Additionally, both would have relative operational disadvantages.

4. The three Saipan sites other than Mt. Petosukara have comparable or greater environmental impacts; none is comparable in meeting mission objectives.

4.2 FACILITY ARRANGEMENT

1. The facility layout is staight foward, consisting of the radar antenna and support buildings. Considering the relatively small areas required for the facility and the nonsite-specific nature of the design, there are no significant differences between the various siting alternatives to indicate an advantage on one alternative over another in terms of reducing the environmental impact.

2. Considerable flexibility for locating the Boresight Tower existed when a tower was included in the project. Its location and respective height were selected based on consideration of a seen-area analysis and a route for improved access into Marpi Commonwealth Forest. Those factors are no longer a consideration because the tower has been eliminated from the project.

4.3 EQUIPMENT

1. Originally, the equipment alternatives for the project were: (1) use of an onsite Boresight Tower versus other radar calibration methods, (2) use of onsite versus offsite power, and (3) choice of a telecommunications system.

2. Several methods available to calibrate the radar antenna include:

    - Use of a small receiver/transmitter antenna on a Boresight Tower constructed as part of the project. The tower should be located 2,000 feet or more from the antenna.

    - Use of a combination of:

        - Existing satellites for coordinate and range calibration.

        - Spheres (balloons) released from the ground for image and angle calibration.

    - Use of a fixed small receiver/ transmitter antenna on an existing structure, such as a radio or microwave tower.

    - Use of a receiver/ transmitter antenna on aircraft or ships.

3. Initially, the option to construct a Boresight Tower as part of the project was selected because:

    - The Boresight Tower is the most convient operationally.

- Construction of the tower and its access road would have provided vehicle access to a campground in the Marpi Commonwealth Forest, northeast of the Radar site. This access was an attractive feature to the DNR Commonwealth Forester, James Culbert.

However, subsequent to the public comments tot he original Environmental Assessment (EA), the Air Force decided to eliminate the Boresight Tower and its Access Road from the project. This decision was based on the determination that the benefits of the tower would not adequately offset the potential impact to wildlife habitat and a portion of limestone forest. The Tower Site and Access Road represented the majority of forested area to be disturbed by the proposed project.

4. None of the alternative calibration methods are considered to have any significant adverse or beneficial environmental impact because:

   - If balloons are used, they will be released from existing access locations.

   - Attaching a small receiver/ transmitter to an existing structure would not result in any land disturbance or noticeable visual changes. Communication between the radar antenna and receiver/ transmitter would be via an existing telephone/ microwave system or a radio remote control system.

   - The use of satellites, ships or airplanes for calibration will have no effect at the Radar Site. Use of ships or airplanes would, however, increase operating costs.

   The Air Force now plans to allow the facility operator to select the actual calibration method to be used, although the Air Force may determine potential existing structures, which could be suitable for a small receiver/ transmitter.

5. One power supply alternative, considered at the beginning of the project, was transmission from the island power station by utility lines. A major disadvantage of this alternative is that the utility line, which would be used to service the project, has a history of frequent power outages. These outages could not be tolerated for effective operation of the project. Other disadvantages of the power line would have been the requirement to widen the area cleared for the Access Road, plus the visual impacts of an overhead line. Based upon these negative factors, the Air Force elected to generate onsite electric power using diesel driven generators.

6. Three telecommunications options were considered for the project. These were:

   - Aboveground telephone lines
   - Underground telephone cables
   - A microwave link to Guam

   The aboveground telephone line system was considered when overhead power lines for offsite powers were being considered. However, when the offsite power alternative was eliminated, the required clearing, visual impact, and cost associated with the aboveground telephone poles contributed toward their elimination.

7. Of the remaining two telecommunications alternatives, the microwave link to Guam was chosen. The primary factors were cost and avoidance of impact to the local telephone service, which already has a long waiting list for new telephone customers.

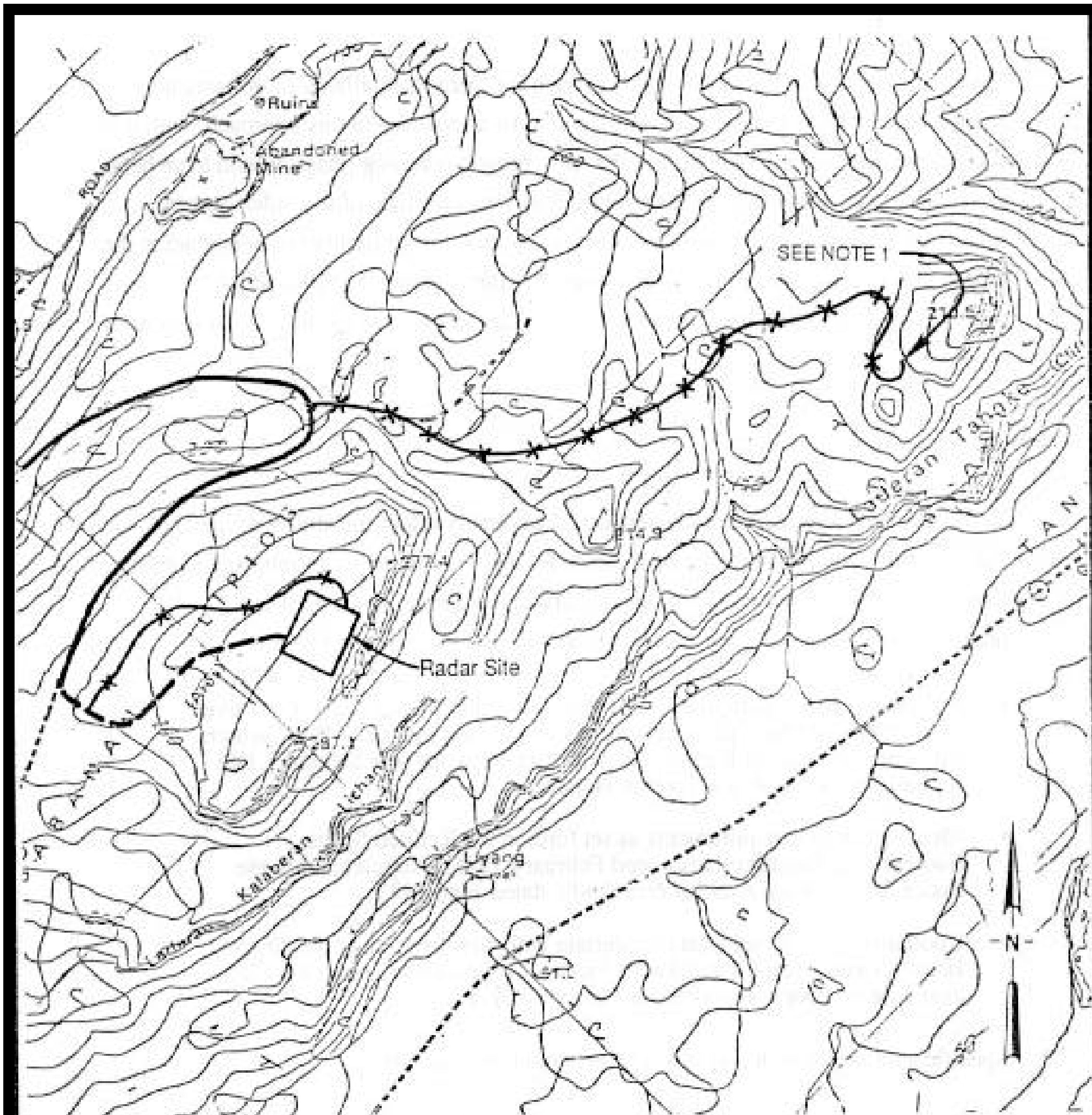
4.4 ACCESS ROAD LOCATION

1. The potential routes for the new Access Road were evaluated relative tot he following criteria:

   - Locations of existing roads
   - Slope requirements
   - Soil conditions
   - Endangered species habitat
   - Archaeological resources
   - Prior graded areas

2. The proposed route, shown in Figure 1.3 and 4.7, was selected primarily to utilize existing roads tot he extent possible. Also, the majority of the 0.3-mile of new road to the actual Radar Site is in recently burned grassland, rather than more important wildlife habitat.

3. An alternative of the alignment selected would be to utilize the existing graded road area shown in Figure 4.7. However, the negative o this alternative is the impact on the forest area. The alignment selected is primarily through grassland and the road grade will be less severe. As discussed in Section 1.2.5.2, the Air Force will mitigate effects of the prior disturbance in a manner agreed upon with the appropriate island and government agencies.



LEGEND

- EXISTING UNPAVED ROAD
- PROPOSED ROAD TO BE CONSTRUCTED
- BULLDOZER PATHWAY CLEARED IN 1985, TO BE ABANDONED AND REPLANTED AS NECESSARY

NOTE 1: This site was the location of the Boresight Tower before it was eliminated from the project design in June 1986.

SOURCE: DNR 1985b

PACBAR III
ENVIRONMENTAL ASSESSMENT

ROAD ALIGNMENT ALTERNATIVES

FIGURE 4.7

4.5 OPERATIONS

1. The radar station will operate by a private company specializing in this area and will be under contract to the U.S. AIR FORCE. An alternative to this approach, which was considered conceptually during the early project-planning phase, would have been to use Air Force personnel for the operation and maintenance of the radar system. Effects of that alternative could have been an increase in the number of personnel at the station and total number of families imported tot he island, but a reduced job opportunity for existing local residents. Economic impacts would have been similar or somewhat greater.

4.6 NO PROJECT

1. A “No Project” alternative, if chosen, could adversely affect the ability of the U.S. AIR FORCE to fully comply with National Space Policy, execute treaty monitoring support, execute U.S. AIR FORCE missions, and satisfy Space Surveillance goals and requirements. Mission objectives mandated, which would not be met, are:

    - Complying with Headquarters Air Force Program Management Directive PMD 4068 (21) for Space Defense System, dated February 1984, which calls for a complete Pacific Radar Barrier Network (see Section 1.1.1) for early tracking new foreign launches.

    - Meeting mission requirements as set forth in the Refined space Surveillance Requirements, dated February 1985, a supplement to the Space Surveillance Architecture Study, dated June 1983.

    - Continued lack of radar data ballistics program operating in Broad Ocean Area 1 located near Saipan. At present, no radar data are available on operations, which occur in this area.

2. Specific activities, which would not be accomplished, include:

    - Detecting, tracking, and identifying <u>all</u> man-made objects in space in a timely manner.

    - Detecting threats to U.S. Space Systems.

    - Supporting International Treaty monitoring.

    - Monitoring space and providing information on activities in space.

    - Providing timely detection and tracking of foreign and non-nominal space launches and on-orbit maneuvers.

    - Increasing space object identification accuracy and timeliness.

3. Also, if the project were not constructed:

   - Development would not occur in the Marpi Commonwealth Forest.

   - The scenic viewpoint and trailhead would not be built to enhance public viewing from the forest.

   - The forest would not be subjected to increased human access.

   - A small amount of habitat of the endangered Micronesian megapode would not be removed.

   - The existing extensive soil erosion along the Marpi Forest Road and resultant heavy siltation of Beach Road and negative impact on the lagoon would continue to occur.

5.0 UNAVOIDABLE ADVERSE EFFECTS AND MITIGATION MEASURES

5.1 PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

1. The noise associated with construction activities cannot be avoided. However, the type of construction will not be of the nature to generate significant noise levels. No blasting or other intense noise generating activities will be permitted. Also, the nearest town, San Roque, is located a considerable distance from the project site (1.3 miles), which should minimize the effect that will occur on local residents. The heavy vegetation in the project area will also provide attenuation of the noise level. Due to the temporary nature of construction, permanent disruption to wildlife in the work is due to noise expected to occur.

2. Removal of about 7 acres of vegetation in the areas designated for the Radar Site and Access Road cannot be avoided. About 60% of these 7 acres will be existing grassland. About 40% will consist of tangantangan tree removals where an existing road will be widened.

3. It is expected that the project will result in a loss of between 0.1 and 3.0 acres of tangantangan forest type of endangered species habitat. This acreage represents less than 0.3% of the Marpi Commonwealth Forest Area, much of which consist of similar potential habitat because of the ability of the tangantangan forest vegetation to grow relatively rapidly in this area.

4. The visual impact of the white radar antenna dish cannot be avoided from five scenic viewpoints on the island, including Mt. Tagpochau. The dish must be white to function properly and will have aircraft warning lights at night.

5. The presence of buildings and other facility structures in the forest environment is an environmental effect that cannot be avoided during the life of the project. The facilities will be painted in a color scheme to minimize the visual impact to the area. At the end of the useful life of the project, the facilities may be converted to a campground, a forest visitor center, or Marpi Commonwealth Forest ranger headquarters (see Chapter 6.0). The facilities may also eventually be removed and the area returned to its original state,

6. Development of an improved access road in the project area is expected to result in additional vehicles and people in this part of the Marpi Commonwealth Forest. Improved access could be used by hunters, poachers, and others. However, existence of personnel at the radar facility would likely signifigantly reduce present illegal activities. The positive impact of the access road drainage and erosion control improvement is to provide a significant reduction of the existing soil erosion, which causes blockage of Beach Road and siltation/discoloration of the lagoon.

7. Mitigation measures to reduce adverse, avoidable impacts are discussed in Section 5.2.

5.2 MITIGATION MEASURES

5.2.1 AIR QUAITY

1. During the site preparation and access road grading, water will be used when required for dust control. This practice typically reduces dust emissions by one-half (U.S. EPA 1977).

2. No special mitigation measures for air quality are required during operations (see Section 3.1.2).

5.2.2 HYDROLOGY

1. Soil erosion will be prevented by revegetation of exposed areas (see Section 5.2.7), drainage diversion design, and paving the most susceptible portion of the existing road (see Section 5.2.3).

2. A water-based pesticide will be used for soil treatment during construction. Application methods, which minimize water quality impacts, will be used.

3. The aboveground diesel fuel tanks are located within a concrete containment berm sized to hold the contents of one tank in the event it leaked. Interconnected to the diked are an oil/water separator tank and associated underground waste oil tank located within a double containment liner, designed in accordance with EPA regulations. The oil/water tank is provided to separate any diesel fuel from storm water that collects in the diked area. The diesel oil phase flows to the waste oil tank for storage and periodic pump-out by a vacuum truck for disposal.

4. To provide safe storage of flammable and hazardous materials used in the operation of the facility, an EPA approved hazardous material storage building is provided. The prefabricated modular unit is an all-steel unit complete with a containment sump.

5. Construction specifications and operating procedures will include a waste material spill plan, which will specify requirements and procedures for conatinmentand cleanup of accidental fuel or chemical spills.

6. The sanitary sewer septic tank and leach field will be located, designed, and constructed according to procedures established by Navy specifications to assure protection of ground water. The unit will be designed to allow future expansion in accordance with CNMI requirements.

5.2.3 GEOLOGY AND SOILS

1. Potential contamination by diesel fuel storage or other chemical spills will be prevented using the measures discussed in Section 5.2.2.

2. The existing Matius Road and storm water drainage system is severely eroded at numerous locations and erosion will continue to occur unless improvements are made. The primary basis of the improvements is to provide drainage facilities which are technically and economically feasible, and which will control the runoff flows and velocities from frequent heavy rainfalls to minimize the existing erosion and to avoid significant new erosion due to increased road usage. The mitigation features direct flow into: (1) natural, heavily vegetated swales, and (2) new drainage channels which are designed to resist erosion for calculated flow conditions.

3. A combination of rock and grass-lined ditches along with road crossing culverts will be employed to control the flow of storm water runoff and reduce its velocity to control erosion. At Beach Road, an energy dissipater design using large boulders and a stilling basin will be provided to reduce the runoff velocity and reduce significantly the silt carried over Beach Road that currently exists. Appendix K provides supplemental descriptions on the mitigation concepts that were agreed upon with the CRM agency.

4. The areas bulldozed during the initial 1985 site investigations that will not be used for final Access Road alignment will be improved in a manner to be agreed upon with appropriate island and government agencies.

5.2.4 NOISE

1. Construction specifications will require that all equipment include engine exhaust mufflers to the extent required to meet Air Force Regulation 161-35 occupational noise exposure standards.

2. The diesel generators will be supplied with exhaust silencers, soundproof insulation (Specifically, on exhaust piping), and vibration dampeners in order to meet the Air Force occupational noise exposure standards.

5.2.5 RADIOFREQUENCY EMISSIONS

1. As discussed in Section 3.5, if the antenna beam is only operated at or above the horizon, power density levels will not exceed personnel or public exposure levels (PELs) at areas of probable human access or wildlife habitat, although a small area on the northeast side of the top portion of Mt. Petosukara may exceed the criteria. However, the radar will use elevation or azimuth limit switches and stops, to prevent accidental exposure to main beam radiation. Therefore, levels will not exceed the unlimited access public exposure limit (PEL).

2. If it becomes desirable to operate the antenna at angles below the horizon, procedures will be used to assure that the public, facility personnel, or endangered wildlife are not exposed to levels exceeding the PELs. Elevation and azimuth limit switches will be installed to assure protection for the public. Due to the use of these switches, restricted access areas will not be necessary. The project-specific exposure footprint for the actual operating mode after initial antenna installation will be measures to insure that PELs are below the public access limit in public access areas.

3. The height of the antenna, expected near-field radiation configuration, and the possible requirement to restrict low angle operation should keep exposure levels to onsite personnel below the PEL criteria. However, if onsite measurements show unexpected conditions, several minor actions may be required. These could include: requirements for personnel to remain in shielded areas during certain operations, providing shielding at the guardhouse or other unprotected areas, or by restricting certain critical operating angles.

5.2.6 FLOOD PLAINS/WETLANDS

1. The project does not affect flood plains or wetlands.

5.2.7 FLORA/FAUNA

1. The major mitigation measure to protect flora and fauna has been the Air Force's decision to use alternative means to calibrate the radar antenna. That decision has led to elimination of the Boresight Tower and its Access Road. This mitigation measure has reduced the wildlife habitat disturbance to only about 0.1 acre of forest, which is not already adjacent to the existing roadway. This is less than 5% of the area originally planned for disturbance to construct the Boresight Tower. Also, this change has completely eliminated project activities in limestone forest acreage.

2. Forest areas, which are still adjacent to the project, will be marked on design drawings for use by the construction contractor. These areas will include the Radar Site and a small portion of the new Access Road. Prior to clearing in these areas, the construction contractor will be required to contact the Commonwealth Forester to allow for site inspection during clearing (U.S. EPA 1977).

3. In the forest areas, the absolute minimum amount of vegetation will be cleared. Vegetation alongside the access road will not be removed unless required for road widening. Vegetation along cliff bases will not be removed unless required for road widening. Vegetation along cliff bases will not be removed (Schmitt 1985). The construction area limits are specified on the contract drawings and will be enforced during the construction phase to assure the minimum amount of vegetation is affected.

4. Although not expected, if any damages should occur to project areas not approved for construction clearing and grubbing, the contractor will be responsible for replanting these areas with Naria or <u>Pterocarpus indicus</u> to restore any damaged vegetation (U.S. EPA 1977).

5. At least two types of vegetation will be used for replanting activities. These include Common Bermuda grass and fast growing, local trees such as Narra or <u>Pterocarpus indicus</u>. The Bermuda grass will be used in cleared areas that require low-lying vegetation, such as the Radar Site and the 30-foot clear zone (see Section 1.1.3.1). The trees will be planted in areas to be negotiated with appropriate island and government agencies. Planting trees should prevent excessive growth of undesirable weeds and grasses that would require continuous future maintenance (U.S. EPA 1977).

6. Replanting activities will be scheduled and implemented where possible to correspond with the start of rainy season, which lasts from late June to early November. Planting during this time will maximize the effectiveness of these activities (U.S. EPA 1977).

7. In compliance with CNMI earthmoving and erosion control regulations, grading, filing and clearing operations will be specified to:

    - Preserve, match or blend with natural contours and undulations of the land;

    - Retain trees and other native vegetation to stabilize slopes, retain moisture, reduce erosion, siltation and nutrient runoff and preserve the natural scenic beauty;

    - Minimize scars from cuts and fills, and to limit the amount of cuts and fills requires;

    - Assure all cleared slopes, cuts and fills vulnerable to erosion are stabilized; and

    - Assure that sediment or other material deposited in the marine waters or coastline or any other public or private lands do not exceed that which would have been deposited if the land had been left in it natural state.

    Also, earthmoving operations will be controlled during and immediately after inclement weather.

8. Construction contractors will be required to insure that any equipment or supplies delivered to Saipan are free of any introduced organisms, such as brown tree snakes. The contractor will provide a plan stating all methods used to accomplish this task, including but not limited to quarantine activities and posting signs (U.S. EPA 1977).

9. In addition, contractor work limits and procedures will be specified to avoid disturbance to habitat of the Micronesian megapode and other species of wildlife.

10. A habitat enhancement area will be located away from the project site to assist in diverting wildlife from the site and provide replacement habitat for displaced wildlife. Mitigation measures involve the clearing of about 10.5 acres of Tangantangan trees within four commonwealth Wildlife Areas and replanting with a mixture of native forest trees of high wildlife value, as directed by the DNR (1987). These sites will consist of 68 individual plots measuring 25 x 25 M located in the following Commonwealth Wildlife Areas of Saipan:

    - Marpi Wildlife Area
    - Bird Island Wildlife Area
    - Kagman Wildlife Area
    - Naftan Wildlife Area

These measures comply with the USFWS Section 7 Consultation, which includes the recommendation that the planting of fruit trees for habitat enhancement will occur only if the fruit will provide endangered wildlife with food and/ or habitat and not encourage human use of the area.

11. An area of approximately two acres of native limestone forest which was cleared to provide road access to the abandoned Boresight Tower location will be restored in a manner determined by the DNR. The area, located between the proposed trailhead and the Boresight Tower site, will be replanted with a mixture of native and naturalized plant species recommended by the DNR (1987).

12. Signs will be posted to protect the endangered Micronesian megapode and to educate the public. These signs are intended to minimize the possibility that increased access and human activity related to the PACBAR III facility would harm the resident population of the Micronesian megapode. There will be two permanent signs, each approximately 5ft. x 3 ft. in size, to inform the public about the importance and special legal status of the Micronesian megapode and other sensitive species present in the Commonwealth Forest.

13. Further mititgstion measures, recommended by the USFWS, include:

    - That a qualified wildlife biologist be included in the roadway right-of-way survey team to insure that any megapode nests which may be in the vicinity of project activity be avoided.

    - That both construction and operations personnel be advised of the critical nature of endangered species, the role of the Marpi Forest in the recovery of the tree referenced species of birds, and the possible impact of construction and operations activities on the welfare of the birds.

    - Development of appropriate educational materials for construction and operations personnel, including a poster at the entrance of the PACBAR III facility. The poster could be developed with the assistance of the Commonwealth's Fish and Wildlife Division. It should warn of the danger of forest fires and should state that harassment of any listed species (including nests) may be in violation of, and punishable under, Federal and Commonwealth statutes (see Item No. 12, above).

    - Construction and operations personnel should be advised that harassment of any of the three references species (including nests) is prohibited under Section 9 of the Endangered Species Act of 1973.

    - If a megapode nest is discovered all project-related activities in the area of the nest shall cease, pending reinitiation of the Section 7 consultation.

- That there be a thorough analysis of the impact on endangered species of construction of a trailhead and scenic view parking area prior to such undertaking.

5.2.8 AESTHETICS

1. Selection of the facility location was based on consideration of the recommendations of a U.S. Forest Service seen-area analysis (Boyton 1985) and the recommendations of James Culbert, DNR Commonwealth Forester (DNR 1985a).

2. The radar antenna will be set back from the cliff to reduce visual impact. At night, aircraft warning lights on the antenna will be on.

3. The Radar Site buildings will be painted a color compatible with the forest background.

4. One scenic viewpoint and one trailhead have been located in coordination with James Culbert, DNR Commonwealth Forester (culbert 1986b).

5.2.9 ARCHAELOGOCAL/HISTORICAL RESOURCES

1. Human skeletal remains found in the proposed project area have been removed from the site by the Japanese consulate.

2. Four 81-mm Japanese mortar projectiles identified during the site archaeological survey will be removed prior to project construction in coordination with the Civil Defense Office on Saipan. Additional assistance from the Explosive Ordnance Unit on Guam may be used.

3. As recommended by the authors of the archaeological survey, the four ordnance storage buildings will be left undisturbed during project construction and operation.

4. The contractor’s construction schedule will be submitted to the Historic Preservation Office prior to construction activities so that possible arrangements for onsite monitoring by an archaeologist may be coordinated.

1. In accordance with the Department of Defense general requirements for the construction of this facility, the Contractor will be requires submitting hazardous waste management plan prior to construction. The plan will include, as a minimum, the following considerations:

   - An inventory of materials to be used in the construction of the facility that are hazardous to human's and/ or the environment shall be specified. Criteria for this classification will include toxicity, corrosivity, reactivity and ignitablity. Materials containing compounds listed in EPA 40 CFR Part 261, subpart D, as hazardous waste, must also be identified.

   - The plan will outline the proper transport and storage of new hazardous materials at the project site. This will consider a designated area with protection from the elements, properly ventilated and secured to prevent entry by unaythorization personnel. Compatibility of the various wastes will also be addressed.

   - Construction personnel will be instructed on the proper methods for disposal of used containers of materials that classify as hazardous waste. This will include drums or cans containing relatively small amounts of materials such as pesticides, paints, adhesives, or paint solvents.

   - There will be a mandatory requirement for waste materials to be stored in sealed containers.

   - Disposal methods will include utilizing an approved bulk storage accumulation area for the interim storage waste materials that is diked, covered and adequately secured to a foundation to prevent overturning in the event of high wind conditions. Proper posting of the area and security will be included to prevent entry by unauthorization personnel.

   - Hazardous wastes will not be stored at the site for more than 90 days, in accordance with EPA regulations. The waste materials will be properly manifested by the Contractor and transported by a qualified hazardous waste hauler for proper disposal to an appropriate off-island hazardous waste landfill or treatment facility (see Section 1.2.12).

2. Management of hazardous waste materials during operation of the radar station will be in accordance to an approved plan. The plan will include conformance to 40 CFR Part 261 regarding the storage and disposal of hazardous waste materials. Interim storage of the materials will be I in a specifically designed storage unit complete with separate areas for waste compatibility and containment sumps.

5.2.11 SAFETY

1. A potential operational hazard associated with the facility is exposure to nonionizing radiofrequency emissions. Mitigation for this safety consideration is discussed in Section 5.2.5.

2. As mentioned in Section 5.2.9, unexploded ordnance identified during the archaeological survey will be removed prior to project construction. In addition, contractors will implement an ordnance removal plan prepared by the Air Force. The plan will address the following procedures in the event unexploded ordnance is encountered during performance of the contract (Burns 1987):

   - Training of employees to identify ordnance items, including “don’t touch” instructions.
   - Provisions to cease all work in the immediate vicinity of suspect items.
   - Plans for evacuation of the work area when suspect items are encountered.
   - A readily available and current list of agencies/personnel to be notified to effect removal.
   - A Memo of Agreement, Host/Tenant Agreement or similar document, will be generated between the Air Force Space Division and another appropriate agency for Explosive Ordnance Disposal.

5.2.12 SOCIOECONOMICS/LAND USE

5.2.12.1 Population and Employment

1. The Air Force anticipates the hiring of local residents for the majority of the construction activities. It is estimated that, after a start-up period of about 12 months, operation of the radar station will provide full-time employment for 15 Micronesians with electronic/mechanical and other backgrounds.

5.2.12.2 Economics

1. The project is not expected to result in any adverse economic impacts to the area. It will provide a source of additional revenues to the island and income to Micronesians employed at the facility. Government on-the-job training in the area of electro-mechanical skills will also be positive contributions of the facility operation to the island community.

5.2.12.3 Land Use and Recreation

1. The improved roadway will provide improved public access to the scenic viewpoint and one trailhead, which will be constructed as part of this project.

6.0 RELATIONSHIPS BETWEEN LOCAL SHORT-TERM USE OF ENVIRONMENTAL AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

1. This section is intended to assess the trade-off between short-term and long-term environmental gains and losses. In particular, the Marpi Commonwealth Forest is important as a wildlife habitat for both federally listed endangered species and CNMI “protected” species. For this reason, activities, which could impact this habitat in the immediate future and the long-term, are discussed below.

2. In the short-term, there are negative effects, such as disruption of approximately seven acres of vegetation, disturbance to wildlife, and loss of between 0.1 to 3.0 acres of tangantangan forest type of endangered species habitat. There also are positive effects, including improved access to portions of the Marpi Commonwealth Forest, improved roads, increased employment, and satisfaction of the national security requirements of the project.

3. Construction and operation of a radar station will remove approximately 0.6% of forest land from potential forest use. However, this small amount would not be the first habitat to be affected in this manner. Other current activities in the forest which detract from preservation of wildlife habitat include cultivation (Appendix A and Figure 1.12) and, sometimes, burning of vegetation for hunting purposes. The beneficial activities of replanting trees in previously cleared Boresight Tower site and Access Road areas, and the wildlife enhancement areas will mitigate the loss of forest habitat.

4. The long-term effect of the project is not expected to adversely affect future numbers of endangered species. Additional construction is not planned, and project operations are not expected to result in death or injury to these species. Also, if the facility is removed after its useful life, the surrounding forest vegetation would spontaneously spread into o the project area. The area’s ability to reestablish native vegetation is evident, since most f the area was used for agriculture prior to World War II, and most of the area was denuded of vegetation during the war.

5. The potential for the future development of forest land for uses other than those intended would depend upon the same review and approval process by CNMI agencies as is occurring for the PACBAR III project. The CNMI agencies would, therefore, have the option to approve or disapprove any future development of this forest area. Based on the decision to eliminate the Boresight Tower from this project, it is anticipated that any project, which would disrupt significant forest acreage, would have difficulty in the review process.

6. In the long term, the Radar Station may no longer be required, due to changes in mission requirements. At that time, three options will exist: (1) the facilities can be removed by the Air Force, and the Access Road can be replanted with appropriate vegetation; (2) remove all structures, but leave the Access Road for recreational access to the viewpoint, trailhead, campground, and forest; and (3) maintain one or more of the structures to complement the recreational activities.

   There are no significant negative long-term effects with any of these options, and some positive benefits could be realized from either of the last two.

7. Some long-term, primarily socioeconomic, effects might be realized if more Americans (non-locals) take residency on the island as a result of this project. The determination of whether such effects would be adverse or beneficial is not practical at this time.

8. As a result of the rental agreement terms for use of the land (chapter 2.0) and mitigation measures specified for the project, a balance of negative and positive effects exists for both short-term and long-term considerations.

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

1. Resources that will irreversibly and irretrievably be committed to the project include construction materials such as gravel, wood, coral, concrete, asphalt paving, and metals. Also, consumption of energy resources will result from construction of the facility.

2. Although these resources are irreversibly and irretrievably committed for the useful life of the PACBAR II project, several of them may be recovered (e.g., metals), depending on the end-of-project activities. Also, some may have continuing beneficial uses, such as the construction materials used for the access roads.

3. Each of the end-of project options discussed in chapter 6.0 will allow either a beneficial use or recovery of the committed resources as described for the following options:

   - Option 1: Remove all structures, excluding the access roads, and revegetate the area to return it to its original state. This option returns the land to its forest-related use.

   - Option 2: Remove all structures, and salvage reusable materials such as metals. This option allows for continued use of the access road into the forest, the viewpoint, and trailhead.

   - Option 3: Convert the Radar Site facility to recreational facility such as a campground, visitor center, or ranger headquarters. This option allows continued use of the permanent structures and returns the land to a forest-related use.

8.0 CONSIDERATIONS THAT OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS

1. The unavoidable adverse effects of the project are offset by: (1) the three U.S. AIR FORCE missions which are satisfied and which contribute to assurance of national security, (2) increased access to the Marpi Commonwealth Forest, (3) training and hiring of local residents, (4) economic benefits to the island economy, and (5) considerable improvements to the existing soil erosion occurring along the Marpi forest road. Existing conditions result in:

   - Unsafe and temporary blockage of Beach Road
   - Siltation and discoloration of the lagoon
   - Additional costs to the island economy for maintenance of the roads

2. The evaluation of alternative sites (Chapter 4.0) indicates that Mt. Petosukara is the most suitable, considering mission limitations, lease uncertainties, costs and environmental impacts. The environmental relationships evaluated are especially appropriate since the Boresight Tower and its access road have been eliminated form the project.

9.0 PERMITING REQUIREMENTS

1. Saipan is a Commonwealth of the United States, as of November 3, 1986. Previously, it was a United Nations' U.S. Trust Territory. In 1975, representatives of the Northern Marianas signed a Covenant with the U.S. agreeing to become a U.S. commonwealth. In the Covenant (Public Law 94-241), the U.S. Environmental Protection Agency (EPA) has jurisdiction over environmental matters and may delegate certain responsibilities to Saipan agencies (shown in Figure 9.1) s it does to individual U.S. state agencies. Therefore, both U.S. federal and local island regulations have been in effect and enforced on Saipan since 1975. Tables 9.1 and 9.2 provide a summary of regulations and permits applicable to the project.

2. In concurrence with CNMI environmental agencies, the Coastal Resources Management Office (CRM) is the lead agency coordinating permit submittals and fees for this project. The CRM will assure that the five-environmental/permitting agencies involved and shown in Figure 9.1 review appropriate permitting information for their approvals. Point of contact at the CRM is Robert W. Rudolph.

3. The permits/approvals that will be required for PACBAR III are summarized in Table 9.1, based on: (1) project description, (2) regulations obtained from the agencies, and (3) communication with appropriate CNMI agencies. These requirements are subject to change if the project description is changed or if the CRM determines otherwise. As shown in the table, some of the regulations are still in draft form. Permit application requirements, agency review periods, and application fees are included, as available.

4. Certain permits/approval are not expected to be required, based on: (1) project description, (2) available regulations, and (3) agency communications. These are summarized in Table 9.2.

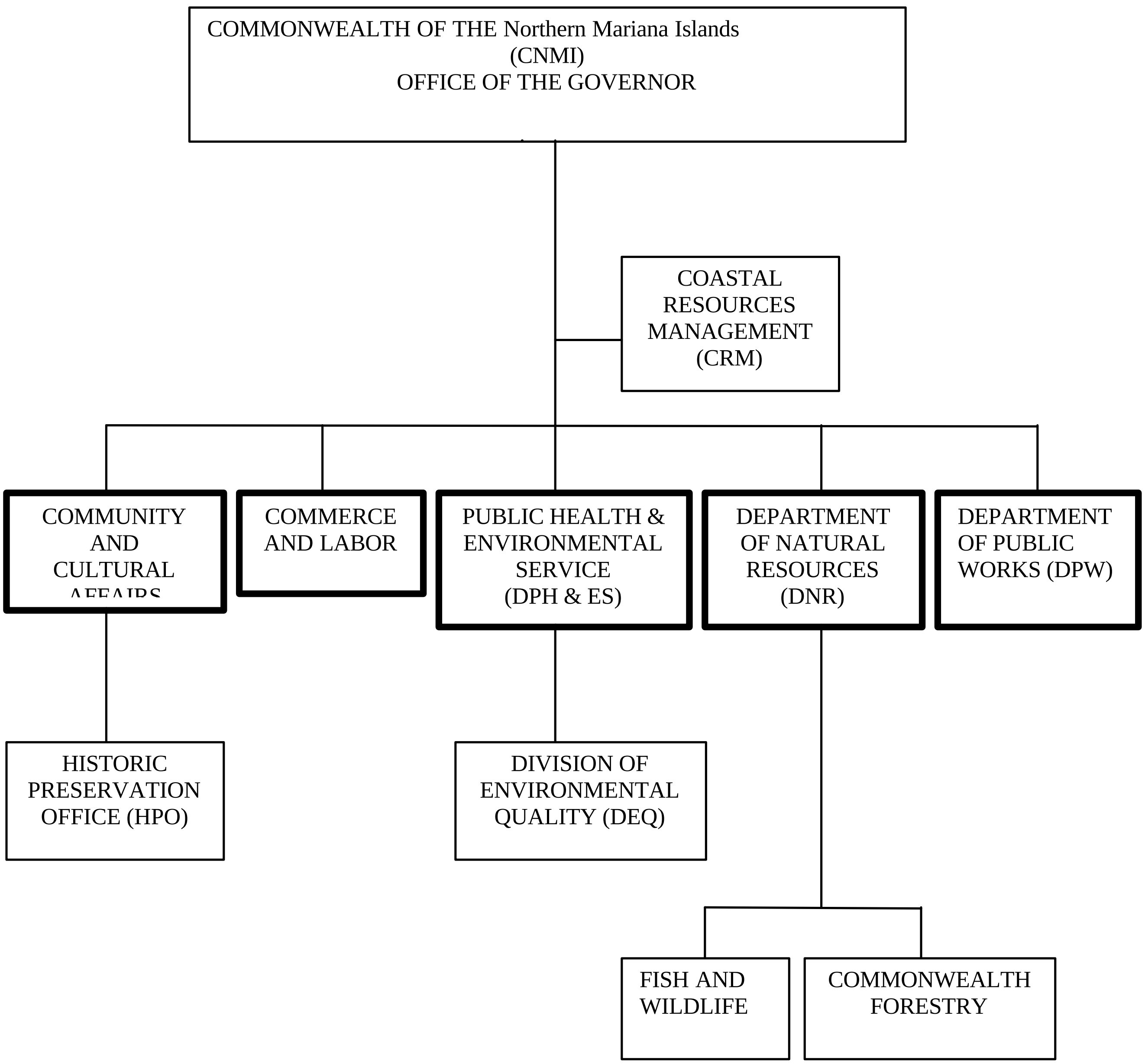
5. As indicated in Table 9.1, some of the required permits have been obtained and/ or permit applications submitted. These include:

   - CRM Federal Consistency Determination (Approved 3/16/87, see Appendix I).

   - USFWS Section 7 Consultation (Finding of No Significant Impact 12/4/86, see Appendix H).

   - CNMI DEQ Earthmoving Permit for Access Road to project site and abandoned Boresight Tower site (5/17/85).

   - CRM Coastal Permit Application submitted (deemed complete 5/20/87).



NOTE: Boxes with bold borders are the five environmental/permitting agencies referred to in Section 9.0

PACBAR III
ENVIRONMENTAL ASSESSMENT
ORGANIZATION CHART
SAIPAN ENVIRONMENTAL AGENCIES
FIGURE 9.1

TABLE 9.1
PERMITS/APPROVALS REQUIRED(1)

PERMIT/ APPROVAL	APPLICABLE CNMI STATUTES AND REGULATIONS	ISSUING AGENCY(2)(3)	PERMIT APPLICATION REQUIREMENTS	AGENCY REVIEW PERIOD	APPLICATION FEE
Federal Consistency Determination	CNMI Public Law 3-47 Commonwealth Register Vol. 7, No. 10, October 17, 1985, pp. 4083-4144.	CRM	A permit application was submitted February 25, 1987. Permit was issued March 16, 1987.	45 days	None
Coastal Permit	Coastal Resources Management Program Rules and Regulations July 1985 Commonwealth Register Vol. 7, No. 10, October 17, 1985, pp. 4083-4144.	CRM	The permit application was deemed complete May 20, 1987.	60 days	Fee based upon appraisal of construction plans of structures affixed to the ground.
Clearance (Consultation) from CNMI Historic Preservation Office	CNMI Public Law 3-39	HPO	CRM, as lead agency, will provide information required for clearance utilizing information from the Archaeological survey performed by Michael Fleming and Scott Russell of the HPO. The content of this survey indicates that clearance will be approved as part of the CRM permits (Russell 1986).	Approximately 1 week (For this situation	None
Earthmoving and Erosion Control	CNMI Public Law 3-23 Commonwealth register Vol. 6, No. 4, April 15, 1984, pp 2726-2735, Section 4.2	DEQ	-Requires CNMI Historic Preservation Office Clearance -Complete DEQ application form -Submit an information report including: 1. Erosion and sediment Control Plan prepared by a qualified Professional Engineer 2. Slope Stabilization and Revegetation Plan -Comply with grading, filing, and clearing considerations stated in the earthmoving and Erosion Control Regulation Part 7. An Earthmoving Permit was obtained for temporary work to drill test borings on May 17, 1985. Additional permits are required for construction of the facility and road.	30 days Approximately 3 weeks	To be handled by the CRM $100 None

			These will be obtained as part of the CRM permit.	**(See Permit)**	
Individual Wastewater Disposal System **(Septic Tank)**	**CNMI Public Law 3-23, Final Wastewater Disposal System regulations, may 14, 1986**	**DEQ**	**Compliance with design standards as specified in regulations. Approval will be granted through the CRM permit process.**	**21 days**	**Federal government agency exempt from fee.**
Clearance (Consultation) From USF & W per Endangered Species Act, 1973, Section 7		**USF&W**	**Consultation was completed on December 4, 1986, with an opinion of No Significant Impact.**	**90 days with a possible opinion in 30 days**	**None**

(1) Final decisions on permit/ approval requirements will be determined by the Coastal Resources Management Office once the project description is finalized.

(2) Coastal resources Management Office will be the lead agency coordinating all other agencies and required permit submittals

(3) See Chapter 12.0 for Acronyms.

TABLE 9.2
PERMITS/APPROVALS NOT REQUIRED [1]

PERMIT/ APPROVAL	APPLICABLE STATUES AND REGUALTIONS	ISSUING AGENCY	REASON NOT REQUIRED
Safe Drinking Water	**CNMI Public Law 1-8** **Commonwealth Register, Vol.4, No.4, August 15, 1982, pp. 1579-1616.**	**DPH & ES**	**No Water will be treated onsite for drinking water purposes. Bottled water will be purchased.**
Hazardous Waste TSD Facility Permit	**CNMI Public Law 3-23** **Commonwealth Register, Vol. 6, No. 6 June 15, 1984, pp. 2816-2832**	**DEQ and EPA**	**Wastes will not be stored onsite >90 days. Hazardous wastes will not be treated onsite.**
PSD Air Quality	**CNMI Public Law 3-23** **Commonwealth Register, Vol. 6, No. 6 June 15, 1984, pp. 2835- 2862** **A draft SIP is currently being reviewed by EPA Region IX**	**DEQ**	**Air emissions are not expected to adversely impact existing air quality.**
Pesticide Applicator Certificate	**CNMI Public Law 3-23** **Commonwealth Register, Vol. 5, No. 5 March 31, 1985, pp. 1938-1949**	**DEQ**	**Contractors will not be using a restricted use pesticide for which a certificate would be required.**
Marine or Fresh Water Discharge	**CNMI Public Law 3-23** **Commonwealth Register, Vol. 5, No. 5, March 31, 1985, pp. 1938-1949**	**DEQ**	**No discharges to marine or fresh water bodies are planned.**
NPDES	**U.S. Clean Water Act, Section 402** **40 CFR Part 122**	**EPA**	**No discharges to navigable waters are planned.**
Utility Hook-up	**CNMI Public Law 4-47, approved 5-3-85.** **No regulations are currently available (Hockett 1986).**	**DPW**	**The project does not use public water, power, or sewer systems.**
Hazardous Waste Disposal to Sewer	**No CNMI laws or regulations are currently available (Hockett 1986)**	**DPW**	**No hazardous waste will be disposed in the sewer. The project is not connected to the public sewer system.**
Department of the Army Permit	**Clean Water Act-Section 404 Permit for "Discharge of Dredge or fill Material into Waters of the U.S."** **Rivers and Harbors Act- Section 10 Permit for "Structures or Work in or Affecting the Navigable Waters of the U.S".** **Marine , Protection, Research and Sanctuaries act-Section 103 Permit for "Ocean Dumping of Dredged Materials"** **33 CFR part 325**	**COE**	**As currently planned, none of the project activities involves work referred to in the stated acts.**
Underground Injection Control	**CNMI Public Law 3-23** **Commonwealth Register, Vol. 6, No. 5, May 15, 1984, pp. 2804-2813**	**DEQ**	**An injection well (e.g. seepage pit) is not part of the project design.**

[1] Final decisions on permit/approval requirements will be made by the Coastal Resources Management Office.
[2] See chapter 12.0 for acronyms.

10.0 DETAILS OF RESOLVED ISSUES

10.1 RESOLVED PRESENTLY

1. The previously unresolved issue of whether the CNMI government or the Air Force would be responsible for road maintenance has been resolved. It has been agreed that the party, which feels road improvement is necessary, will finance the improvement.

2. Negotiations have been completed between the Air Force and appropriate island and government agencies relative to mitigation measures to restore certain portions of the forest that were damaged during the site investigation phase of the project.

10.2 YET TO BE RESOLVED

1. The potential need to strengthen the existing bridge and culvert road crossings along the haul route, from Tanapag Harbor to the project site, relative to transport of the radar antenna components, have not been determined. The Air Force will resolve this issue by providing a detailed inspection of the haul route and the appropriate measures necessary to accommodate the one-time heavy loads. The techniques used to strengthen the structures would be environmentally acceptable. Any damage incurred would be repaired by the Air Force (Edwards 1987).

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12.0 ACRONYMS

AFOSH	Air Force Occupational Safety and Health
ANSI	American National Standards Institute
CNMI	Commonwealth of the Northern Mariana Islands
COE	U.S. Army Corps of Engineers
CRM	Coastal Resources Management, CNMI
DEQ	Division of Environmental Quality, CNMI
DNR	Department of Natural Resources, CNMI
DOD	Department of Defense, U.S.
DPH&ES	Department of Public Health and Environmental Services, CNMI
DPW	Department of Public Works, CNMI
EDD	Economic Development Division, CNMI
EPA	environmental Protection Agency, U.S.
FAA	Federal Aviation Administration, U.S.
FEBC	Far East Broadcasting Company
HPO	Historic Preservation Office, CNMI, Division of the Department of Community and Cultural Affairs
MPLC	Marianas Public Land Corporation, CNMI
NASA	National Aeronautics Space Administration
NIOSH	National Institute for Occupational Safety & Health
NPDES	National Pollution Discharge Elimination System, U.S.
OEDS	Overall Economic Development Strategy, CNMI
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PSD	Prevention of Significant Deterioration
RF	Radiofrequency
TSD	Treatment, Storage, and Disposal
UN	United Nations
US F&W	United States Department of Fish and Wildlife
USGS	United States Geological Survey
WSMC	Western Space and Missile Center

APPENDIX A

Biological Resources Assessment:

Vegetation of the Proposed PACBAR III Project Site
Mt. Petosukara, Saipan
Commonwealth of the Northern Mariana Islands

I. INTRODUCTION

The U.S. AIR FORCE is proposing to construct and operate a radar station on the island of Saipan in the Commonwealth of the Northern Mariana Islands (CNMI). The project facility consists of a radar/Antenna Site and an access road. A Boresight Tower and its Access Road, which were originally planned for the project, have been eliminated to reduce environmental impacts.

The preferred project location is in the Marpi Commonwealth Forest on the northern section of Saipan as shown in Figure 1.2 and 1.3. Access to the site will be provided from the main road by Matuis Road, and existing public road of which approximately 0.6 mile will be regraded and resurfaced. From Matuis Road, another public road at the boundary of the Marpi commonwealth Forest will be widened for about 1.3 miles. The final 0.3 mile of Access Road will be constructed, mostly on grassland to the radar Site, which will be located just north of the Mt. Petosukara peak.

In cooperation with the CNMI Department of Natural Resources Commonwealth Forestry (DNR), one scenic viewpoint, and one trailhead will be establishes at locations along the project access route. The scenic viewpoint will consist of a turnout area with parking for 5 to 10 vehicles.

This report has been prepared in order to identify vegetative characteristics of the project area and predict vegetative losses resulting from construction of the PACBAR III radar station. A description of the Marpi Commonwealth Forest is included. This report was prepared based on discussions with Mr. James H. culbert, CNMI Commonwealth Forester and site investigations conducted on October 29, November 5, and November 7, 1985. References are listed in Section VII.

II. VEGETATION OF SAIPAN

Vegetation of the Mariana Islands can be found on either limestone or volcanic formations. Most of Saipan's original mixed forests were cleared before World War II for sugar cane production and subsequently destroyed during the war. Current vegetation includes some indigenous species such as <u>Cynometra ramiflora</u> and <u>Hibiscus tiliaceus</u>, yet is greatly influenced by the introduced tangantangan <u>Leucaena leucocephala</u> which can be seen throughout the island. Tangantangan seeds were aerially sown throughout the Mariana Islands by the military after World War II in an effort to control rapid erosion.

III. MARPI COMMONWEALTH FOREST

The Marpi Commonwealth Forest is an area of approximately 1,150 acres of public land established for the protection and enhancement of natural resources. The goals of this conservation area include recreation and reforestation activities, improvement of wildlife habitat, watershed and soil protection. Current reforestation projects include conversion of grasslands to forest and diversification of the existing tangantangan forest to mixed forest to include wood and fruit trees and fast-growing acacias. Current habitat improvement projects include the planting of breadfruit trees (Artocarpus mariannensis and A. altilis). The approximate boundaries of the Marpi Commonwealth Forest are shown in Figure 1.3. The Marpi Commonwealth Forest is one of two Commonwealth Forests in the CNMI, which are “set-aside” areas for preservation and enhancement of biological resources. The second commonwealth Forest is the Katan Afato on Rota, a Mariana Island located south of Saipan.

The Marpi Commonwealth Forest is comprised of the tangantangan monoculture, limestone forest, Savannah/grassland, and farmland. The approximate locations where these vegetative communities occur for the PACBAR III project and Access Road are shown in Figure 1.12. Each community type is described below. Some of the more important plant species commonly found in each community of the project area are indicated.

A. Tangantangan Monoculture

The tangantangan is a leguminous shrub or small tree characterized by compound leaves. It bears its seeds in long dark pods. The tangantangan is thickly branched with dense foliage and small round-headed white flowers. Tangantangan stands in the Marpi area are the introduced L. leucocephala, which is native to tropical America or Pan-tropical. It has also been referred to as L. glauca. The native species L. insularum has up to 50 pairs of leaflets per pinna, compared to about 12 fpr L. leucocephala. While both species can be found growing together, the native species is found mostly along the coast. The tangantangan monoculture is experiencing continual growth. On Saipan, it has recently experienced invasion of Heteropsylla, a small sucking pest insect.

Tangantangan is the dominant vegetation over most of the project area especially alongside the access road. Tangantangan stands in some areas reach heights of 15 to 20 feet with little understory due to lack of sunlight.

B. Limestone Forest

The limestone forest is a stable community, which now occupies areas previously cultivated for sugar cane. These areas include reseeded plateaus, terraces and cliffs containing porous substrate. These terraces are usually covered by a thin layer of lateritic soil, which supports a high diversity of plant species in undisturbed areas. The upper layer of the undisturbed forest is made up of trees such as wild breadfruit and pandnaus, while trees such as Chopak and Joga (Chamorro names), lianas and epiphytes make up the understory. In disturbed areas, wild papaya is the first to invade, followed by Guam dais, bitter-melon and tangantangan. The pure or climax limestone forest is not usually encountered as the final stage is prevented by periodic typhoons. Plant species found in limestone forest are listed in Table A.1.

The limestone forest vegetation was important for the project when the Boresight Tower and its Access road were planned to extend to the north of the Radar Site. Since the Boresight Tower is now eliminated from the project, no planned activities are in limestone forest. The southeastern boundary of the Radar Site borders a cliff at the bottom of which is a limestone forest area, which will not be disturbed.

C. Savannah/Grassland Community

The Savannah or grassland community grows on soil of volcanic origin in areas disturbed by fire, erosion or off road recreational vehicles. Several plants communities can be identified on the Savannah; the most prevalent being the swordgrass. The succession of plants occurring on washed-out areas are weedy consisting of herbs and woody shrubs. The community is then invaded and eventually replaced by grasses. Typical species of Savannah vegetation found in the project location are:

Common Name	Scientific Name
Iron/Australian Pine	Casuarina equisetifolia
Dwarf Poinsettia	Euphorbia cyathophora
Swordgrass	Miscanthus floridus
Foxtail	Pennisetum polystachyon
Wild Passion Flower	Passiflora suberosa
Napier Grass	----

TABLE A.1
LIMESTONE FORSET PLANT SPECIES

Trees[1]

Common Name	Scientific Name
Tangantangan	Leucaena leucocephala
Paipai(Chamorro)	Guamia marianne (found on Marianas only)
-- --	Neisosperma oppositifolia (Malaysia/Tropical Pacific)
-- --	Melanolepis multiglandulosa
Chopak(Chamorro)	Mammea odorata
-- --	Cynometra ramflora
Ifil	Intsia bijuga
Wild Breadfruit	Artocarpus mariannensis
Pandanus	Pandanus sp.
Indian Mulberry	Morinda citrifolia
Joga (Chamorro)	Elaeocarpus sphaericus
Acacia/Formosan Koa	Acacia confusa
-- --	Albizia lebbeck
Lantana	Lantana camara
Coral Tree	Erythrina variegata

Vines

False Rattan	Flagellaria indicia
Crab's Eye	Abrus precatorium
Wood Rose	Operculina ventricosa
Bitte Melon	Momordica charantia
Sensitive-Plant	Mimosa pudica
Chain-of-Love	Antigonon leptopus

Weeds

Beggar's Tick Or Guam Daisy	Biden alba
Eupatorium(Masigsig)	Eupatorium odoratum

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[1] Some species listed do not have common english names, or local Chamorro names.

D. Farm Community

The farm community occurs amidst the limestone forest or grassland community and is the result of human modification of the environment to suit agricultural intentions of the farmer. Development of the farm usually begins by clearing of dense growth by the slash and burn technique, which fertilizes the soil with ashes of, burned debris. Useful trees such as pandanus and other fruit trees are retained. The cleared area is planted with the seeds of family consumption foods, which the farmer will usually obtain from neighbors. Common farm community plants are:

Common Name	Scientifcic Name
Palm	Cocos nucifera
Mango	Mangifera indica
Coral Tree	Erythrina veriegata
Breadfruit	Artocarpus altilis
Panama Cherry	Muntingia calabura
Papaya	Carica papaya
Sugarcane	Saccharum officinarum
Hot Pepper/Chili Pepper	Capsicum frutescens

Many other fruit trees are also common to the farm community. Some of the species listed were originally introduced to Saipan and have been presented for so long that they are considered “common”.

IV. VEGETATIVE CLASSIFICATION OF PROJECT AREA

This section presents information on project area vegetation as illustrated in Figure 1.12.

A. Transport of Project Components

PACBAR III project components will be transported from Tanapag Harbor along Beach Road and Chalan Pale Arnold Road to Matius Road and along access roads to the facility site. Chalan Pale Arnold Road is a two-lane, two-way hard surface primary road that traverses residential and small business on either side. This road is over 40 years old and although paved, shows signs of erosion. Vegetation along this road consist primarily of tangantangan which grows over the road in some places, and may require trimming or removal for transport of components.

Twenty-two sets of utility lines crossing over the road were counted, which will need to be removed or raised. This section of Chalan Pale Arnold Road passes over two natural drainageways: Saddok As Agatan and Bobo Achugao, which are intermittent stream. A concrete lined box culvert is located at the first crossing and seven small concrete or corrugated metal culverts are located at the second crossing. Flooding at the second crossing has been experienced in the past. Vegetation at these stream crossings includes the reed or marsh grass Phragmites karka and standing water was observed at the first location. After passing the town of San Roque, before the turnoff to Matius Road, construction of Japan AirLines' Hotel Nikko is occurring on both sides of the road. Excavation activities were being conducted at the Hotel Nikko site 24-hours per day during the October/November 1985 site visits. Red-dirt runoff was observed along the road and at the intersection.

B. Matius Road to Marpi Commonwealth Forest Boundary

This existing access road (Matius Road) consist of a single-lane unpaved compacted coral road. This road shows signs of erosion including gullies and loose rocks. Numerous large construction vehicles which visit the coral borrow pit, which is, located further north on Matius Road frequent the road. Hunters, poachers, sightseers, hikers and others also use this road. On the south side of the road, an area of less than one acre in size has been burned and cleared. Several residences and small farms are also located on the south side of this section of Matius Road. Vegetation along this road consists primarily of tangantangan with occasional pine trees, papayas, vines and grasses.

Matius Road forks at the boundary of the Mrpi Commonwealth Forest, with the south fork becoming the project access route and the north fork being the continuation of Matius Road leading to the coral borrow pit. Matius Road becomes a two-lane road after this fork.

C. Existing Access Road to the Radar Site

This reach of the project access route consist of an overgrown and eroded single-lane road which borders the Marpi Commonwealth Forest on the east and is fenced from small farms on the west. Vegetation consists of tangantangan and grassland communities.

Following the sharp turn to the northeast, the road leads to the first proposed DNR scenic viewpoint, which is situated atop grassland. A stand of breadfruit and pandanus trees is located northeast of this area approximately 500 feet from the road. This stand is reported to be within the flight path of the Marianas fruit Bat, which feeds on these fruit trees in the early morning and evening hours. The road continues eastward and then switchbacks to the west. In these locations, the road is bordered by tangantangan on either side of the road. At the point where the new portion of the Radar Site road will be constructed, the existing one0lane road continues toward the southwest.

D. New Portion of Access Road to the Radar Site

The new portion of access road to the Radar Site will be locates south of a temporary pathway, which was bulldozed in early 1985. The previous bulldozed pathway now consists of a single-lane dirt road with fallen trees and scatters debris left in the area. Some regrowth of shrubs and grasses has occurred.

The new portion of road will pass through less then 0.1 mile of tangantangan and then will pass through grassland for the 0.3 mile approach to the Radar Site. A DNR trailhead is to be located in the grassland area prior to reaching the site. The view from this location includes the Mariana Country Club and the Far East Broadcasting Company.

E. Radar Site

The radar site is located on a grassy plain just north of Mt. Petosukara at its 942-foot elevation. The eastern boundary of the site is a cliffy limestone forest area with stands of tangantangan and associated growth near the cliff edge.

V. VEGETATIVE LOSSES

Construction of the PACBAR III Radar Site, including easement areas, will result in the loss of approximately 4 acres of vegetation, which is primarily grassland with some tangantangan.

Improvements to existing access roads and construction of a new portion of access road are expected to result in the loss of approximately 3.2 acres of vegetation, assuming removal of 6 feet of vegetation on each side of the road will be required. Of this total amount, approximately 0.5 acre is grassland, 2.6 acres will consist of trimming or removal of tangantangan trees at the edge of existing roads and 0.1 acre will be presently undisturbed tanagantangan trees.

VI. RECOMMENDATIONS

The following mitigation measures are recommended to minimize impacts to vegetation:

- Vegetation along cliff bases should not be removed as these areas contain limestone forest plant communities (Kosaka 1984).

- Contractor work limits should be specified to avoid unnecessary disturbance to vegetation. Adherence to work limits should also be stipulated in contractor work packages.

- Exposed graded areas should be replanted with native grass or other fast-growing, local trees shortly after grading is completed.

- A habitat enhancement area should be established away from the project site to replace vegetation losses. This may be accomplished by planting fruit trees such as breadfruit in coordination with the DNR (Schmitt 1985).

- The pathways bulldozed in 1985, which will not be used for final road alignment, will be mitigated in a manner agreed upon with the appropriate agencies.

Elimination of the Boresight Tower and Access Road from the project has been a very important “mitigation” measure. That change eliminated the longest portion of new road through tangantangan and completely eliminated limestone forest disturbance.

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APPENDIX B

Biological Resources Assessment:

Wildlife of the Proposed PACBAR III Project Site
Mt. Petosukara, Saipan
Commonwealth of the Northern Mariana Islands

I. INTRODUCTION

The U.S. Air Force is proposing to construct and operate a radar station on the island of Saipan in the Commonwealth of the Northern Mariana Islands (CNMI). The project facility consists of a Radar/Antenna Site and an access road. A Boresight Tower and its Access Road, which were originally planned for the project, have been eliminated to reduce environmental impacts.

The project is to be located in the Mari Commonwealth Forest on the northern section of Saipan as shown in Figures 1.2 and 1.3. Access to the site will be provided from the main road by Matuis Road, an existing public road of which approximately 0.6 mile will be regarded and resurfaced. From Matuis Road, another public road at the boundary of the Marpi Commonwealth Forest will be widened for about 1.3 miles. The final 0.3 mile of access road will be constructed, mostly on grassland to the Radar Site, which will be located just north of the Mt. Petosukara peak.

In cooperation with the CNMI Department of Natural Resources (DNR), one scenic viewpoint and one trailhead will be established at locations along the project access route. The scenic viewpoint will consist of a turnout area with parking for 5 to 10 vehicles.

This report has been prepared in order to identify wildlife species of the project area and predict habitat losses resulting from construction of the PACBAR III radar station. This report was prepared based on discussions with government agencies and site inspections conducted on October 29, November 5, and November 7,1985. References are listed in Section V. Particular references are made to information acquired from U.S. Fish and Wildlife Bird Surveys of 1982 and 1984. Appendix G has also been included as supplemental biological data based on additional investigations through June 1986.

II. PROJECT SETTING

The altered tropical forest setting of Saipan provides habitat for numerous species of birds and a limited number of terrestrial animals. Species which are known to occur in the vicinity of the proposed PACBAR III radar station in the Marpi Commonwealth Forest include the Sambar deer, fruit bats, coconut and land crabs, monitor lizards and a variety of birds as shown on Table B.1. Four federally listed endangered species of birds are present on Saipan. A number of additional species are "protected" by CNMI hunting regulations. These endangered, threatened and protected species of Saipan are listed on Table B.2. Some of the more important species of the area are discussed in the following subsections.

III. SPECIAL STATUS SPECIES

A. Marianas Gallinule

This ducklike bird is found in wetland areas, not in the higher dry area selected for the radar facility. The Marianas Gallinule is purplish-black with a red forehead and beak and unwebbed yellow feet. Their long toes enable them to walk across floating water plants. Impacts to this species would not be expected from construction and operation of the project.

B. Marianas Mallard

One of the rarest ducks in the world, the Marianas Mallard is now extinct in the CNMI (DNR 1984). Overhunting and loss of its wetland habitant may have contributed to its extinction.

C. Nightingale Reed Warbler

This brown-green songbird native to Guam was last seen on Guam in the late 1960's. Post-World War II spraying of pesticides may have led to their extinction on Guam. The species occurs throughout Saipan. Although it seems to prefer the dense and varied vegetation near wetlands in the southern portions of the island, it can also be found in tangantangan such as that found adjacent to the project area. A nest was discovered in a tangantangan tree in the southernmost study location on Saipan, where highest densities are reported.

The Saipan population of Reed Warblers was approximately 5,000 in 1984. These birds occur in greater densities in southern Saipan and the species is an aerial bird, able to fly. Conservation of habitat for Saipan's population of the Reed Warbler is a priority due to its presence on only three other more remote islands in the Marianas (DNR 1984). Minimal impact to the Nightingale Reed Warbler may be expected from construction and operation of the radar facility (Kosaka 1984).

D. Vanikoro Swiftlet

This dark gray bird nests and roosts in caves of limestone and ravine forests. Airborne most of the day, it is known to capture tiny flying insects while darting through the sky. It is commonly seen flying along cliff ridges or forest openings

TABLE B.1
WILDLIFE OF THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME
BIRDS	
Dusky Shearwater	Puffinus lherminieri dichrous
Red-tailed Tropic Bird	Phaethon rubricauda rothschildi
* White-tailed Tropic Bird	Phaethon lepturus dorotheae
Reef Heron	Demigretta sacra sacra
* Chinese Least Bittern	Ixobrychus sinensis
Pacific Golden Plover	Pluvialis dominica fulva
Herring Gull	Larus argentatus vegae
* Fairy Tern	Gygis alba candida
* Philippine Turtle Dove	Streptopelia bitorquata dusumieri
White-throated Ground Dove	Gallicolomba xanthonura xanthonura
Marianas Fruit Dove	Ptilinopus roseicapillus
* Vanikoro Swiftlet	Aerodramus vanikorensis bartschi
Micronesian Megapode	Megapodius laperouse laperouse
* Whitecollared Kingfisher	Halcyon chloris albicilla
House Sparrow	Passer domesticus
Cardinal Honeyeater	Myzomela cardinalis saffordi
* Golden Honeyeater	Cleptornis marchei
* Rufous-fronted Fantail	Rhipidura rufifrons saipanensis
Red Jungle Fowl	Gallus gallus
Nightingale Reed Warbler (1)	Acrocephalus luscinia
MAMMALS	
Sambar Deer	Cervus unicolor
Mariana Fruit Bat	Pteropus mariannus
Wild Goat	Capra hircus
Cow	Bos domesticus
Dog	Canis familiaris
Cat	Felis domesticus
Brown Rat	Rattus rattus, R. norvegicus
House Mouse	Mus musculus
REPTILES	
*Monitor Lizard (Iguana)	Varanos indicus
*Tree Gecko/Lizard/Wild Gecko	Gekkonidae
House Gecko	Sepidodactylis Iuguoris
Blind Snake	Typhlops braminus
AMPHIBIAN	
Toad	Bufo marinus
CRUSTACEANS	
Coconut Crab	Birgus latro
Fiddle/Soldier/Sand Crab	
Land Crab	Cardisoma spp.
*Hermit Crab	Coenobita

(1) These species were not sited during the October – November 1985 and April 21 through 23, 1986 site visits; however, previous surveys (Engbring 1984) have sited megapode in the project area and an independent one-day visit by Phil Glass of the DNR Fish and Wildlife and Paul Conry of the Marianas Audubon Society on April 24, 1986 noted calls from Megapodes in three locations and a Nightingale Reed Warbler in one location. (Additional detail in Appendix G.)

* Species observed during October – November 1985 and/or April 1986 site visits.

TABLE B.1
WILDLIFE OF THE PROJECT AREA
(Continued)

COMMON NAME	SCIENTIFIC NAME
MOLLUSKS	
*Giant African Snail	Achatina fulica
Garden Slug	Limacidae

TABLE B.2
ENDANGERED, THREATENED AND
PROTECTED SPECIES OF SAIPAN, CNMI

COMMON NAME	SCIENTIFIC NAME	STATUS (1)
BIRDS		
Marianas Mallard	Anas oustaleti	E*
Micronesian Megapode	Megapodius laperouse laperouse	E
Nightingale Reed Warbler	Acrocephalus luscinia	E
Vanikoro Swiftlet	Aerodramus vanikorensis bartschi	E
Philippine Turtle Dove	Streptopelia bitorquata dusumieri	P
White-throated Ground Dove	Gallicolomba xanthonura xanthonura	P
Marianas Fruit Dove	Ptilinopus roseicapillus	P
Micronesian Starling	Aplonis opacus guami	P
MAMMALS		
Blue Whale	Balaenoptera musculus	E
Sperm Whale	Physeter catodon	E
Sambar Deer	Cervus unicolor	P
Wild Pig (2)	Sus scrofa	P
Wild Goat	Capra hircus	P
Mariana Fruit Bat	Pteropus mariannus	E^{G}
CRUSTACEANS		
Coconut Crab	Birgus latro	P
Land Crab	Cardisoma sp.	P
REPTILES		
Hawksbill Turtle	Enetmochelys imbricata	E
Leatherback Turtle	Dermochelys coriacea	E
Ridley Turtle	Lepidochelys kempii	E
Green Turtle	Chelonia mydas	T/P
Loggerhead Turtle	Caretta caretta	T
Olive Ridley Turtle	Lepidochelys olivacea	T
Monitor Lizard (Iguana)	Varanos indicus	P (3)

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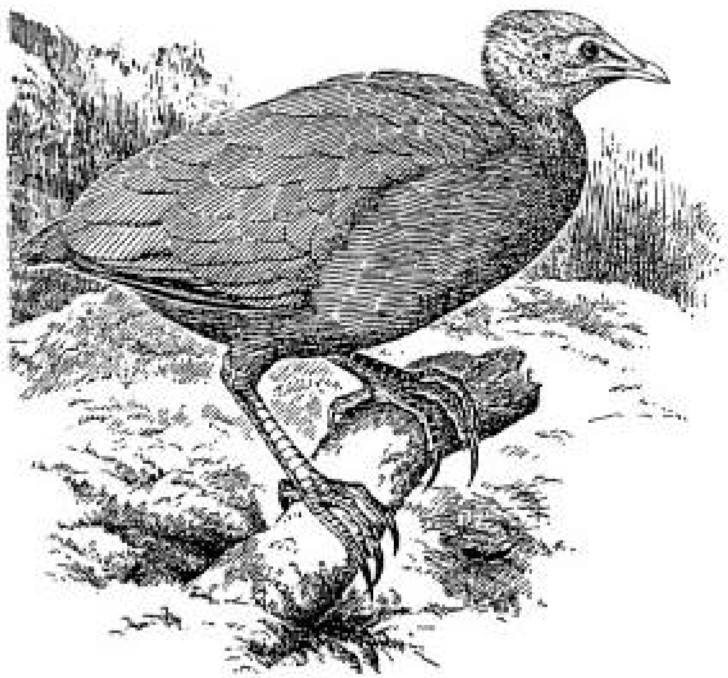
(1) P CNMI Protected (Limited hunting season)
E Federally-Listed Endangered Species (*Extinct)
E^{G} Federal Endangered Species (Guam Population Only)
T Federally-Listed Threatened Species

(2) Wild pigs are not currently present on Saipan; however, if they are ever reestablished, they will be protected.

(3) Although the Monitor Lizard is protected, no season or bag limits are imposed by the 1983 CNMI Hunting Regulations

and foraging in the northern section of the island where the project is to be located. The Vanikoro Swiftlet may occasionally feed over the project site, but appears to be more common to the interior valleys of Saipan where the concentration of caves is higher. A number of swiftlets were observed in the project area during the 1985 and 1986 site visits. It has been recommended that caves utilized by the swiftlet should be protected in an effort to prevent further disappearance of this endangered species. Impacts from the project to this bird are expected to be minimal.

E. Micronesian Megapode



Micronesian Megapode
Reprinted with permission from Extinct and Vanishing Birds of the World, James G. Greenway, Jr., 1967.

This dark brownish black ground-dwelling bird is extinct on Guam and Rota, but is still found in low numbers on Saipan and some of the smaller islands north of Saipan. It is sometimes known as an incubator bird. It has been recorded in the Marpi Commonwealth Forest and Suicide sections of northern Saipan. Surveys conducted in 1982 located the Micronesian Megapode in four specific locations within the Marpi Commonwealth Forest. These are shown as Locations 1 through 4 on Figure 1.13. In addition, 1984 surveys of the Micronesian Megapode were conducted in the northern Marpi region where historical markers and war memorials are located at the base of Suicide Cliff. The 1984 survey located 10 to 15 individuals in these areas as shown on Figure 1.13 confirming the presence of the species in the area. Two of the 1982 locations (Locations 1 and 2) are alongside the project access road in an area characterized by cliffy grassland and tangantangan vegetation. Location 3 is beneath the eastern cliff project site boundary and is not expected to be impacted or affected by construction of the radar site. Location 4 does not appear to be easily accessible.

The Micronesian Megapode is a gregarious bird reported to be fast on foot but slow and clumsy in flight. It forages and nests on the ground, preferring the uneven substrate along and below limestone and other cliffs. Lesser numbers are found on relatively level areas away from the bases of cliffs. The species has been located in pure tangantangan stands in 29% of the recordings conducted in 1984. The density of megapodes on Saipan is reported to be 2 per square kilometer (245 acres) and the total population is estimated to be 40. There is the possibility that the megapode may also occur elsewhere on the island of Saipan as recent unconfirmed sightings have been reported from the Susupe region and the Kagman peninsula. Unconfirmed single sightings are also reported from the island of Rota.

The mating season for the megapode is reported to be January or February to June, although chicks have been found later in the year. Courtship and mating behavior was observed in the north by the 1984 survey team in January, but mounds or chicks were not observed. Both sexes participate in construction of the nest by scratching soil, leaves and organic matter into a large mound into which eggs are deposited. Heat for the nest is provided by the sun and decaying organic matter. Warm ground areas may provide attractive nesting sites for the species. While mound nests are thought to be utilized by several females at once, the same nest is not used more than once. Upon hatching, the independent chick will dig itself out of the mound. The decline of the megapode population is believed to be caused by human depredation upon the eggs taken from the mound nest for consumption, and from the inter-island transport of the eggs and the adults. Elimination of understory vegetation bye feral goats may also contribute to the decline of the terrestrial megapode, although the species may also prefer an open understory. Other possible explanations for diminished numbers include poor nesting habitat and little to no nesting success. The species is currently being studied by the U.S. Fish and Wildlife Service.

Site inspections were conducted in November 1985 by the author and Barbara Schmitt of CNMI-DNR Fish and Wildlife to determine the presence of the megapode along the access road and radar site (and along the Boresight Tower Access Road and Site which have subsequently been eliminated from the project). The access routes to both facilities were viewed from a 4-wheel drive vehicle and on foot. A tape recording of the megapode call provided by the CNMI-DNR Fish and Wildlife was played at various locations along the route off the road in lowlying areas beneath the tangantangan. This sort of area appeared to be suitable and potential megapode habitat, however, no megapode responses were received. This lowlying debris-littered ground occurs alongside the project route in a number of locations as shown on Figure 1.13. No suspected mounds were observed in areas checked.

The area of previous (1982) megapode recordings (Location 1 on Figure 1.13) was inspected on the November 1985 site visit. This area was of concern because it was near the original site proposed for the DNR scenic viewpoint. This area currently consists of dense grassland vegetation, practically impenetrable on foot from the road elevation. It is however, situated atop a cliff and it is conceivable that the megapode may utilize the base of this cliff as habitat. This scenic viewpoint location has since been changed to a point further south along the access road away from the cliff area mentioned above (June 1986). The local population of megapodes in this area may be subject to potential disturbance from placement of the scenic viewpoint, and from increased access into the forest from improvement of the road.

Location 2 (Figure 1.13) appeared to be a densely wooded area with cliff bases suitable for the megapode.

Areas of limestone forest north of the project area were also inspected for signs of megapode. That evaluation was particularly important when the Boresight Tower was still a portion of the project. Taped calls were played in 1985 with no response from the megapode. Limestone forest areas with significant vegetative cover and understory may also provide habitat for the species. There appear to be many volcanic rock formations with dense tropical forest vegetation located 10 to 20 feet off a bulldozed pathway cleared in this area in early 1985. These sites may provide a moist, dark and inconspicuous habitat for the megapode.

While megapodes on Saipan are frequently found at cliff bases and similar rugged areas, it is possible that this is due to the fact that these areas generally provide the type of vegetation needed by megapodes to meet ecological requirements. Also, these areas are often relatively undisturbed. Much of Saipan's remaining limestone forest is found on cliffsides or in rugged areas not previously devegetated for farming. However, a limestone forest on flat ground, with its relatively open understory, is likely to provide good megapode habitat. (Palacios 1986).

Site inspections of the Radar Site revealed that this area is not a likely habitat for the megapode, owing to the fact that this is an open flat area. The cliff area adjacent to and beneath the Radar Site is a potential megapode habitat. Recordings of megapodes were made south of the facility beneath the cliff in 1982 (Location 3 on Figure 1.13). It is not expected that the facility will cause significantly impacts to this particular megapode population, as this cliff terrain is largely inaccessible from the facility. The 4-wheel drive road unrelated to the PACBAR III project and locate beneath the cliff in the Kalabera area would have more impact on this population.

Additional discussions about site observations in April 1986 are presented in Appendix G.

Megapode Habitat Losses

It is estimated that the PACBARIII project (with elimination of the Boresight Tower) will result in the loss of 0.1 to 3 acres of potential megapode habitat. More than 90 percent of this disturbance will be from the trimming or removal of trees adjacent to an existing unpaved road.

II. OTHER SPECIES IN THE PROJECT AREA

As discussed in Appendix A, the Marpi Commonwealth Forest is composed of dense tangantangan monoculture, limestone forest, grassland and farmland cultivation areas. The tangantangan monoculture provides good habitat for insect-feeding nongame birds, but offers little in the way of habitat for Fruit Bars, Sambar Deer and the three protected dove species listed on Table B.2. These three species of doves are hunted as gamebirds in the CNMI. Invasion of tangantangan has greatly reduced plant diversity on the Pacific Islands. Fruit Doves, Ground Doves, and Fruit Bats are forest-dwelling species that feed on a variety of wild fruits (DNR 1984). The opportunity exists for partial mitigation of loss of this habitat by replanting fruit trees in other remote parts of the forest. The project will not result in loss of significant fruit trees.

A. <u>Sambar Deer</u>

Saipan has a small population (estimated at 6 in 1984) of Sambar Deer, which are located in scattered pockets of native and semi-native forest. They survive in areas that are relatively inaccessible to hunters (DNR 1984). The Sambar Deer has been observed in the Marpi Commonwealth Forest. The Sambar deer was introduced to Guam in the 1700's and transported to Rota, Saipan and Tinian. The only sizeable population of Sambar beer occurs on Rota, while populations on Spain and Tinian are in decline due to poaching and scarcity of habitat. A moratorium on hunting deer is being considered for Saipan. Deer were not seen in the project area during the recent site visit.

B. <u>Fruit Bats</u>

The Guam Population of the Marianas Fruit Bat was placed on the Federal Endangered Species List in 1984. The Saipan population has decreased in the past 10 to 15 years due to over-hunting. The current population on Saipan is so small that it is difficult to manage or conserve (DNR 1984). The Mariana Fruit Bat is known to occur deep in the forest where it forages on fruit trees such as breadfruit, guavas, pandanus and papayas.

Sightings of Fruit Bats are rare on Saipan (DNR 1984). It is estimated that less than 25 individuals are present on Saipan. Another species, the Little Marina Fruit Bat, whose range is the Marianas, does not occur on Saipan. The Fruit Bat is reported to utilize some of the fruit trees in limestone forest portions of the project vicinity as feeding area. Since 1977, Fruit Bats have received legal protection in the CNMI by means of a 2-year monitoring, although enforcement has not been effective (DNR 1984). Designation of the Saipan and Tinian population as Endangered has been recommended by local agencies (DNR 1984). Because it is a traditional Chamorro food item, public support for bat preservation is not popular (DNR 1984). Project operational activities such as shift changes may affect nocturnal activities of the fruit bat.

C. Coconut Crab

The coconut crab, another popular local delicacy is brownish-red in color and may reach sizes up to 3 feet across. It begins its life in the ocean, floats for a few months, climbs inside a seashell and, looking like a hermit crab, crawls up on the beach. Young crabs live in the water for several months before migrating to shore. It subsequently leaves its shell and digs a hole in which to hide during the day. It lives in remote areas, in burrows or in cracks along cliffs, but returns to the sea to spawn. It forages nocturnally on, among other things, coconuts which it tears and mysteriously cracks open. Hunting of the coconut crab is a popular sport activity on Saipan, as shown by the comparatively higher number of permits sold for this animal (DNR 1984). The coconut crab is sometimes hunted at night by leaving a notched coconut out as bait. Evidence of this baiting procedure was observed in the project area, particularly in limestone forest areas. Hunting of this species is subject to seasonal and bag limits. Since the coconut crab is already present in scarce amounts, and the project is expected to remove approximately 2.6 acres of its potential habitat, the project has a small potential to contribute to a decrease in the number of crabs and related degrading of hunting for this species. Additionally, potential impacts to this species from increased activities in the forest may be expected. Project operational activities such as shift changes may affect nocturnal activities of the Coconut Crab.

III. OTHER OBSERVATIONS

Other observations made at the project area during the site visits included a monitor lizard, giant african snails, fairy terns, kingfishers, rufous-fronted fantails, white-tailed tropicbird, golden honeyeaters, bitterns and calls of the Philippine turtle dove.

IV. RECOMMENDATIONS

In order to mitigate impacts to Micronesian Megapode, Coconut Crab and Fruit Bar populations in the project area, it is recommended that the following measures be incorporated into project planning:

- Establishment and adherence to construction work limits restricting the contractor to the immediate work area. This may be accomplished by inclusion of an Environmental Resource Map into contractor work packages.

- Vegetation at the bases of cliffs should not be removed or disturbed. This is particularly important in limestone forest areas.

- Vegetation alongside access roads should not be removed unless required for road widening.

- Develop an "enhancement area" to be replanted with fruit trees such as breadfruit. This enhancement area should be located away from the project area and access roads to divert Fruit Bats from the area and replace habitat losses due to project construction. Siting of this enhancement area should be coordinated with CNMI-DNR Fish and Wildlife.

- Prior to start of construction and during initial construction (clearing), the project area should be field-checked by a DNR biologist to ensure that the megapode or mound nests are not present in the area to be affected.

Elimination of the Boresight Tower from the project has been a "mitigation" measure, which has eliminated the majority of disturbance in potential habitat areas. The potential wildlife impact of the project has been greatly reduced by this project modification.

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APPENDIX C

The Report of an Archaeological Survey of the U.S. Air Force PACBAR III Radar Site in the Sabanan Lipiog and Laderan Tanke Areas, Saipan, C.M.

The Report of an Archaeological Survey

of the

U.S. Air Force PACBAR III Radar Site

in the

Sabanan Lipiog and Laderan Tanke Areas,

Saipan, C.M.

Prepared for:

Environmental Solutions Inc.

By:
Scott Russell
And
Michael A. Fleming

November 1985

Abstract

This report presents the findings of an archaeological survey of the proposed project areas of the U.S. Air Force PACBAR III radar tracking station on Saipan, Commonwealth of the Northern Marianas.

In addition to describing four sites and three clusters of objects, the report also presents data on previous archaeological research on Saipan, the environmental, a land use history of the project areas and conclusions and recommendations.

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I. Introduction

This report presents the findings of an archaeological survey of the proposed sites of the U.S. Air Force PACBAR III radar tracking station on Saipan, Commonwealth of the Northern Mariana Islands. The survey was conducted in three principal areas; the major access road right-of-way and portions of Sabanan Lipiog and Laderan Tanke.

The primary aims of the survey were to locate, record and assess archaeological and historic properties in the project areas to determine whether they meet the criteria for inclusion in the U.S. National Register of Historic Places and/or the CNMI Register of Historic Places. The survey was also to provide data to allow project planners to avoid damaging eligible historic or archaeological properties or for developing appropriate mitigative actions, should circumstances warrant this approach.

This report serves as the basis for consultation between the U.S. Air Force and the CNMI Historic Preservation Officer and allows for compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966, as amended and Section 9 of CNMI Public Law 3-39.

II. Environmental Setting

Saipan is a high island and the second largest in the Marianas archipelago, which is located between 13 and 15 degrees latitude at the northwestern edge of Micronesia (Figure 2). The island, roughly 22 kilometers long and eight kilometers wide, is a mixture of volcanic and limestone rock. Its topography is distinguished by a central mountainous spine running north-south for nearly the entire length of the island. This spine is dominated by Mt. Tapochau which rises 436 meters above sea level. On the western and southern sides of the island, the mountainous interior gives way to narrow strips of flat coastal lands which are boarded on the west by white sand beaches and on the south by limestone cliffs and smaller pocket beaches. A fringing reef runs parallel to the shoreline and forms a narrow, protected lagoon for virtually the entire length of the western coast. The eastern and northern coasts

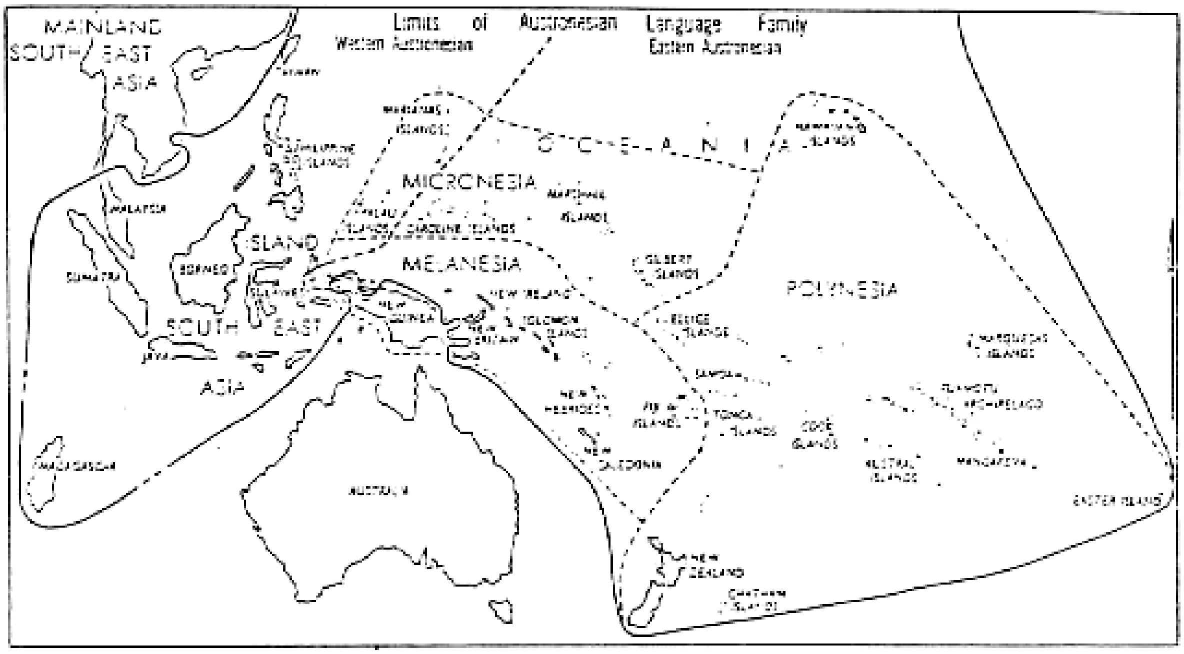

Figure 1. Map of the Pacific
(after Bellwood)

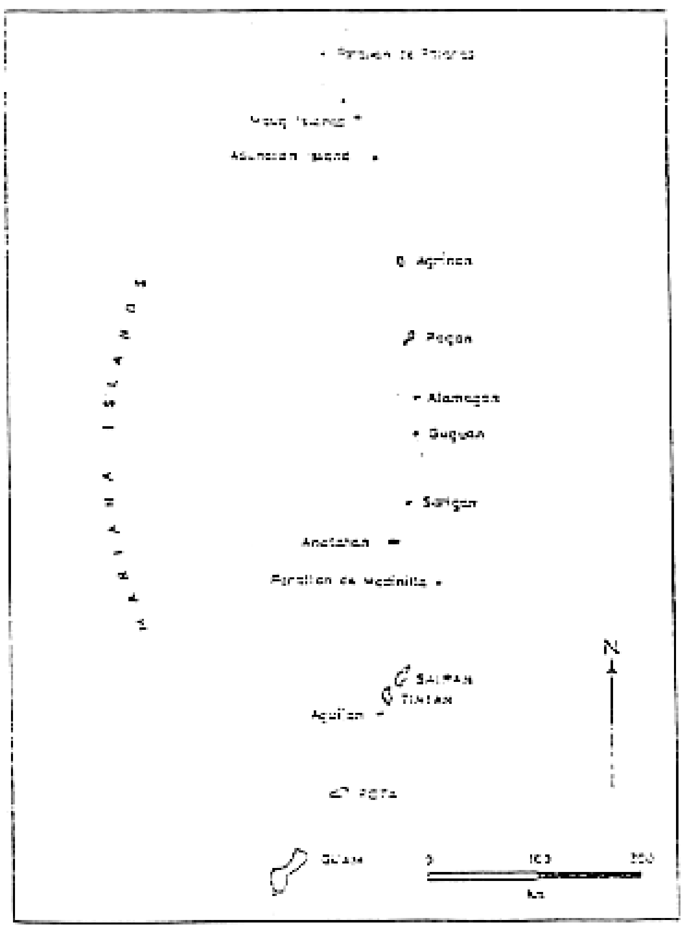

Figure 2. Map of the Marianas
(after Ward, et. Al.)

of the island are rugged with steep cliffs dropping directly into the open ocean. Sandy beaches are present at only a few isolated locations.

The climate on Saipan is tropical with an average temperature of 27 degrees Celsius. There are two distinct seasons in the Marianas, a dry season from January until May which is dominated by strong northeast trade winds and light rainfall and the wet season which is characterized by lighter, variable winds, greater rainfall and the occurance of tropical storms and typhoons.

The original vegetation on Saipan was probably simple, falling under three general floristic associations with some variants. The first association is a strand type forest which extends from just back of the beaches onto the lower limestone areas. The major species include Hernandia sonora, Thespesia, Hibiscus tiliaceus, Barringtonia asiatica, Pandanus tectorius, P. dubius, Ochrosia oppositifolia, Pisonia grandis, Guettarda speciosa and other trees and shrubs. A second major association consists of the mixed forests of the limestone portions of the island, where Casurina and seedless breatfruit are numerous. In the rough or rocky areas, Cynometra ramiflora is either dominant or exclusive. The undergrowth is usually a thick tangled confusion of Colubria, Jasminum, Callicarpa, Phyllanthus, Mucuna, Ipomoea and other native plants competing with thorny patches of Triphasia trifolia. The third major floral association is grassland, of which there are several on the island. The antiquity of the grassland areas is uncertain.

The survey considered by this report was undertaken in several areas in northern Saipan (Figure10). The first area consisted of a narrow right-of-way along the existing road and a recently cleared stretch which connects the main paved coastal road (usually referred to as Beach Road) with Sabanan Lipiog. The second area is the grassland at Sabanan Lipiog (circa 250 meters), the location of the main radar facility. The third area consists of the access road from Sabanan Lipiog to Laderan Tanke (circa 210 meters), situated to the northeast. The last area is at Laderan Tanke which will be the site of the bore site tower.

Originally, the vegetation in the survey areas probably would have fallen into the second floristic association as described earlier (ie mixed limestone forest). The exception to this would be the grassland at Sabanan Lipiog. Normally in Micronesian environments, grasslands persist only in areas of volcanic geology (see Fosberg 1960:31-35). Although there is a fairly extensive volcanic core area to the south of Sabanan Lipiog, the area itself is limestone. The grassland may have resulted from fairly recent activities in the 1930s and 40s. However, its traditional Chamorro name indicates that it may have been a grassland at least since the time of the island's resettlement in the 1800s.

The current vegetation in the survey area is largely exotic and reflects the massive land disturbance resulting from Japanese agricultural activities in the 1930s and 40s and the U.S. military construction during the Second World War. The floral community is dominated by the hearty Leucaena leucocaphala which apparently was introduced after World War II to control erosion. Also present in limited numbers are Casurina equisetifolia, Acacia confusa, Carica papaya and a number of species of grasses, vines and weeds. Portions of Laderan Tanke and the cliffs along the eastern side of Sabanan Lipiog are covered with species indigenous to limestone forests. This indicates that these rugged areas were not cleared previously. One notable feature is the grassland at Sabanan Lipiog.

III. Previous Arvhaeological Work on Saipan

The field of archaeology is a relatively young discipline with may of its current techniques and principles developed within the last 30 to 40 years. The precursor to modern archaeological research on Saipan was the work conducted by Hans Hornbostel, a former Marine intelligence officer. Hornbostel conducted archaeological survey and test excavations on Saipan during the 1920s under the sponsorship of the Bernice P. Bishop Museum in Honolulu. Although Hornbostel was ignorant of modern field and reporting techniques, he did have the opportunity to work on Saipan prior to the massive land disturbance resulting from Japanese agricultural activities and the events of the Second World War. Hornbostel's notes provided the basis for the first summary of Marianas prehistory which was prepared by Laura Thompson (1932). Especially useful were Thompson's observations concerning the pottery collections. She defined four types based on their texture, surface treatment and morphology. Unfortunately, Hornbostel's site descriptions were either of surface contexts of gave little attention to stratigraphic factors beyond noting depths from the ground surface and suggesting probable antiquity.

The modern era of archaeological research in the Marianas was ushered in by Alexander Spoehr who conducted survey and test excavations at several locations on Saipan, Tinian and Rota. Unlike Hornbostel, Spoehr conducted stratigraphic analyses during excavations and was able to establish that settlement in the Marianas was of some antiquity. Armed with the then newly developed technique of radiocarbon analysis, Spoehr was able to date components of sites on Saipan and Tinian. A relatively early date of 3,477 ±200 BP, derived from an oyster shell recovered from cultural deposits at the Chalan Piao site on Saipan, served for many years as the primary evidence supporting the suspected early settlement of the island (Spoehr 1957:168). Surprisingly, this sample was redated in 1956 and resulted in a much younger determination of 1,730 ±450 BP, a correction not noted by archaeologists until quite recently (Cloud, et. Al 1956:87).

Based on his fieldwork, Spoehr tentatively divided the prehistory of the Marianas into two broad periods. The earlier period was referred to as the Prelatte Phase, which commenced with the initial settlement of the islands and distinguished by the presence of Marianas Red pottery and settlements situated in optimal coastal areas. Spoehr referred to the second phase of Marianas prehistory as the Latte Period. This period was characterized by the emergence of latte architecture and the production of Marianas Plain pottery, a thick-walled, poorly-made, unslipped ware. Latte, for which the period is named, consist of two parallel rows of coralline stone columns which were capped by hemispherically-shaped stones called tasa. Hornbostel had concluded that these latte sites marked ceremonial areas in which human sacrifices were performed. Spoehr, however, argued that latte sites were the remains of traditional Chamorro houses and perhaps other specialized structures (1957:20). He based his argument on the results of exactions around latte houses – which recovered a wide range of domestic artifacts and refuse – and upon the early historical accounts left by Spanish missionaries which indicated that they were supports for houses.

Based on a single radiocarbon determination from a site on Tinian, Spoehr placed the beginning of the Latte Period at approximately 1105 ±145 BP (1957:1668). However, a recent evaluation of Spoehr's excavation has raised doubts as to whether his sample was associated with the surface latte. Based on radiocarbon data of more firm association, the emergence of latte architecture cannot be confidently dated earlier than 800 BP (Graves 1983). A final characteristic of the Latte Period is the expansion of settlement into areas that fall outside of the optimal coastal zones.

In 1985, a reconnaissance survey of the Unai Paopao area was undertaken by Michael Fleming and Scott Russell. The survey identified a substantial shell midden area which stretched along the shoreline for approximately 100 meters. A single 1 m^2 test pit was excavated in this midden. The excavation revealed stratified cultural deposits to a depth of two meters. The upper 50 centimeters of the deposit had been disturbed by modern agricultural activities, which probably also resulted in the destruction by modern agricultural activities, which probably also resulted in the destruction of surface features. However, undisturbed strata were encountered below the disturbed zone and Marianas Plain pottery sherds were found throughout the deposit (Fleming, in preparation). No radiocarbon samples were recovered but it is apparent that the site was occupied for a considerable length of time during the Latte Period.

There has been no previous archaeological research conducted in the project areas. However, on archaeological site has been documented along the cliff line just below Laderan Kalaberan Lichan. This is Liyang As Teo, also known as Kalabera Cave. This cave has attracted the attention of foreign researchers for many years. It was first mentioned in the accounts of Alfred Marche, a Frenchman who visited the island in the 1880s. Marche made the following observations:

> On 16 May with Governor Olive, we went to visit Mount de las Calaveras. The Governor, whose report I have already mentioned, had told me that, according to

> informants, one found in these in the caves of these mountain skeletons buried in a standing position. These caves are formed of hard rock, and no soil is found in them; they could not have served for this kind of burial, because the islanders are far too lazy to move the quantity of earth necessary to maintain the corpses in a vertical position. Luckily, I found in one of the caves an almost complete skeleton buried horizontally. This cave is located 100 meters above ground level behind a mountain 190 meters high (1982:14-5).

This site was also visited by Georg Fritz, the German district officer at the beginning of the twentieth century:

> Close by a large field of ruins, near Tanapag, is a rock called Calaberas, the cavities of which are filled with human bones. The are bedded between layers of burned lime and are therefore decayed. Since the ancients buried their dead individually and kept the skulls for good luck, we have before us not a burial ground but a massgrave prepared by the Spaniards. However, in the same rock location, I found a true cave dwelling about ten meters above the ground. In it I found a piece of forging iron and a bamboo pole carved like a cane. At the entrance, erected for the protection of the inhabitants, were about twelve skulls, several of them shattered at the left temple, possibly by sword thrust. Another large stalactite cave, not far from the one previously mentioned, high as a church, must have served for many years as an abode or meeting place, because at the entrance can be found a meter-high ash layer. In this cave a spear tip of human bone and two shell signal horns were found. This cave is called As Teo (1904:41).

From these two accounts, it is possible to hypothesize that Liyang As Teo served as a rock shelter and as a burial site for precontact Chamorros. It is possible that the area may have played a role in the events of the Spanish-Chamorro conflict in the late 1600s. Firtz's account is particularly interesting since he mentions "a field of ruins", presumably a latte village, located nearby. Unfortunately, his account is not specific enough to accurately place the location of this site. It is possible that the latte village was located in the relatively flat land of Kalabera located to the east of Liyang As Teo. This site, if it were located there, may have been destroyed by agricultural activities during the 1930s. Both observers failed to mention the pictographs which are present on one of the walls of Liyang As Teo.

Based on the results of previous archaeological work, it is possible to make some general statements concerning archaeological site pattering in the Marianas. First, sites associated with the earlier period of prehistory are found in protected coastal areas where their inhabitants enjoyed easy access to protected off-shore marine resources and relatively fertile lands with which to support a small inventory of root and tree crops. During this earlier phase, it is unlikely that inland areas were utilized. Latte Period settlements occupied the same optimal coastal sites that were utilized during the earlier phase of prehistory. In fact, many latte sites sit atop earlier period sites. However, in addition to coastal sites, Latte Period settlements were also established in areas outside the narrow coastal strips. On Saipan, these areas include the Chalan Galaide and I Maddok sites. Rock shelters and caves situated along cliff lines were also utilized during the Latte Period. Several theories have been put forth in an attempt to explain the inland expansion during the Latte Period. These include an increase in population forcing settlement in areas outside the optimal coastal zones; an expansion of horticultural activities into areas of fertile soil; and a movement of Chamorro inhabitants to more isolated areas in response to the arrival of Spanish military troops.

With this general settlement pattern in mind, it is possible to conclude that the survey areas were not utilized during the earlier period of prehistory. However, with the inland expansion during the Latte Period, portions of the survey areas may have been used for shelter, burial, ceremonial and horticultural purposes. This is especially likely since the survey areas are bounded on the west by a prehistoric settlement area at Unai Paopau and on the east by Liyang As Teo and a possible latte village at Kalabera.

IV. Historical Overview

The Marianas were fist visited by Europeans in 1521 when Magellan touched at Guam on his historic circumnavigation of the globe. For the next 100 years, the Marianas – named in honor of Mariana de Austria, Queen of Spain – remained a quiet backwater stopover for Spanish treasure galleons plying their route from New Spain to the Philippines. Guam, the largest island in the archipelago and endowed with the best harbors, served as a watering and resupply stop for these Manila-bound galleons. The remaining islands of the group did not feel the effects of these yearly contacts with the exception of a few European trade goods that found their way to the islands north of Guam.

The culture of the Marianas was to undergo profound changes, however, precipitated by the arrival on Guam of a small band of Jesuit priest, lay brothers and soldiers in 1668. Saipan was first visited by a Spanish military expedition in 1684 when the much feared Commander Quiroga landed at Agingan in an attempt to punish rebellious natives. Quiroga's men roamed up and down the western and southern coasts fighting small skirmishes with Chamorro warriors. Several villages were sacked and a small fort was constructed (Repeatti 1941). Before Quiroga could complete his work, a messenger arrived from Guam with news of a general uprising that threatened the mission in Agana. Quiroga commandeered several native canoes and returned to Guam in time to save the besieged mission.

The Spanish force of arms, combined with the exotic European diseases finally wore down Chamorro resistance by the 1690s. It also resulted in a dramatic decline in the Chamorro population. Although early Spanish estimates of 70,000 to 100,000 Chamorros are undoubtly exaggerated, the Marianas almost surely had at least 30,000 inhabitants at the time of Magellan's visit.

By the time of the first Spanish census in 1710, however, this relatively large population had been reduced to only 3,500.

In order to facilitate mission work and to ease administrative problems, the Spanish relocated surviving native inhabitants from Saipan and Tinian to Guam in the early decades of the 1700s. Only on Rota did a small group of Chamorros succeed in avoiding this resettlement effort.

For much of the eighteenth and nineteenth centuries, the Marianas were a quite Spanish colonial backwater. Most of the limited contact with the outside world was confined to an occasional supply ship which stopped at Guam, a few scientific expeditions that passed through the islands in the early decades of the 1800 and whale ships which took on supplies and water. Most of the contacts were limited to Guam. The islands to the north of Guam, with the exception of Rota, remained empty.

In 1785 and again in 1786, Carolinian voyaging canoes visited Guam, where astonished Spanish officials were told that the Marianas had traditionally been a part of the Carolinians' trading network. The voyages had been stopped, according to the Carolinians, because they had observed the cruelty of the Spanish administration and had no wish to come into contact with it (Kotzubue 1821,II:240). Their desire for trade goods, especially for iron implements, finally overcame their fear and, after enjoying kind Spanish hospitality, plans were made for their return the following year. Tragically, the Carolinians who had visited Guam in 1786 were lost in a storm on the return voyage, an event which caused further voyaging to be suspended. It wasn't until 1804, through the personal efforts of the Spanish Vice Governor, Luis Torres, that Carolinians visits resumed.

The Carolinians, inhabiting the tiny coral islands and atolls between the high islands of Truk and Yap, were especially dependant on their canoes and upon their system of navigation which allowed them to voyage to distant landfalls utilizing stars, wave patterns and other, more esoteric forms of knowledge. Initially, Carolinians voyaged to Guam to trade for iron, a particularly sought after item and other European goods, bartered with traditional handicrafts and precious shells. However, it was not long before the Carolinians discovered the rich lands on Saipan and Tinan. Living on resource scarce islets which were vunerable to the whims of nature, the Carolinians soon came to desire land in the Marianas. Spanish officials, wishing to increase the tiny population of the Marians and to secure the exceptional maritime skills of the Carolinians, consented to this request and by 1818 a small settlement was established by the Carolinians on the western coast of Saipan just opposite of Managaha Island (Russell 1984:13).

In the late 1800s, Spain began to lose control over its far-flung colonial empire. In 1898, after suffering a humiliating defeat at the hands of the United States during the brief Spanish-American War, Spain found it expedient to sell her Micronesian possessions to Germany. Guam, the only island occupied by U. S. troops during the conflict, remained in American hands. However, the remainder of the archipelago, along with the Carolines, were passed on the German which assumed control in 1899.

The small German administration in the Marianas was located on Saipan, which was considered to possess the greatest economic potential. The former Carolinian settlement of Arabwal, which came to be called Garapan by Guamanian Chamorros who began returning to the island in the 1870s, became the seat of the German colonial administration.

Although the German presence was small and its rule brief, the colonial administration focused attention on several areas. Especially important to the German economic plans was the production of copra and considerable efforts were expended to increase the island's coconut plantations. Public works projects were also given priority and soon roads, water catchments and administration buildings were completed. The Germans also were concerned with improving public health, an area neglected by the Spanish administration. Toward that end, a hospital was constructed on Saipan and local residents benefited from the periodic visits of a German medical officer. The Germans were also responsible for establishing the first public school in Micronesia on Saipan; previously, what little formal instruction that was available was provided by mission schools.

The period of German rule in the Marians was brought to an end at the outbreak of World War I. With its attention and resources concentrated in far-away Europe, Germany's Pacific colonial holdings were left in an exposed position. Japan, ostensibly an ally of Britain, was quick to launch an invasion of Germany's Micronesian possessions during the first weeks of the war. With no garrisons to protect the islands, Japan completed a rapid, bloodless conquest.

Japan's hold on Micronesia was formally recognized when the League of Nations granted it a Class C Mandate over the former German colonies. This mandate allowed Japan to assimilate the islands into the Japanese empire. The only major restriction placed on Japanese actions was a provision that forbade the fortification of the islands.

Following a brief period of uncertainty about what to do with these new possessions, Japanese companies soon were attracted to the new "South Sea Islands". Initial attempts were made to produce sugar cane but poor management and the lack of expertise led to failure. It wasn't until Matsue Haruji established to Nanyo Kohatsu Kabushiki Kaisha (South Seas Development Company or, more popularly "NKK") that the sugar industry was successfully established. Under Matsue's direction, large areas of Saipan were cleared and planted in cane. A narrow-gauge railroad system was constructed and used to transport cane from the fields to the processing mill in Chalan Lanoa. The sugar industry, a labor intensive operation, required large numbers of workers both to tend the fields and process the sugar in the mill. Rather than attempt to develop the small local work force, the NKK elected to recruit thousands of Japanese and Okinawan laborers. By the late 1930s, the alien population in the Northern Marianas reached 45,000, almost ten times the number of Chamorros and Carolinians (Russell, in press).

Under Japanese administration, the islands of the Northern Marianas were transformed from sleepy, isolated outposts to a bustling, prosperous colony. The sugar industry brought with it an improved standard of living, modern townships, electricity, running water, improved medical care and a cash economy. From the beginning, it was the intention of the colonial administration to assimilate the Marianas into the Japanese empire. In order to accomplish this, education was focused on instructing local residents in the Japanese language and customs. The assimilation process was speeded by the large Japanese population in the Marianas.

The relatively prosperous period of Northern Marianas history came to an end after Japanese naval aircraft inflicted a crushing defeat on the U.S. Pacific Squadron at Pearl Harbor on 7 December 1941 (8 December local time). Following Pearl Harbor, the Japanese military quickly launched other attacks at U.S., British and Dutch possessions throughout the Pacific and Asia. Aircraft flying from Saipan participated in the Japanese attack on Guam which was the first American possession to be lost to Imperial forces during the conflict.

During the first two years of the war, the Marianas served as a rear area supply base feeding material and men into the desperate battles with U.S. forces in the South Pacific (Crowl: 1960:55). Slowly, as American industrial might was brought to bear on the Pacific conflict, Japanese advances were first halted and then reversed. By early 1944, the Marianas bad become a front line position as part of Japan’s Absolute National Defensive Sphere. The Japanese realized that the defense of the Marianas was critical and that the very fate of the war hung in the balance. Unfortunately, Japanese military planners, traditionally offensive-minded, failed to adequately fortify the Marianas. In early 1944, a desperate program was commenced to stiffen Japanese defenses in anticipation of an American invasion. This program failed, however, due to an aggressive campaign against Japanese supply ships spearheaded by American submarines lurking off the coast of the Marianas. Cement and reinforcing steel needed to complete bunkers and other fortifications, were sent to the bottom along with thousands of Japanese troops sent to reinforce the island’s garrison.

Despite these problems, the invasion of the Marianas - code named Forager by U.S. military planners – would be no pushover. On Saipan, 30,000 determined Japanese troops were encouraged to fight to the death in order to keep the island out of American hands. What the Japanese lacked in materials and equipment they hoped to make up for with their warrior spirit.

The anticipated attack on Saipan was commenced by a heavy bombardment by ships and aircraft or Task Force 58 on 12 June 1944. For three days, the island was rocked by thousands of explosions as the American pre-invasion forces attempted to soften Japanese positions. D-day in the Marianas was at 0600 on 15 June when thousands of Marines and G.I.s waded ashore along Saipan's sandy, western shore. The battle that followed was one of the bloodiest of the Pacific campaign and certainly one of the most decisive from a strategic standpoint. In the tragic conclusion, of the fighting, thousands of men, women and children cast themselves off high cliffs in northern Saipan, choosing suicide over the prospects of capture by the Americans.

Soon after Saipan was captured, work was begun on expanding the Japanese bomber strip at Aslito. Renamed Isely Field by the Americans, this facility became the most important base for operations by the B-29 Superfortress (Denfeld and Russell 1984). The new bomber possessed a cruising range of 5,600 kilometers, a bomb capacity of four tons and was heavily armed. It proved the perfect weapon with which to destroy Japan's industrial capabilities. At the time, however, it was unclear whether the B-29 raids would be enough to force Japan's surrender. Many believed that an invasion of the Japanese home islands would be necessary. As a part of the logistics of such an assault, Saipan, in addition to serving as a bomber base, also served as an advance supply and repair base. Virtually the entire island was utilized and soon warehouses, hospitals, ship repair areas, munitions storage bunkers and scores of other facilities were constructed and manned by tens of thousands of military personnel. Military construction greatly altered the landscape of the island even more so than had the earlier sugar industry.

The anticipated invasion of Japan never took place, however, due to the development and use of the atomic bomb. Flying from North Field on Tinian, a B-29 nicknamed the Enola Gay drooped the first atomic bomb on the city of Hiroshima on 6 August 1945. Three days later, a second B-29 dropped another atomic bomb on the city of Nagasaki, forcing the Emperor to announce his government's intention to surrender unconditionally to the United States. Saipan's role as an advance base for the invasion of Japan proved unnecessary and within three years, virtually all of the military facilities were closed and troops returned to the United States.

V. Historic Land Use in Project Areas

A review of pertinent historical documents was undertaken in order to identify specific land use activities which took place within the project areas. Presented below is a summary, by historic period, of the major historic era activities.

(1) Spanish (1818 to 1899 only)

During this period, the island's population resided in two settlements, Garapan and Tanapag, both located along the western coast. It is unlikely that the project areas were utilized for any purpose during this period with the exception of hunting. It is possible that Chamorros and Carolinians may have hunted deer, wild pigs, coconut crabs and fruit bats in this area. No remnants of this possible activity would be expected to have survived.

(2) German (1899-1914)

As was the case during the Spanish administration, Saipan's tiny population probably did not utilize this area other than for subsistence hunting. It is likely, however, that the sloping ground near the present Beach Road and perhaps portions of Sabanan Lipiog may have been planted in coconut trees. German District Officer Georg Fritz encouraged the planting of coconut trees and also the reforestation of the island's grasslands. Sabanan Lipiog may have received such attention. Other than hunting and reforestation, no activities could be documented in the project areas during this period.

(3) Japanese (1914-1940)

With the establishment of the sugar industry during the Japanese administration, large areas of Saipan were cleared of native forests and planted in cane and a few other commercial crops. All relatively flat areas with suitable soil were thus used. Indigenous and exotic vegetation were used as wind breaks along cliff lines and rocky areas not suited for cultivation.

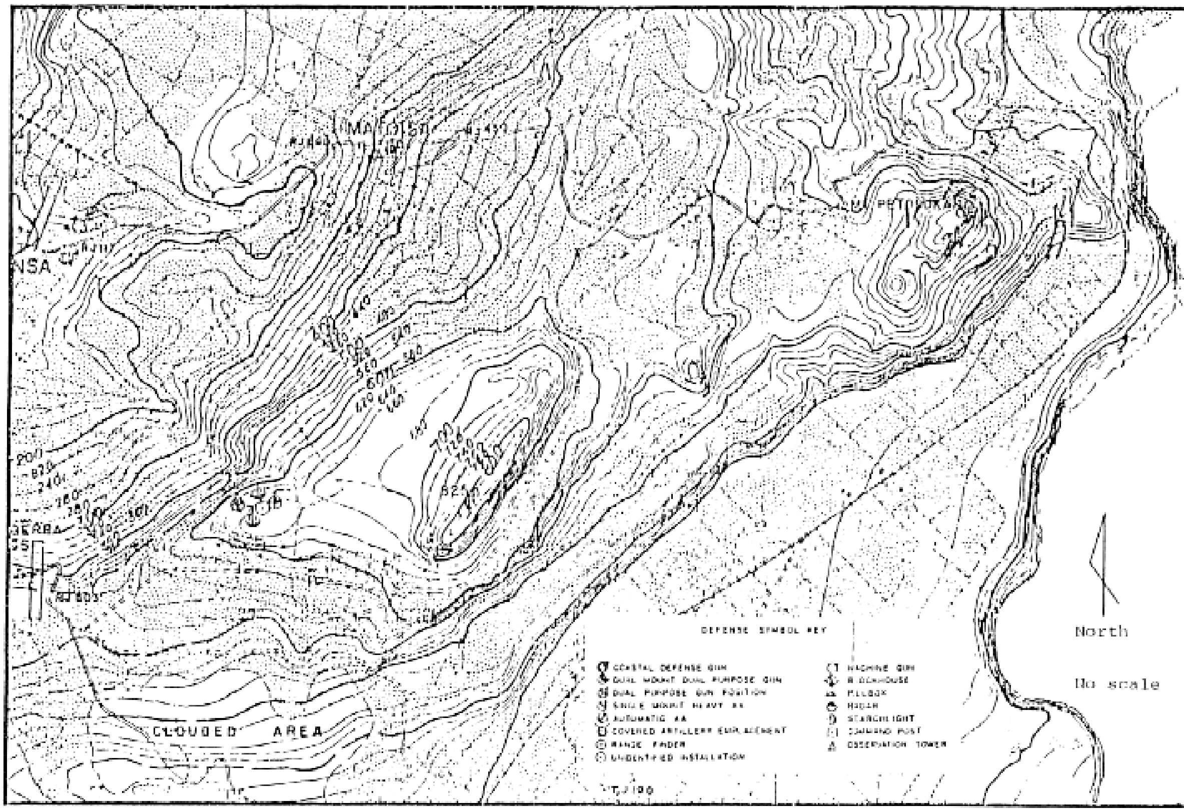

Figure 3. U.S. Target Map of Northern Saipan showing project areas. Brown areas are cultivated fields, green areas vegetation (JICPOA 1944; redrawn 1985).

It was during the 1920s and 30s that portions of the project areas were extensively utilized for the first time. The access road right-of-way from Beach Road to Sabanan Lipiog passes through an area that was cultivated field, probably planted in cane. Cultivated fields were also located to the south and east of Sabanan Lipiog. The sabana itself was apparently a grassland. A 1914 U.S. target map indicated the area was covered with “light vegetation” (JICPOA 1944). At Laderan tanke, cultivated fields extended right up the base of the cliff line on both the western and eastern sides. It appears that the site of the bore tower is also located in former cultivated field. The remainder of Laderan tanke was covered in “heavy vegetation”, presumably indigenous in origin (Figures 3 and 4).

In order to make these areas accessible, several major and secondary roads were constructed by the Japanese. One main artery ran from the railroad line on the west coast across the interior of the island and the circled through the northern section of the island, returning to the west coast in the Banaderu area. This road, which skirted Laderan Tanke, is referred to as Banaderu Road” on the target map. A second major road connected the Japanese farming village of Matansha (which was located near the present day village of San Roque), to the fields in Lipiog area. In addition to these, there was also a secondary road which ran around the southern and western boundaries of Sabanan Lipiog, connecting the two major roads. It also appears that there were a number of trails or cart paths that led from the secondary road directly to the Sabanan Lipiog area (JICPOA 1944).

(4) World War II (1941-1945)

U.S. target maps indicate that there were several Japanese Defensive installations in the project area, all concentrated in Sabanan Lipiog. These were identified as two dual purpose guns, two search lights and an unidentified installation which were clustered at the southwestern corner of the sabana. Also identified

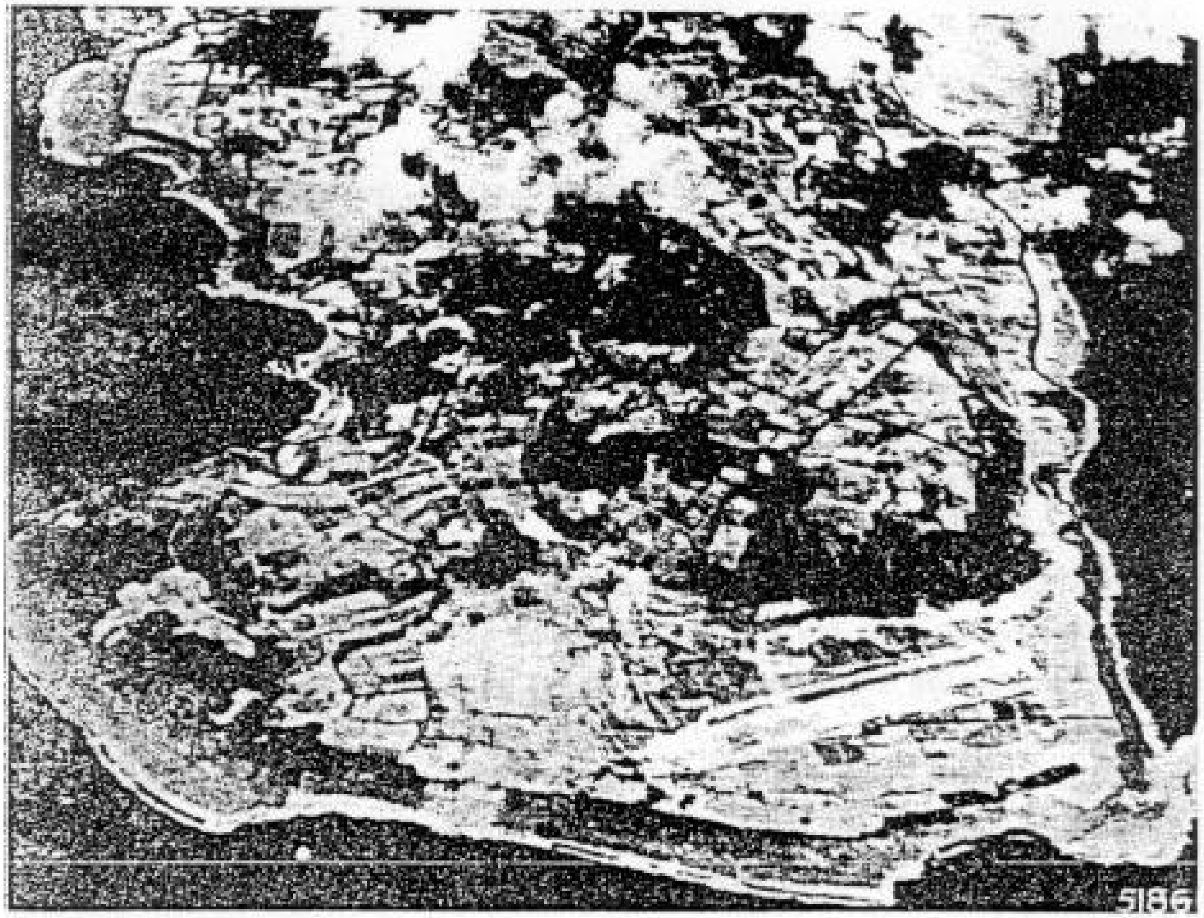

Figure 4. Oblique Aerial Photograph of the Northern Section of Saipan Prior to the U.S. Invasion. Note fields in Kalabera area and heavy vegetation covering Laderan Tanke.

was a radar installation situated on the southern end of the Sabanan Lipiog cliff line. These observations were based on the results of U.S. reconnaissance air photography taken prior to the invasion. It is difficult to determine whether these descriptions are accurate; many details of these per-invasion maps were later found to be in error, especially with regard to the interpreting of Japanese defenses. These positions may have been decoys designed to draw enemy fire away from other positions, a tactic commonly utilized by the Japanese on Saipan (Figure 5). It is assumed that these suspected targets were bombarded during the pre-invasion air and navel attacks.

During the battle for Saipan, the Sabanan Lipiog and Laderan Tanke areas were captured by elements of the 2nd Marine Division on 6 July 1944 (Crowl 1960:262). The following day, a massive suicide attack was launched by surviving Japanese troops which had been driven to

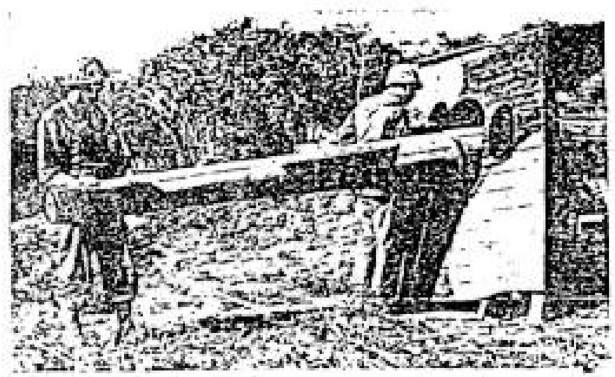

Figure 5. U.S. Troops examine dummy Japanese gun emplacement, June 1944.

the northern part of the island by U.S. forces. Many of those who participated massed in the area that the major access road right-of-way runs through. The attack initially overran U.S. positions and fierce hand-to-hand fighting followed. The attack was finally smashed by heavy artillery and naval gunfire and by U.S. troops firing from well fortified positions. The cost of this desperate attack was 4,311 Japanese and 406 American dead (Crowl 1960:257). Many of the Japanese dead were buried in mass graves dug by bulldozers.

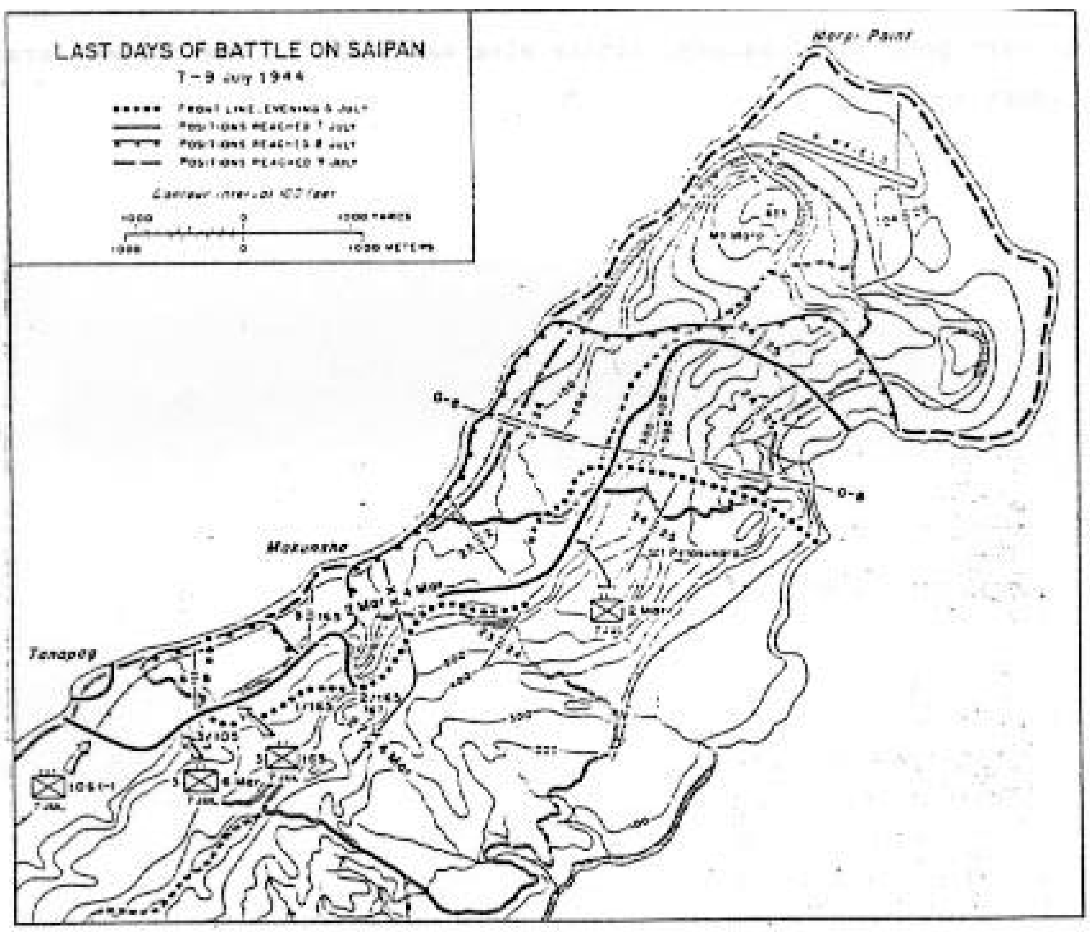

Figure 6. U.S. Situation Map showing movement of Front Line U.S. Units during the Period 7 to 9 July 1944 (Crowl)

This attack was the final organized resistance offered by the Japanese although there was much fighting remaining for U.S. troops; surviving Japanese took to caves and rock shelters where they fought to the death. The project areas were “mopped-up” by elements of the 27th Army Division between 31 July and 6 August (Crowl 1960:265). In spite of these efforts, this area harbored Japanese stragglers until after the end of the war (Captain Oba, personal communication with the author, 1983).

After the island was secured by U.S. forces, construction was commenced to transform Saipan into an advance supply base to support the anticipated invasion of Japan. Four bomb storage buildings were built along the western edge of Sabanan Lipiog and an access road, paved with crushed coral was completed to connect these buildings with the main coastal road. Although extensive facilities were constructed throughout the northern portion of Saipan, little else was built in the project areas (Figure 8).

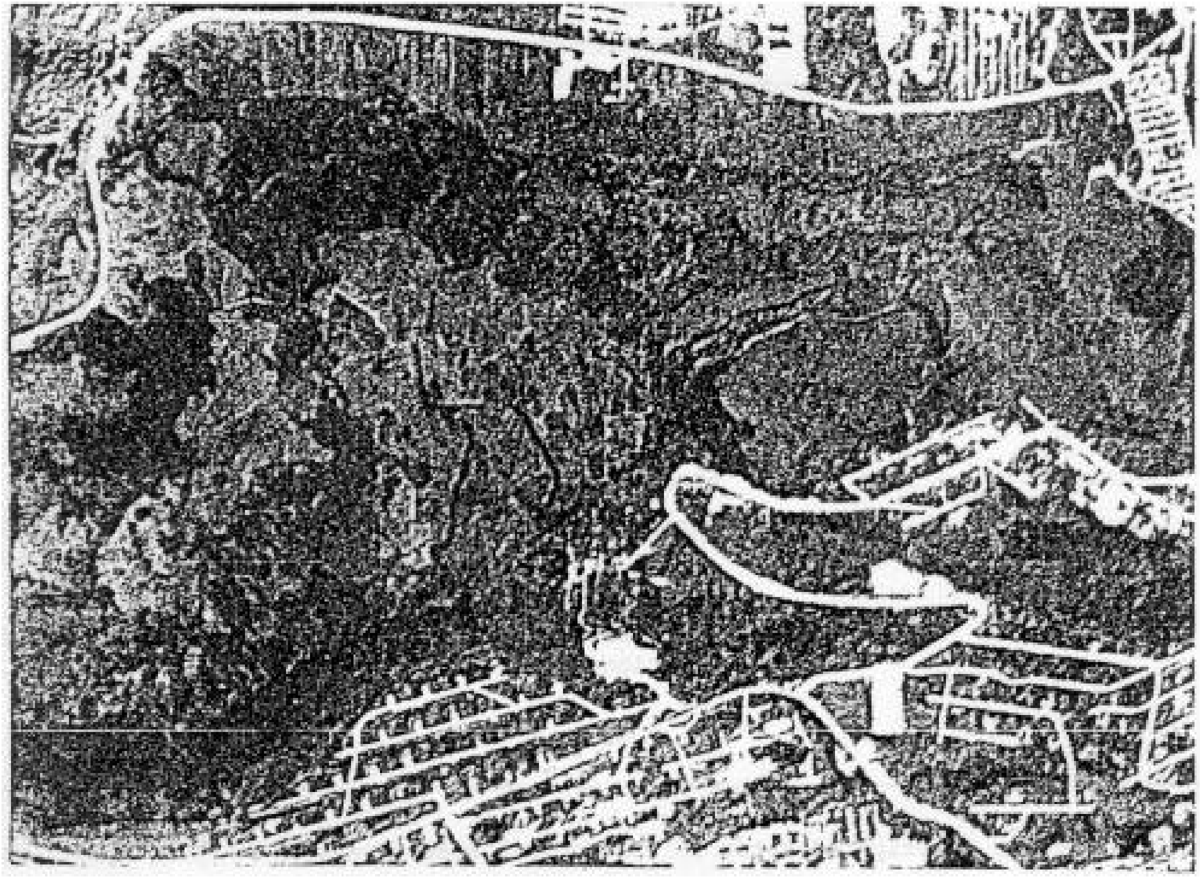

Figure 8. Post Invasion Air Photo showing U.S. Installations, late 1945.

VI. Site Predictions

Based on the results of previous archaeological research conducted on Saipan and the land use history, predictions were made concerning the types of sites that were likely to be encountered during the field survey. These prediction are presented on Table 1 on the following page.

Table 1.

Site Predictions

Period	Site Type	Represented by:
Prehistoric		
Prelatte Period	none anticipated	---
Latte Period	agricultural areas, habitation sites, burials ceremonial sites	pottery scatters, middens, rock shelters, pictographs, human burials.
Spanish	none anticipated	---
German	none anticipated	---
Japanese	agricultural sites	roads, house foundations cisterns refuse dumps.
World War II	battlefields, defensive positions, mass graves	remnants of fortification and installation, human burials, military equipment.

With regard to anticipated sites in the project areas, several working hypotheses were formed prior to the commencement of field work. These included the following: (1) Cultural deposits associated with prehistoric archaeological sites, should they be found to exist, would be shallow and perhaps totally disturbed by twentieth century land use activities; (2) Caves and rockshelters that may have been utilized by prehistoric inhabitants probably were impacted by the activities of Japanese military troops during World War II; (3) Japanese era sites, especially the remnants of house foundations, cisterns and refuse dumps probably would have survived intact; (4) World War II sites, especially those constructed by the U.S. after the invasion, are likely to be found. Remnants of Japanese positions might also be located.

VII. Methodology

This survey consisted of two main components. The first consisted of a background literature review during which the reports of previous archaeological research were consulted. Pertinent historical documents were also reviewed

APPENDIX D

Qualifications of Preparers

QUALIFICATIONS OF PREPARERS

This Environmental Assessment has been prepared by Environmental Solutions, Inc. for the Department of the Air Force, Space Division. Project Manager John Edwards of the Air Force Environmental Planning Division (SD/DEV) also provided information and assistance in preparing this final report.

U.S. Air Force, Space Division

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Environmental Assessment Project Manager
M.S. Environmental Engineering, 1976, USC
B.S. Zoology, 1973, UCLA

Eleven years experience as an environmental engineer and project manager for various projects including:

- Environmental Assessments and Environmental Impact Statements
- Air Pollution Control
- Hazardous Waste Treatment
- Permits for projects including the Air Force Space Shuttle, radar stations, and missile programs.

Environmental Solutions, Inc

Richard D. Ellison, President
Principal
Ph.D. Civil (Geotechnical) Engineering, 1969, Carnegie-Mellon University
M.S. Civil (Geotechnical) Engineering, 1967, Carnegie-Mellon University
B.S. Civil Engineering, 1965, Carnegie-Mellon University

Professional Engineering registered in 25 states. Twenty-nine years of experience in project management and engineering. Project manager for various projects including:

- Environmental Assessments
- Waste Discharge Requirement Application Reports

- Air Quality Permits
- Conditional Use Permits and Building Permits
- Waste Discharge Requirement reports for the STS Power Plant and Space Shuttle Launch Pad, Vandenberg AFB.

Project Engineer for numerous geotechnical and environmental studies for military, commercial and industrial facilities.

Miro Knezevic, vice President
Project Director
Ph.D. Civil Engineer, 1978, USC
M.S. Civil Engineering (Environmental), 1973, University of Maryland
B.S. Civil Engineering, 1971, University of Maryland

Nine years of experience as project engineer and project manager for various projects including:

- Environmental Assessments
- RCRA Part B compliance documentation
- Surface and ground water quality assessments
- Waste Discharge Requirement Reports for the STS Power Plant and Space Shuttle Launch Pad, Vandenberg AFB
- Management and engineering activities associated with MX and Assembly Test and System Support construction surveillance at Vandenberg AFB, hazardous waste inventory and assessment for RCRA Part A at Vandenberg AFB, RCRA part B preparation for Kirkland Air Force Base, and RCRA Part B compliance evaluation for radioactive waste for the Waste Isolation Pilot Plant for the DOE.

Michael J. Wolters
Project Manager M.A. Business Administration, 1982, Pepperdine University, Irvine, California
B.S. Mechanical Engineering, 1972, CSUP
P.E., State of California, 1976

Fifteen years of experience in environmental permitting and engineering activities including:

- Permitting, Environmental Assessment, and Risk Analysis, USAF Beryllium project

- Hazardous Materials Spill Prevention and Preparedness Plan, Space Transportation System

- Waste discharge closure plans

- Environmental audits

- Facilities engineering and design

Mark E. Cramer
Project Engineer
B.S. Chemical Engineering, 1986, CSULB

One year experience in environmental engineering support on projects including:

- Environmental Assessments

- Underground Tank Monitoring and Assessment

- Site investigation, remedial action in response to soils contamination

Rosemarie S. Crisologo
Principal Field Investigator
M.S. Environmental Engineering, 1980, USC
B.S. Biological Sciences, 1978, USC

Six years of experience as an environmental quality specialist including activities such as:

- Environmental Assessments and Environmental Impact Reports

- Biological field surveillance and monitoring activities

- Environmental protection plan and mitigation measure requirements

- Extensive environmental experience for projects at Vandenberg AFB

Carolyn e. Trindle
Environmental Planner
M.A. Business Administration, 1981, Pepperdine University, Irvine, CA
M.A. Secondary Education, 1974, University of Missouri, Kansas City

Bachelor of Journalism, 1965, University of Missouri, Columbia

Ten years of experience as environmental planner for various projects including:

- Environmental Assessments and Environmental Impact Reports

- Socioeconomic and planning documents for proposed industrial projects and military installations

- Environmental documents for establishing the F/A-18A aircraft at Kaneohe Bay, Oahu, Hawaii, and for impacts of constructing satellite earth stations in urban Southern California locales.

- Permitting for major mining projects

<u>Department of Community and Cultural Affairs, Division of Historic Preservation, CNM10</u>

Michael A. Fleming
Staff Archaeologist
B.A. Anthropology and Sociology, 1977, University of Guam

Ten years of experience in archaeology include extensive fieldwork on Guam, Saipan, Tinian and Rota. Six years of experience with the CNMI Division of Historic Preservation. Author of several publications relating to archaeology of the CNMI. (See further details in Appendix C.)

Scott Russell
Deputy Historic Preservation Officer
B.S. Political Science/History, 1973, Stephen F. Austin University, Texas

Eight years of experience with the Division of Historic Preservation including experience teaching Northern Marianas history at Northern Marianas College. Author of many historical articles, technical reports journal articles and monographs about the Northern Mariana Islands and Micronesia. (See further details in Appendix C.)

APPENDIX E

Radiofrequency Emissions Calculations

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APPENDIX E

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E.1.0 INTRODUCTION

PURPOSE

1. This Appendix provides calculations for approximate power density levels in locations surrounding the Radar site and in the area of Personnel access. Assumptions and methodology are included.

2. These calculations were performed for the purpose of an Environmental Assessment and it is recommended that these values be supplemented by field measurements in accordance with AFOSH 161-9 standards when the antenna is installed.

STANDARDS

1. AFOSH 161-9 standards were used for these calculations. Specifically:

   - 10 mW/cm² Maximum exposure to Personnel
   - 5 m W/cm² Maximum exposure to the public and small children

Far field power density formulas and nomenclature from this standard are used, where applicable.

METHODOLOGY

1. In general, the calculations are based on antenna characteristics shown in Tab E.1 and far field equations corrected for near field considerations, including approximate spill over lobe configurations.

2. The topography surrounding the Radar Site is shown in Figure E.1. Specific points of interest are also shown in Figure E.1.

3. Hazard distances for the 5 and 10 mW/cm² exposure limits are calculated using AFOSH 161-9 far field methods, and are corrected for near field considerations using Figure E.2.

4. Power densities at specific locations of interest are determined using near field considerations and approximate spill over lobe configurations. The locations are of interest because they are possible points of public access and wildlife habitants. These points are:

   - Proposed Scenic Viewpoint
   - Potential Endangered Species Habitat, Megapode Location #2
   - Access Road to the Boresight Tower [1]
   - Boresight Tower [1]
   - Access Road to the Radar Site
   - Mt. Petosukara

   Distances from the antenna and location elevations are estimated from Figure E.1.

5. The approximate power density level on Mt. Petosukara is determined assuming the location could be in the direction of the main beam. A near field correction is used based on Figure E.1.

6. An approximate power density level for personnel exposure is a determined using antenna dish dimension and assumed personnel access height of 7 feet. Figures E.6. through E.8 are used to account for corrections off the main beam and near field considerations.

7. Table E.2 provides a list of symbols used in this Appendix.

[1] Although the Boresight Tower and Access Road have been removed from the project, power densities in those areas are still reported because hikers may use the forest there.

E.2.0 CALCULATIONS

E.2.1 HAZRAD DISTANCES

Power density on the centerline of the beam is given by:

(1) $$PD = \frac{Pa\ Gn}{4\pi D^2}\ (W/m^2) = \frac{Pa\ Gn}{4\pi D^2 x10}\ (mW/cm^2)$$

The distance to a specified power density on the centerline of the beam is then:

(2) $$D = \frac{\sqrt{PaGn}}{40\pi\ PD} \times \frac{3.28\ ft.}{m}$$

The distance to the transition from near field to far field is calculated by using a typical wavelength based on an operating frequency range of 5,400-5,650 Megahertz (see Equation 6):

(3) $$D = \frac{2L^2}{\lambda} = \frac{2x(30\ ft.)^2}{0.174\ ft.} = 10,345\ ft.$$

In the near fields, the power density does not decrease with the square of the distance as it does in the far field, necessitating certain assumptions to be made to predict power density. To aid in calculation of near field power density, the gain of the antenna may be assumed to be reduced according to the following equation:

(4) $$\frac{G}{Go} = \frac{256X^2}{\pi^2} \left[1 - \frac{16X}{\pi} \sin\left(\frac{\pi}{8X}\right) + 1\frac{28X^2}{\pi^2} \left(1 - \cos\frac{\pi}{8X}\right) \right]$$

(5) $$X = \frac{D\lambda}{2L^2}$$

This function (Figure E.2) is plotted on page 36 of the Microwave Engineer's Handbook, vol., T.S. Saad, Ed., Horizon House, Dedham, Massachusetts, 1971.

When calculating the distance to the PEL power density, using the longest wavelength maximizes the distance, λ.

(6) $$\lambda = \frac{c}{f}$$

where c = speed of light, 9.84×10^8 ft./s
f = frequency, Hz

Using f = 5.65 to 5.4 GHz,

λ = 0.174 to 0.182 ft.

Using Equation (2) for a PEL = 10 mW/cm², the calculated hazard distance, D is:

$$D = \sqrt{\frac{7{,}680\ \text{W} \times 10}{40\ \ \pi\ 10\ \frac{\text{mW}}{\text{cm}^2}}}\ \left(3.28\ \frac{\text{ft.}}{\text{m}}\right)$$

D= 3,419 ft., use 3,400 ft. to iterate

An iterative procedure using Equations (4), (5) and Figure E.2 is used, comparing calculated D values with previous D values to determine the D value for a 10 mW/cm² PEL corrected for near field considerations. Starting with D = 3,400ft., as calculated from Equation (2) for a PEL = 10 mW/cm², the value X is:

(7) $$X = \frac{D\lambda}{2L^2} = \frac{3400\ \text{ft.} \times 0.182\ \text{ft.}}{2 \times (30\text{ft.}^2)} = 0.344$$

Using Figure E.2 and the value for X calculated in Equation 7, the gain of 52.5 dB is decreased at 3,400 ft. by 0.4 dB. Therefore, the gain factor, Gn, corrected for near fields is:

(8) $$\text{Gain Factor} = Gn = \text{Log}^{-1}\left(\frac{52.5-0.4}{10}\right) = 1.622 \times 10^{5}$$

Using this value for the gain factor in Equation (2) to compute the distance to the 10mW/cm² PEL power density corrected for near field gives:

(9) D= 3.266 ft., round up to 3,300 ft.

Iterating, at D= 3,300 ft., X=.334 from Equation (5) and the gain is decreased by 0.4dB from Figure E.2. The gain factor, Gn, is again 1.622×10^{5} from equation (8) and the resulting D using Equation 92) is 3,266 ft. which may be rounded up to 3,300 ft. This iteration resulted in the same value for D, therefore no further iterations are required and the final determined hazard distance, D at 10 mW/cm² PEL corrected for near field is D =3,300 ft. Using the same iterative procedure to modify the gain factor, the distance to 5 mW/cm²is 4,800-ft.

E.2.2 POWER DENSITIES AT SPECIFIC LOCATIONS SURROUNDING THE RADAR SITE

Figure E.1 shows the specific locations of interest for these calculations. Figure E.3 shows the general picture of power density at a location off the main beam centerline. The spill over lobes for the parabolic dish antenna is approximately 60 dB down from the main beam. The central direction of these lobes was inferred from the geometry of the antenna, estimated from photographs furnished. The inferred antenna geometry and direction of spill over lobes are shown in figure E.4. The spill over directed forward from the subreflector will probably lie between 16.7° and 28.1° from the central axis of the main beam. The rear directed spill over lobe from the main dish would probably lie between 76° and 96° from the rearward projection of the central axis of the main beam (see Figure E.4). With the assumption that the central axis of the main beam can be directed to the horizon and be depressed 0.248° below horizontal, the spill over lobes can be washed over any point within line sight form the antenna.

(10) $$D = \sqrt{\frac{P_a G_n \left[\log^{-1}\left(\frac{-25}{10}\right)\right]}{40\pi\ PD}}$$

$$D = \sqrt{\frac{7{,}680\text{W} \times 1.778 \times 10^{5} \times 3.16 \times 10^{-3}}{40\pi\ 1\text{mW/cm}^{2}}} \times \frac{3.28\text{ ft.}}{\text{m}}$$

$$D = 680\text{ ft}$$

For this type of antenna, side lobes are approximately 25 dN down from the main lobe and are located within 1 degree of the main beam.

Selected locations below the lowest depression of the main beam are all beyond the 1 mW/cm^2-predicted distance.

LOCATION	DISTANCE FROM ANTENNA	POWER DENSITY
Scenic View Point	2,046 ft.	<5 mW/cm^2
Megapode Location #2	1,984 ft.	<5 mW/cm^2
Access Road to Boresight[1]	1,054 ft.	<5 mW/cm^2
Boresight Tower [1]	3,224 ft.	<5 mW/cm^2
Access Road to Radar Site	930 ft.	<5 mW/cm^2

Mt. Petosukara is high enough so that the main beam could be directed at it with the given assumptions of beam elevation and azimuth control. The peak of Mt. Petoskura is approximately 680 ft. from the antenna. At that distance, the relative gain of the antenna is reduced 8.4 dB ($\lambda = 0.182$ ft.) from Figure E.2, and;

(11) $$\text{Gain} = 52.5 - 8.4 = 44.1\text{ dB}$$

$$G_n = 2.57 \times 10^{4}$$

The power density in the central beam at Mt. Petosukara is:

(12) $$PD = \frac{7{,}680\text{ W} \times 2.57 \times 10^{4}}{40\pi \left(\frac{680\text{ ft.}}{3.28\text{ ft/m}}\right)^{2}}$$

$$= 36.5\text{ mW/cm}^{2}$$

[1] Although the Boresight Tower and Access Road have been removed from the project, power densities in those areas are still reported because hikers may use the forest there.

E.2.3 POWER DENSITY IN THE PERSONNEL EXPOSURE AREA

Figure E.5 shows distances related to the antenna dimensions and personnel access height. Refer to this figure and Table E.2 for an explanation of the symbols used in the following equations. The distance, x_c from the centerline of the beam to the personnel access area is:

(13) $X_c = H - h_p$
$= 37 \text{ ft.} - 7 \text{ ft.}$
$= 30 \text{ ft.}$

The distance from the edge of the beam, x_e, to any personnel access height is:

(14) $X_e = H - \frac{L}{2} - h_p$
$= 37-15-7 \text{ ft.}$
$= 15 \text{ ft.}$

As power densities in this region are strongly dependent of the operation and mechanical alignment of all components of the antenna, these calculations can only serve as a guide until measurements are made of the operating antenna as installed.

The distance to the personnel access area is 15 ft. below the edge of the beam and 30 ft. below the centerline. The relative beam width is 2.0 From Figure E.6; the power density is more than 10dB below the centerline power density.

From Figure E.7, power density at $D = 2L^2/\lambda$ is off the graph, therefore, Equation (15) as noted on Figure E.8 is used to calculate the PD:

(15) $PD = \frac{158.4 \text{ x } Pa \text{ kW}}{L^2 \text{ ft.}} \quad (\text{mW/cm}^2)$

$= \frac{158.4 \text{ x } 7.68}{900 \text{ ft.}^2} = 1.352 \text{ mW/cm}^2$

Using Figure E.8, the maximum near field power density is 41 times higher, or 55.4 mW/cm^2. When this is reduced 10dB at a relative beam width of 2.0, the power density is 5.54 mW/cm^2. Therefore, it is not expected that the power density in the immediate area where personnel have access will exceed 10 mW/cm^2.

E.3.0 CONCLUSIONS

1. The approximate hazard distances and power density levels determined in this Appendix are summarized below:

Distance	Results
Hazard distance, 10 mW/cm^2	~3,300 ft.
Hazard distance, 5mW/cm^2	~4,800 ft.

Power Density Location	Results
Scenic Viewpoint	<5 mW/cm^2
Megapode Location #2	
Access Road to Boresight Tower(1)	
Boresight Tower(1)	
Access Road to Radar Site	
Mt. Petosukara	
Personnel Exposure at Radar Site	

Figure E.1 shows the above locations.

2. These values are approximate and should be supplemented by field measurements according to AFOSH 161-9 standards after antenna installation. Assumptions are stated in the Calculations portion of this Appendix.

---

[1]Although the Boresight Tower and Access Road have been removed from the project, power densities in those areas are still reported because hikers may use the forest there.

TABLE E.1

ANTENNA CHARACTERISTICS

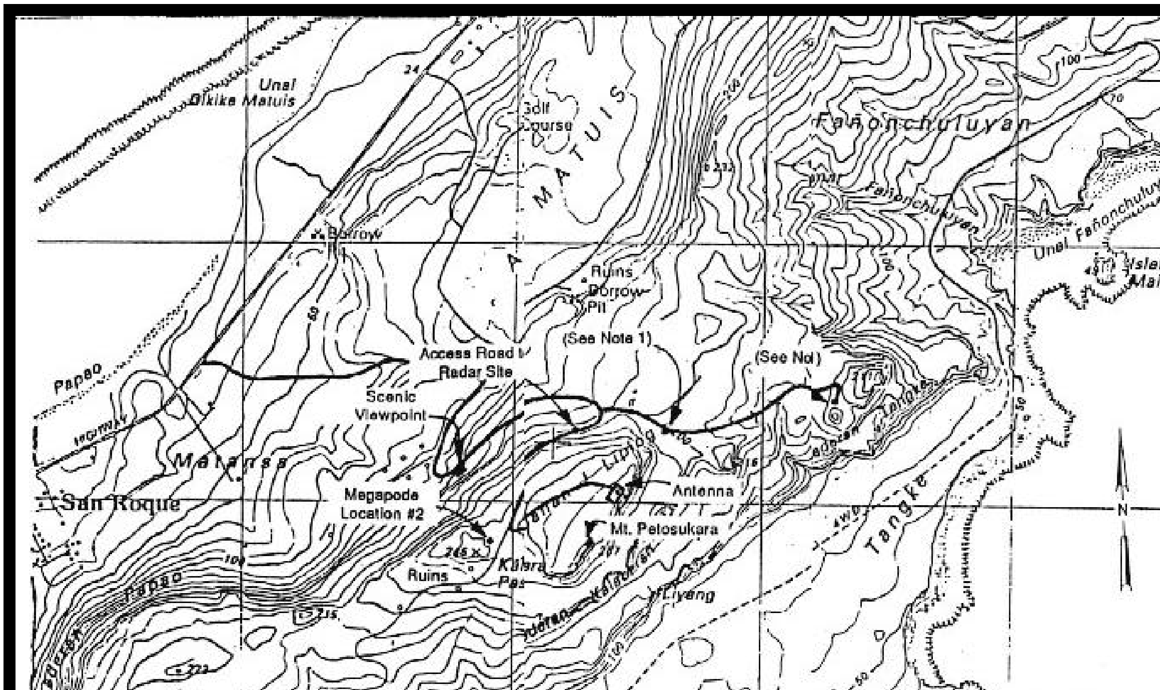
CHARACTERISTIC	SYMBOL	VALUE
Antenna Type	—	Parabolic
Antenna Diameter	L	30 ft.
Antenna Centerline Height (above ground)	H	37 ft.
Frequency	f	5400-5650 Megahertz
Average Power	Pa	7,680 Watts
Antenna Gain	G	52.5 dB
Antenna Gain Factor	Gn	1.778×10^5
Wavelength	λ	0.182 ft.
Half Power Beam Width		0.4 degrees
Look Angle-Elevation	—	Transmission disabled below Adjustable elevation threshold and where Exposure levels may exceed Public exposure standards.
Look Angle-Azimuth	—	0-360 Degrees Look angle will be Restricted where exposure Levels may exceed public Exposure standards.
Time vs. Angle Estimates	—	Antenna may be stationary For 6 minutes or more

Source: Department of the Air Force, November 8, 1985 letter from Ronald B. Saldino, Acting, Director of Engineering Systems Development, WSMC, to John Edwards, SD/DEV.

TABLE E.2

LIST OF SYMBOLS

SYMBOL	PARAMETER	UNITS
D	Distance	Feet
Dn	Near field distance	Feet
Dpel	Hazard distance for a specific PEL	Feet
E	Elevation above sea level	Feet
F	Frequency of antenna	Megahertz
Gn	Antenna gain facto	Dimensionless
H	Height of antenna centerline above ground level	Feet
Hm	Antenna depth	Feet
Hp	Personnel access height	Feet
Hs	Subreflector mast height	Feet
L, lm	Antenna diameter	Feet
Ls	Subreflector diameter	Feet
Pa	Antenna average Power	Watts
PD	Power density level at a specific point	mW/cm^2
PEL	Maximum permissible power density Exposure level for humans	$m W/cm^2$
X_c	Beam centerline to access distance	Feet
X_e	Beam edge to access distance	Feet
α	Angle from main beam centerline to point of interest	Degrees
λ	Antenna wavelength	Feet
θ	Half power beam width	Degrees
θ_B	Backward lobe angle	Degrees
θ_f	Forward lobe angle	Degrees



APPROXIMATE SCALE

0 1575 FEET

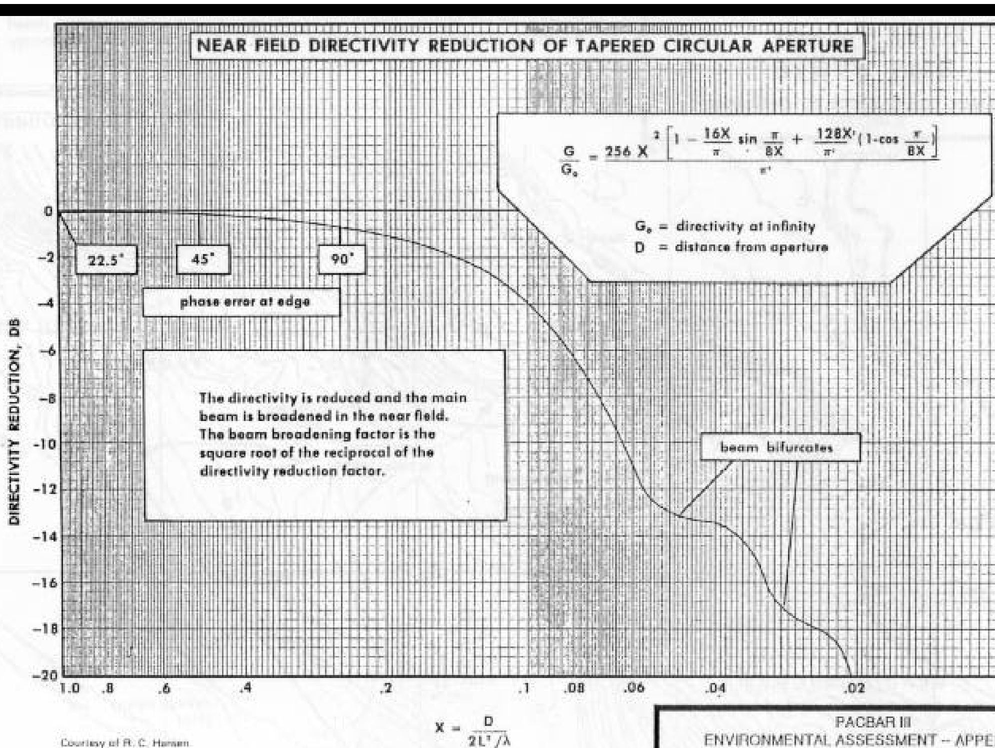
NOTE 1: Although the boresight tower and its access road have been reved from the project, power densities in these areas are still reported because hikeray use the forest there.

SOURCE: ENLARGED COPY OF USGS TOPOGRAPHIC MAP OF THE ISLAND OAIPAN, 1:25 000, 1983.

PACBAR III
ENRONMENTAL ASSESSMENT -- APPENDIX E

RADAR SITE TOPOGRAPHY

FIGURE E.1



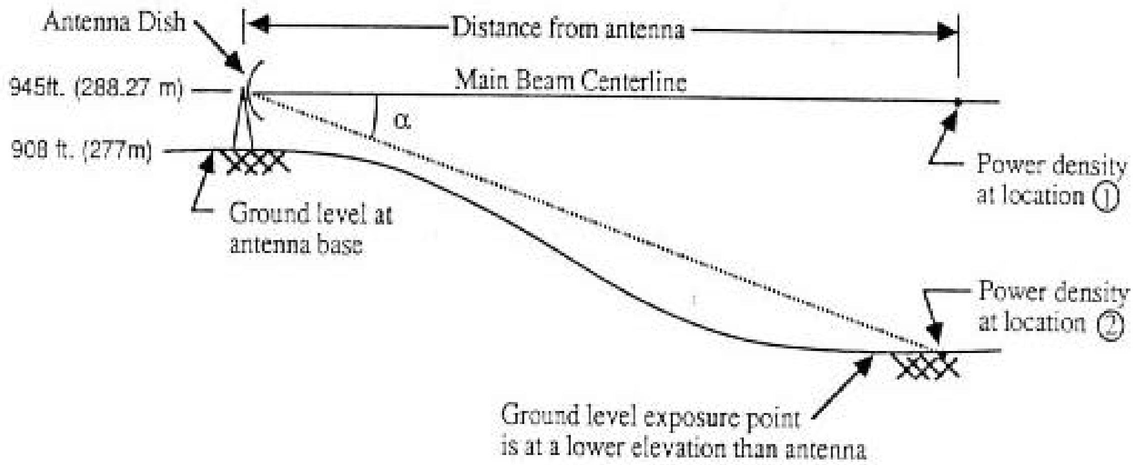
SOURCE: MICROWAVE ENGINEERS' HANDBOOK, VOL. II., T.S. SAAD, ED., HORIZON HOUSE, DEDHAM, MASSACHUSETTS, 1971.

NOTE: FIGURE NOMENCLATURE HAS BEEN CHANGED TO CORRESPOND WITH THE APPENDIX TEXT.

PACBAR III
ENVIRONMENTAL ASSESSMENT -- APPENDIX E

NEAR FIELD DIRECTIVITY REDUCTION OF TAPERED CIRCULAR APERTURE

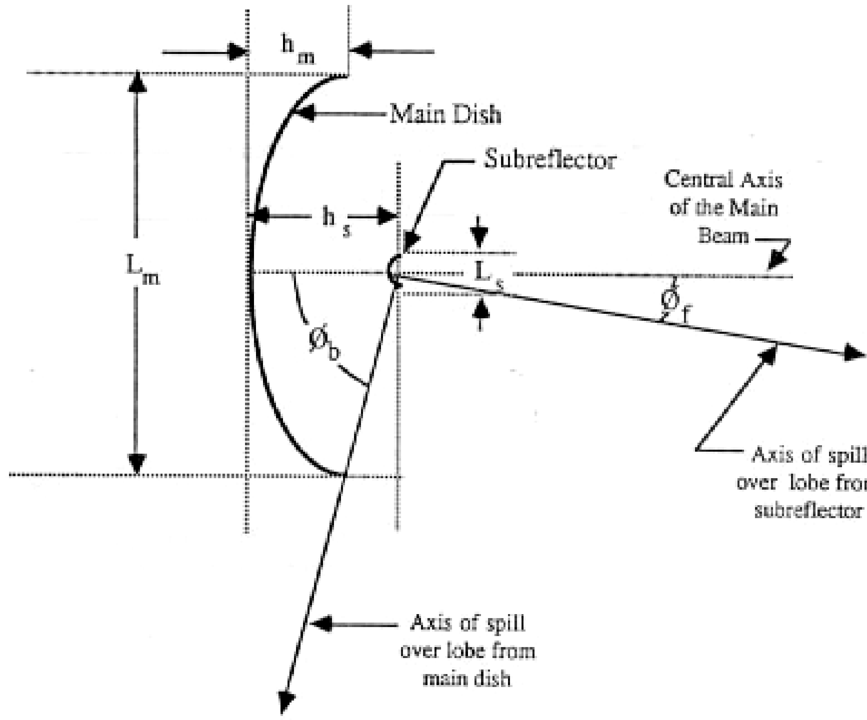
FIGURE E.2



PACBAR III
ENVIRONMENTAL ASSESSMENT – APPENDIX E

SECTION VIEW OF BEAM
POWER DENSITIES
AT LOCATIONS OFF THE
MAIN BEAM CENTERLINE

FIGURE E.3



LEGEND

h_m Main Dish Depth $6 \pm 1.5'$

h_s Height of Subreflector Mast $7 \pm 1'$

L_m Antenna Diameter 30'

L_s Subreflector Diameter $2.8 \pm 4'$

$\emptyset_b$ Angle of backward-directed spill over lobe from main dish

$\emptyset_f$ Angle of forward-directed spill over lobe from subreflector

$$\emptyset_b = \cos^{-1}\left(\frac{h_s - h_m}{1/2\,L_m}\right) = 76^\circ - 96^\circ$$

$$\emptyset_f = \tan^{-1}\left(\frac{1/2\,L_s}{h_s}\right) = 16.7^\circ - 28.1^\circ$$

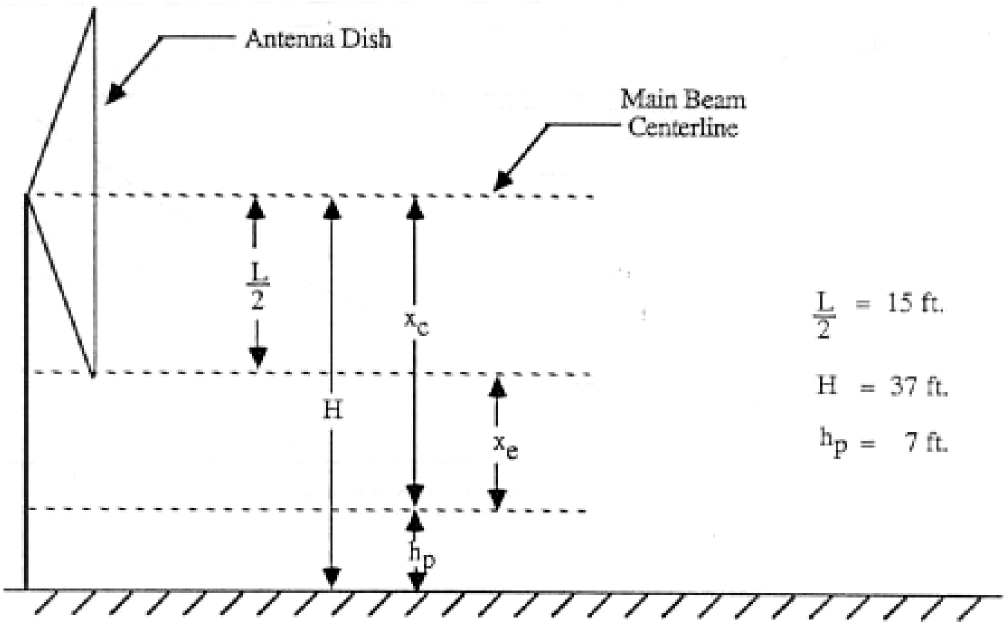
NOTE: L_m, h_s, and h_m are scaled from photographs of the antenna.

NO SCALE

PACBAR III
ENVIRONMENTAL ASSESSMENT -- APPENDIX E

ANTENNA DISH CONFIGURATION INCLUDING APPROXIMATE SPILL OVER LOBE LOCATIONS

FIGURE E.4



LEGEND

H = Antenna centerline height above ground

h_p = Personnel access height per AFOSH 127-1

L = Antenna diameter

x_c = Radial distance from centerline

x_e = Radial distance from edge of dish

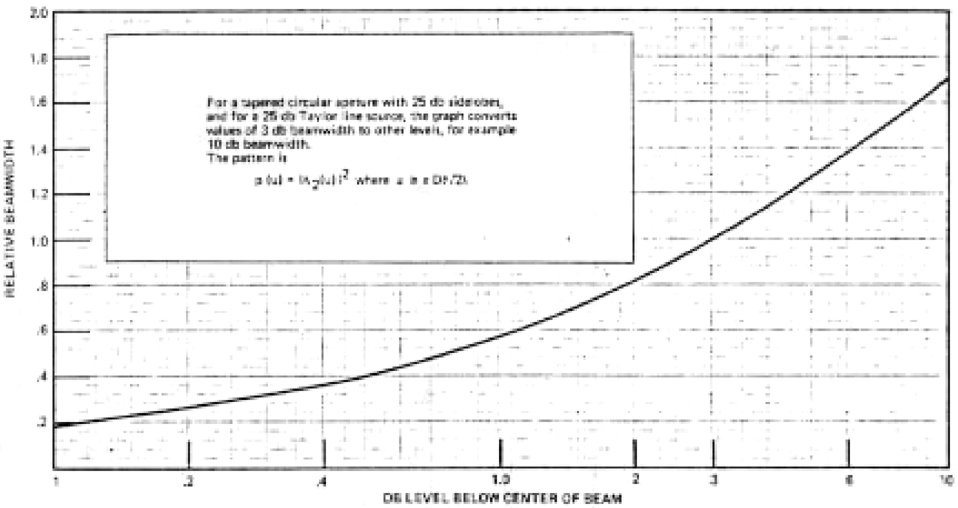
NO SCALE

PACBAR III
ENVIRONMENTAL ASSESSMENT -- APPENDIX E

ANTENNA DISH DIMENSIONS WITH RESPECT TO PERSONNEL ACCESS HEIGHT

FIGURE E.5

Beamwidth Conversion



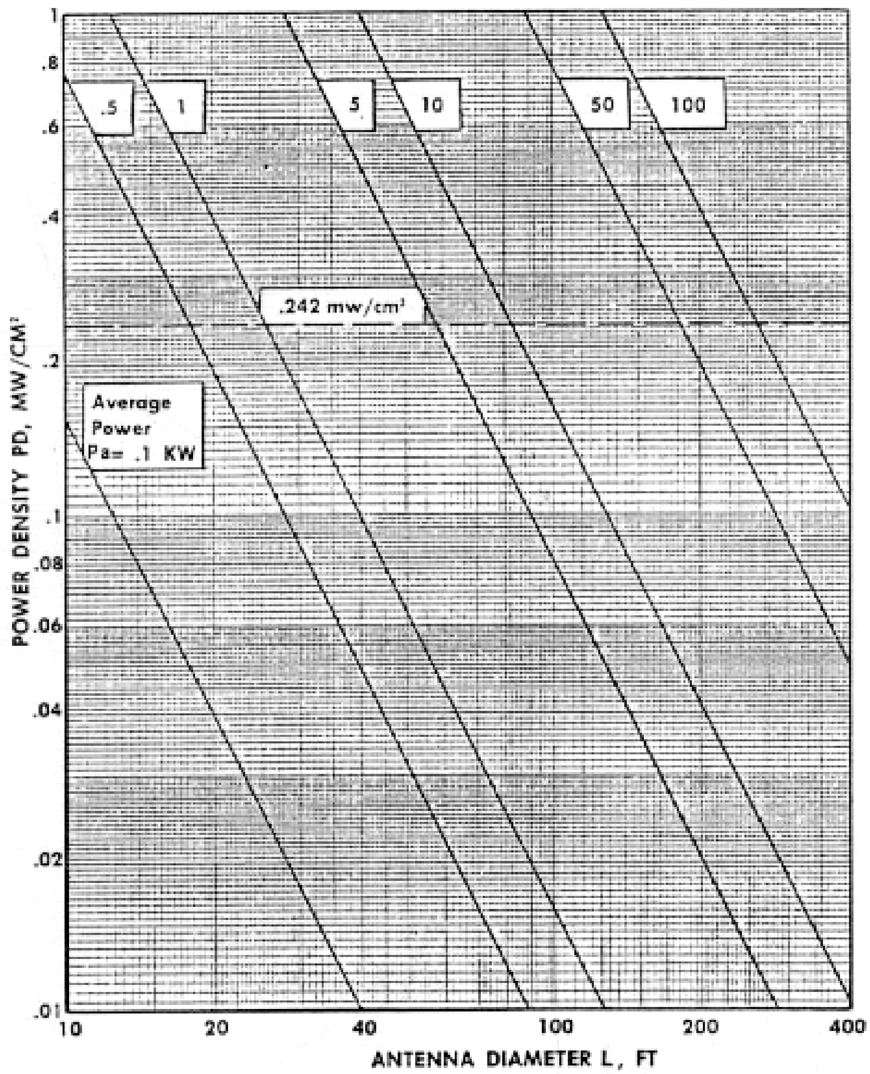
Courtesy of George Stern, James Eickmann, Hughes Aircraft Co., Culver City, Cal.

SOURCE: MICROWAVE ENGINEERS' HANDBOOK, VOL. II, T.S. SAAD, ED., HORIZON HOUSE, DEDHAM MASSACUSETTS, 1971.

PACBAR III
ENVIRONMENTAL ASSESSMENT – APPENDIX E

BEAMWIDTH CONVERSION

FIGURE E.6



Courtesy of R. C. Hansen

NOTE: The accepted safe level of 10 mw/cm² is reached in the near field if the level at $2L^2/\lambda$ is 0.242 mw/cm²

$$PD = \frac{3\pi Pa}{64 L^2} = \frac{158.4\ P_{KW}}{L^2\ ft} \quad mw/cm^2 \text{ (tapered illumination)}$$

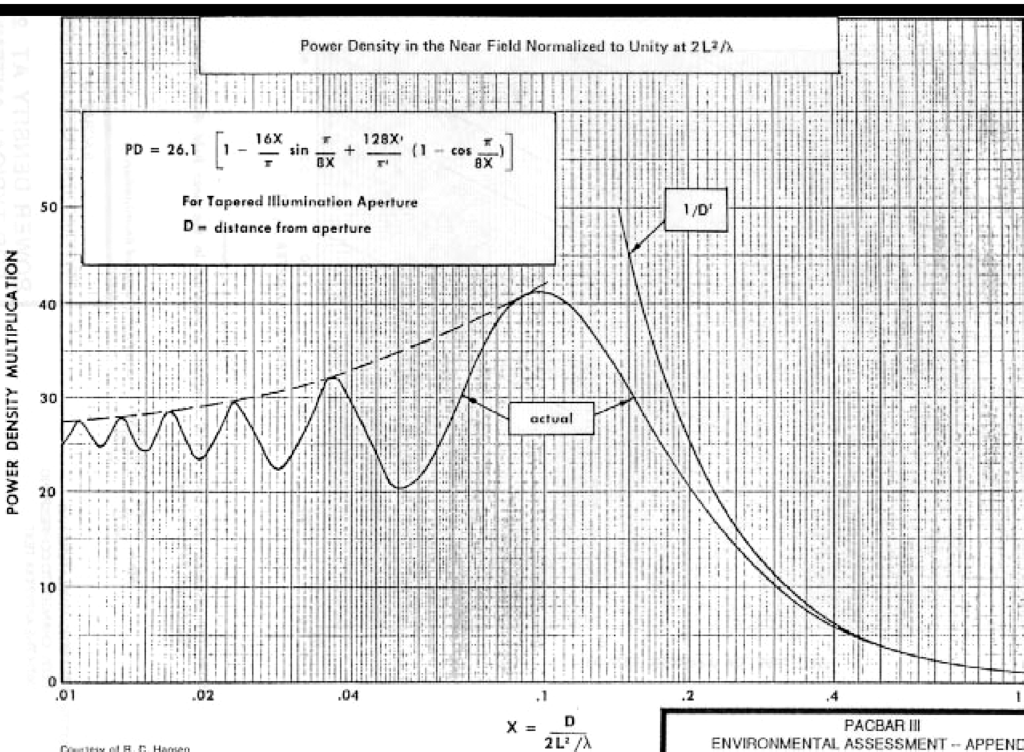
NOTE: FIGURE NOMENCLATURE HAS BEEN CHANGED TO CORRESPOND WITH THE APPENDIX TEXT.

SOURCE: MICROWAVE ENGINEERS' HANDBOOK, VOL. II, T.S. SAAD, ED., HORIZON HOUSE, DEDHAM MASSACUSETTS, 1971.

PACBAR III
ENVIRONMENTAL ASSESSMENT – APPENDIX E

POWER DENSITY AT $2L^2/\lambda$ FOR TYPICAL ANTENNA

FIGURE E.7



Courtesy of R. C. Hansen

SOURCE: MICROWAVE ENGINEERS' HANDBOOK, VOL. II., T.A. SAAD, ED., HORIZON HOUSE, DEDHAM, MASSACHUSETTS, 1971.

NOTE: FIGURE NOMENCLATURE HAS BEEN CHANGED TO CORRESPOND WITH THE APPENDIX TEXT.

PACBAR III
ENVIRONMENTAL ASSESSMENT -- APPENDIX E

POWER DENSITY IN THE NEAR FIELD NORMALIZED TO UNITY AT $2L^2/\lambda$

FIGURE E.8

APPENDIX F

Contacted Persons, Agencies and Organizations

APPENDIX F
CONTACTED PERSONS, AGENCIES AND ORGANIZATIONS

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Stan Sugai

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300 Ala Moana Blvd., Room 6110, Honolulu, Hawaii 96850

Salwyn S. W. Chinn

U.S. Department of Agriculture
Soil Conservation Service
UOG Station
Mangilao, Guam 96923

Fred J. Young, Soil Scientist
Saku Nakamura
Joan B. Perry

<u>ORGANIZATIONS</u>

Marianas Audubon Society
P.O. Box 4425, Agana, Guam 96910
Paul J. Corny, President
Gretchen R. Grimm, Vice President
Michael Neubauer, Correspondence Secretary
Georgeanne Neubauer, Recording Secretary

Far East Broadcasting Co. Inc. (KFBS), Saipan

Norman Blake, Field Director
Bob Springer

NASA Tracking Station, Bendix Field Engineering Corporation
Dandun, Guam 96916
John P. Obloy, Senior Manager

San Diego, Sea World
Paula Klier

Smith Young and Hida, Inc.
667 Ala Moana Blvd., Suite 1000, Honolulu, Hawaii 96813
James Young

Mobile Oil Company
P.O. Box 367, Saipan, CA 96950

Emil DeBrum, Manager of Saipan Bulk Plant

APPENDIX G

Follow-on Biological Study

June 1986

APPENDIX G

FOLLOW-ON BIOLOGICAL STUDY

June 1986

1.0 INTRODUCTION

1. This report has been prepared as a follow-on biological study for the Micronesian Megapode to supplement megapode information written in the “Final Environmental Assessment (EA): Construction and Operation of the PACBAR III Radar Station, Saipan, CNMI” (March 1986).

2. Following issuance of that original EA document in March 1986, three significant activities have occurred:

   - Comments were received from three local agencies, one private organization (Hotel Nikko) in Saipan and from the Mariannas Audubon
   - Society located in Guam.

   - A public hearing for the project was held on April 24, 1986.

   - The Boresight Tower and its Access Road have been eliminated from the project.

3. A major portion of this follow-on study was to undertake an additional opportunity to determine the presence of the megapode in the project area. Therefore, the field portion of the study was conducted in April 1986 to investigate the site at a time of the year when megapodes would be more active than in October or November, and to meet with local experts to obtain additional information on the species.

4. Where revisions are appropriate for the inclusion directly in the EA, they Have been incorporated in the EA, which is now referred to as the “Draft Environmental Assessment, Revised PACBAR III Radar Station.”

2.0 BACKGROUND

1. The presence of an endangered bird species, the Micronesian megapode (Megapodius laperouse, laperouse) in the project area was stated in the original EA. This determination was based on the results of previous surveys done by the U.S. Fish and Wildlife Service in 1982, which located the megapode in two areas alongside project access roads. Additional surveys done by CNMI-DNR Division of Fish and Wildlife in 1984 located the species in the Marpi area of northern Saipan, in close proximity to the project area.

2. In October and November 1985, site visits were conducted over a period of 3 days to determine the likelihood of presence of the megapode. The taped call of the megapode was played during one of these site visits. Although no megapode mound nests were observed and no megapode responses were received from limited attempts in November 1985, considerable amounts of potentially suitable habitat were observed in the vicinity of the project area. Potentially suitable habitat is shown on Figure 1.13.

3. It was thought that failure to locate the megapode in November 1985 might have been due to the limited nature of the site visits and the diminished frequency of megapode sightings at that time of the year.

3.0 LITERATURE REVIEW

1. Since the first site visit in October/November, 1985, there appears to be only limited new information regarding sightings of the megapode in the project area. A “Christmas Bird Count” conducted on December 27, 1985 by the Marianas Audubon Society identified 3 megapodes at the Last Command Post/Suicide Cliff area located 3.3 miles northeast of San Roque (MA 1986). This new information is consistent with initial information reported by the CNMI-DNR Division of Fish and Wildlife in 1984. The project area is located a few miles south of these sightings, therefore, is not expected to impact those megapodes. The U.S. Fish and Wildlife Service (Honolulu) and the CNMI-DNE Division do not have additional data on megapodes in the project area, although the species is carefully watched on Saipan.

4.0 APRIL 1986 SITE VISITS

1. Site visit was conducted over a period of three days (April 21, 22and 23, 1986). The taped call of the megapode was played on the tape player used by previously by the CNMI-DNR Division of Fish and Wildlife for the same purpose. This was performed on two of these days at selected locations in the project area. These areas were selected based on history of previous megapode recordings and physical suitability as megapode habitat. The 30 second taped megapode call was played a minimum of 3 times at stations within each location. Areas inspected include potential habitat alongside the Access Road, including locations 1 and 2 on Figure 1.13, and the limestone forest area north of the Radar Site. Audible responses from the megapode were not received during these attempts.

2. On April 24, 1986, Phil Glass of the CNMI-DNR Division of Fish and Wildlife, Barbara Schmitt and Paul Conry of the Marianas Audubon Society conducted a separate site visit and played the taped megapode call at various locations on the project area. Responses from the megapode were received at three different locations (Conry 1986b): (1) at both of the previous (1982) survey locations along the project access roads (Locations 1 and 2 of Figure 1.13), and (2) in the limestone forest area north of the Radar Site.

5.0 CONCLUSIONS

1. While it is often difficult to elicit a response from the megapode, the April 24, 1986 data indicate that the species is present within the Marpi Commonwealth Forest in the proposed project area.

2. The presence of the endangered megapode in the Marpi Commonwealth Forest is important in that this area has been “set aside” for conversation and enhancement of natural resources (Palacios 1986). Such areas often provide sanctuaries for wildlife (Palacios 1986). Introduction of any project development in previously undisturbed portions of such a “set aside” area would likely result in short-term, long-term and cumulative impacts to this conversation area.

3. The megapode is a territorial bird (Palacios 1986) which is thought to have a relatively small home range (Engbring, Ramsey and Wildman 1984). It depends on specific habitat requirements such as particular food- producing plant or nesting material (Palacios 1986). When its habitat is removed, it must compete with other individuals or other species for new habitat (Palacios 1986). Elimination of a small portion of its habitat can lead to stress or possibly loss of individuals dependent on this specific habitat. This characteristic was the primary factor for the Air Force's decision to eliminate the Boresight Tower and its Access Road. Those facilities were the major portions of the project which would have caused an area of long-term disruption in a portion of forest, which otherwise does not have frequent human entry. The remaining portions of the project will primarily be limited to areas adjacent to an existing road and on grassland. As a result, the potential for loss of megapode habitat has been greatly reduced. However, road construction activities have the potential to cause impact, especially in the vicinity of locations 1 and 2 on Figure 1.13.

4. For example, the megapode population in this part of the Marpri Commonwealth Forest would have been susceptible to much greater potential for loss of feeding habitat and reduction of food sources if the Boresight Tower had been constructed. Foraging activities, away from the existing road disturbance, would have been disrupted during the initial construction period (excavation and clearing), and it is also possible that courtship, mating and nesting activities could have been impacted should construction occur between the months of January and June. This potential still exists, but to a much smaller degree.

5. It is expected that construction and operation of the revised PACBAR III Radar Station at this site will not result in significant adverse effects on the existing limited population of megapodes, as long as mitigation measures to minimize or avoid such impacts are implemented during the construction phase of the project.

APPENDIX H

Section 7 Consultation
U.S. Fish and Wildlife Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE

300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:

SEP 9 1986

Mr. John E. Maddox
Deputy Director of Acquisition
Civil Engineering
Headquarters Space Division
Los Angeles Air Force Station
P.O. Box 92960
Los Angeles, California 90009-2960

Dear Mr. Maddox:

This responds to your July 28, 1986 request for consultation under section 7 of the Endangered Species Act of 1973, 16 U.S.C. 1531, et seq. (Act). Your letter iniating consultation was received here on August 2, 1986. At issue are the possible effects of your authorization and funding of the construction and operation of the PACBAR III (Pacific Barrier III) Radar Station (Saipan, Commonwealth of the Northern Mariana Islands) and related structures on three Federally listed endangered species. These species are:

Micronesian megapode	(Megapdius laperouse)
Vanikoro swiftleft	(Aerodramus vanikorensis bartschi)
Nightingale reed warbler	(Acrocephalus luscinia)

A map of the site appears at the end of this letter (Figure 1).

This letter represents the Biological Opinion of the U.S. Fish and Wildlife Service (Service) as directed by Section 7 of the Act, "Interagency Cooperation Regulations" (50 CFR 402, 43 FR 870) on your proposed action. Our reference number for this consultation is 1-2-86-F-091.

On September 4, 1986, we completed our review of the information provided by you along with other related information in our files. We also contacted some of that familiar with the biology, management, and recovery of the species involved. Copies of [pertinent materials and documentation are contained in an administrative record maintained in this Service's office in Honolulu, Hawaii.

BIOLOGICAL OPINION

It is our biological opinion that your authorizing and funding the construction and operation of the facilities and structures associated with the construction and operation of the PACBAR III Radar Station, Saipan is not likely to jeopardize the continued existence of any of the three referenced listed species. Because there is no designated critical habitat within or near the project area, no destruction or adverse modification of critical habitat will occur.

BACKGROUND INFORMATION AND DESCRIPTION OF THE PROPOSED ACTION

As is stated in your July 1986 document entitled “Environmental Impact Analysis Process” (Draft EA), you proposed to construct and operate a radar station and approximately two miles of access road on Mt. Petosukara, Saipan, Commonwealth of the Northern Mariana Islands (CNMI). The radar facility will be used for three missions: (1) space surveillance for acquisition of new foreign space launches; (2) cataloging resident space objects as tasked by United States Space Command; and (3) recording splashdown locations of test launches.

The facility is proposed to be located on Mt. Petosukara, a low peak on Saipan, and is to be composed of:

-An accesses roadway, which primarily consist s of an existing roadway. About 1,500 feet of the roadway would be new construction.

- A 420- by 380- foot Radar Site facility.

- Related service facilities, including:

  - Onsite diesel generators for electric power
  - A microwave link telecommunications service
  - An onsite rainwater collection system for nonpotable water
  - An onsite septic tank and leach field sewage system
  - A flammable materials storage building
  - Onsite fire fighting capability

Construction is planned to begin in early 1987 and continue for about one year. The facilitates should be operational by mid 1989. The total estimated cost of the construction is approximately five million dollars.

The facility and its specifications are discussed in detail in the Draft EA.

The majority of the access road currently exists and will be improved. One portion will be paved. Approximately 0.3 miles of the access road will be newly constucted. The Radar Site and most of the access road are located in the Marpi Commonwealth Forest, which will be leased by the Air Force from the Marianas Public Land Corporation.

SPECIES ACCOUNTS

Micronesian Megapode:

Two subspecies of this bird are found in Micronesia, *M. l. laperouse* in the Mariana Archipelago, and *M. L. Senex* in Palau. In the Marianas, the megapode was once apparently resident on all the major Islands, but is now extinct on Guam, Rota, and Tinian. It has been recorded on nine of the ten commonwealth islands north of Saipan; it is unknown whether it occurs on the tenth island, Farallon de Medinilla, for which information is lacking.

The megapode is a dark, brownish black, terrestrial bird about the size of a small chicken. It forages on the ground, scratching through leaf litter with its large feet and picking out seeds, vegetable matter, insects, and even crabs. The species is remarkable for its nesting behavior. The nest is built by scratching soil, leaves, and other organic matter into a mound in which the eggs are laid. Heat for incubation is supplied by the sun and the decaying organic matter. Upon hatching, the young chick digs its way out and fends for itself. The megapode has suffered because of human depredation, primarily on the eggs, which are dug from nests, but also from the taking of adults.

A small population remains on Saipan, and a 1982 survey estimated an island-wide total population of 40 individuals. For the survey, the island of Saipan was divided into 6 regions (see Figure 2); megapodes were reported from only one of those, the "Suicide" region, which includes Mt. Petosukara. The eight megapodes recorded from this area constitute the total number of the birds seen or heard island-wide during this survey.

Nightingale reed warbler:

This species, also known, as the reed will willow warbler, was listed as endangered in the *Federal Register* of June 2, 1970. Three subspecies of this genus are found in the Marianas: one Guam, Saipan, and Alamagan; one in Pagan; and the third on Agiguan. None of the subspecies is found on Rota or Tinian. Other subspecies are found on Truk, Pohnpei, Kosrae and Nauru.

The Guam population disappeared in the late 1960's and the Agiguan population is very small. No reed warblers have been reported from Alamagan or Pagan for many years, and the status of these populations is questionable. On Saipian, however, the bird can be found in a variety of forest types. It prefers dense vegetation around wetlands or other semi-open areas, but can be found in second growth forest as well. It feeds on insects, lizards, snails, and spiders. A 1982 survey of Sapian estimated the warblers' population to be more than 4,800 individuals. The population in the Suicide region was estimated at 284.

Vanikoro swiftlet

This subspecies (A. v. bartschi) is endemic to the Mariana Islands, where it is found on Guam, Rota, Agiguan, Titian, and Saipan. No specimens have been taken from Agiguan to verify subspecific status. The species is found in Palau, the Philippines, and New Guinea. In the 1960's, a few birds were introduced to Oahu, Hawaii, where a small colony has become established.

The swiftlet nests and roost in caves and is airborne much of the day. It forages on small insects taken in flight. The nest, placed on ceilings or walls of caves, is constructed primarily of moss cemented together with saliva. Nesting is believed to be from January through July, but complete information is lacking. The birds forage in a variety of habitats but prefer small openings where they repeatedly fly a circuit several meters above the ground.

The swiftlet was formerly common to abundant throughout its range. On Saipan, it was abundant just after World War II, and has continued to reside in fair numbers on Guam and Rota; the swiflet's populations in the Marianas were listed as endangered in 1984. The 1982 survey of forest birds on Saipan estimated a total island population of 9,120; no swiftlets was recorded from the Suicide region. However, the Draft EA states that the species frequent part of the proposed project area; sightings of the bird near the PACBAR III site were noted in the area in October 1985 and April 1986.

EFFECTS OF THE PROPOSED ACTION AND ANALYSIS OF IMPACTS

Neither the swiftlet nor the reed warbler would be expected to be affected to any significant degree by the proposed construction and operation of the PACBAR project. Although both may be found in the vicinity of the project site, only minor alteration of either of the bird's habitats is anticipated to occur, and no significant decrease in their food supply or other factors influencing their chances for survival and recovery would be expected.

Possible impacts to the Micronesian megapode may be considerably more significant. With an island-wide population estimated at only 40 individuals, almost any impact has the potential to affect the chances of this species' recovery on Saipan.

Under the section of the Draft EA titled Unavoidable Adverse Effects and Mitigation Measures, it lists several such effects and measures. This includes, but is not limited to:

Adverse Effects:

- Removal of about 7 acres of vegetation in the areas designated for the Radar Site and Access Roadway cannot be avoided. About 60% of these acres will be existing grassland. The remainder will consist of tangantanagan tree removals where an existing road will be widened.

- It is expected that the project will result in loss of between 0.1 and 3 acres of tangantangan forest type of endangered species habitat. This acreage represents less than 0.3% of the Marpri Commonwealth Forest Area, much of which consist of similar potential habitat because of the ability for the tangantangan forest to grow relatively rapidly in this area.

- Development of improved access roads in the project area is expected to cause the impact of additional vehicles and people in this part of the Marpri Commonwealth Forest. Improved access could be used by hunters, poachers ad others. However, existence of personnel at the radar facility would possibly aid in reducing significantly reduce present illegal activities.

Mitigation Measures

- No disturbance is planned to the limestone forest. Further, the construction contractor will be required to contact the Commonwealth Forester to allow for site inspection during any forest clearing operations.

- In forest areas, an absolute minimum amount of vegetation will be cleared.

- Vegetation along cliff bases will not be removed.

- If an damage should occur to project areas not approved for construction clearing and grubbing, the contractor will be responsible for replanting these areas with Naria or Pterocarpus indicus to restore any damaged vegetation.

- Construction contractors will be required to insure that any equipment or supplies delivered to Saipan are free of any introduced organisms such as brown tree snakes. The contractor will provide a plan stating all methods used to accomplish this task including but not limited to quarantine activities and posting signs.

- Contractor work limits and procedures will be specified to avoid disturbance to habitat of the Micronesian megapode and other species of wildlife.

- Establishment of a habitat enhancement area is being negotiated between the Air Force as the Commonwealth's Division of Fish and Wildlife which will be located away from the project site and provide replacement habitat for displaced wildlife. This area may be accomplished by planting fruit trees in a Division approved area away from the project site.

The precautions mandated by these mitigation’s and requirements should appreciable decrease the chances for direct adverse impacts to the megapode. No megapode mortality is anticipated, but the issue of habitat destruction remains.

Although predation has been cited as a major cause of the endangered status of the megapode, it is clear that the destruction of its habitat has contributed to its condition. This is true of many endangered species, but it is especially clear in island species where the loss of habitat can so easily be documented and quantified. The 1982 forest bird surveys on Saipan showed that the megapodes were found only in the northern portions of the island, and, in agreement with other observations on the species’ distribution, were located along cliff areas, with lesser numbers found on the relatively level areas away from cliff bases. The birds were not uncommonly heard near an existing active roadway at the Suicide Cliffs Memorial, a much frequented tourist attraction; the proximity of people and human activities of this type does not appear to be a detriment. As such, the improvement of the existing roadway and its extension would not be expected to significantly impact megapodes.

Intrusion into the forests off these roads, however, may be detrimental. There is little such intrusion at the memorial. The Draft EA proposes the construction of a scenic viewpoint and a trailhead, aiding public access and encouraging forest use. While such activities may not detrimental to the megapode, the are clearly not needed to fulfill PACBAR III missions and should be held in abeyance pending a more thorough impact analysis.

Because of the small percentage of habitat in the Marpr Commonwealth Forest which would be lost as a result of the construction and operation of the PACBAR III radar compound, the improvement of the existing roadway, and the creation of additional access road as described in the Draft EA of July 1986, it is our determination that those activities will not be likely to jeopardize the continued existence of the Micronesian megapode. This determination is made with the recognition that there are currently no other projects, which threaten to further deplete the forest there, nor is it expected that the PACBAR III project would encourage other construction in the area.

CUMULATIVE EFFECTS

Cumulative effects are those impacts of future local government and private actions, which are reasonably certain to occur. Such an action is “reasonably certain” to occur if the action requires the approval of a local resource or land use control agency, and such agencies have essentially approved the action. Cumulative effects are not expected in the case of the construction and operation of the PACBAR III radar installation and access roads in Saipan since we know of no other local government or private action that should be considered in the evaluation of impacts on the Vanikoro swiftlet, nightingale reed warbler, or the Micronesian megapode.

INCIDENTAL TAKE

Section 9 of the Act prohibits any taking (harm, harassment, mortality, etc.) have listed species without specific exemption. Under the terms of Section 7(b)(4) and 7(0)(2), taking that is incidental to and not intended as part of the agency action (in this case your construction and operation of the PACBAR III radar facility and road improvements and extensions on Saipan) is not considered taking within the bounds of the Act provided that such taking is in compliance with this Incidental Take statement.

We do not expect any mortality of any of the three listed species subject to this consultation to occur as a result of this action as it is described in your letter and the Draft EA. However, some harassment in the form of noise, general vehicle and personnel activity, and other disturbances generated by the construction and operation of the facility and roadways may occur.

Both the Vanikoro swiftlet and the nightingale reed warbler are highly mobile, and would be expected to avoid such disturbance easily by flying elsewhere. However, the Micronesian megapode may be terrestrial and territorial, and harassment may occur if a megapode is in the area of the construction-related disturbances. If such incidental take by harassment is experienced, and if the take does not result in the physical injury or mortality of adult megapodes, authorization for such take is hereby given. However, if, either before, during, or after construction, it is discovered that a megapode nest may in any way affected by your activities so as to constitute “take” this Incidental Take Provision does not allow for such take. If a megapode nest is discovered, all project-related activities in the area of the nest are discovered, all project-related activities in the area of the nest shall cease pending re-initiation of this consultation. As suggested in your Draft EA, the potential for adverse impacts would be decreased if affected areas are surveyed by a qualified biologist immediately prior to any construction activities.

Response to this Service in the event of any mortality to any of the three (swiftlet, warbler, or megapode) resulting from the project should be directed to:

William R. Kramer
Deputy Project Leader
Office of Environmental Services
U.S Fish and Wildlife Services
P.O. Box 50167
Honolulu, Hawaii 96850

BIOLOGICAL OPINION

It is our biological opinion that your authorizing and funding the construction and operation of the facilities and structures associated with the construction and operation of the PACBAR III Radar Station, Saipan, is not likely to jeopardize the continued existence of any of the three referenced listed species.

Because there is no designated critical habitat within or near the project area, no destruction or adverse modification of critical habitat will occur.

CONSERVATION RECOMMENDATIONS

Section 402.02 (Definitions) of Section 7 of the Act states that discretionary measures which would serve to minimize or avoid adverse effects of a proposed action on listed species or critical habitat may be recommended. We believe the “Mitigation Measures” list provided in the Draft EA and reiterates (in part) previously in this letter provides many such recommendations. We would, however, advise that the following points be considered:

-That a qualified wildlife biologist be included in the roadway right-of-way survey team to insure that any megapode nests which may be in the vicinity of project activity be avoided.

- That both construction and PACBAR III facility operations personnel be advised of the critical nature of endangered species, the role of the Marpi Forest in the recovery of the three species of birds found there, and the possible impact of their actions on the welfare of the birds. Education, through such means as a poster at the entrance of the facility, for example, might warn of the danger of forest fires, and should state that harassment of any listed species (including their nests) may be in violation of, and punishable under, Federal and Commonwealth statutes. Such a poster could be developed with the assistance of the Commonwealth's Fish and Wildlife Division.

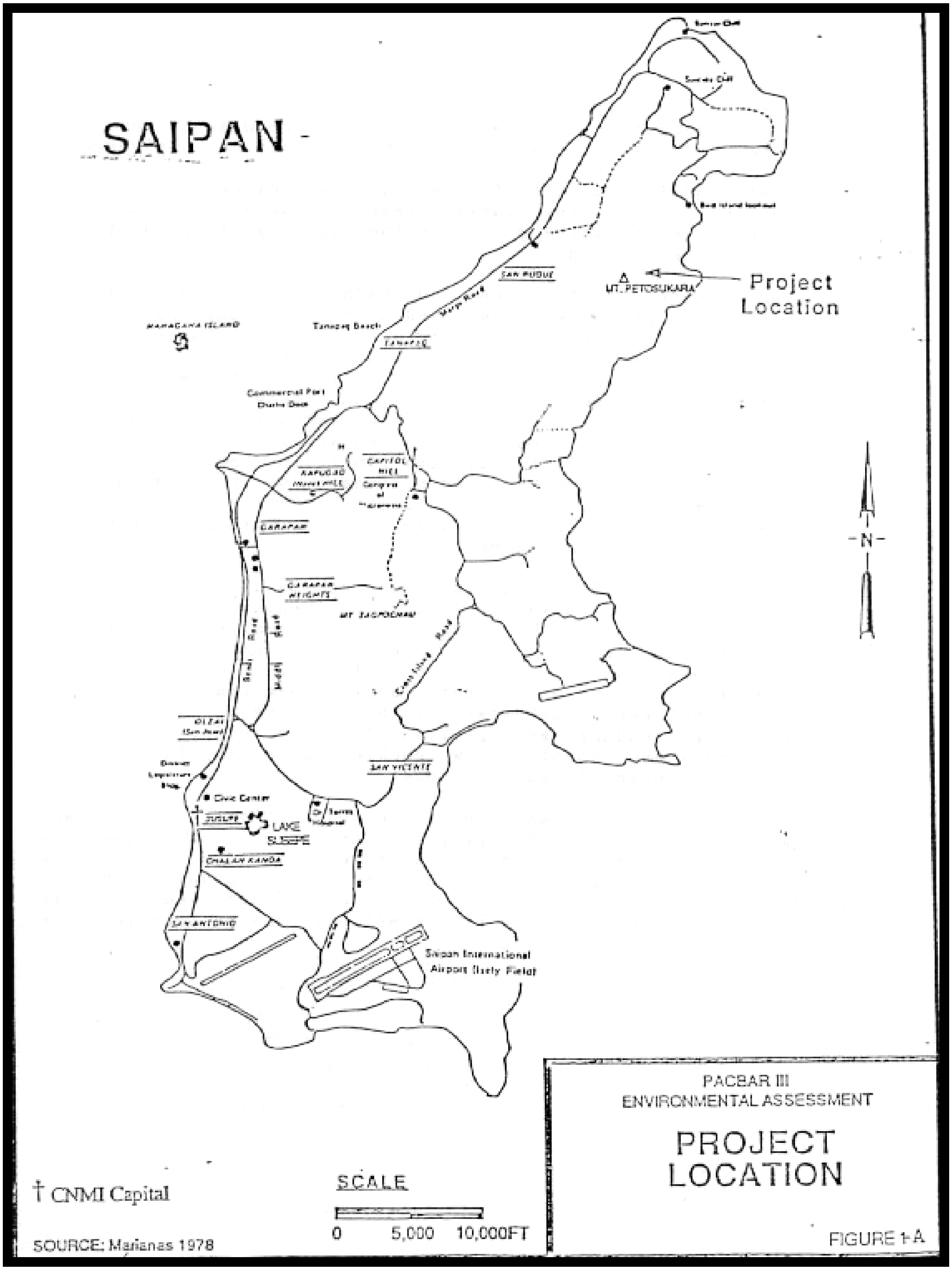
- That the possible creation of a habitat enhancement area, as suggested in the Mitigation Measures section of the Draft EA, be given careful analysis. The suggestion of planting fruit trees, for example, should be followed only if the fruit will provide endangered wildlife food and/ or habitat, and not encourage human use of the area. Likewise, a thorough analysis of the impact on endangered species of construction of a trailhead and scenic view parking area should be undertaken prior to such actions.

This concludes formal consultation on this action. Should any changes be made in the proposed action, should any new information become available regarding the species herein addressed which might be pertinent to this consultation, or should new species be listed which are not addressed in this letter which may be affected by the action, you must re-initiate consultation with this office.

Sincerely yours,

Ernest Kosaka
Project Leader
Office of Environmental Services

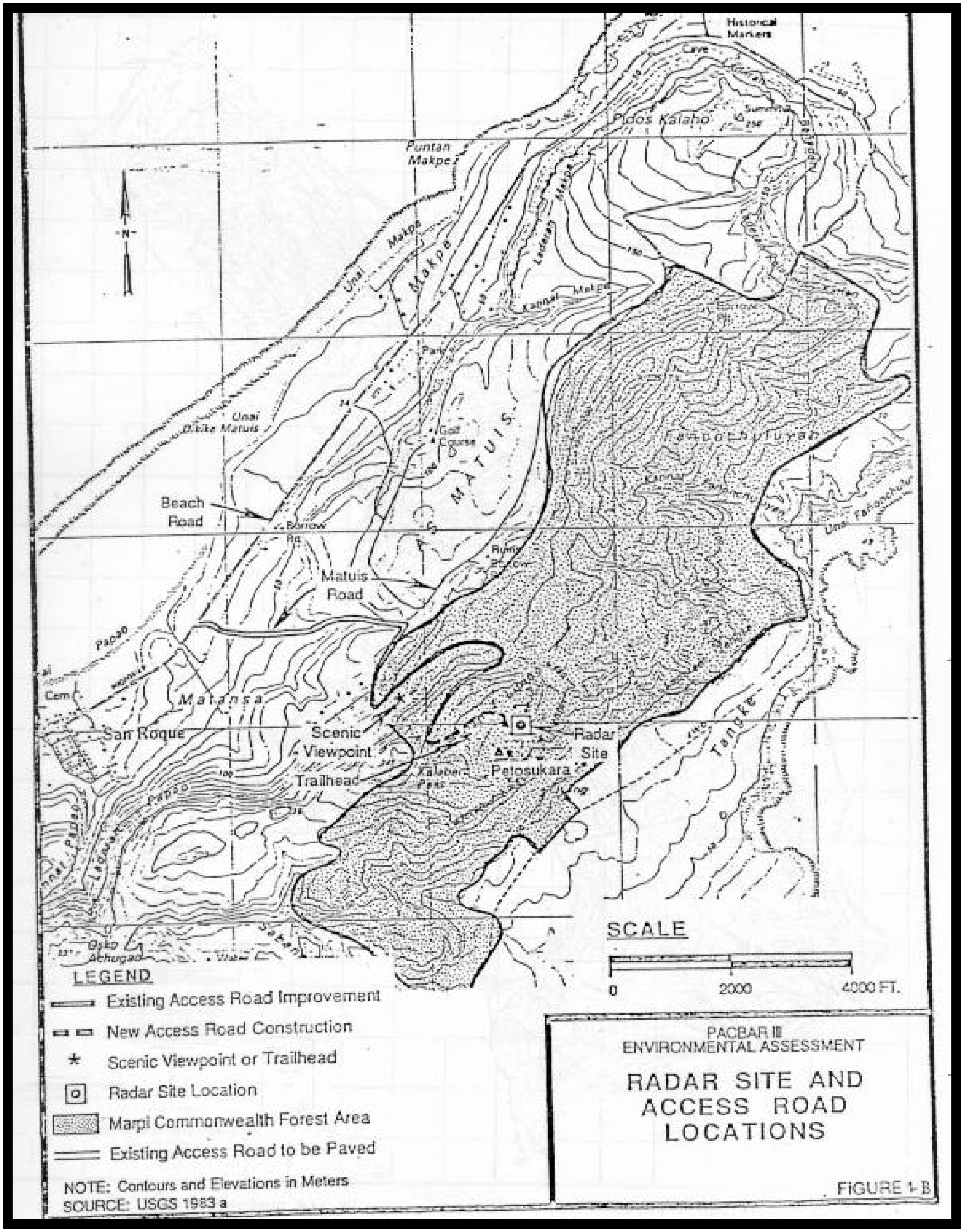
Cc: Chief, FWS, SE, Portland, OR (Attn: Swanson)



PACBAR III
ENVIRONMENTAL ASSESSMENT

PROJECT LOCATION

FIGURE 1-A



PACBAR III
ENVIRONMENTAL ASSESSMENT

RADAR SITE AND ACCESS ROAD LOCATIONS

FIGURE 1-B

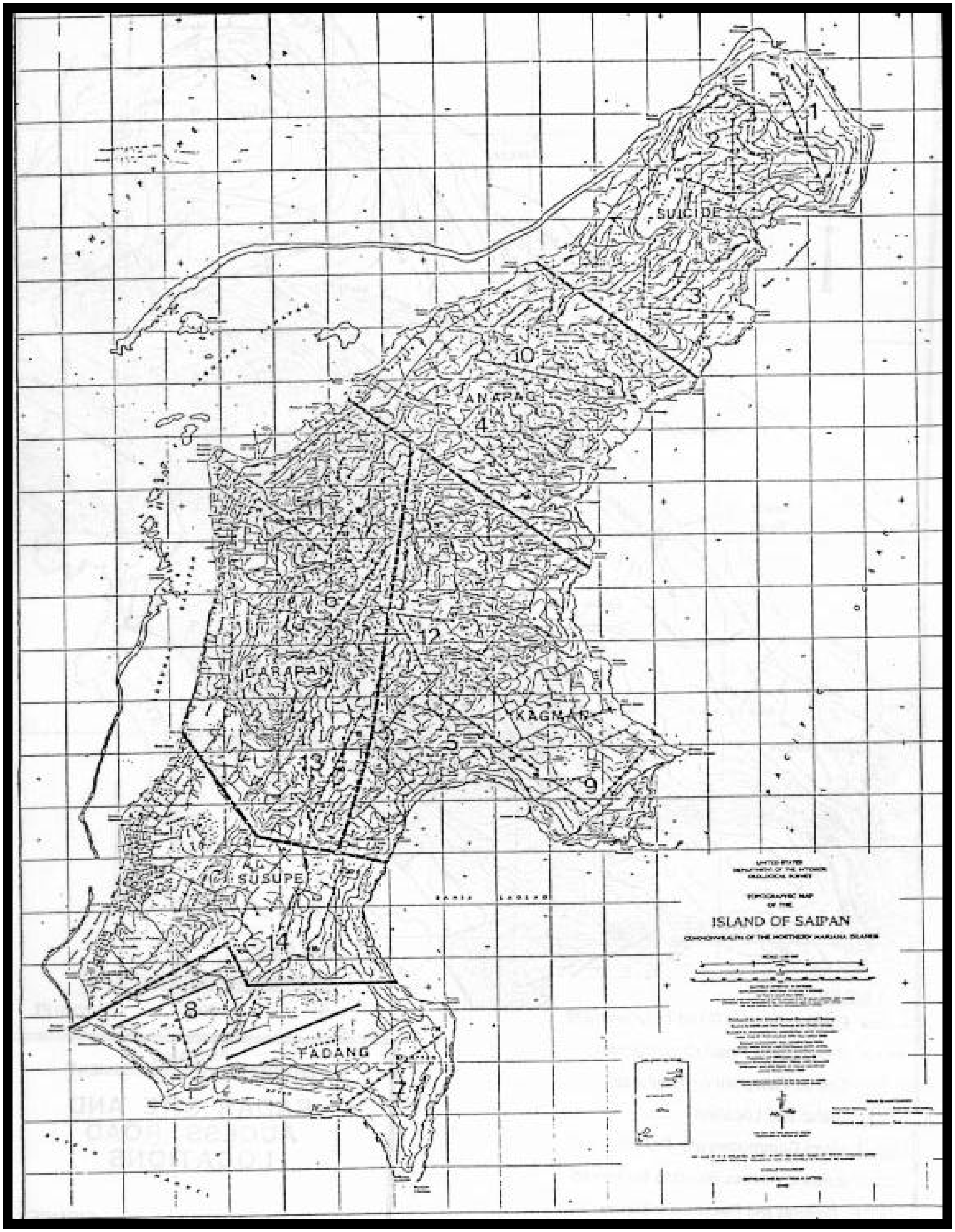


Figure 2. Saipan transects and regions. Transects are numbered 1-14. There are six different regions.

FROM MICRONESIAN FOREST BIRD SURVEY, FWSS 1982 FIGURE 2

APPENDIX I

Federal Consistency Determination
And
CRM Letter of Acceptance

Commonwealth of the Northern Mariana Islands
Coastal Resources Management
Office of the Governor
Saipan, Mariana Islands 96950

CABLE ADDRESS
GOV. NMI SAIPAN
TELS. [illegible]/7320

March 16, 1987

Mr. Raphael O. Roig
HQ Space Division
P.O. Box 92960
Worldway Postal Center
Los Angeles, CA 90009

Dear Mr. Roig:

The Commonwealth of the Northern Mariana Islands Coastal Resources Management Office has reviewed the federal consistency determination submitted by the United States Air Force on February 25, 1987 for construction of the PACBAR III radar project on Saipan. The Coastal Resources Management Office finds that the proposed activity complies with the CNMI CRM Program and will be conducted in a manner consistent with such program.

Over the long period of time since the Air Force first applied for a coastal permit from the office, we have been ale to meet with Air Force personnel several times and discuss the concerns of the CRM program as regards this project in the spirit of mutual cooperation. We are confident that any final concerns can be addressed in the conditions of a coastal permit.

Thank You for your time and efforts spent to prepare the consistency determination. This office hopes to have consistency guidelines formally published by year's end at which time we will forward you a copy for future reference. Should you have any further questions on this consistency determination, please feel free to contact me.

Sincerely,

Robert W. Rudolph

ROBERT W. RUDOLPH
Acting Administrator
Coastal Resources Management

Cc: Mr. John Edward
Mr. Marcus Kerner
OCRM

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE DIVISION (AFSC)
LOS ANGELES AIR FORCE STATION, PO BOX 92960, WORLDWAY POSTAL CENTER
LOS ANGELES, CA 90009

February 25, 1987

Mr. John Bay
Assistant Attorney General
Commonwealth of the Northern Mariana Islands
Coastal Resources Management
Office of the Governor Saipan, Mariana Islands 96950

RE: PACBAR III Federal Consistency Determination

Dear Mr. Bay

Submitted for your agency's approval is the Federal Consistency Determination regarding the USAF PACBAR III radar project on Saipan.

In accordance with 15 CFR Section 930.41, please inform me of your agency's agreement or disagreement with the Federal Consistency Determination at the earliest practicable time. This letter, and the attached Federal Consistency Determination, respond to your 18 Dec 86 request to Mr. John Edwards that the USAF Space Division Environmental Planning Division submit a Federal Consistency Determination for approval. Please call me at (213) 643-2484 should you have questions during your review.

Sincerely

Marcus M. Kerner

MARCUS M. KERNER, Captain, USAF
Assistant Staff Judge Advocate
Chief, Environmental Law

atch
Federal Consistency Determination

FEDERAL CONSISTENCY DETERMINATION

U.S AIR FORCE
PACBAR III RADAR FACILITY

Saipan, CNMI

Mt. Petosukara Site

FEBRUARY 24, 1987

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FEDERAL CONSISTENCY DETERMINATION

1.0 INTRODUCTION

1.1 CONSISTENCY DETERMINATION

In accordance with the Federal Coastal Management Act of 1972, as amended, and the National Oceanic Atmospheric Administration implementing regulations contained within CFR Part 930, the USAF finds that the proposed action is consistent to the maximum extent practicable with the Commonwealth of the Northern Mariana Islands Coastal Resources Management Program, as amended, and approved by the National Oceanic Atmospheric Administration. Consistency is based on the program in place and approved by the National Oceanic Atmospheric Administration, on or before January 1987.

1.2 PURPOSE OF THE REPORT

1. A Federal Consistency Determination for Federal activities is required in accordance with the Federal Coastal Zone management Act of 1972, as amended, Section 307(C)(1), and with the National Oceanic and Atmospheric Administration (NOAA) Regulations (15 Code of Federal Regulations [CFR] Part 930). All Federal agencies are required to ensure that their activities are consistent to the maximum extent practicable with the NOAA-approved State coastal management plan for actions that may have direct effects on the coastal zone. The CNMI's Coastal Zone Management Program, as amended through January 1987, and the establishment of the CNMI Coastal Zone, has been approved by NOAA.

2. The purpose of this document is to determine the consistency of the USAF activity, known as PACBAR III, with the CNMI's Coastal Zone Management Program, as amended.

1.3 SCOPE OF THE REPORT

1.3.1 Scope of the Project

1. The Project is within a Coastal State as defined by 16 USC Section 1453(4).

2. The Island of Saipan is considered a Coastal Zone under the Coastal Zone Management Act, Chapter 33, Section 1453.

1.3.2 Scope of the regulations Addressed

1. The CNMI Rules and Regulations of the Office of Coastal Resources Management (CRM) incorporate the requirements of the Coastal Zone Management Act of 1972 and 15 CFR Part 930, NOAA, Federal Consistency with Approved Management Programs.

1.4 ORGANIZATION OF THE REPORT

1. The contents of this FCD have been prepared in compliance with the requirements of: (1) 15 CFR Section 930.39 Content of a Consistency Determination, and (2) Coastal Resources Management Rules and Regulations, Section 21C, Federal Activities and Development Projects. CRM Regulation Section 21c (iii) states: "Consistency Determinations must include:

   (a) A detailed description of the proposed project;
   (b) The project has associated facilities;
   (c) The combined, cumulative coastal effect of the project; and
   (d) Data and information sufficient to support the Federal agency's conclusion".

2. In compliance with these requirements, this FCD contains the requisite information and is organized as follows:

   1.0 Introduction, Consistency Determination
   2.0 Detailed Description of the Proposed Project
   3.0 The Project's Associated Facilities
   4.0 The Combined, Cumulative Coastal Effect of the Project
   5.0 Data and Information Sufficient to Support the Federal Agency's Conclusion
   6.0 References
   Appendix A: Section 7 Consultation
   Appendix B: Mitigation Agreement

2.0 DETAILED DESCRIPTION OF THE PROPOSED PROJECT

2.1 PURPOSE

1. The U.S. Air Force proposes to construct and operate a radar station on Saipan to support missions, which cannot be satisfied, using existing DOD resources. The project is known as PACBAR III, an acronym for Pacific Barrier III, and an acronym for Pacific Barrier III.

2. PACBAR III provide coverage for a blind area between two other DOD radar stations: PACBAR I (ALTAIR) at Kwajalein, in the Marshall Islands, southeast of the Northern Mariana Islands; and PACBAR II (GPS-10) located in the Philippine Islands, west of the Northern Mariana Islands, as shown on Figure 1. The inability to provide space surveillance coverage between PACBAR II and I result in the loss of critical data on newly launched orbital vehicles (U.S. AIR FORCE 1985).

2.2 OVERVIEW

1. The proposed facility will be located on Mt. Petosukara, a low peak located on Saipan, a Northern Mariana Island more than 100 miles northeast of Guam, as shown on Figures 1 and 2.

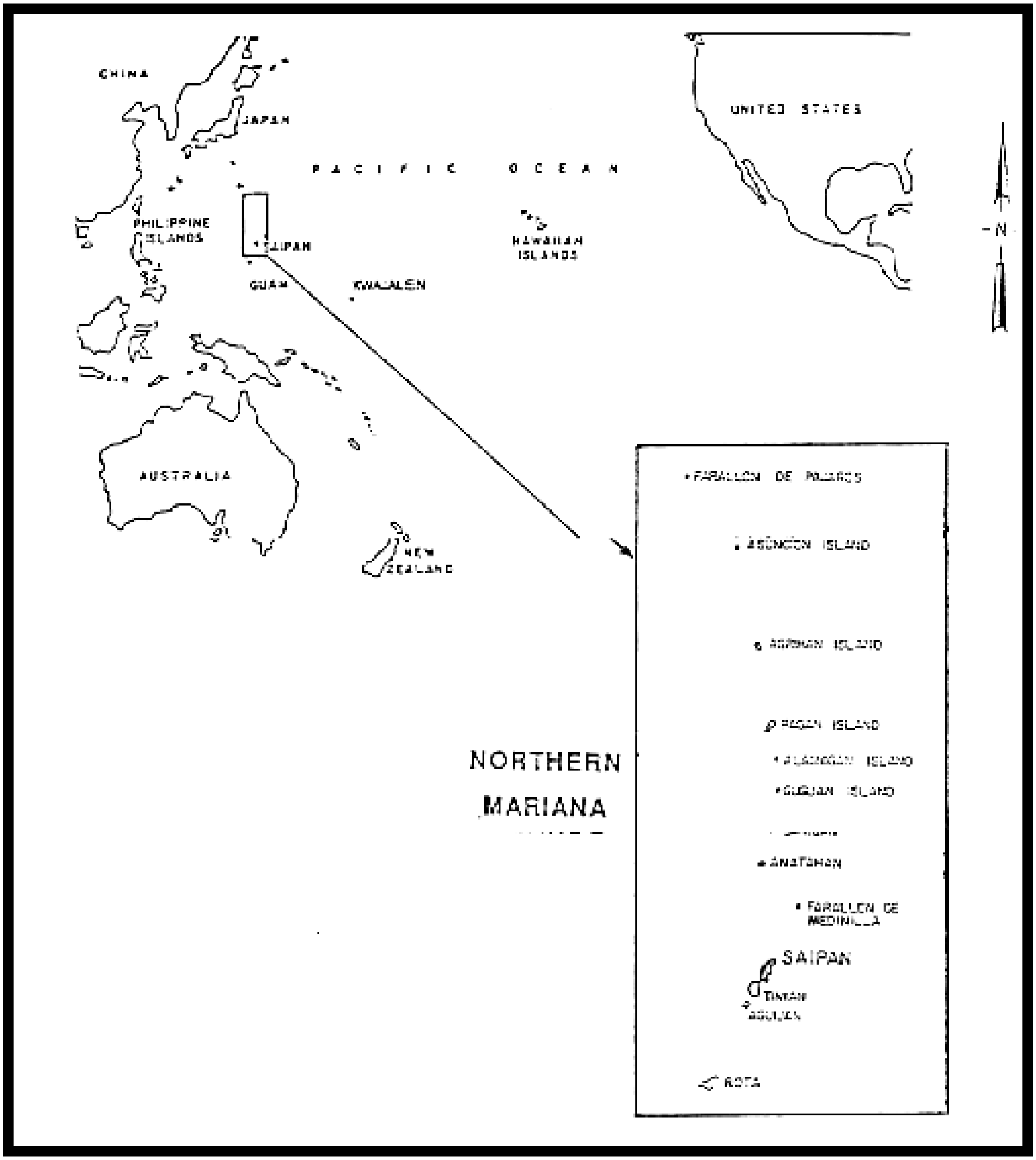
2. Eight primary sites were considered and evaluated as part of a detailed siting study. These were:

   - Guam. NASA Dandan Tracking Station, an existing facility, due to be deactivated because its function may be taken over by satellites.

   - Tinian. Maga Plateau on the northwestern side of the island on undeveloped land leased by the U.S. Department of Defense.

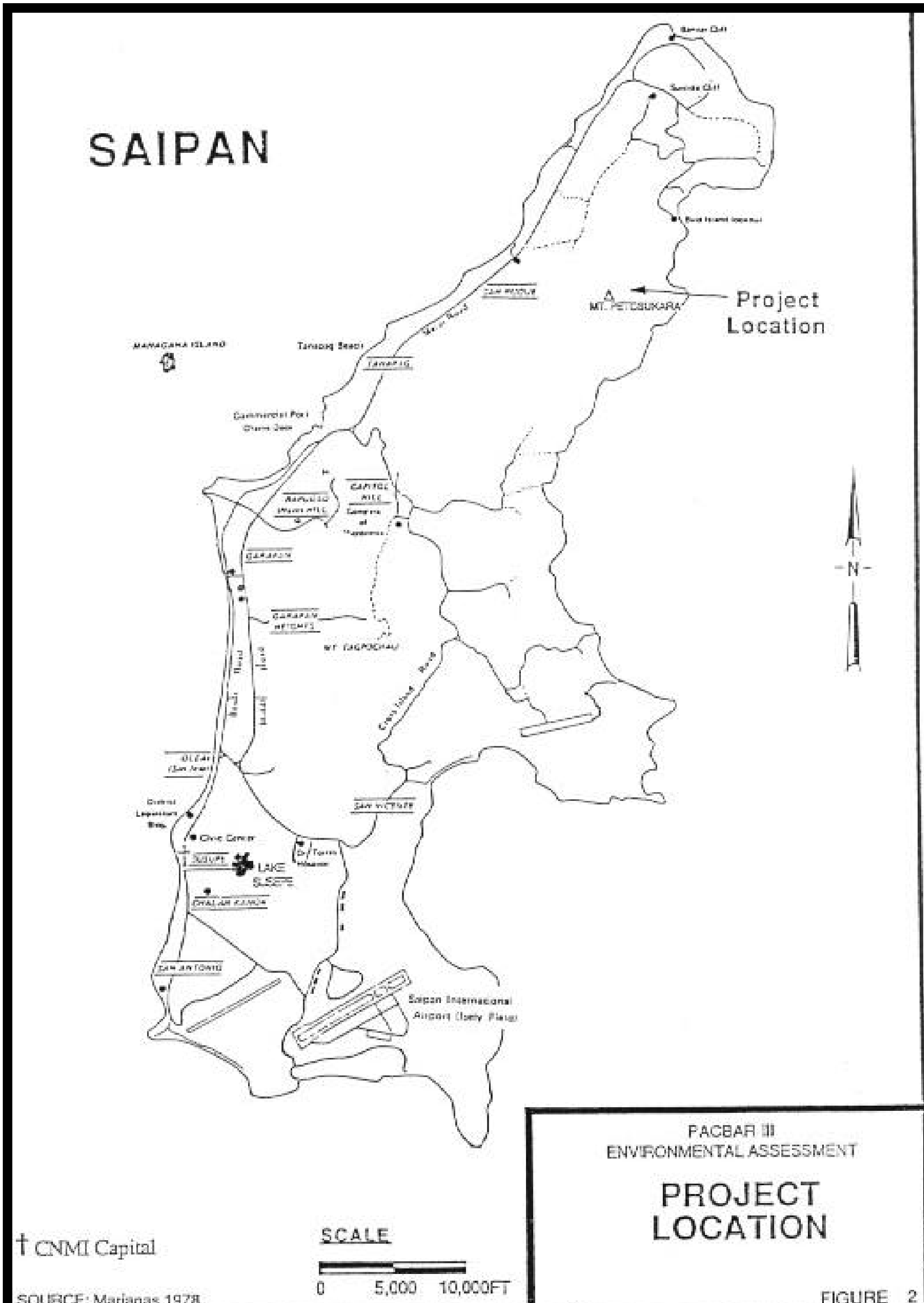
   - Tinian. Massalog, a high points on the central eastern part of the island on undeveloped land lease by the Department of Defense.

   - Saipan. Mt. Tagpochau, the highest elevation on the island.



SOURCE: FAA 1973   NO SCALE

PACBAR III
ENVIRONMENTAL
ASSESSMENT
VICINITY MAP



PACBAR III
ENVIRONMENTAL ASSESSMENT

PROJECT LOCATION

FIGURE 2

- Saipan. Laderan I Maddock, on the northeastern tip of the island.

- Saipan. Suicide Cliff, on the northwestern tip of the island.

- Saipan. Okso Talufofof, in the Capitol Hill area.

- Saipan. Mt. Petosukara, the chosen project location.

3. Three other alternatives were considered during early project planning stages: (1) Anderson Air Force Base in Northern Guam, (2) shipboard radar's, and (3) less developed and uninhabited islands. These alternatives were eliminated early in the project planning stage.

4. The "No Project" option is not considered viable by the U.S. Air Force because the required project missions could not be otherwise satisfied.

5. As shown on Figure 3 and as described in the following sections, PACBAR III is proposed to consist of:

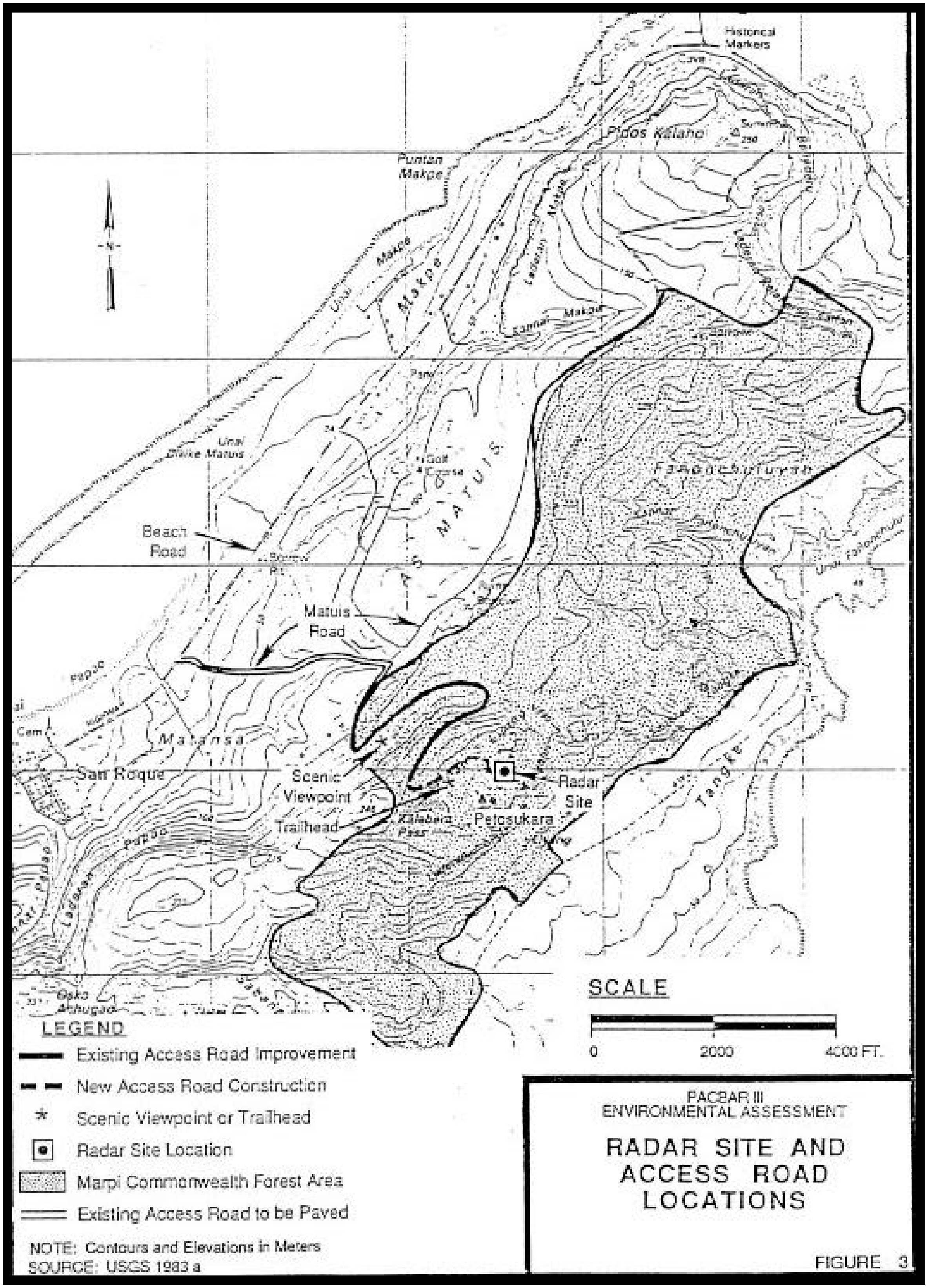
   - An access roadway which primarily consist of improvements to an existing roadway. About 1,500 feet of the roadway would be new construction.

   - A 420 – by 380- foot radar site.

   - Related service facilities, including:

     - Onsite diesel generators for primary and redundant electric power
     - A microwave link telecommunications service
     - An onsite rain water collection system for non-potable water
     - An onsite septic tank and leach field sewage system
     - A flammable materials storage building
     - Onsite firefighting capability

6. The originally proposed PACBAR III facility included a boresight tower and related 0.7-mile access road, which would have been located in relatively undisturbed forest.



PACBAR III
ENVIRONMENTAL ASSESSMENT

RADAR SITE AND ACCESS ROAD LOCATIONS

FIGURE 3

In June 1986, the U.S. Air Force decided to eliminate the boresight tower portion of the project to reduce environmental impacts on the coastal zone.

7. Construction is planned to begin in 1987 and continue for about one and one-half years. The facilities should be operational by 1990. The total estimated cost of the construction is approximately five and one-half million dollars.

2.3 OPERATIONS

1. PACBAR III is currently planned to be operated by a contractor hired by the U.S. AIR FORCE. Twenty-six personnel will operate the radar station on a 24- hour, 7-day per week basis. Except for maintenance personnel, the station personnel will be highly skilled engineers and technicians. Supervisory Air Force personnel may also be onsite (Rentschler 1985).

2. The operational period is planned to last for 25 years (U.S. Navy 1985).

3.0 THE PROJECT'S ASSOCIATED FACILITIES

3.1 RADAR SITE

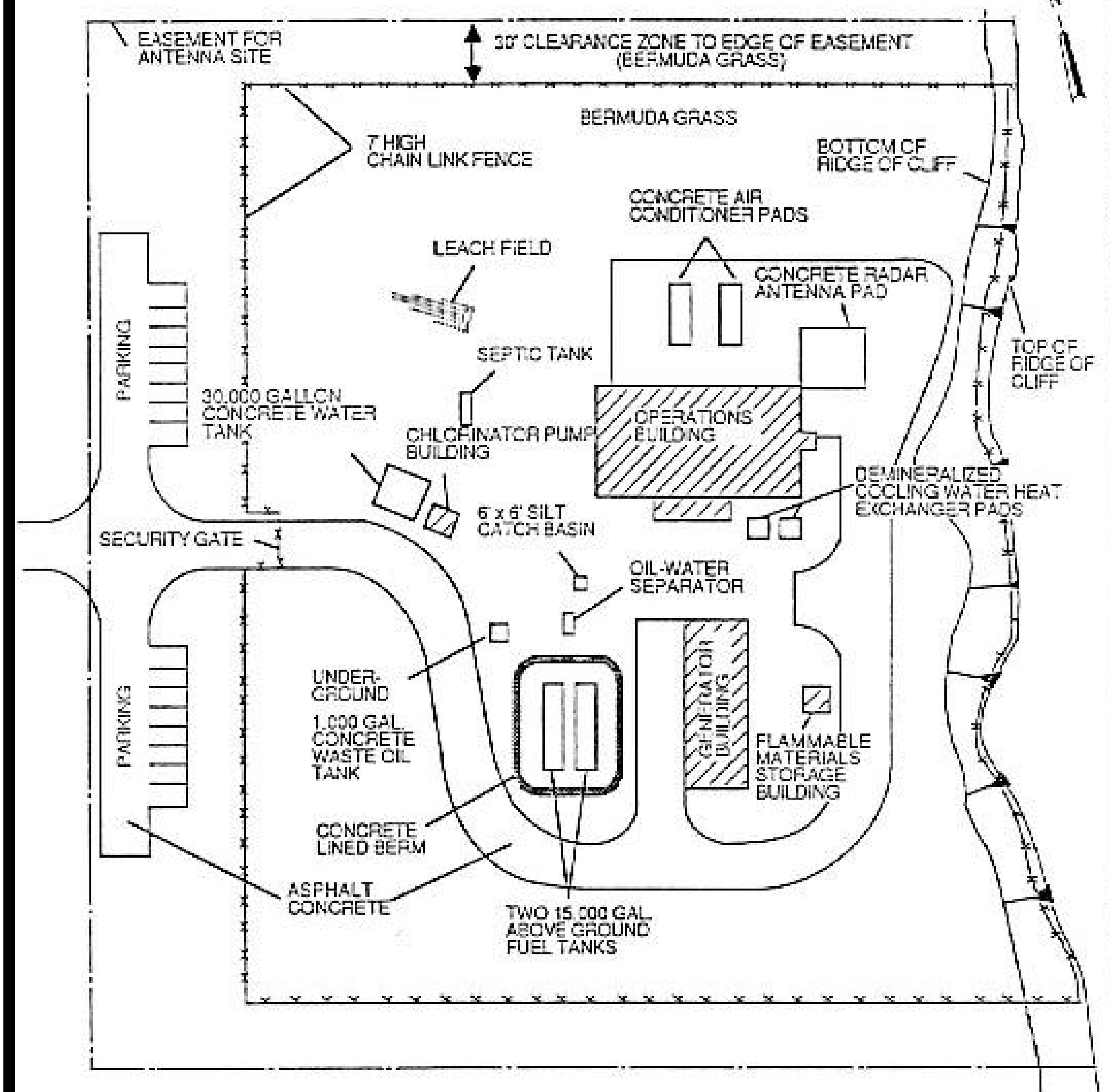
1. The radar site, as shown on Figure 4, will consist of a 420-by 380-foot area (approximately four acres) enclosed on four sides by a seven-foot high chain-link security fence (Smith, Ylung & Hida 1986b). The east side will be at the top edge of a cliff. A 30-foot wide clear zone, planted with common Bermuda grass, will surround the outside perimeter of the fence. The zone is used for security purposes. A 16-car parking lot will be provided outside the fence. A manually operated 24-foot wide vehicle gate will be included.

2. Inside the fence, the primary structure will be operations building, a generator building, and the radar antenna. Secondary structures also located within the fence will include: a flammable materials storage building, pump/chlorinate building, 30,000-gallon concrete water storage tank, two air conditioners, two demineralized water heat exchangers, and two steel 15,000-gallon above-ground diesel fuel storage tanks. Underground items will include a 1,000-gallon waste oil storage tank; septic tank, leach field, and raw rainwater silt catchment basin.

3. The parking area and roadway within the radar station will be paved with asphalt concrete. Other portions of the access road will be protected with compacted coral, a common road construction material on the island. The initial, approximate 0.6 mile, section from Beach Road to the entrance to the Marpri Commonwealth Forest will be re-graded and partially paved (see Section 3.21, Access Road).

4. The operations building will be a 5,525 square foot, single-story, and air-conditioned structure of concrete masonry units. It will house offices, the control center, a data handling area, and a transmitter room. The building will be designed to withstand 155-mph wind conditions and seismic loads of Zone 4 intensity. The Mariana Islands are located in a Zone 3 earthquake area. Zone 4 design standards, which will be used, are more stringent than the requirements for Zone 3.

5. The generator building (generator/sop/warehouse) will be 2,400



LEGEND

UNDERGROUND STRUCTURES

BUILDINGS

SCALE

0 50 100 FT.

Source: Smith, Young & Hida, Inc. 1986a

PACBAR III
ENVIRONMENTAL ASSESSMENT

RADAR FACILITY SITE PLAN

FIGURE 4

square foot single-story structure of concrete masonry units. This building will house three 500-kW diesel generators, shop/warehouse space, and an air-conditioned office. The diesel generators will be provided with vibration dampners, exhaust silencers and soundproof insulation on the exhaust ducting. No special air quality control features are provided, because local island wind conditions disperse air emissions quickly. The office door and interior window are soundproofed. This building is designed to with stand 155-mph wind conditions and seismic loads of Zone 4 intensity.

6. The 130-ton radar antenna and pedestal will be mounted on a 30-by 30-foot concrete foundation. The radar is the refurbished T-AGM-9 C BAND radar, which was removed from the U.S.N.S. GENERAL H. ARNOLD, a decommisioned range instrumentation ship. The antenna consist of three sections: a pedestal (60tons), a yoke (65 tons), and a 30-foot diameter dish (5 tons). The bottom of the antenna will stand 22 feet above the ground and will be equipped with elevation and azimuth switches to protect personnel and the public from radiofrequency emissions. The transmitter receiver, signal processing and ancillary equipment will be housed in the operations building.

7. Power will be generated onsite by one of three 500-kW diesel generators. The other two generators will provide standby power. Diesel fuel will be stored in two 15,000-gallon, steel, aboveground storage tanks. The two storage tanks will be placed in a concrete-paved berm large enough to contain more than twice the capacity of both tanks.

8. Bottled water for drinking will be transported to the station by truck. Non-potable water, for washing, toilets, and demineralized circulation water makeup, will be obtained from rainwater collected by roof gutters on both the operations and generator buildings. The rainwater will flow from the gutters to an underground silt catchment basin for solids removal and chlorination. The chlorinated rainwater will be pumped to an aboveground 30,ooo-gallon (30-day supply) concrete storage tank, from which it will be distributed for use in the facility. The cathcment basin will be supplied with an overflow discharge line.

9. The sanitary sewer system will consist of a two-compartment, concrete septic tank and a leach field. Waste water from the operations and generator buildings at the radar station will gravity flow to the septic tank:

1.0 Telephone services will be provided by a microwave link to Guam.

11. Calibration will be accomplished by a combination of:

- Small boresight equipment located on an existing tower or towers
- Boresights on ships and/or aircraft
- Calibration spheres (balloon-like spheres) and or
- Satellites

12. The flammable materials storage building will be a 200 square foot single-story concrete building used to store up to 50 drums of paint and oil. The building will be designed with a six-inch concrete curb for spill containment and will be able to withstand 155-mph winds and seismic loads of zone four intensity.

13. The 1,000-gallon underground concrete waste oil tank will be designed according to U.S. EPA regulations for secondary containment. The tank will be placed in e trench, which will be lined with a synthetic impermeable liner and backfilled. A four-inch diameter observation pipe will be used for leak detection in the backfilled region.

14. Firefighting capability will consist of individual fire suppression units on each generator and a complete subfloor halon system for the operations building.

3.2 ACCESS ROAD

1. The access road, shown on Figure 3, will include improvements for approximately 1.9 miles of existing roadway and construction of approximately 0.3 mile of new road (Smith, Young & Hida 1985a, 1986a). The initial section of improved road will be paved as described below. The planned access road work consists of:

- Re- grading and partial paving of approximately 0.6 mile of existing Matuis Road between Beach Road and the access road into Marpi Commonwealth Forest. This section will have a grade of 8% to 10% and will be 24 feet wide, including shoulders.

- Widening approximately 1.3 miles of existing roadway from the entry of the Marpi Commonwealth Forest toward the radar site, and constructing approximately 0.3 mile of new roadway from the access road to the radar site. These sections will have a preferred maximum grade of 8% with occasional short lengths more than 8% and will be 20 to 24 feet wide, including shoulders.

2. Drainage diversion and required culverts will be constructed for applicable portions of the road construction in order to divert floe from road shoulders and adjacent areas (Rentschler 1986).

3. The access road to the radar site will be designed for normal traffic plus one-time use of a heavy equipment transporter, which will be used to haul the radar sections to the site.

4. In cooperation and coordination with the Department of Natural Resources, the location of one scenic viewpoint and one trail head will be established along he access road at the approximate locations shown on Figure 3 (Culbert 1986(. Parking for 5 to 10 vehicles will be made available at the scenic viewpoint.

3.3 CONSRTUCTION CONSIDERATIONS

1. It is expected that most construction material will be brought onto the island. The contractor will be required to ensure that any equipment or supplies delivered to Saipan are free of any introduced organisms, especially brown tree snakes (Glass 1986.) This requirement will include, but will not be limited to guarantee activities and posting signs. The docking and unloading will occur at Charlie Dock in Tanapag Harbor on the West Side of the Island. Temporary storage will be provided onsite.

2. Construction equipment, which may also be moved to the island, includes a coral crusher, a heavy crane, earthmoving equipment, and temporary generators.

3. It is anticipated that successful contractors will use local crews and equipment to the extent possible.

4. Road modifications and construction will be completed first, in order to transport materials and equipment to the site. It is not anticipated that any physical improvements will be required at the existing quay, bridge, and five culverts, which are along the haul route. An engineering study will be performed by the construction contractor to determine if temporary measures such as on-time use of temporary steel plates may be used for temporary strengthening (Rentschler 1986.) Two areas of tree cover may have to be trimmed and 22 sets of utility lines may have to be temporarily removed for overheight loads. Current plans are to use a multiwheeled tank mover (heavy equipment transporter) who distributes weight sufficiently in order to avoid damage to the road, bridge, or culverts.

5. The construction specifications will require that the site practices minimize environmental impacts. Works limits will be indicated on site drawings. Dust and erosion control will be enforced during grading operations, and exposed graded areas will be replanted with common Bermuda grass or fast growing, local trees immediately after grading (Smith, Young & Hilda 1986b, Edwards 1986). Removed vegetation will be hauled to acceptable disposal sites in accordance with federal and local regulations (Smith, Young & Hilda 1985b and 1986b). Removed vegetation will not be burned.

6. After grading is completed and prior to pouring concrete slab, the soil will be treated with, water-based pesticides protect wooden structures from subterranean termites. The pesticides will be registered with the U.S. Environmental Protection Agency (U.S. EPA). In addition, pesticide concentrations will not exceed values specified in NAVFAC Specification No. 41-84-0229, Division 2, Section 02250 (Smith, Young &Hida 198b). No restricted-use pesticides are planned to be used.

7. Use of explosive during construction will not be permitted, as specified in NAVFAC Specification No. 41-84-0229, Division 2, Section 02102.

8. A special ordnance survey will not be conducted to find ordinance in addition to that found by the archaeological survey team. However, a site ordnance removal plan will

be utilized by the construction contractor to assure contractor safety.

4.0 THE COMBINED, CUMULATIVE COASTAL EFFECT OF THE PROJECT

1. It is expected that the project will result in loss of between 0.1 and 3.0 acres of tangantangan forest type of endangered species habitat. This acreage represents less than 0.3% of the Marpi Commonwealth Forest area, much of which consists of similar potential habitat because of the ability of the tangantangan forest vegetation to grow relatively rapidly in this area.

2. This project sets a precedent for development in the Marpi Commonwealth Forest; an area set-aside for protection of wildlife. The precedent does not, however, open the door for private development in the Forest. A national security project is wholly different than a private development project. The precedent does not preclude the CRM from denying permits to proposed projects, which would have significant impacts on the Marpi Commonwealth Forest.

3. Removal of about seven acres of vegetation in the areas designated for the radar site and access road cannot be avoided. About 60% of these seven acres will be existing grassland. About 40% will consist of tangantangan removal where the existing access road will be widened.

4. The visual impact of the white radar antenna dish cannot be avoided from five scenic viewpoints on the island, including Mt. Tagpochau. The dish must be white to function properly, and it will be lighted at night.

5. Secondary impacts, such as increased traffic and some development of new housing are expected to occur, but the overall effect of the proposed facility is expected to be minimal compared to other island projects.

6. Development of an improved access road in the project area is expected to result in additional vehicles and people in this part of the Marpi Commonwealth Forest. Improved access could be used by hunters, poachers, and others. However, existence of personnel at the radar facility would likely significantly reduce present illegal activities 9see appendix B).

7. The presence of buildings and other facility structures in the forest is an

Environmental effect that cannot be avoided during the life of the project. However, at the end of the useful life of the project the facilitates may be converted to a campground, a forest visitor center, or Marpi Commonwealth Forest ranger headquarters. Another option is remove the facilities and return the area to its original state.

8. Most of the noise associated with construction activities cannot be avoided. However, construction will be located away from the nearest town, San Roque, thereby minimizing the effect on local residents. Due to the temporary nature of construction, permanent disruption to wildlife due to noise in the worker area is not expected.

5.0 DATA AND INFORMATZION SUFFICIENT TO SUPPORT THE FEDERAL AGENCY'S CONCLUSION

5.1 INTRODUCTION

1. In accordance with the Federal Coastal Zone Management Act of 1972, as amended (PL 92-583), the U.S. Air Force has evaluated proposed construction and operation of the PACBAR III radar facility on the Island of Saipan, CNMI, and has determined that it is consistent to the maximum extent practicable with the relevant Federal and local laws. Noteworthy of mention are:

   - CNMI Coastal Resources Management Act (CRMA) (PL 3-47), effective February 11, 1983

   - CNMI Coastal Resources Management Program (CRMP) Rules and Regulations, effective October 15, 1985.

   - 15 CFR Part 930, et seq

2. The finding of consistency is based on project evaluation relative to site development limitations, direct t and cumulative adverse effects, and proposed mitigation's, especially sensitive habitat, surface hydrology, cultural- historic considerations, scenic values, and future development options.

3. Project compliance with specific applicable provisions of the CRMA, CRMP Rules and Regulations, 15 CFR Part 930, and implementing guidelines is presented in the following sections.

5.2 COMMONWEALTH MARIANAS CODE, VOLUME 2. DIVISION 1, CHAPTER 5, COASTAL RESOURCES MANAGEMENT ACTS OF 1983 (PL 3-47) (2 CMC).
Article 1, Section 1511, Coastal Resources Management: Policy

5.2.1 2 CMC Section 1511(a)(3)(D) Improvement of Coordination between Commonwealth and Federal Agencies.

1. There has been ongoing coordination between Commonwealth and

federal agencies since 1982 relative to the PACBAR III project. In October/November of that year, representatives of the U.S Air Force traveled to Guam and Saipan to assess alternative sites and discuss the project with CNMI environmental and government agencies.

2. In October 1984, the U.S. Air Force met with environmental agencies on Saipan to determine the environmental concerns to be incorporated into the impact analysis and engineering design. During November/December 1984, the Air Force again traveled to the Northern Mariana Islands for additional siting studies and further discussions with CNMI environmental agencies relative to potential environmental impacts and mitigation measures for the proposed project. At that time, turnouts and a scenic viewpoint along the access road were initially suggested by CNMI DNR Forestry personnel and later incorporated into the project design.

3. During the spring of 1985, geotechnical work was begun at the Mt. Petosukara site, under permit from the CNMI Department of Public Health and Environmental Services, Division of Environmental Quality.

4. During October/November 1985, the Air Force and its representatives conducted field studies at the potential project sites and held further discussions with CNMI government agencies to review mitigation measures. Local historic reservation Office employees who were retained as local experts also performed the archaeological site survey during this time.

5. In March 1986, the Final Environmental Assessment for the PACBAR III project was distributed to various CNMI and Federal government agencies and private organizations.

6. In April 1986, the CRM and the Air Force conducted a public hearing for the Coastal Permit application in April 1986. Oral as well as written comments received at the hearing resulted in: (1) Major changes in project design, (2) additional biological field studies, and (3) incorporation of these into an Amended Environmental Assessment.

7. As a result of this interaction and coordination between Commonwealth agencies and the U.S Air Force, it was determined that the Environmental Assessment be revised and reissued as “Draft EA, Revised PACBAR III Radar Station”.

8. A detailed discussion of these coordination activities is presented in the preface to the revised Draft EA for the PACBAR III Radar Station.

5.2.2 2 CMC Section 1511(a)(8) Mitigate to the Extent Practicable Adverse Environmental Impacts, including those on Aquifers, Beaches, Estuaries and Other Coastal Resources while Developing an Efficient and Safe Transportation System.

2 CMC Section 1511(a)(10) Maintain or Improve Coastal Water Quality through Control of Erosion, Sedimentation, Runoff, Siltation, Sewage and Other Discharges.

1. The proposed project includes an access road between Beach Road and the project site, which will involve improvements for about 1.9 miles of existing roadway and construction of about 0.3 mile of new road. Major drainage improvements will be provided for about 0.6 mile of Matuis Road, beginning at the Beach Road intersection, to reduce existing erosion problems and to mitigate the potential for new erosion due to increased road usage. This section of road will also be re-graded and widened where required, and the lower portion nearest Beach Road will be paved with asphalt. The other 1.3 miles of existing road will be widened with ditch improvements and culverts, where required. The 0.3-mile of new road will extend from the end of the Marpi Forest Road to the project site and will include a drainage control ditch.

2. A major feature of both the new and improved road segments will be the engineered drainage control system, designed to maintained storm runoff flows in controlled, rock-protected ditches. This will greatly reduce erosion potential and will reduce the velocitited of high runoff flows. Hard limestone riprap from a nearby existing quarry will be used as the primary material for erosion protection because: (1) rock can be used to fit the existing terrain without excessive grasping and vegetation removal, (2) riprap will tend to cause flow velocities to be reduced due to the rough surface, and (3) rock is relatively easy to maintain.

3. As a result of the road work to be done in association with the radar station, there will be a decrease in the amount of eroded silt which frequently is deposited on Beach on Beach Road. Also, there is expected to be a significant reduction in the amount of sedimentation which presently

reaches the important coral lagoon, downhill from the road intersection.

4. Sewage and other discharges will be contained by an onsite septic tank and leach field which will be located, designed, and constructed according to U.S. Navy specifications and approved by the Division of Environmental Quality (DEQ). Therefore, there will be no waste discharge from the project site, thereby complying with Section (a)(10), above.

5. Diesel fuel will be stored onsite for the electrical generators in two 15,000-gallon steel, aboveground tanks. The tanks will be within a concrete-paved berm sufficient to contain more than twice the capacity of both tanks. There also will be a 1,000-gallon underground tank for waste oil, designed in accordance with EPA regulations for secondary containment. The tank will be contained within a trench, which will be lined with a synthetic impermeable liner and backfilled. There will be a four-inch observation pipe for leak detection.

6. Soil erosion will be mitigated by revegetation of cleared areas, design of road alignment perpendicular to natural contours where feasible, and drainage diversion design for the access road. In addition, the access road from Beach Road to the entrance to the Marpi Commonwealth Forest will be partially paved and constructed with effective drainage diversion. This action will help solve an existing serious erosion control problem.

7. Areas which were bulldozed during initial 1985 site investigations but will not be used for final access road alignment will be improved in a manner to be agreed upon with appropriate island and government agencies (see Appendix A).

8. Further, detailed discussion about the above measures is presented in Sections 1.1.4 and 5.2.2 of the Revised Draft EA.

5.2.3 2 CMC Section 1511(a)(11) Recognize and Respect Locations and Properties of Historical Significance throughout the Commonwealth, and Ensure that Development Which Would Disrupt, Alter, or Destroy These, Is Subject to Commonwealth and any Applicable Federal Laws and Regulations.

2 CMC Section 1511(a)(12) Recognize Areas of Cultural Significance the development of which Would disrupt the Cultural Practices Associated with such areas, which shall be subject to a Consultation Process with Concerned Ethnic Groups and any Applicable Laws and Regulations.

1. An archaeological/ historical inventory was conducted by the CNMI Community and Cultural Affairs Historic Preservation Office during October/November 1985. Archaeological items found during the inventory included a light scatter of ceramic shards from the Latte period.

2. Historical finds included four U.S. ordinance storage buildings, now covered by soil and vegetation, two World War II Japanese 81 mm mortal projectiles, and incomplete remains of a Japanese soldier killed during World War II, including a canteen and helmet.

3. Based upon the findings, it was determined that none of the properties was eligible for inclusion in the U.S. Register of Historic places, although the ordnance buildings may be eligible for inclusion in the CNMI Register of Historic Places.

4. The historic ordnance items are to be removed prior to project construction. The skeletal remains were removed from the site by CNMI archaeologists. The ordnance building will be left in place, as recommended by the CNMI Office of Historic Preservation.

5. In order to ensure that actual project construction activities will not disrupt, alter, or destroy any undiscovered properties of cultural or historical significance, there may be onsite monitoring by a representative of the CNMI Historic Preservation Office during project construction activities.

6. In compliance with the policy of recognizing and respecting locations and properties of historical significance, the potential project site on Suicide Cliff was rejected during the project siting process, partially due to its proximity to historic memorials and associated gravesites.

7. Detailed discussion of the above are presented in Sections 1.2.11, 3.9, 4.1.4, 5.2.9, and Appendix C of the Revised Draft EA.

5.2.4 2 CMC 1511(a)(14) (It is the Coastal Resources Management Policy of the Commonwealth to:) Not permit, to the extent practicable development with the potential for causing sifgnifigant adverse impact in fragile areas such as designated and potential historic and archaeological sites, critical wildlife habitats, beaches, designated and potential pristine marine and terrestrial communities, limestone and volcanic forests, designated and potential mangrove stands and other wetlands.

1. The proposed project originally consisted of both a radar station facility and boresight tower, and an access road to each facility. The boresight tower was to be constructed on a small site within the Limestone Forest and be serviced by a 0.7-mile access road, primarily through tangantangan vegetation. As a result of concern relative to potential impacts resulting from its construction and operation, the boresight tower and access road have been eliminated from the project.

2. The radar station has been sited primarily within a grassland area to minimize, to the extent practicable, impacts to tangantangan forest vegetation.

3. Mititgations have been developed, in conjunction with the U.S. Fish and Wildlife Service (USFWS) and CNMI Department of Natural Resources, addressing: (1) the abandoned access roads t o the boresight tower and radar site (areas which were temporarily cleared for protect construction activities), (2) habitat enhancement and revegetation, (3) construction procedures, and (4) policies regarding the brown tree snake.

4. The above are discussed in detail in Appendix A and B of this report and Section 5.2 of the Revised Draft EA.

5.2.5 2 CMC Sections 1511(a)(18) Encourage Preservation and Enhancement of and Respect for, Commonwealth's Scenic Resources through the Development of, Increased Enforcement of, and Compliance with, Sign, Letter, Zoning, Building Codes, and Related Land-Use Laws.

2 CMC Section 1511(a)(19) Discourage, to the Maximum Extent Practicable, Visually Objectionable Uses so as not to significantly Degrade Scenic Views.

1. As part of the siting procedure for the project facilities, the U.S. Forest Service at the request of the CNMI DNR Commonwealth Forester did a seen-area analysis. The computerized study evaluated five potential boresite tower sites, utilizing topographic data to simulate three-dimensional views. The results were considered in overall site evaluation, although the boresight tower was eventually eliminated.

2. The radar antenna must be painted white to function properly, and it will be lighted at night. The project site and associated buildings and other structures will not be visible form a distance, although the antenna will be, due to its size, configuration, and color. However, it has been recommended that other project structures be painted a color compatible with the forest environment so that they blend, to the extent practicable, with the surroundings vegetation.

3. Additionally, in compliance with the provision in Section (a)(18) to encourage enhancement of scenic resources, the project includes the construction of a scenic viewpoint and a trail head to provide additional opportunity for visitors to enjoy the Marpi Commonwealth Forest and observe coastal vistas form the Mt. Petosukara area.

4. A comprehensive siting study was prepared for eight potential sites throughout the Northern Mariana Islands. Once the Island of Saipan was chosen, further studies were undertaken to determine the best site on the island. The criteria included a consideration of aesthetic qualities. Potential sites on Suicide Cliff, Laderan I Maddock, and Mt. Tagpohau were rejected, in part, on the basis of environmental considerations, primarily because of their use as tourist attractions due to their aesthetic qualities.

5. Aesthetic considerations are presented in detail in Sections 1.2.10, 3.8, 4.1, 4.4, and 5.2.8 of the Revised Draft EA.

5.2.6 2 CMC Section 1511(20) <u>Encourage the Development of Recreation Activities</u> which are Compatible with the Surroundings Environment and Land-Uses.

1. In compliance with this and related policies (a)(18) and (a)(19), above, the project includes the provision for one public access scenic viewpoint and one trail head, plus adequate parking. Descriptive signing will also be provided, per the Mitigation Agreement (see Appendix B). These facilities will encourage appropriate uses, within clearly identified areas.

2. Additionally, the 1.9 miles of road improvements and 0.3 mile new road will provide improved public access to the forest. It is likely that this will result in additional controlled visitor use of the area. Also, it may serve to decrease inappropriate use by poachers.

5.3 RULES AND REGULATIONS, OFFICE OF COASTAL RESOURCES MANAGEMENT, SECTION 11, STANDARDS FOR DETERMINATION OF MAJOR SITING (CRM RR).

5.3.1 CRM RR SECTION 11A. Determination of Major Siting.
(iv) Proposed Projects with Potential for Significant Adverse Effects on Submerged Lands, Ground Water Recharge Areas, Cultural Areas, Historic or Archaeological Sites and Properties, Designated Conservation and Pristine Areas, or Uninhabited Islands, Sparsely Populated Islands, Mangroves, Reefs, Wetlands, Beaches and Lakes, Areas of Scientific Interest, Recreational Areas, Limestone, Volcanic and Cocos Forest, and Endangered or threatened Species or Marine Mammal Habitats.

1. As required and as discussed in Section 5.2 of this report, the proposed project is in conformance with the policy enumerated in 2 CMC Section 1511 (PL 3-47).

2. The proposed PACBAR III radar station may be considered a major siting. However, through certain of the project's proposed procedures and practices, the U.S. AIR FORCE has adopted measures to mitigate the potential for adverse effects. These include: (1) appropriate design and construction of the new an improved portions of access roads, to re7duce existing erosion and control the quality of runoff, particularly across Beach Road and into the lagoon area, (2) construction of one new trail head and a scenic view area, (3) revegetation and habitat enhancement plans, and (4) deleting the boresight tower and access road from project, thereby utilizing only about 25% of the originally proposed portion of the facilities which would have been located in a forest area.

3. These mitigation measures are discussed in detail in Appendix B, and in Chapter 5.0 of the Revised Draft EA.

5.3.2 CRM RR SECTION 11B. Specific Criteria Major Siting

5.3.2.1 CRM 11B(I) Project Site Development. The Proposed Project Site Development Shall Be Planned and Managed so as To Ensure Compatibility with Existing and Projected Uses of the Site and Surrounding Area.

CRM RR 11B(ii) Minimum Site Preparation. Proposed Projects Shall, to the Extent Practicable, BE Located at Sites With Pre-Existing Infrastructure, or Which Require a Minimum of Site Preparation (e.g., excavation, filing, removal of vegetation, utility connection).

1. The proposed project originally consisted of a radar station plus a boresight tower. However, due to environmental concerns, the boresight tower was eliminated from the project and, with it, a proposed 0.7-mile access road. The resulting project consists of an approximate four –acre radar station and 2.2 mile access road. The radar facility will be on the edge of the Marpi Commonwealth Forest, primarily on recently burned grassland at the top of a cliff, thereby disrupting forest vegetation and through-access to the least extent practicable. Also, the site is compact, to minimize disruption. Finally, only 0.3 mile of road will be new; most of the access roadway will involve improvement to an existing alignment.

2. Elimination of the boresight tower resulted in an overall reduction of site preparation by about 50%, including activities within the most sensitive forest and wildlife areas.

3. The approximate four-acre radar station site is as compact as practicable, given security requirements, and the new access road alignment (about three acres) minimizes the clearing necessary to accommodate project-related traffic.

4. There will not be a need for utility connections, as telephone service will be provided by microwave link from Guam, power will be generated on site, and the project will have its own water supply, septic tank, and leach field.

5. These considerations are discussed in detail in Sections 1.1, 2.0, 3.7, and 5.1 of the Revised Draft EA.

5.3.2.2 CRM RR 11B(iii) Adverse Impacts on Fish and Wildlife. The Proposed Project Shall Not Adversely Impact Fragile Fish and Wildlife Habitats, or Other Environmentally Sensitive Areas.

1. In compliance with this policy, the proposed project has been sited in a manner which will minimize impacts to wildlife habitat and could have a positive effect on wildlife, as its presence may discourage poaching (see Section 5.3.1, 5.3.2 above, and Appendix B).

2. Also, the access road improvements will result in less siltation to the lagoon area west of Beach Road. This will result in an overall decrease in deposition and sedimentation to the lagoon area. Ultimately, this will have a positive effect on local fish habitat.

3. Potential impacts to fish and wildlife have been mitigated in accordance with the agreement, which resulted from the Section 7 Consultation with the USFWS (see Appendix A).

4. The major mitigation measure to protect flora and fauna has been the Air Force's decision to use alternative means to calibrate the radar antenna. That decision has led to elimination of the boresight tower and its access road. This mitigation measure has reduced the wildlife habitat disturbance to about 0.1 acre of forest, which is not directly adjacent to the existing roadway. This is less than 5% of the area originally planned for disturbances to construct the boresight tower. Also, this change has completely eliminated project activities in limestone forest acreage.

5. The construction contractor will mark Forest areas, which are adjacent to the project, on design drawings for use. These areas will include the radar site and a small portion of new access road. Prior to clearing in these areas, the construction contractor will be required to contact the Commonwealth Forester to allow for site inspection during clearing (Edward 1986).

6. In forest areas, the absolute minimum amount of vegetation will be cleared.

7. Vegetation alongside the access road will not be removed unless required for road widening.

8. Vegetation along cliff bases willnot be removed (Schmitt 1985).

9. Although not expected, if any damage should occur to project areas not approved for construction clearing and grubbing, the contractor will be responsible for replanting these areas with Naria or Pterocarpus indicus to restore any damaged vegetation (Edwards 1986).

10. At least two types of vegetation will be used for re-planting activities. These include common Bermuda grass and fast-growing, local trees such as Naria or Pterocarpus indicus. The Bermuda grass will be used in cleared areas that require low-lying vegetation, such as the radar site and the 30-foot clear zone. The trees will be planted in specified areas, as negotiated with appropriate island and government agencies. Planting trees should prevent excessive growth of undesirable weeds and grasses that would require continuos future maintenance (Edwards 1986).

11. Replanting activities will be scheduled and implemented where possible to correspond with the start of the rainy season, which lasts from late June to early November. Planting during this time will maximize the effectiveness of these activities (Edwards 1986).

12. Construction contractors will be required to ensure that any equipment or supplies delivered to Saipan are free of any introduced organisms, such as the brown tree snake. The contractor will proved a plan stating g all methods used to accomplish this task, including but not limited to quarantine activities and posting signs (Edwards 1986) (Appendix B).

13. In addition, contractor work limits and procedures will be specified to avoid disturbance to habitat of the Micronesian Megapode and other species of wildlife.

14. Establishment of a habitat enhancement area (Schmitt 1985) is being negotiated between the Air Force and the DNR Division of Fish and Wildlife (Rentschler 1986). This may be accomplished by planting fruit trees in an DNR-approved location away from the project site. The area will be located away from the project site to assist in diverting wildlife from the site and provide replacement habitat for displaced wildlife. The Air Force has requested a recommendation from the DNR Fish and Wildlife on this matter.

15. If it becomes desirable to operate the antenna at angles below the horizon, procedures will be used to assure that the public, facility personnel, or wildlife are not exposed to levels exceeding the PEL's. Elevation and azimuth limit switches will be installed to assure protection for the public. Due to the use of these switches, restricted access areas will not be necessary. The project-specific exposure footprint for the actual operating mod after initial antenna installation will be measured to ensure that PELs are below the public access limit in public access areas.

16. These items are also discussed in Appendix A and B.

5.3.2.3 CRM 11B (iv) Cumulative Environmental Impact. The Proposed Project Site Shall Be Selected in Order to Minimize Adverse Primary, Secondary, or Cumulative Environmental Impacts.

1. Various elements of project siting procedures were utilized to minimize adverse impacts. For example, results of a seen-area analysis were incorporated into overall site evaluation procedures. Also, other potential sites on the Island of Saipan (Suicide Cliff, Ladern I Maddock and Mt. Tagpochau) were rejected, partially on the basis of environmental considerations, primarily aesthetics.

2. Cumulative impacts are not anticipated. The proposed PACBAR III project is not specifically related to other projects or facilities on the islands and is, therefore, not part of their cumulative effect.

3. There could be some cumulative effect if the radar station were to form the basis for other U.S. Government installations. It is unlikely, however, that this project would form the basis for future growth. There are no Department of Defense (DOD) plans requirements to expand the site. Such expansion would be difficult, due to environmental pressures and the precedent established by this project in achieving removal of the boresight tower from the project.

4. This is discussed in detail in Section 3.14 of the Revised Draft EA.

5.3.2.4 CRM RR (v) Future Development Options. The proposed Projects Site Shall Not Unreasonably Restrict the Range of Future Development Options in the Adjacent Areas.

1. Current CRM plans seeks to curtail future development in this particular area, which is set-aside for habitat. The presence of the PACBAR III radar station will not impose any further restrictions on development in the area, except in the immediate project site area.

2. The proposed project is located within the Marpi Commonwealth Forest, which the DNR is striving to preserve rather than develop. Development of the area for recreation use would be restricted by the presence and operational requirements of the radar station during the anticipated 25-year operational life of the project. Extension and improvement of the access road and establishment of a scenic view area and trial head would, however, have beneficial effects relative to controlled recreational use of areas away from the radar station.

3. These facilities are discussed in detail in Appendix A to this report and Sections 1.1.4, 2.0, and 5.2.12 of the Revised Draft EA.

5.3.2.5 CRM RR (vi) <u>Mitigation of Adverse Impact.</u> Wherever Practicable, Adverse Impact of the Proposed Project on the Environment Shall Be Mitigated.

1. Mitigation measures have been incorporated to the maximum extent practicable to reduce environmental impacts. Many of the mitigation measures are discussed in the appropriate sections of this chapter. Mitigation is which are not specifically called for in the CRM Rules and Regulations follow.

2. Operating procedures will include requirements for proper handling of project hazardous wastes. Drums containing the relatively small amounts of project hazardous wastes, such as used pesticide, paint, adhesive, or paint solvent, will be transported by the contractor or local hauler to an appropriate off-island, hazardous waste landfill or treatment facility.

3. The Air Force anticipates the hiring of local residents for the majority of construction activities. It is estimated that, after a start-up period of about 12 months, operation of the radar station will provide full-time employment for 15 Micronesians with electronic/mechanical and other backgrounds.

4. Construction specifications will require that equipment include engine exhaust mufflers to the extent required to meet Air Force Regulation 161-35 regarding occupational noise exposure standards.

5. The diesel generators will be supplied with exhaust silencers, soundproof insulation (specifically, on exhaust piping), and vibration dampeners in order to meet the Air Force occupational noise exposure standards.

5.3.2.6 CRM RR (vii) <u>Cultural-Historic and Scenic Values.</u> Consider Siting Alternatives that promote the Commonwealth's Goals with Respect to Cultural-Historic Values.

1. An extensive siting study was conducted, utilizing three primary criteria: (1) effective radar operation, (2) availability of support facilities and land, and (3) environmental impacts (including archaeological/historic and aesthetic considerations). Of the sites inventoried, none had special significance relative to cultural-historic values.

2. As discussed in Section 5.2.3 of this report, the Mt. Petosukara site appears to have no cultural-historic significance.

3. Scenic values also were considered in choosing the Mt. Petosukara site. These are discussed in Sections 5.3.2.3 and 5.25 of this report.

4. Siting the proposed project on Saipan is expected to have less impact on the area's cultural resources than would occur if it were sited on the Island of Tinian, but more than if sited on Guam. Cultural impacts, which may occur to the island of Saipan, would be the same for any of the potential sites on the island.

5.4 <u>RULES AND REGULATIONS. OFFICE OF COASTAL RESOURCES MANAGEMENT (CRM RR).</u> Section 21, Federal Consistency. B, Standards for Determining Consistency

5.4.1 CRM RR (21B)(iii) <u>Federal Air and Water Quality Standards,</u> to the Extent Applicable, to the Commonwealth of the Northern Mariana Islands.

CRM RR (21B)(iv) Air and Water Quality Standards and Regulations of the CNMI, including but not limited to the CNMI Underground Injection Control Regulations and the CNMI Drinking Water Regulations.

5.4.1.1 Air Quality

1. Air Quality on the island is under the jurisdiction of the Department of Public Health and Environmental Services. A Draft State Implementation Plan is under review for final approval by Region IX of the Environmental Protection Agency.

2. The only project operation, which may affect air quality, involves the use of diesel engines for insight generators. The diesel fuel sulfur content will not exceed 2.5 weight percent, as specified by the proposed local air pollution control regulations (DEQ 1984). Further, the estimated emissions are well below the 250 ton/year/pollutant Prevention of Significant Deterioration (PSD) permit requirements. These are shown below:

SUMMARY OF EXPECTED DIESEL GENERATOR EMISSIONS

POLLUTANT	EMISSION RATE (ton/yr.)
Particulate	7
Sulfur Dioxide	8
Carbon Monoxide	17
VOC	2
Nitrogen Oxides	66

NOTE: The emission rates shown above were obtained by multiplying a continuos hourly fuel consumption rate of 30 gal/hr. (Guam generators_ by AP-42 Emission Factors for internal combustion engine sources (AP-42 Section 3.3.4.2). The emission rates shown are for one generator, since only one is expected to operate at a time. The number shown for Volatile Organic Compounds (VOC) is a total for methane plus nonmethane components.

3. Air emissions are not expected to be visible from other island locations, and opacity levels will be less than 20%, as required by Federal Regulations. No significant changes in air quality are anticipated, due to favorable wind conditions and site elevation.

4. No special mitigation measures for air quality are required during project operations, as emissions will me minimal and in compliance's with Federal and CNMI standards.

5. Water spraying will be used to control the potential for dust generation during construction, if required, during grading operations and before the access road is completed. This practice typically reduces dust emissions by one-half (Edwards 1986).

5.4.1.2 Water Quality

1. Ground Water on the Islands of Saipan meets National Interim Primary Drinking Water Standards, but it does not meet National Secondary Drinking Water Standards. The water is high in salinity, likely due to bomb action during World War II and overdraft by developments on the Island.

2. There will be no withdrawal of ground water associated with the proposed project, as test borings drilled were dry (Lum 1985) and shallow ground water does not exist at the site.

3. Potable water will be obtained from a bottled water supplier. Other water will be obtained from rainwater, and treated and stored onsite. The radar facility will have provision for storing a 30-day supply of treated water.

4. Wastewater discharge will be to an underground septic tank and leach field designed and located according to U.S. Navy specifications, which are in compliance with DEQ requirements.

5. Soil erosion will be prevented by revegetation of exposed areas, drainage diversion design, and paving the most susceptible portion of the existing road.

6. A water-based pesticide will be used for soil treatment during construction. Application methods, which minimize water quality impacts, will be used.

7. The aboveground diesel fuel tank installation will be constructed in accordance with Federal regulations and will be surrounded by a concrete berm for purposes of spill containment. The flammable materials storage buildings will also be constructed with provisions for spill containment.

8. The underground concrete waste oil tank will be installed in accordance with EPA regulations for secondary containment. The tank will be installed in a trench lined with a synthetic liner and backfilled. A four-inch observation pipe will be installed for detecting leaks in the tank area.

9. Construction specifications and operating procedures will include requirements for a spill plan, which will assure immediate containment and cleanup of any accidental fuel or chemical spills.

5.4.2 (v) Any Additional Policies, Regulations, Standards, Priorities and Plans that Are Enforceable ad Incorporated into any Amendment of the CRM Program in the Future.

1. The proposed project will be consistent, to the maximum extent practicable, with anticipated future actions, which affect the CRM program.

2. The U.S. AIR FORCE and its representatives will continue consultation and interaction with representatives of Commonwealth and Federal agencies during final design, construction, and operations phases of the project.

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APPENDIX A

SECTION 7 CONSULTATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

SEP 25 1986

The Honorable Pedro P. Tenorio
Governor, Commonwealth of the
Northern Mariana Islands
Saipan, Commonwealth of the
Northern Mariana Islands 96950

Dear Governor Tenorio:

We have been working with the U.S. AIR FORCE for the last two years assessing the impact of the proposed PACBAR III Radar Station Project on the endangered species found on Saipan. The three listed species, which may be located in the vicinity of the project, are the Micronesian megapode, Vanikoro swiftlet, and nightingale reed warbler. Information we received from various agencies and organizations was given full consideration in our review of possible impacts.

On September 9, 1986 we concluded our formal consultation with the Air Force and determined that the construction and operation of the roadways, facilities and structures associated with the project, as currently proposed, are not likely to jeopardize the continued existence of any of the three species.

Because of your direct interest in the project, we have enclosed a copy of our biological opinion sent to the Air Force for your information.

Sincerely yours,

William R. Kramer
Acting Pacific Islands

Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:

SEP 9 1986

Mr. John E. Maddox
Deputy Director of Acquisition
Civil Engineering
Headquarters Space Division
Los Angeles Air Force Station
P.O. Box 92960
Los Angeles, California 90009-2960

Dear Mr. Maddox:

This responds to your July 28, 1986 request for consultation under section 7 of the Endangered Species Act of 1973, 16 U.S.C. 1531, et seq. (Act). Your letter iniating consultation was received here on August 2, 1986. At issue are the possible effects of your authorization and funding of the construction and operation of the PACBAR III (Pacific Barrier III) Radar Station (Saipan, Commonwealth of the Northern Mariana Islands) an related structures on three Federally listed endangered species. These species are:

Micronesian megapode	(Megapdius laperouse)
Vanikoro swiftleft	(Aerodramus vanikorensis bartschi)
Nightingale reed warbler	(Acrocephalus luscinia)

A map of the site appears at the end of this letter (Figure 1).

This letter represents the Biological Opinion of the U.S. Fish and Wildlife Service (Service) as directed by Section 7 of the Act, "Interagency Cooperation Regulations" (50 CFR 402, 43 FR 870) on your proposed action. Our reference number for this consultation is 1-2-86-F-091.

On September 4, 1986, we completed our review of the information provided by you along with other related information in our files. We also contacted some of that familiar with the biology, management, and recovery of the species involved. Copies of [pertinent materials and documentation are contained in an administrative record maintained in this Service's office in Honolulu, Hawaii.

BIOLOGICAL OPINION

It is our biological opinion that your authorizing and funding the construction and operation of the facilities and structures associated with the construction and operation of the PACBAR III Radar Station, Saipan is not likely to jeopardize the continued existence of any of the three referenced listed species. Because there is no designated critical habitat within or near the project area, no destruction or adverse modification of critical habitat will occur.

BACKGROUND INFORMATION AND DESCRIPTION OF THE PROPOSED ACTION

As is stated in your July 1986 document entitled “Environmental Impact Analysis Process” (Draft EA), you proposed to construct and operate a radar station and approximately two miles of access road on Mt. Petosukara, Saipan, Commonwealth of the Northern Mariana Islands (CNMI). The radar facility will be used for three missions: (1) space surveillance for acquisition of new foreign space launches; (2) cataloging resident space objects as tasked by United States Space Command; and (3) recording splashdown locations of test launches.

The facility is proposed to be located on Mt. Petosukara, a low peak on Saipan, and is to be composed of:

-An accesses roadway, which primarily consist s of an existing roadway. About 1,500 feet of the roadway would be new construction.

- A 420- by 380- foot Radar Site facility.

- Related service facilities, including:

  - Onsite diesel generators for electric power
  - A microwave link telecommunications service
  - An onsite rainwater collection system for nonpotable water
  - An onsite septic tank and leach field sewage system
  - A flammable materials storage building
  - Onsite firefighting capability

Construction is planned to begin in early 1987 and continue for about one year. The facilitates should be operational by mid 1989. The total estimated cost of the construction is approximately five million dollars.

The facility and its specifications are discussed in detail in the Draft EA.

The majority of the access road currently exists and will be improved. One portion will be paved. Approximately 0.3 miles of the access road will be newly constructed. The Radar Site and most of the access road are located in the Marpi Commonwealth Forest, which will be leased by the Air Force from the Marianas Public Land Corporation.

SPECIES ACCOUNTS

Micronesian Megapode:

Two subspecies of this bird are found in Micronesia, M. l. laperouse in the Mariana Archipelago, and M. L. Senex in Palau. In the Marianas, the megapode was once apparently resident on all the major Islands, but is now extinct on Guam, Rota, and Tinian. It has been recorded on nine of the ten commonwealth islands north of Saipan; it is unknown whether it occurs on the tenth island, Farallon de Medinilla, for which information is lacking.

The megapode is a dark, brownish black, terrestrial bird about the size of a small chicken. It forages on the ground, scratching through leaf litter with its large feet and picking out seeds, vegetable matter, insects, and even crabs. The species is remarkable for its nesting behavior. The nest is built by scratching soil, leaves, and other organic matter into a mound in which the eggs are laid. The sun and the decaying organic matter supply heat for incubation. Upon hatching, the young chick digs its way out and finds for itself. The megapode has suffered because of human depredation, primarily on the eggs, which are dug from nests, but also from the taking of adults.

A small population remains on Saipan, and a 1982 survey estimated an island-wide total population of 40 individuals. For the survey, the island of Saipan was divided into 6 regions (see Figure 2); megapodes were reported from only one of those, the "Suicide" region, which includes Mt. Petosukara. The 8 megapodes recorded from this area constitute the total number of the birds seen or heard island-wide during this survey.

Nightingale reed warbler:

This species, also known, as the reed will willow warbler, was listed as endangered in the Federal Register of June 2, 1970. Three subspecies of this genus are found in the Marianas: one Guam, Saipan, and Alamagan; one in Pagan; and the third on Agiguan. None of the subspecies are found on Rota or Tinian. Other subspecies are found on Truk, Pohnpei, Kosrae and Nauru.

The Guam population disappeared in the late 1960's and the Agiguan population is very small. No reed warblers have been reported from Alamagan or Pagan for many years, and the status of these populations is questionable. On Saipian, however, the bird can be found in a variety of forest types. It prefers dense vegetation around wetlands or other semi-open areas, but can be found in second growth forest as well. It feeds on insects, lizards, snails, and spiders. A 1982 survey of Sapian estimated the warblers' population to be in excess of 4,800 individuals. The population in the Suicide region was estimated at 284.

Vanikoro swiftlet

This subspecies (A. v. bartschi) is endemic to the Mariana Islands, where it is found on Guam, Rota, Agiguan, Titian, and Saipan. No specimens have been taken from Agiguan to verify subspecific status. The species is found in Palau, the Philippines, and New Guinea. In the 1960's, a few birds were introduced to Oahu, Hawaii, where a small colony has become established.

The swiftlet nests and roost in caves and is airborne much of the day. It forages on small insects taken in flight. The nest, placed on ceilings or walls of caves, is constructed primarily of moss cemented together with saliva. Nesting is believed to be from January through July, but complete information is lacking. The birds forage in a variety of habitats but prefer small openings where they repeatedly fly a circuit several meters above the ground.

The swiftlet was formerly common to abundant throughout its range. On Saipan, it was abundant just after World War II, and has continued to reside in fair numbers on Guam and Rota; the swiflet's populations in the Marianas were listed as endangered in 1984. The 1982 survey of forest birds on Saipan estimated a total island population of 9,120; no swiftklets was recorded from the Suicide region. However, the Draft EA states that the species frequent part of the proposed project area; sightings of the bird near the PACBAR III site were noted in the area in October 1985 and April 1986.

EFFECTS OF THE PROPOSED ACTION AND ANALYSIS OF IMPACTS

Neither the swiftlet nor the reed warbler would be expected to be affected to any significant degree by the proposed construction and operation of the PACBAR project. Although both may be found in the vicinity of the project site, only minor alteration of either of the bird's habitats is anticipated to occur, and no significant decrease in their food supply or other factors influencing their chances for survival and recovery would be expected.

Possible impacts to the Micronesian megapode may be considerably more significant. With an island-wide population estimated at only 40 individuals, almost any impact has the potential to affect the chances of this species' recovery on Saipan.

Under the section of the Draft EA titled Unavoidable Adverse Effects and Mitigation Measures, it lists several such effects and measures. This includes, but is not limited to:

Adverse Effects:

- Removal of about 7 acres of vegetation in the areas designated for the Radar Site and Access Roadway cannot be avoided. About 60% of these acres will be existing grassland. The remainder will consist of tangantanagan tree removals where an existing road will be widened.

- It is expected that the project will result in loss of between 0.1 and 3 acres of tangantangan forest type of endangered species habitat. This acreage represents less than 0.3% of the Marpri Commonwealth Forest Area, much of which consist of similar potential habitat because of the ability for the tangantangan forest to grow relatively rapidly in this area.

- Development of improved access roads in the project area is expected to cause the impact of additional vehicles and people in this part of the Marpri Commonwealth Forest. Improved access could be used by hunters, poachers ad others. However, existence of personnel at the radar facility would possibly aid in reducing significantly reduce present illegal activities.

Mitigation Measures

- No disturbance is planned to the limestone forest. Further, the construction contractor will be required to contact the Commonwealth Forester to allow for site inspection during any forest clearing operations.

- In forest areas, an absolute minimum amount of vegetation will be cleared.

- Vegetation along cliff bases will not be removed.

- If an damage should occur to project areas not approved for construction clearing and grubbing, the contractor will be responsible for replanting these areas with Naria or Pterocarpus indicus to restore any damaged vegetation.

- Construction contractors will be required to insure that any equipment or supplies delivered to Saipan are free of any introduced organisms such as brown tree snakes. The contractor will provide a plan stating all methods used to accomplish this task including but not limited to quarantine activities and posting signs.

- Contractor work limits and procedures will be specified to avoid disturbance to habitat of the Micronesian megapode and other species of wildlife.

- Establishment of a habitat enhancement area is being negotiated between the Air Force and the Commonwealth's Division of Fish and Wildlife which will be located away from the project site and provide replacement habitat for displaced wildlife. This area may be accomplished by planting fruit trees in a Division approved area away from the project site.

The precautions mandated by these mitigation’s and requirements should appreciable decrease the chances for direct adverse impacts to the megapode. No megapode mortality is anticipated, but the issue of habitat destruction remains.

Although predation has been cited as a major cause of the endangered status of the megapode, it is clear that the destruction of its habitat has contributed to its condition. This is true of many endangered species, but it is especially clear in island species where the loss of habitat can so easily be documented and quantified. The 1982 forest bird surveys on Saipan showed that the megapodes were found only in the northern portions of the island, and, in agreement with other observations on the species’ distribution, were located along cliff areas, with lesser numbers found on the relatively level areas away from cliff bases. The birds were not uncommonly heard near an existing active roadway at the Suicide Cliffs Memorial, a much frequented tourist attraction; the proximity of people and human activities of this type does not appear to be a detriment. As such, the improvement of the existing roadway and its extension would not be expected to significantly impact megapodes.

Intrusion into the forests off these roads, however, may be detrimental. There is little such intrusion at the memorial. The Draft EA proposes the construction of a scenic viewpoint and a trailhead, aiding public access and encouraging forest use. While such activities may not detrimental to the megapode, they are clearly not needed to fulfill PACBAR III missions and should be held in abeyance pending a more thorough impact analysis.

Because of the small percentage of habitat in the Marpr Commonwealth Forest which would be lost as a result of the construction and operation of the PACBAR III radar compound, the improvement of the existing roadway, and the creation of additional access road as described in the Draft EA of July 1986, it is our determination that those activities will not be likely to jeopardize the continued existence of the Micronesian megapode. This determination is made with the recognition that there are currently no other projects, which threaten to further deplete the forest there, nor is it expected that the PACBAR III project would encourage other construction in the area.

CUMULATIVE EFFECTS

Cumulative effects are those impacts of future local government and private actions, which are reasonably certain to occur. Such an action is “reasonably certain” to occur if the action requires the approval of a local resource or land use control agency, and such agencies have essentially approved the action. Cumulative effects are not expected in the case of the construction and operation of the PACBAR III radar installation and access roads in Saipan since we know of no other local government or private action that should be considered in the evaluation of impacts on the Vanikoro swiftlert, nightingale reed warbler, or the Micronesian megapode.

INCIDENTAL TAKE

Section 9 of the Act prohibits any taking (harm, harassment, mortality, etc.) of listed species without specific exemption. Under the terms of Section 7(b)(4) and 7(0)(2), taking that is incidental to and not intended as part of the agency action (in this case your construction and operation of the PACBAR III radar facility and road improvements and extensions on Saipan) is not considered taking within the bounds of the Act provided that such taking is in compliance with this Incidental Take statement.

We do not expect any mortality of any of the three listed species subject to this consultation to occur as a result of this action as it is described in your letter and the Draft EA. However, some harassment in the form of noise, general vehicle and personnel activity, and other disturbances generated by the construction and operation of the facility and roadways may occur.

Both the Vanikoro swiftlet and the nightingale reed warbler are highly mobile, and would be expected to avoid such disturbance easily by flying elsewhere. However, the Micronesian megapode may be terrestrial and territorial, and harassment may occur if a megapode is in the area of the construction-related disturbances. If such incidental take by harassment is experienced, and if the take does not result in the physical injury or mortality of adult megapodes, authorization for such take is hereby given. However, if, either before, during, or after construction, it is discovered that a megapode nest may in any way affected by your activities so as to constitute “take” this Incidental Take Provision does not allow for such take. If a megapode nest is discovered, all project-related activities in the area of the nest is discovered, all project-related activities in the area of the nest shall cease pending re-initiation of this consultation. As suggested in your Draft EA, the potential for adverse impacts would be decreased if affected areas are surveyed by a qualified biologist immediately prior to any construction activities.

Response to this Service in the event of any mortality to any of the three (swiftlet, warbler, or megapode) resulting from the project should be directed to:

William R. Kramer
Deputy Project Leader
Office of Environmental Services
U.S Fish and Wildlife Services
P.O. Box 50167
Honolulu, Hawaii 96850

BIOLOGICAL OPINION

It is our biological opinion that your authorizing and funding the construction and operation of the facilities and structures associated with the construction and operation of the PACBAR III Radar Station, Saipan, is not likely to jeopardize the continued existence of any of the three referenced listed species.

Because there is no designated critical habitat within or near the project area, no destruction or adverse modification of critical habitat will occur.

CONSERVATION RECOMMENDATIONS

Section 402.02 (Definitions) of Section 7 of the Act states that discretionary measures which would serve to minimize or avoid adverse effects of a proposed action on listed species or critical habitat may be recommended. We believe the “Mitigation Measures” list provided in the Draft EA and reiterates (in part) previously in this letter provides many such recommendations. We would, however, advise that the following points be considered:

-That a qualified wildlife biologist be included in the roadway right-of-way survey team to insure that any megapode nests which may be in the vicinity of project activity be avoided.

- That both construction and PACBAR III facility operations personnel be advised of the critical nature of endangered species, the role of the Marpi Forest in the recovery of the three species of birds found there, and the possible impact of their actions on the welfare of the birds. Education, through such means as a poster at the entrance of the facility, for example, might warn of the danger of forest fires, and should state that harassment of any listed species (including their nests) may be in violation of, and punishable under, Federal and Commonwealth statutes. Such a poster could be developed with the assistance of the Commonwealth's Fish and Wildlife Division.

- That the possible creation of a habitat enhancement area, as suggested in the Mitigation Measures section of the Draft EA, be given careful analysis. The suggestion of planting fruit trees, for example, should be followed only if the fruit will provide endangered wildlife food and/ or habitat, and not encourage human use of the area. Likewise, a thorough analysis of the impact on endangered species of construction of a trailhead and scenic view parking area should be undertaken prior to such actions.

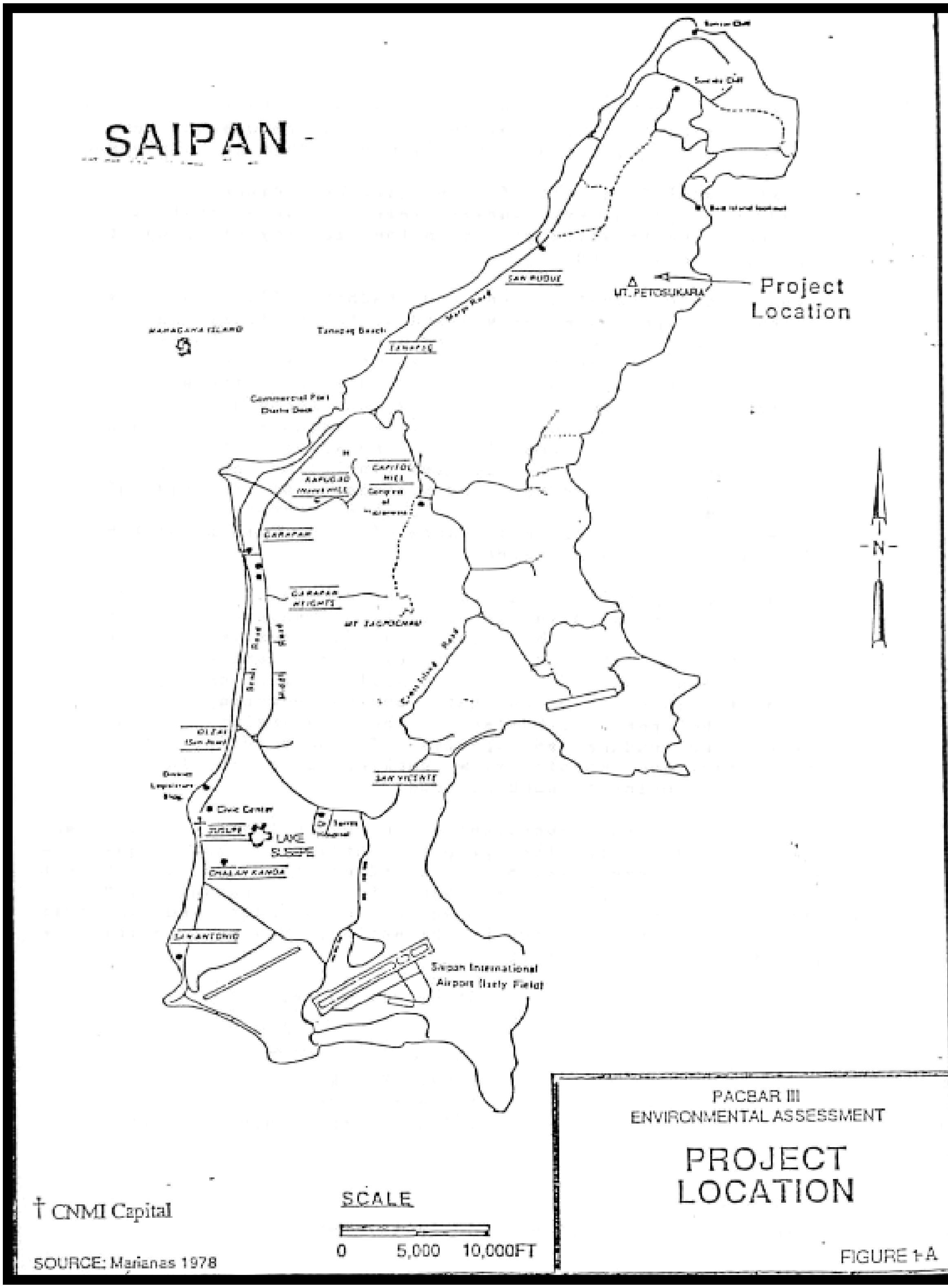
This concludes formal consultation on this action. Should any changes be made in the proposed action, should any new information become available regarding the species herein addressed which might be pertinent to this consultation, or should new species be listed which are not addressed in this letter which may be affected by the action, you must re-initiate consultation with this office.

Sincerely yours,

Orginal Signed by

Ernest Kosaka
Project Leader
Office of Environmental Services

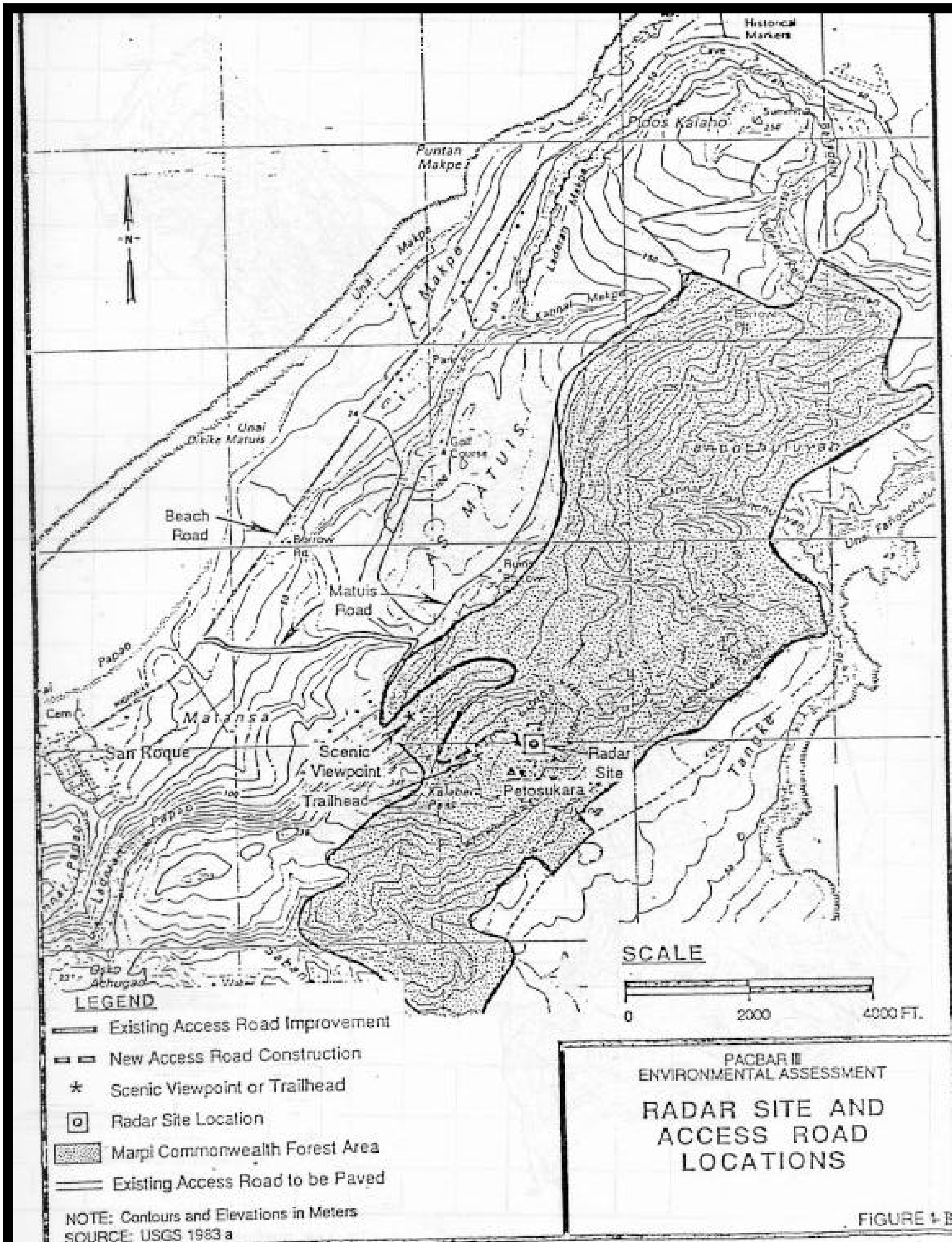
Cc: Chief, FWS, SE, Portland, OR (Attn: Swanson)



PACBAR III
ENVIRONMENTAL ASSESSMENT

PROJECT LOCATION

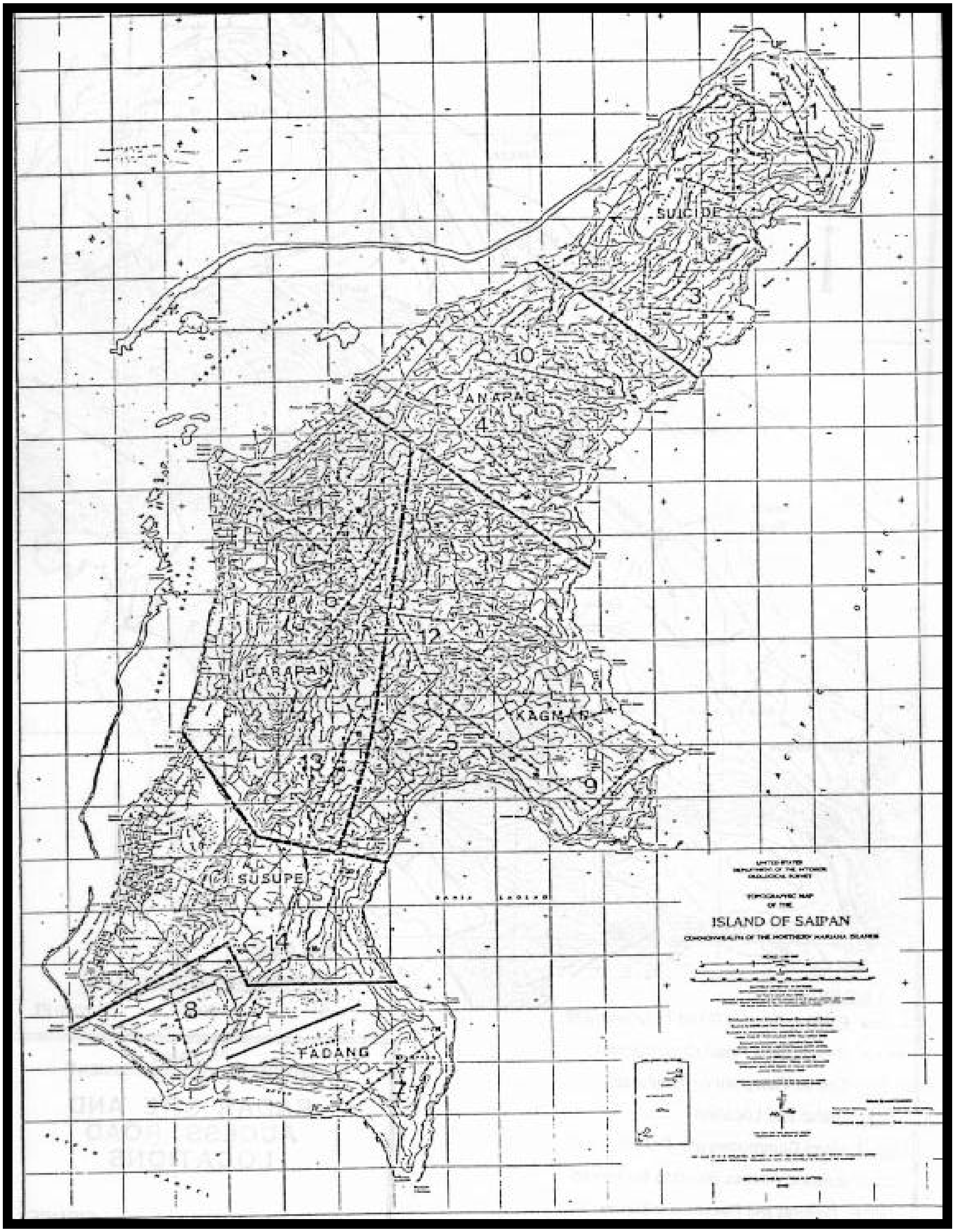
FIGURE 1-A



PACBAR III
ENVIRONMENTAL ASSESSMENT

RADAR SITE AND ACCESS ROAD LOCATIONS

FIGURE 1-B



ISLAND OF SAIPAN
SUICIDE
ANAPAG
GARAPAN
KAGMAN
SUSUPE
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APPENDIX B

MITIGATION AGREEMENT

AGREEMENT

11 DECEMBER 1986

THIS IS THE AGREEMENT entered into by the CNMI Department of Natural Resources (DNR), the Commonwealth Forester, the Fish and Wildlife (F&W) Division, and the United States Air Force as the result of the joint meeting concerning environmental mitigation measures for the PACBAR III radar project in the Marpi Forest. The agreement is as follows:

1. Turnouts. Two turnouts will be included in the project as specified in the Draft Environmental Assessment. As per the request of the U.S. Fish and Wildlife (Honolulu, HI) in their letter of 4 December 1985 (atch 1), the Air Force will provide one interpretative sign at each turnout. CNMI F&W will provide the text for the signs by 1 February 1987.

2. Abandoned Road to Boresight Tower. The Air Force will facilitate and be responsible for insuring native forest restoration in a portion of the Limestone Forest Specifically, the unnamed trailhead to the limits of the abandoned excavation (approximate location given on map, atch 2). CNMI DNR will provide Statement of work (SOW) for this task by 1 February 1987. The restoration will involve collection of seeds, use of nursery, site preparation, planting at approximately three-meter intervals, one year of maintenance which shall consist primarily of weeding, and one time replanting if necessary. Forestry anticipates seed collection will begin about October 1987 and planting in July 1988. These actions will be performed or contracted out for performance by DNR and paid for with specified Air Force funding. However, if the burden either physical or financial is too great on either party the Air Force will contract directly and insure performance.

3. Abandoned Road to Radar Site. The Air Force will provide an adequate barrier, if requested, to prevent use of the abandoned road. During road construction, the CNMI Forester will assess the need for such a barrier and its form. The Forester desires a natural barrier such as rock, a berm, or trees. The Air Force will not plant any trees, other than the natural barrier, along the length of the said abandoned road.

4. Mitigation for Intrusion in the Marpi Forest. The Air Force will provide habitat enhancement for 10.5 acres (1.5 x the impacted area). Its location will be designed by CNMI F&W. This will be accomplished in a manner similar in nature to item 2 above. The species mix may be different from that of the Limestone Forest. The DNR will provide for this task in the same SOW to provide on 1 February 1987.

5. Snake Quarantine. The Air Force will adopt approved CNMI F&W Inspection procedures (Attachment 3) for any equipment delivered from Guam. Equipment will be properly quarantined to prevent the introduction of the Brown Tree Snakes into Saipan. Air Force will specify in its construction contract that adherence to CNMI F&W and DNR quarantine procedures are mandatory on all contractors associated with the project.

6. Permit Application Complete. The above particulars and other information already provided to the DNR from the Air Force fulfill all data requirements for the DNR portion of the CRM permit process.

FOR THE AIR FORCE: FOR CNMI DEPARTMENT OF NATURAL RESOURCES:

JOHN R. EDWARDS, GS-13
Environmental Planning Division
Directorate of Acquisition Civil Engineering
US Air Force Space Division

NICOLAS M. LEON GUERRERO
Director, Department of Natural Resources
Commonwealth of the Northern Mariana Islands

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

DEC 4 1986

Mr. John Edwards
Headquarters Space Division
Los Angeles Air Force Station
P.O. Box 92960
Los Angeles, California 90009-2960

Dear Mr. Edwards:

This follows up on our conversation Tuesday regarding the PACBAR III Radar Station Project on Saipan, Commonwealth of the Northern Mariana Islands, and its possible impact on endangered species. Specifically, we discussed the mitigation's suggested in the Draft Environmental Assessment (Assessment), the conversation measures recommended in our September 9, 1986 biological opinion (our reference number 1-2-86-F-091), and other planned actions pertinent to those species.

1. One of our concerns in our previous review of the Assessment was that the construction of a scenic pull-off and a parking area for a trail head along the access roadway would both destroy vegetation through clearing and encourage poaching in the Marpi Forest.

-The scale o such clearing is smaller than we first believed, and we were pleased that parking areas would be constructed close to the access road, not far back into the forest area. As such, the amount of vegetation lost would be minimal.

-Parking areas would not necessarily increase human intrusion, as roads already exist in this area, and ample room to park cars is currently available. A concern has been that the project roadways and parking would ease access for poachers. However, as poachers already have access, the creation of higher quality roads and parking would be expected to cause an increase in visitation by legitimate hikers, tourists, and other who may, in fact, act to discourage poaching. Also, as we discussed, the 24-hour staffing at the radar site might actually aid in discouraging poaching in the project area.

2. We were pleased to learn that you intend to work closely with the Commonwealth Forester in developing re-vegetation plans for areas which may need to be temporarily cleared and in investigating possibilities for the development of plots for planting species which may benefit native wildlife. Likewise, as suggested in both the Assessment and our biological opinion, your plans to cooperate with the Division of Fish and Wildlife biologists in surveying the road right-of-way and other impacted areas for the presence of endangered species prior to actual construction is encouraging.

3. We suggest you coordinate the content, layout and construction of public information signs regarding the protected species of the Marpi Forest with the Commonwealth Forester, the biologists of the Division of Fish and Wildlife, and, perhaps, Mr. Gordon Joyce of the National Park Services at the American Memorial Park in Garapan.

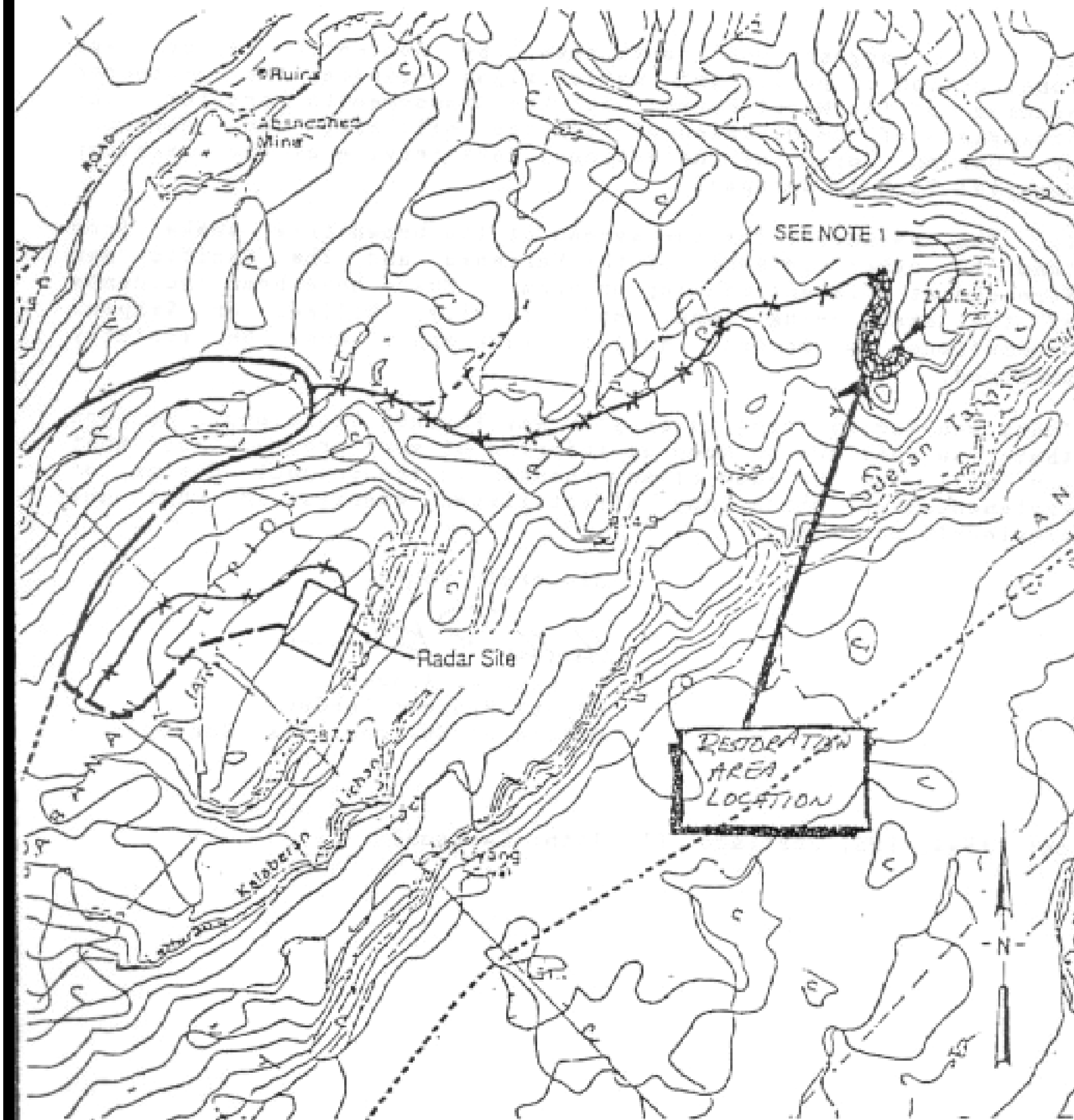
4. The potential for the spread of the brown tree snake from Guam to other islands of the Marianas and the Pacific was stressed at a recent meeting on Guam. There have been incidents of the snake being seen, and, likely, killed, on Saipan. Precautions to protect against such entry must be strictly enforced.

Thank you for visiting us on your way through to Saipan. We hope that you continue to keep us informed of your progress and that you will let us know of any changes in the project design or implementation, which may affect listed species in ways not previously addressed.

Sincerely yours,

William R. Kramer
Deputy Project Leader
Office of Environmental Services

Cc: AFWE, FWS, Portland, OR (Attn: Swanson)



LEGEND

EXISTING UNPAVED ROAD

PROPOSED ROAD TO BE CONSTRUCTED

BULLDOZER PATHWAY CLEARED IN 1985, TO BE ABANDONED AND REPLANTED AS NECESSARY

NOTE 1: This site was the location of the Boresight Tower before it was eliminated from the project design in June 1986.

SOURCE: DNR 1985b

SCALE

0 1000 FEET

PACBAR III
ENVIRONMENTAL ASSESSMENT

ROAD ALIGNMENT ALTERNATIVES

FIGURE 4.7

Requirements to prevent accidental snake introduction into C.N.M.I. form cargo vessels loading or stopping at Guam.

Guam is currently experiencing an environmental catastrophe of historical proportions as a result of the accidental introduction of the exotic Brown Tree Snake. The population of this unwanted and destructive pest has recently (1985) Been estimated at form one to three million individuals on Guam. Its inadvertent introduction into Saipan would be disastrous to the wildlife and domestic poultry populations and would adversely affect Saipan's leading industry, its tourist industry. Because of the gravity of this threat, the Division of Fish and Wildlife requires that the following measures be taken by any permit holder who will be shipping materials of any type from or through Guam to any island in the C.N.M.I:

1.) Department of Natural Resources "Let's Keep Our Islands Snake Free!" posters must be prominently posted and protected from the elements a.) at the cargo loading point in Guam, b.) on board all cargo carrying vessels, c.) at the cargo receiving point on Saipan, and d.) at the cargo receiving point at the project site. These posters must be maintained throughout the construction period and at the completed project site as long as cargo for Guam is being received.

2.) A search for stowaway snakes must be accomplished on all boats carrying cargo for the project from Guam during the construction period. This search must be done while at sea.

3.) The project manager must designate an official "snake quarantine officer" who must submit more detailed plans for carrying out the above provisions to the Division of Fish and Wildlife and the Division of Animal Health and Industry for their approval before construction is initiated.

DRAFT 5/6/86 DFW

APPENDIX J

Comments and Responses
To
July 1986 Revised Draft Environmental Assessment

List of Persons and Organizations
Commenting on Revised Draft EA

1. Pedro P. Tenorio
   Governor
   Commonwealth of the Northern Mariana Islands
   Saipan, Mariana Islands 96950
   Phone: 6407/6408/6581
   Telex: 783-622 Gov.NMI

2. Paul J. Conroy, President
   Marianas Audubon Society
   P.O. Box 4425
   Agana, Guam 96910

3. Loretta kahn Barsamian, Chief
   Federal Activities Branch
   United States Environmental Protection Agency
   Region IX
   215 Fremont Street
   San Francisco, CA 94105

4. Coastal Resources Management Office
   (Robert Rudolph/Tami Grove)
   Commonwealth of the Northern Mariana Islands
   Office of the Governor
   Saipan, Mariana Islands 96950
   Telex: 6623/7320

Commonwealth of the Northern Mariana Islands
Coastal Resources Management
Office of the Governor
Saipan, Mariana Islands 96950

AUG 13 1986

Phone: 6407/6408/6581
Telex: 783-622 Gov.

Major Tommy Anderson
WSMC/ROPA
Vandenberg AFB, CA 93437-6021

Dear Major Anderson:

This will officially acknowledge receipt of the Draft copy of the amended Environmental Assessment for the proposed PACBAR III radar Tracking Station which the U.S. Air Force proposes to place in the Mt. Petosukara region of Saipan. I appreciated the opportunity to discuss the project with you via telephone on August 8, 1986. This letter will serve to supplement our conversation.

As you are aware, there was considerable opposition to the project when a public hearing was held on Saipan last April. The Lieutenant Governor's letter of July 3, 1986 served to bring the objections to the project into proper focus. Since hat time, the opposition has been strengthened by the passage by the House of Representatives of House Joint Resolution 5-13. This resolution urges that the directors of the Coastal Resources Management Program deny the request of the Air Force. It further requests that the installation not be located in the Northern Mariana Islands. This resolution is now awaiting action by the Senate. In addition, full-page advertisements were placed in local newspapers on Friday, August 8, 1986 and my office has received numerous letters expressing strong opposition. I am enclosing copies of the petition, an advertisement, House Joint resolution 5-13 and a sample letter, which my office recently received, all of, which indicate strong opposition to locating the radar installation in the Commonwealth.

In my opinion, those who stand in opposition are respected within the community, well organized and have broad-based community support. The people of the Commonwealth, while pro American, have vivid memories of the destruction and havoc which occurred during World War II and are very opposed to any project which, in their opinion, will expose them and their families to unnecessary risk.

I hope that our conversation and this letter will be of some assistance to you and the Air Force Command in re-evaluating the proposed location of the PACBAR III project in the Northern Mariana Islands.

If I can be of any further assistance, please feel free to contact me.
Sincerely,

PEDRO P. TENORIO
Governor

OFFICE OF THE PRESIDENT
The Senate
FIFTH NORTHERN MARIANAS COMMONWEALTH LEGISLATURE
P.O. Box 129
Saipan, CM 96950

JULIAN S. CALVO
President of the Senate

Phone: 7292/6534/6539

July 30, 1986

The Honorable Pedro P. Tenorio
Governor, Commonwealth of the
Northern Mariana Islands
Saipan, CM 96950

Reference: House Joint Resolution 5-13/U.S. AIR FORCE Radar Station

Dear Governor Tenorio:

The senate has recently received House Joint Senate Resolution 5-13, from the House of Representatives request which Senate approval. For your convience, I am enclosing a copy of the Resolution.

The Senate has been requested to consider this matter. However, at this time we do not have sufficient information concerning the Air Force's proposal to install an anti-satellite radar tracking station on Saipan to be able to make an informed decision concerning this matter?

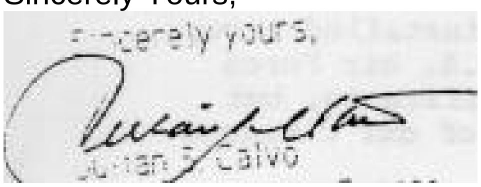
As such, you are kindly requested o provide the Senate any information you may have concerning the Air Force's request. In particular a copy of the application, which may have been filed with the Coastal Resources Management Office; Environmental Impact Report; or other information which may possibly assist us in the decision which we have been ask to make.

Additionally, if your office has prepared a position paper or alternative proposal on this matter a copy of such would be helpful.

Governor Tenorio
July 30, 1986
Page Two

We recognize that this issue should be acted upon without undue delay, so your attention to this request would be appreciated.

Sincerely Yours,



President of the Senate

The Honorable Pedro P. Tenorio
Governor, CNMI
Saipan, CM 96950

Dear Gov. Tenorio:

This will demonstrate to you that we, the people of the CNMI, are completely against the installation of the proposed U.S. AIR FORCE Radar Station anywhere in the CNMI.

We refuse to become a nuclear target which the U.S. Military may consider "expendable" to protect the continental United States. We believe that if the radar station is installed here, we will be placed on Russia's taget list. The U.S. AIR FORCE may say that the radar is of minor military signifigance, but the Russians will not believe them even if some of our citizens do.

We expect you to veto this U.S. AIR FORCE proposal in response to the demands of your people.

Sincerely,

Margarita C. Matagolai

RESPONSE TO COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS, OFFICE OF THE GOVERNOR
LETTER RECEIVED AUGUST 13, 1986

Comment 1: Letter acknowledges receipt of the revised Draft EA and summarizes the status of public opposition to the project.

Response 1: The Air Force is aware of the well-organized opposition to the proposed project. It has responded to many public concerns by eliminating a major aspect of the project (the Boresight Tower) and by including many measures to mitigate the potential effects of the project. These include re-design and partial paving of the Access Road to alleviate existing siltation problems in the lagoon. Most of the roadway currently exists as a dirt road into and through the Marpi Commonwealth Forest. Other measures include habitat protection and enhancement actions and reclamation of previously disturbed areas.

Comment 2: The letter expresses that the project opponents have broad-based community supports and believes the project will expose them to unnecessary risks.

Response 2: The PACBAR III projects are much smaller in size and in scope to other radar installations located in the Philippines and Kwajalein. These installations have been operative continuously, for many years, and without incident of even a local nature.

Comment 3: The letter requests that the Air Force reevaluates the projects proposed location.

Response 3: As Stated in Section 1.1.1 Figure 1.1 of the EA, one of the purposes of the proposed project is to provide coverage for a blind area between two other DOD radar stations: PACBAR I at Kwajalein in the Marshall Islands, and PACBAR III facility within the Northern Marianas area. Location of the radar facility elsewhere would be counter to the purpose of the project and its missions, as it would not enable such coverage to be obtained. The procedure, which resulted in Saipan being the preferred location is extensively, documented in the EA, Chapter 4.0, Description and Comparison of Alternatives.

RESPONSE TO THE SENATE,
FIFTH NORTHERN MARIANAS COMMONWEALTH LEGISLATURE,
LETTER OF JULY 30, 1986

Comment: The letter express concern relative to the proposed PACBAR III Project.

Response: This radar does not contribute to anti-satellite targeting. The missions are stated in Section 1.1.1 of the EA.

RESPONSE TO MARGARITA C. MATAGOLAI LETTER
NO DATE

Comment: Letter expresses opposition to the proposed project and perceives international implications.

Response: The proposed radar project would be one of a network employed by the U.S. Armed Forces on a worldwide basis for the routine tracking of satellites and monitoring of splashdowns, such as are associated with the U.S. Man-In-Space program. This type of radar has been operational for many years, without incident.

MARIANAS AUDUBON SOCIETY
P.O. BOX 4425, AGANA, GUAM 96910

27 August 1986

Raphael O.Roig
Chairman, Space Division
Environmental Protection Committee
HQ Space Division
P.O. Box 92960
World Way Postal Center
Los Angeles, CA 90009

Dear Mr. Roig:

The conversation committee of the Marianas Audubon Society has reviewed the Draft Environmental Assessment (July 1986) for the revised PACBAR III Radar Station proposed for Saipan, Commonwealth of the Northern Mariana Islands (CNMI). We submit the following comments.

1. We agree that the elimination of the Boresight tower and its access road greatly lessens the expected environmental impacts at the Marpi Forest site, however, we feel the project will still seriously degrade the natural integrity and aesthetic value of the Marpi Forest reserve and a set a precedent for future non-conservation related use of wildlife and forest reserves in the CNMI. We urge that an alternate site such as Massaolog on Tinian that is already leased by DOD for military purposes be selected and the Marpi Forest Reserve be retained unaltered for its intended purpose of natural resource conservation.

2. Sections 3.4 and 3.8. The EA has given inadequate consideration as to how the project facilities will degrade the aesthetic value of the forest reserve. The project facilities will dominate the view in the forest reserve reducing the wilderness value the reserve now has. The increase in noise and daily vehicle traffic associated with the operation of the facility will also reduce the wilderness value of the area. The project will intrude into the Marpi Forest Reserve without adding significantly to the natural resource conservation values of the area. We feel the Marpri site should have been eliminated from initial consideration because of its status and value as a Forest Reserve with the intended purpose for forestry, wildlife, and recreational use, such as was done for other alternatives in 1.1.2 #3. We feel the Air Force should cooperate with local efforts to conserve natural resources rather than impede them. We feel the sanctity of the reserve is of such importance that it warrants the selection of another site even though it may have grater logistical problems or be less efficient.

3. Section 3.14. We disagree with the interpretation of the potential cumulative effects. We believe the project will set a precedent for future encroachment into areas set aside for natural resource protection, not only in the Marpi Forest but in other designated conservation areas as well. As case in point, during a 24 April 1986 meeting with CNMI Agencies and he MAS, Air Force Representatives repeatedly cited the existence of an identical radar facility in a National Park in Hawaii as proof that it was OK for such facilities to be built in conservation areas on Saipan. Others will no doubt offer the same rationale that their projects only require a small part of an area, will have insignificant impacts on the immediate project site, will provide local jobs and economic gains, and that the proposed site is the best for the project, regardless of the existing land use plans and conservation goals. We are concerned that this project will set a harmful precedent

for chipping away at CNMI conservation areas that will be extremely difficult to overturn.

4. Section 3.7. Impacts on Flora/Fauna.

   a. We are concerned that the project will have both short and long term adverse impacts on the endangered Micronesian Megapode population in the area. It is unknown what immediate impact the construction and daily operational activities will have on the small megapode population in the area. The road bisecting the Forest Reserve mat serve as a barrier to movements and population mixing between the southern and northern parts of the Forest Reserve, greatly reducing the role of the forest as a wildlife conservation area. Siting the project elsewhere is preferred to taking a chance on disrupting an already small-endangered population residing in an existing conservation area.

   b. We doubt the suggestion that the facility might reduce poaching. Poachers on Guam routinely trespass to poach in heavily guarded and patrolled areas on Anderson Air Force Base and Naval Magazine. It appears that the proposed facility will be not be guarded nor the surrounding area patrolled.

5. Section 3.12. As stated, the projects will have some favorable impacts on the recreational use of the area, improving access and providing a scenic viewpoint. However, the project will also limit other uses such as camping (undesirable) or legal gun hunting (unsafe) in the general vicinity of the project facilities. The Marpi Forest Reserve has a designated function for public recreational use that this project will restrict to some extent. Siting the project on leased DOD land on Tinian orleased private property elsewhere will not have as great an impact on public recreational use.

6. Comparison of alternatives-Mission objectives section 4.1.1.1. We feel the numerical ranking analysis used for comparing sites is inappropriate in this case because ranking analyses can be arbitrary, make inaccurate comparisons by exaggerating minor differences, and, therefore, be misleading. We urge that this section be rewritten to clarify the relative ability of each alternate site to meet mission objectives. The following examples and discussion illustrate our point.

   a. Fig. 4.4-Factor 2. Ranking system can exaggerate minor differences between the sites. Dandan has a ranking of 5 for the "distance to splash down" limitation of Mission Objective III and Mt. Petosukara has a ranking of 1. Is the lowest elevation to which the Dandan site can track a re-entry object actually 5 times higher than the corresponding elevation at the Mt. Petosukara site? Likewise, is the lowest elevation to which the Tinian sites can track re-entry object actually twice that of the Mt. Petosukara or Mt Tagpochau sites? Tinian and Saipan are only separated by a few miles and a two-fold difference seems large. We suspect the rankings may exaggerate minor ddifferences between sites.

   b. Fig 4.3-Factor 2. Airplane traffic was ranked at 2 for Danadan, 3 for Tinian sites, and 1 for all other sites. Does Tinan actually have 3 times the traffic as Saipan sites and 1/3 more traffic than Guam? Again, the ranking analysis used may exaggerate what are minor differences between sites.

   c. Fig. 4.3 and 4.4-Factor 2. Does Mt. Tagpochau actually have twice the natural blockage limitation in the 270°-90° range for mission objectives II and I twice the natural blockage limitation in the 380°-70° range for mission objective III than Mt. Petosukara? Limitations such as natural blockage would be more fairly compared if listed as the actual azimuth and elevation blocked at each site. Those values could then be expresses as the percent of the radar's potential range of view that is blocked.

   d. Section 4.1.1.1. Another potential bias in the ranking analysis used is that limitation from natural blockage and safety blockage may cancel each other our instead of being additive as presented in this analysis. For instance, if the radar cannot operate below a certain elevation for safety reasons, then it is irrelevant if there is natural blockage in that region. Hence, natural blockage would be overrated at sites where safety blockage is a factor. Once again, it would be better to present site limitations as the actual azimuth and elevation blocked at each site. Those values could than be expressed as the percent of the radar's potential range of view that is blocked.

e. Section 4.1.1.1. With the information presented, the ranking system also seems to be somewhat arbitrary. For instance, the Tinian sites have a limitation ranking of 3 in airplane traffic for mission objective I and II (Fig.4.3-Factor 2) but a ranking of 4 in airplane traffic for mission objective III (fig. 4.4-Factor). Why is this? The quantity of airline traffic does not change for mission objectives. Likewise, the Dandan site has a limitation ranking of 2 for natural blockage in the 270°-90° range for mission objectives I and II (fig. 4.3-Factor 2) but a ranking of 5 natural blockage in the 340°-80° range for mission objective III (Fig. 4.4-Factor 2). The difference in rankings is not apparent since there is a ridgeline of 1,332 feet elevation to the north-northwest of Dandan and 1000 feet to the north. Intuitively, it would seem that the blockage would be similar for all three-mission objectives and produce more similar rankings. Another example where ranking appears to be inconsistent is in the relative rankings of natural blockage in the 270°-90° range for mission objectives I and II (Fig. 4.3-Factor 2) between Dandan and Tinian. The Dandan site was ranked 2 and the Tinian site was marked 4. Why is Tinian ranked 4 when the elevation difference between the site and mountains on Saipan is comparable to the elevation difference between Dandan and the Mt. Lamlam ridge Guam?

f. The above examples (6a-e) illustrate the bias inherent in the ranking analysis used and we are concerned that the bias may have exaggerated the significance of minor differences between sites. We presented a few examples that illustrate these points and would like to stress that the same bias may be included in each limitation category. A more quantitative analyses may provide a more accurate comparison. An appropriate method would be to present the limitation as actual values, i.e., azimuth and elevation blocked at each site by natural barriers or safety concerns, average daily airplane traffic, etc. These values could then be converted into an index relative to the Mt. Petosukara site, weighted, and compared.

7. Section 4.1.1.1 #16. We agree that in ranking analysis used, the Mt. Petsosukar sit best meets mission objectives of the sites considered. However, we feel that site also has relatively higher environmental impacts than other sites 9see 8). Will an alternate site **adequately** meet mission objectives with lesser environmental impacts? A stated in the 24 April public hearing, this radar station is not a component of the U.S. missile defense shield and as such we feel that mission objectives can be balanced with environmental impacts. Do other similar installations now operate with comparable or more limitations than the Mt. Petosukara site will have? **NASA** currently successfully operates a similar radar tracking station from the Dandan site that has a limitation ranking nearly twice that of the Mt. Petosukara site. How does the currently operating **PACBAR I** and **II** rank in comparison to the Mt. Patosukara site or Massalog site using the ranking analysis in section 4.1.1.1?

8. Comparison of alternatives: Environmental Impacts-Section 4.1.1.3. Section 4.1.1.3-2 states that "no attempts has been made to apply weighting factors to differeniate the relative importance of environmental issues…" We agree with the conclusion that such values differ for each individual. However, we would like to point out that you did apply weighting factors by assigning each category a number ranking and overall rating. Each category now has equal importance. We question some of the assessed values in table 4.3 on

environmental impacts and feel that impacts at the Mt. Petosukara site (B) is in a conservation and public use area, we think it should have rankings of 3-4 for noise, RF emissions, and aesthetics, certainly comparable to the impacts assigned to the Saipan Suicide Cliff site. Because the Marpi site is a designated conservation area with a known small population of the endangered Micronesian Megapodes and those birds inhabit areas adjacent to construction and road building areas, we suggest that potential short and long term impacts on flora/fauna merit a ranking of 3-5. Likewise, because this project would be the first intrusion into a conversation reserve and the project is not consistent with conservation use, land use impacts should be rated as 3-5. As such, we feel that the Mt. Petosukara site still has unacceptably high environmental impacts and feel that the project should be sited elsewhere.

9. Table 4-3, Section 4.1.2, Section 4.1.3.2. We agree that the Guam Dandan and Tinian Massalog site have considerably less environmental impacts than other alternatives examined and urge selection of either of these sites for the project.

10. Section 4.1.4 #3. The points in this section about the conversation area status of Mt. Tagpochau site and the presence of the endangered Vanikoro Swiftlet suggest that this site should also have higher environmental impacts than it was given. Environmental Impact ratings for flora/fauna and land use in table 4.3 should be increased.

11. Section 4.1.4 #2,5,6. Summaries of environmental impacts at these Saipan sites indicate that they were partially rejected because of potential RF emission exposures. Why is that not a reason o eliminate the Mt. Petosukara site as well since it is a public area?

12. Comparison of alternatives: Other sites not considered. Considering the public concern expressed at the April 24th public hearing and the extensive comments expressing displeasure with the Mt. Petosukara site, why were no other sites given serious consideration for the revised EA. Sites on Guam that seem to have excellent potential but were not considered are Nimitz Hill, central Guam and Mt. Santa Rosa, northern Guam.

13. Other issues. The increased threat of attack to Saipan and CNMI from siting this project on Saipan were only briefly discussed in section 3.14 and Table 1 of the transmittal letter. Considering that this was a major concern and issue at the public hearing, it should be discussed in detail in the EA.

14. Needed revisions. As pointed out in numbers 6,8, and 12 above, we feel the final document should be revised and present additional information on evaluation of mission objectives at alternate sites (details in 6f), a reevaluation of environmental impacts at the Mt. Petosukara site, and consideration of additional alternatives.

In conclusion, we feel that if the project is implemented at the Mt. Petosukara site, it will have higher environmental impacts than at the Tinian Massalog site, because of (1) the intrusion into a designated conservation area, (2) the precedent set for other intrusions into conservation areas, (3) the potential short and long term impacts on the endangered Micronesian Megapode, (4) degradation of the aesthetic value of the Marpi Forest Reserve, and (5) reduction of some recreational opportunities in the Mapri Forest reserve. Other sites may adequately meet mission objectives and offer environmental impacts and should be given serious consideration for the projects.

Thank you for the opportunity to comment on this project.

Sincerely,

Paul J Conry

Paul J. Conry
President Marianas Audubon Society

Cc: Ms. Tami Grove
Coastal Resources Management
6th Floor, Nauru Bldg.
Saipan, CNMI 96950

Mr. Norman Lovelace, Chief
U.S. Environmental Protection Agency
215 Freemont Street
San Francisco, CA 94105

Ms. Fran Weber
National Audubon Society
645 Pennsylvania Avenue, S.E.
Washington, D.C. 20003

RESPONSE TO MARIANAS AUDUBON SOCIETY
LETTER OF AUGUST 27, 1986

Comment 1: Project will seriously degrade aesthetic value of the Marpi Forest, even with the elimination of the Boresight Tower and Access Road.

Response1: It is understood that the environmental impacts were not totally eliminated by removal of the Boresight Tower site from the project. However, the most significant impacts were eliminated, the remaining overall effect evaluated and addressed in the EA, and a finding of no significant impact has been reached.

The concern that the PACBAR III project might set a precedent for development is understood. However, it should be noted that, in the past, other Air Force systems have been introduced into remote, undeveloped areas such as Kana Point, Oahu, Hawaii, and Big Sur, California, and have not induced further development.

Other alternative sites were considered, as discussed in Section 4.1. The Mt. Petosukra site was chosen as the preferred site overall based on consideration of a composite of environmental and operational factors.

Comment 2: The EA is inadequate in addressing aesthetic impacts of the proposed project.

Response 2: USAF concurs regarding impacts to the forest, and they have been addressed in the EA. It has been determined that there would be no significant impact, especially with elimination of the Boresight Tower.

Project-related noise is addressed in Sections 3.4 and 5.2.4 of the EA. As discussed, the diesel generators utilized for the project will be located inside a building and will be supplied with exhaust silencers, soundproof insulation, and vibration dampners. Air Force occupational noise standards, more stringent than those of OSHA, will be met.

Certain alternative sites were eliminated from consideration early in the study. These were: (1) shipboard radar's, (2) Anderson Air Force Base on Guam, and (3) other, less developed and uninhabited Islands. These sites were eliminated for reasons of operational insufficiency and excessive costs.

In response to local environmental concerns, the Boresight Tower and its access road were eliminated form the project, thereby assuring that there would be no construction in the limestone forest and decreasing overall land requirements by about 50%. This action was taken, although it will result in an overall increase in operational costs, due to the increased difficulty in calibrating the radar.

Comment 3: The project sets a precedent for future encroachment into designated conservation areas.

Response 3: Future Air Force expansion into the forest is not likely because the U.S. Air Force recognizes and respects the strict conservational goals established by the CNMI Coastal Resources Management Office. Further, other Air Force Systems introduced into remote, undeveloped areas have not induced further development (see Response #1, above).

Comment 4: The project will have adverse impacts on flora/fauna.

Response 4a: A section 7 Consultation with the U.S. Fish and Wildlife Service in Honolulu, Hawaii was conducted. As a result of this action, the U.S. Fish and Wildlife Service determined that the project, as planned, is not likely to jeopardize the continued existence of any of three potentially affected Federally listed endangered species (Micronesian megapode, Vanikoro swiftlet, and Nightingale reed warbler).

Response 4b: It is possible that, rather than being reduced, the incidence of poaching will be unaffected by the proposed radar facility.

Comment 5: The project will have an adverse effect on recreational uses of the area.

Response 5: The overall beneficial effects on recreational use, such as the improved access and planned trailhead and scenic viewpoint, offset the localized adverse effect of the presence of the project within the forest. It is anticipated that, overall, the project will benefit recreational use of the area.

Comment 6: The numerical renaming analysis used for comparing potential sites is inappropriate.

Response 6: It is agreed that any ranking system will be somewhat arbitrary, as subjectivity is involved even in choosing the factors to be ranked. However, the system which was developed and utilized for this project represents the results of numerous Air Force environmental, engineering, and operations personnel in developing a system whereby the factors of greatest importance are set forth and measured in a rational and objective manner. The system, which was utilized and is represented in the EA, provides the most useful information, given the complexities of the analysis.

Response 6a: The numeric rankings are meant to be comparative rather than arithmetic, whereby one ranking is not meant to be a multiple of another number.

Response 6b: The ranking of airplane traffic is concerned with potential operational interference. The factor of greatest importance is the direction of air traffic relative to the antenna rather than the number of airplanes. Because viewing in the northerly direction is important for each mission, the presence of aircraft near the radar horizon toward the north will have the greatest potential for detrimental impact. Aircraft landing at the Saipan airport make their final approach at the southern part of the island where they are topographically shielded from the Saipan sites. However, these same aircraft would be just north of, and unshielded from, the Tinian site.

Similarly, aircraft on final approach to the Guam airport would be far from the Dandan site and in the "shadow" of intervening high terrain.

Response 6c: The numerical rating system is explained above in paragraphs 2 and 2b. The addition of another variable (percent of potential range of view that is blocked) would not enhance the usefulness of the analysis.

Response 6d: The natural/safety blockage mission limitations do appear to be a "double counting" in some cases. However, broken down in this manner, it gives a better understanding of the mission limitations. As indicted in Figures 4.3 and 4.4, the impacts of natural and safety blockage are often very different at a particular site.

Response 6e: As discussed in 6b above, the most important factor in evaluating airline traffic interference is the direction of air traffic relative to the antenna, not the number of airplanes.

The difference in ratings for Objectives I and II compared to Objective III relate to the fact that Objects I and II involve objects in space, while Objective III involves objects on the earth's surface. The ridgeline might provide some hindrance to tracking objects in space (Objectives I, II), providing the basis for the rating of 2. However, it could preclude tracking objects on the surface (Objective III), providing the basis for the rating of 5.

The primary factor in determining natural blockage is topographic obstruction, such as nearby peaks and ridges, as well as those on other islands. Elevation, therefore, is to be considered in conjunction with these other factors.

Response 6f: The EA explains the rationale and use of the evaluation system that was utilized. Further, the discussions in Sections 4.1.1.2 and 4.1.1.3 compare the additional factors of land and facilities availability and cost (Table 4.3), plus individual and overall environmental impacts (Table 4.2). When the results of these analyses are considered in conjunction with the operational analyses presented in Section 4.1.1.1. the choice of the Mt. Petosukara site becomes more apparent. USAF is confident that development of a different “index” system would be time consuming and would result in conclusions not significantly different than those presented in the EA.

Comment 7: The Mt. Petosukara site has relatively greater environmental impacts than other sites considered.

Response 7: As shown in Table 4.3, the Mt. Petosukara site has a lower environmental ranking than all but two other sites, Dandan (Guam), and Mt. Tagpochau (Saipan). However, the Mt. Petosukara is preferred, due to operational constraints of the other two sites. As discussed in Section 4.1.1.1, the Dandan site has significant operational limitations. Of all the sites considered, it is least capable of tracking splashdown, incapable of completely satisfying Objective III (recording splashdown), and has significant limitations for objectives I and II due to both natural and safety blockage factors. The Mt. Tagpochau site has severe limitations relative to fulfilling the requirements of Objective II due to safety blockage in all directions and natural blockage to the north. These considerations are presented indetail in Section 4.1.1.1 and Figures 4.3, 4.4, and 4.5 of the EA.

A comparison study of PACBAR I (Philippines) and PACBAR II (Kwajalein) with two of the least appropriate sites considered for the project is outside the scope of this environmental Assessment for PACBAR III.

Comment 8: Some of the categories for Mt. Petosukara should have higher rankings, as it is in a conservation and public use area.

Response 8: The factors of noise, RF emissions, and aesthetics are higher for Suicide Cliff than for Mt. Petosukara because the Suicide Cliff is actively used as a tourist attraction due to is aesthetic quality. The Mt. Petosukara site is in a less-accessible and less-used area. Although the antenna will be visible, the buildings will be screened by the heavy forest growth and intervening topography.

As states by the U.S. Fish and Wildlife Service in its Section 7 Consultation letter, the PACBAR III project is not likely to jeopardize the continued existence of any of the three referenced listed species (see Response #4a, above).

Comment 9: Statement of preference for selection of Dandan, Guam, or Massalog, Tinian sites.

Response 9: USAF agrees that either the Dandan, Guam, or Massalog sites would have somewhat less of an environmental impact than the Mt. Petosukara site. However, this is not the only factor to be considered, as project objectives also must be met. Both the Dandan and Massalog sites have operational constraints, which preclude the selection of either as the preferred site for the PACBAR III Radar Facility (see above Response #7).

Comment 10: Impacts to Mt. Tagpochau site should be greater than shown in table 4.3.

Response 10: It would be productive at this time to alter the results of the environmental analysis for one site, as it would not affect the overall of the environmental analysis for one site, as it would not affect the overall results of the Comparison of Alternatives presented in Chapter 4.0 of the EA.

Comment 11: Perhaps the Mt. Petosukara site should have been eliminated because of potential RF emissions exposures.

Response 11: The RF emissions and analyses discussed in Section 3.5 and Appendix E of the EA show that safety to the public can be provided at the Mt. Petosukar site without excessive impacts to mission capabilities.

Comment 12: Other sites on Guam should have been considered in the revised EA.

Response 12: The site survey analysis included all of Guam, as well as Tinian and Saipan, but because of several factors, no site on Guam, other than Dandan, was deemed worthy of study. On the northern portion of the island, all potentially “good” space surveillance sites are already accepted by other powerful emitters or sensitive receptors, making electromagnetic interference a two-way certainty. On the southern portion, high points are in rugged, mountainous terrain with few roads of any kind. Dandan appeared to be the only feasible location, although serious horizon blockage does exist, and the site is very far from the missile test impact area.

Comment 13. The threat of attack should be discussed in detail.

Response 13: As stated in the EA, the PACBAR III project is not related to ballistic missile defense. Saipan is not likely to become a target due to the presence of this project on the island.

Comment 14: There should be consideration of other sites, reevaluation of Mt. Petosukara, and consideration of additional alternatives.

Response 14: USAF concurs that it would be possible to reevaluate the proposed project and alternatives and to conduct analyses of additional elements of both the environment and the proposed project. USAF believes, however, that the number and extent of analyses to date are appropriate to the type and size of the project and the potential impacts. Additional analyses would be unlikely to produce enough new information to alter the conclusions presented by the analysis discussed in the EA.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

25 SEP 1986

Mr. Ralphael O. Roig
HQ Space Division
P.O. Box 92960
Worldway Postal center
Los Angeles, CA 90009

Dear Mr. Roig:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Assessment (EA) titled CONSTRUCYION AND OPERATION OF REVISED PACBAR III RADAR STATION, SAIPAN, CNMI. We have the enclosed comments regarding this EA.

We appreciate the opportunity to comment on these EA and request 3 copies of any subsequent National Environmental Policy Act documents. If you have any questions, please contact David Powers, Federal Activities Branch, at (415) 974-8187 or FTS 454-8187.

Sincerely yours,

Loretta Kahn Barsamian

Loretta Kahn Barsamian, Chief
Federal Activities Branch

Enclosures

Cc: Paul Conry, Marianas Audubon Society
William Lopp, CNMI-DEQ
William Kramer, USFWS

EPA Comments:

1. The Draft EA (p. 1-6) discussed an underground storage tank (UST) for waste oil. The UST will be subject to interim prohibition requirements of the EPA UST program as authorized under Subtitle I of the Resource Conservation and Recovery Act (RCRA). These requirements will remain in effect until EPA issues new tank performance standards. The EPA contact for questions pertaining to UST requirements is Eric Yunker at (415) 974-8160 or FTS 454-8160.

2. The final EA should expand discussion on the generation of hazardous waste (HW) during construction and the generation of small quantities of HW and waste oil during the life of the project. An estimated of the quantity of HW to be generated should be provided because EPA regulations governing HW differ depending on the amount of HW generated. The generation of 100 to 1000kg of HW per month would be subject to recently promulgated regulations covering small quantity generators (regulations enclosed).

3. Table 9.2 of the draft EA starts that HW will not be stored onsite for more than 90 days. HW treatment facilities or landfills do not currently exist on Saipan or Guam, so the HW will probably be transferred to a military transfer station on Guam prior to transport to a landfill or treatment facility elsewhere (draft EA, p. 3-10). The final EA should describe where HW will be stored pending transfer offsite. A permit for HW storage will be required if the onsite storage period exceeds the timeframe (s) stipulated in RCRA. The timeframe will be based on the volume of HW generated.

4. A finding of no significant impact (FONSI) is made on page v of the July 1986 draft EA. A letter requesting an Endangered Species Act, Section 7 consultation was sent to the U.S. Fish and Wildlife Service (USFWS) the week of July 28, 1986 (draft EA, table 9.1). A FONSI should not proceed USFWS Section 7 consultation.

RESPONSE TO UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
LETTER RECEIVED SEPTEMBER 25, 1986

Comment 1: The underground storage tank is subject to certain EPA requirements under the Resource Conservation and Recovery Act (RCRA).

Response 1: It is understood that the project's underground storage tank (UST) for waste oil will be subject to interim prohibition requirements of the EPA UST program as authorized under Subtitle I of RCRA.

Comment 2: The discussion of hazardous waste should be expanded in the EA.

Response 2: The generation of hazardous waste during the construction and operation phases of the project is discussed in Section 3.10 of the Environmental Assessment for the facility. In summary, the potentially hazardous wastes generated during construction will consist of used paint and paint solvent containers, used adhesive and pesticide containers; used oil and hydraulic fluids, and other related types of construction debris. The waste materials will be managed in accordance with a plan prepared by the contractor and approved by the Government contract agency responsible for construction of the facility. The waste materials will be properly stored on site until sufficient quantities are accumulated for disposal or prior to the 90-day accumulative time expiration. The quantities of this waste material are estimated to not exceed the 100kg per month limit.

During the operational phase of the facility, very small quantities of hazardous waste are expected to be generated. On an average monthly basis, it is estimated the quantity will be less than 100kg. The waste materials will consist of maintenance items such as used paint and solvent containers, waste oil and oil filters and other similar types of refuse. The facility will have installed a specially designed hazardous waste/flammable material storage building for accumulation of the wastes for disposal within the 90-day onsite storage period.

Comment 3: Hazardous waste storage should be discussed in the EA.

Response 3: The onsite storage of hazardous waste will be limited to less than the 90-day storage limit and as described in the EA, Section 5.2.10. As discussed in Response 2, a suitable storage building will be provided for temporary storage of waste materials.

Comment 4: The FONSI was prepared prior to the Section 7 Consultation.

Response 4: A section 7 Consultation with the U.S. Fish and Wildlife Service (USFWS) has been completes. The USFWS determined that the project, as planned, would not significantly affect the three federally endangered species of concern, the Micronesian megapode, Vanikoro swiftlet, and Nightingale reed warbler (see Appendix H).

Commonwealth of the Northern Mariana Islands
Coastal Resources Management
Office of the Governor
Saipan, Mariana Islands 96950

September 12, 1986

Mr. Raphael O. Roig
Chairman, Space Division
Environmental Protection Committee
HQ Space Division
P.O. Box 92960
Los Angeles, CA 90009

Received April 10

Attn: Mr. John Edwards

Dear Mr. Roig:

The Coastal Resources Management (CRM) Program Agencies have conducted a joint review of the revised Draft Environmental Assessment (July 1986) for the proposed PACBAR III Radar Station on Mt. Petosukara, Saipan. This letter is written as a consolidation of the comments made on the draft document and is being transmitted to you at this time following my recent telephone conversations with Major Tommy Anderson and Mr. John Edwards. I would also like to acknowledge receipt of a copy of your recent letter to governor Tenorio. We understand that Air Force officials are now planning a trip to the commonwealth sometime in late October in order to further discuss the status of the proposed PACBAR facility. We will look forward to hearing from you as to the exact date of your expected arrival so that we may assist in arranging the necessary meetings.

Below, please find a summary of CRM's questions and comments regarding the draft, E.A. (You will note that several concerns relate to the draft, discussion of alternative sites.)

1) It is agreed that the deletion of the Boresight antenna represents a definite environmental improvement since its location was proposed to be in the most sensitive habitat type, limestone forest. However, this modification alone does not eliminate other concerns about the environment and about the changes that would occur in the Marpi Forest, which has been designated for forestry, wildlife and recreation. (We also note that survey crews at the proposed boresight location caused unfortunate habitat damage to the area, an area in which the endangered Marianas Megapode is known to exist.)

Mr. Raphael O. Roig
September 12, 1986
Page two

2. Potential cumulative effects of the project are discussed in Section 3.14. However, CRM finds that there is not adequate attention given to the significant precedent, which would be set by siting a facility such as PACBAR III within Commonwealth Forest lands. A limited number of areas are set aside for resource protection within the CNMI; the radar facility would be the first non-conservation, non-recreational related use of the Marpi Forest. Such action may open the door to other non-conforming uses within the forest and other conservation areas; this is a serious consideration being made by the CNMI Department of Natural Resources. Given this, we believe that the environmental impact "value" given the Petosukara site under "land use" in Table 4.3 is low and should be between 3 and 5.

   In addition, the fact that "agencies involved with this project have not been approached by any other DOD agencies for potential expansion and currently have no plans for future expansion" (Section 3.14, No.3) does not mean there is no potential for military facility expansion in the area. The existence of one facility may well improve the desirability of future related expansions at the same location.

   Another concern in the area of cumulative impacts is the potential increase of test missile splashdowns in the CNMI area. Section 4.1.1.7 (page 4-10) provides: "Distance determines how close to splashdown the object can be tracked, because of sighting distance to the earth's horizon. The closest station would permit tracking to the lowest elevation, while the furthest distance would restrict tracking to the actual splashdown location"" Although the language is somewhat ambiguous, it appears that the Mt. Petosukara radar could track test missiles to the point of actual splashdown. Due to the earth'' curvature the radar's horizon would appear to be 50-75 miles from Saipan. If this is the case, does it indicate that test missiles will be splashing down within 50-70 miles from Saipan? If so, how often, and will the presence of this facility lead to an increase in test missile splashdowns in this area?

3. The building of the radar facility at Petosukara would not only potentially set a future encroachments within the forest but would also have a definite aesthetic

impact on the scenic values of northern Saipan since, as the E.A. points out in Section 3.8, the antenna would be painted white and would be visible day and night from all scenic viewpoints discussed in the document. The fact that Saipan depends heavily upon a tourism industry which is largely based upon the scenic quality of the island demands that careful attention be given to the degradation of horizon views that might be expected from the project. The discussion of potential impact inadequate within the E.A.

In addition to creating aesthetic impacts, siting PACBAR III in the Marpi Forest would cause short and long-term effects to the flora and fauna of the area. Potential adverse impacts to the Marianas Megapode have been of particular concern since the species is endangered. Resource management agencies in the CNMI are interested in siting facilities at alternate sites rather than disrupting the small population of megapodes, as well as other flora and fauna, residing in the Forest, an area which has been set aside for wildlife and conservation purposes.

In light of the discussions in NOS. 1-3 above and in light of the Air Force's statements that PACBAR III is not a part of the U.S. Military's strategic defense system and is not related to ballistic missile defense, CRM believes that the mission objectives should and must be balanced against environmental impacts. Thus, the serious consideration of alternative sites is extremely important.

4. Generally, reviewers found section 4 (Description & Comparison of Alternatives) to be difficult to understand and interpret, inhibiting a thorough evaluation of the pros and cons of each site. In several areas, clarification is needed on the relative ability of each site to meet the mission objectives. At the outset, we note that at no point in the section did we find a statement that the mission objectives could not be met at any of the sites, rather there were comparisons made in terms of "more" or "less" on effective radar operations. This point is quite significant in weighing the environmental/land-use impacts that might be associated with the different sites. CRM would like information as to whether or not similar facilities are in operation elsewhere that has constraints comparable to potential alternative sites for PACBAR III.

Given the extensive military holdings in Guam, CRM questions why only one site was considered on that island. Based on the understanding we have of the mission requirements for the facility, there appears to be a variety of locations in Guam which might meet PACBAR III's needs. The Dan Dan site in Guam is largely discredited because of the uncertainty of when it would be available for use. What is the feasibility of a temporary location for the PACBAR III station until the Dan Dan site could be occupied?

CRM has questions and is concerned about the numerical ranking given the different evaluation parameter for comparing alternative sites. It appears that the "importance factor" may be easily manipulated to inflate what may in fact be only minor differences between sites.

In terms of "distance to splashdown, " how is that parameter computed? Saipan and Tinian are very near each other, yet Tinian's "ranking" for distance to splashdown is given as being twice as limiting as Saipan's upon what is this based?

In terms of "airplane traffic" limitations, the Guam DanDan site is listed as being far less limiting (no. 2 "rank") than tinian sites (n0.4 "rank") on Figure 4.4. This is quite confusing and appears to be erroneous since Guam hosts a busy international airport while Tinian serves only small commuter planes. The narrative Section 4.1.1.1.11 (p. 4-11) confirms this by stating that the DanDan site has more airplane traffic than the other sites. Furthermore, Saipan sites are Mr. given the least limiting rating (No.1 "rank"), yet the airline traffic into Saipan is far greater than that into Tinian.

In terms of natural/safety blockage "mission limitations", both perimeters are separately listed on Figures 4.3 and 4.4, yet they cover the same area. This seems to have the potential for "double counting" mission limitations when there is an overlap of natural and safety blockage, thus not clearly reflecting the overall ability of any particular site to support a radar facility.

In terms of radio frequency (RF) emissions, Section 4 discredits the use of Mt. Tagpochau, Suicide Cliff and Osko Talufofo sites, in part, because of the potential for RF emission exposures (EA. Pg. 4-21). We agree that these are public areas;

however, the Mt. Petosukara site is also within a public Commonwealth Forest and, as much, should represent the same potential impact. CRM also notes that only depict "average" power, without giving the range of expected high/low power output.

5. Page IV of the "Finding of No Significant Impact", which is included in the E.A., states that "drainage diversion designs, where necessary, along project access roads" have been added to the facility plan. We understand that this is in response to the letter written by the Division of Environmental (DEQ) in May 1986. CRM continues to support the need for adequate erosion, sedimentation and drainage controls along the roadways.

   On September 3, 1986, CRM and DEQ representatives met with Mr. James Young, a member of the engineering group designing the PACBAR III facility. Mr. Young explained their tentative plans for controlling erosion/drainage along the roadway by constructing swales, lined with an asphalt concrete wearing surface, with intermittent run off diversions. However, their plans did not include a complete drainage/sedimentation control plan. Furthermore, the proposed swales were depicted as terminating at the road junction with the highway ("Marpi Road"), absence of any provision for handling the large flow of water that would be discharged by the swales. Such a design is unacceptable for several reasons, including the flooding that would occur at Marpi Road and the potential for the silt-laden runoff to reach the Saipan Lagoon. As explained in the May DEQ letter, appropriate drainage diversion is essential. Schemes to allow for water retention should be explored in order to reduce the amount and rate of run-off flow as well as to eliminate potential siltation problems within coastal waters.

6. Section 1.1.3.10 (Page 1-9) provides that telephone service will be provided by a microwave link to Guam. It was the understanding of the CRMP that a hard line link to the local telephone system was also anticipated. Will the microwave link require a separate dish at the site and other dishes and/ or towers on Tinian or Rota. If not, what existing links will be used?

The above discussions provide a summary of the review findings of the CRM Program. Although it is not directly germane to the Environmental Assessment, our office notes an outstanding issue which appears to need to be addressed between the Commonwealth and the U.S. AIR FORCE before finalizing any agreements for the radar facility.

Mr. Raphael O. Roig
September 12, 1986
Page six

Section 806 (b) of the Covenant provides that “[n]o interest in real property will be acquired unless duly authorized by the Congress of the United States and appropriations are available therefore”. To date, there has not been clear written documentation that indicates both “authorization and approval” for the acquisition of the leasehold interest in the Mt. Petosukara site is in progress. The government has obtained copies of the PACBAR III FY1987 Military Construction Project Data Sheet submitted to the House Committee in Armed Services, Subcommittee on Military Installations and Facilities (copy enclosed) and of the military Construction Authorizations of 1987 both of which note a construction budget of $5.2 million and list Saipan as the radar site. Neither of these documents appears to include any funds for site acquisition. Consequently, to the best of CRM’s knowledge, no information as to the authorization and appropriation of funds for the acquisition of the real property interest as required by the Covenant has been obtained.

As states above, this issue is not directly related to the Environmental Assessment, but we believe its resolution will be important in the final decision on this project by the CNMI government.

CRM hopes that these comments will be useful to you in providing the decision-makers on the project with a full and fair assessment of the environmental impacts of the preferred, and alternative, sites for this project. Please do not hesitate to contact the CRM office should you have any questions or need additional information.

Sincerely,

TAMI GROVE
Administrator, CRMO

Cc: Governor
Lt. Governor
Senator Juan N. Babauta
Department of Natural Resources
Division of Fish & Wildlife
Division of Plant Industry, Forestry
Department of Public Works
Department of Commerce & Labor
Division of Environmental Quality
Historic Preservation Office
Marianas Public Land Corporation

1. COMPONENT AIR FORCE	**FY 19_87 MILITARY CONSTRUCTION PROJECT DATA**	2. DATE

3. INSTALLATON AND LOCATION SAIPAN, NORTHERN MARIANA ISLANDS	4. PROJECT TITLE PACIFIC RADAR BARRIER III

5. PROGRAM ELEMENT 1.24.24	6. CATEGORY CODE 131-132	7. PROJECT NUMBER zzzz860002	8. PROJECT COST (5000) 5,200

9. COST ESTIMATES

ITEM	U/M	QUANITY	UNIT COST	COST(5000)
PACIFIC RADAR BARRIER III	LS			2,575
RADAR OPERATIONS BLDG	SF	5,500	270	(1,485)
GENERATOR/SHOP BLDG	SF	2,400	310	(744)
GUARD HOUSE	SF	175	400	(70)
BORESIGHT BLDG	SF	125	390	(48)
ANTENNA FOUNDATION	LS			(183)
BORESIGHT TOWER	LS			(45)
SUPPORTING FACILITIES				2,115
COMMUNICATIOS SUPPORT	LS			(85)
UTILITIES	LS			(2,030)
SUBTOTAL				4,690
CONTNGENCY (5%)				235
TOTAL CONTRACT COST				4,925
SUPERVISION; INSPECTION AND OVERHEAD (5.5%)				271
TOTAL REQUEST				5,196
TOTAL REQUEST (ROUNDED)				5,200

10. DESCRIPTION OF PROPOSED CONSTRUCTION Reinforced concrete, foundations and floor slabs for four buildings. Includes reinforced concrete antenna foundations, primary and secondary electrical power, asphalt paving for roads and parking, concrete water storage facility and all necessary support utilities. Air Conditioning-75 tons.

11. REQUIREMENTS: As required.
PROJECT: Construct facilities for the Pacific Barrier Radar III.
REQUIREMENT: Adequate facilities are required to support the Pacific Barrier Radar (PACBAR) system. The PACBAR system provides early detection and tracking of space launches in the pacific corridor. PACBAR III will provide radar coverage in an area in this corridor currently without coverage.
CURRENT SITUATION: PACBAR II, at kwajalein and in the Philippines and I respectively, provides radar coverage in that area of the pacific. However, there is a gap of coverage between Kwajalein and the Philippines.
IMPACT IF NOT PROVIDED: A gap in the acquisition and tracking of foreign space launches in this region will continue. This will result in loss of critical orbital vehicle data.

1. COMPONENT AIR FORCE	FY 19_87 MILITARY CONSTRUCTION PROJECT DATA	2. DATE

3. INSTALLATON AND LOCATION

SAIPAN, NORTHERN MARIANA ISLANDS

4. PROJECT TITLE	5. PROJECT NUMBER
PACIFIC RADAR BARRIER III	zzzz860002

12. SUPPLEMENTAL DATA:

a. Estimated design data:

(1) Status:

(a)	Data Design Started	85 APR 30
(b)	Percent Complete as of January 1986	35
(c)	Percent Complete as of October 1986	100
(d)	Date Design Complete	86 APR 15

(2) Basis

(a)	Standard or Definitive Design -		Yes	No
(b)	Where Design Was Most Recently Used-	N/A		

(3) Total cost (C) = (a) + (b) or (d) + (e): ($000)

(a)	Production of Plans and Specifications	249
(b)	All Other Design Costs	154
(c)	Total	403
(d)	Contract	403
(e)	In-house	0

(4) Construction start 86 APR

b. Equipment associated with this project will be provided from other appropriations: N/A

APPENDIX K

Access Road Drainage and
Erosion Control
Mitigation Measures Description

K.1.0 INTRODUCTION

1. This appendix presents a description of the design concepts that satisfy the CRM agency requirements to mitigate existing erosion conditions occurring along the route of the Access Road to the Radar Station.

2. The concepts presented in this appendix are being incorporated into the final design details for the Access Road, with appropriate consideration of onsite survey data, property lines and roadway configuration requirements.

3. The description of the drainage and erosion control mitigation measures are referenced to the drawing (Figure K.1) included at the end of this appendix.

K.2.0 ACCESS ROAD DRAINAGE AND EROSION CONTROL MITIGATION MEASURES DESCRIPTION

K.2.1 NEW ROAD SECTIN FROM RADAR SITE TO EXISTING ROAD

1. Drainage Ditches B-1, -2, -3, -4 and –5 collect the 10- year storm runoff from the uphill side of the new road section to collect and transport runoff from the 10-year frequency storm. This ditch discharges to a natural swale located just south of the new road, approximately 600 feet uphill from its intersection with Marpi Forest Road. The ditch is planned to be seeded with grass (type GL1) at the completion of construction.

K.2.2 UPPER SWITCHBACK

1. Drainage Ditch B-1, -2, -3, -4 and –5 collect the 10-year storm runoff from the uphill side of the road for most of the length of the switchback. These sections vary in width as the flow increases: Ditches B-1 and –2 will be grass-lined (Type GL1) for erosion control. Ditch B-3 will also be grass-lined, but stone erosion cutoffs will also be provided at 100-foot centers (Type GL2) as further protection. The short section of Ditch B-5 is also the entrance to the first culvert and is planned to be grouted riprap (Type RR1).

2. Ditch Section B-4 is in a natural already vegetated swale, which is separated from the roadway alignment. No changes are required here and the existing vegetation will not be disturbed.

3. A short section of Ditch B-2 passes directly in front of a World War II Bunker, which is not to be disturbed. Grouted riprap, or an equivalent system, is planned for the steeper slope along a short distance on both sides of the bunker to protect its foundation.

4. Culvert No. I is located to collect the runoff from Ditch Section B-5. The culvert will be capable of passing more than the 10-year storm without overtopping the road. Grouted riprap is planned at the culvert outlet and for some distance downhill to reduce erosion potential and allow the discharge to flow to a natural, heavily vegetated swale.

K.2.3 MIDDLE SWITCHBACK

1. Drainage for the entire middle switchback is presently collected in a heavily vegetated uphill swale, which discharged, to a larger swale that drains away from the project area. Portions of the existing swale are adequate to convey the 10-year storm runoff. However, most of the drainage in this section will be improved concurrently with roadway improvements.

2. Ditch Section C-1 is a heavily vegetated natural swale, which is separated from the roadway alignment. No changes are required here and the existing vegetation will not be disturbed.

3. Ditch Sections C-2 and C-3 are identical and are planned to be formed as V-ditches with grass lining and stone erosion cutoffs (Type GL1) for erosion control. Section C-4 is in a natural heavily vegetated swale, which is separated from the road alignment. Section C-4 will not be disturbed by construction.

4. Ditch Section C-5 , at the lower and of the middle switchback is an area that will be disturbed by roadway improvements. Therefore, a new V-ditch is planned for this area. Because of the flow and increased steepness in this area, grouted riprap (Type RR1) is planned for erosion protection here.

K.2.4 LOWER SWITCHBACK

1. This section of road collects only the relatively small amount of runoff between the middle and lower switchbacks . It is characterized by a low dip near its midpoint, which collects water and presently causes a constant wet condition. This situation will be corrected by the improvements discussed below.

2. Ditch Sections D and E are on the uphill side of the lower switchback to collect and transport the 10-year recurrence storm runoff to Culvert No. II. These small ditch sections are planned to be grassed-lined (Type GL1) for erosion protection.

3. Culvert No.II will consist of a concrete inlet structure and grouted rock. Grouted riprap is also planned at the culvert outlet and for some distance downhill to reduce erosion potentials and allow the discharge to flow to a natural, vegetated swale area.

4. The lower portion of the lower switchback drains toward the northeast. Ditch Section F is designed along this section to collect and transport the 10-yeat storm to Culvert No. III discussed below. Ditch Section F is planned as a grass-lined (Type GL1) for erosion protection.

K.2.5 <u>NORTHEASTERN END MATUIS ROAD</u>

1. Although the segment of Matuis Road toward the northeast is outside of the Access Road area, drainage in that area is considered because: (1) it contributes to the existing siltation condition, and (2) it contributes to flow at the lower portions of Matuis Road. Ditch Sections G-1 and G-2 are designed to control runoff front the east side of Matuis Road, and Ditch Section G-3 will control runoff from the west side in this area.

2. Ditch Section G-1 will collect only local runoff and is at the location of one existing small roadside ditch. This ditch will be improved by shallow excavation to assure clean passage of the flow and is planned to be seeded with grass (Type GL1) to improve existing erosion conditions.

3. Ditch Section G-2 is located where the road begins to become steeper and will collect a signifigant amount of additional runoff from the higher portion of adjacent hillside and direct the flow to Culvert III. Therefore, grouted riprap protection (Type RR1) is planned for erosion control and to form the culvert entrance.

4. Culvert No. III will convey the flow from Ditch Sections F and G-2 to the north side of the Matuis Road. The culvert will be sized to convey greater than the 10-year recurrence storm; the culvert discharge will be into Ditch Section H-1, discussed below.

5. Ditch Section G-3 is provided for local runoff control on the northwest side of Matuis Road beyond the project boundary. Activities at this small ditch (Type GL1) are planned to consist of: (1) improving existing eroded areas, (2) diverting the ditch outlet into Ditch H-1, and (3) seeding area.

K.2.6 NORTH SIDE MATUIS ROAD

1. Ditch Section H-1 is along the top portion of the mtuis Road to convey discharge from Culvert No. III to the point where an existing eroded channel discharges into a large natural swale, which flows parallel to a long portion of the road. Ditch Section H-1 is sized to contain the 10-year storm and is planned to be lined with large rock (Type RR2) to handle both large and low flow conditions and for erosion protection.

2. A “rock lined” transition zone is planned where Ditch Henters into the natural swale. The Ditch Section H-2 area presently is heavily eroded (to a maximum depth of 8 to 10 feet) and a source of existing siltation, will be improved by placement of rock fill. The rock used to protect this eroded area will be large and the top surface will form a rough surface so that velocities are slowed prior to entering the natural swale.

3. Ditch Section H-3 is at a large heavily vegetated swale, which is separated from the road. This area presently conveys the runoff for the large storms. In general, no construction or disruption to existing vegetation will be undertaken in Ditch Section H-3, with the exception of removing siltation art selected areas to obtain the required flow capacity. Also, areas where significant erosion is observed to be occurring will be improved with large rock (similar to type RR2) in the eroded areas.

4. A small roadside Ditch I is provided directly adjacent to the north side of the improved Matius Road to collect and convey runoff directly onto the north half of the crowned road. This ditch will be capable of conveying the 10-year storm and is planned to be grass-lined (Type GL1).

K.2.7 SOUTH SIDE MATUIS ROAD

1. The natural swale on the south side of the upper portion of the Matuis Road (Ditch Sections L-1 and L-2) is adequate to convey flow from the uphill area. However, dense vegetation (vines) in several areas has acted as a dam, forcing this flow onto the road. The remedial work specified in the top portion of this swale (Section L-1) is planned to include the removal of the vegetation build up where flow is retarded, but without exposing bare soil.

2. The lower portion of Ditch Section L (Section L-2) may receive additional runoff from an adjacent drainage area tot he south because discharge occurs into Culvert IV. To provide additional erosion protection in this area, three stone erosion cutoffs are planned in the last part of the ditch.

K.2.8 MAIN CONFLUENCE COLLECTION ZONE

1. Essentially, all of the water flowing in the existing road watershed comes together at a confluence point about 1,400 feet uphill from the Beach Road intersection. The following paragraphs discuss the mitigation measures at this location.

2. Hard limestone or coral is evident at shallow eroded ditches adjacent to the existing road from the confluence point to about 350 feet east of Beach Road. To avoid difficult excavation into that rock or coral to form a main ditch for the relatively high flow in this area, the road is planned to be raised a few feet above the existing contours. The ditch sections discussed in this section are based on the road being raised.

3. Culvert No. IV is designed to convey runoff south of the road to a main channel (Ditch Section J) on the north side of the road. That flow currently crosses over the road surface causing repeated washouts of patched crushed coral. The flow from Culvert IV is directed onto Ditch J-1.

4. Asphalt paving _of the access Road will extend approximately 100 feet upstream from Culvert No. IV, above the point where large flows occurring due to the confluence of the various swales could enter onto the road in the event of ditch or pipe clogging.

5. Ditch J-1 is only a “partial” ditch in that the large rock is planed only against thew raised road embankment and a short apron area. The north side eof the Ditch J-1 is left “open” because flow from the natural swale (Ditch H-3) will occur over a distance of several hundred feet, as the swale gradually “tilts” toward the road. The rock, which is planned for Ditch J-1, is similar to a Type RR3, ditch wherever hard coral is encountered. If hard coral is not encountered, Ditch J-1 would be similar to Type RR4.

6. Ditch J-2 must carry a large flow to avoid damage to the road or overtopping onto the south side of the road. Because the natural coral appears to be shallow here, the ditch along the raised road can be formed by using the natural hard coral as the erosion resistant bottom. Also, for this Type RR3 configuration, rock is planned along the slope at the edge of the shallow road embankment and where soil is cut on the north side of the ditch.

7. Ditch K is planned to begin where the coral is no longer shallow. This relatively large ditch is planned to be constructed by excavation into natural soil and lining with relatively large riprap (Type RR4). Ditch K discharges directly into the " stilling basin" discussed in Section K.2.10.

K.2.9 SOUTH ROADSIDE DIRCHES DOWNSTREAM FROM MAIN CONFLUENCE COLLECTION ZONE

1. Ditch M will direct runoff from one-half of the road surfaces and a small portion of land south of the road into Culvert V. This ditch is in the area where the road is raised, and therefore, it will generally be at the intersection formed by the natural ground and road embankment toe. Grass seeding is planned as per ditch Type GL-1.

2. A small grouted riprap entrance is planned for Culvert V, which will convey flow from Ditch M across the Access Road, into Ditch K. The culvert will be reinforced concrete capable of conveying more than 10-year storm.

3. Ditch N begins just below an existing driveway, downstream from Culvert V and parallels the road down to the Beach Road intersection. A small swale will be formed here to direct runoff away from the intersection.

K.2.10 BEACH ROAD "STILLING BASIN"

1. Dissipation of the flow velocity (energy) from the large flow in Ditch K at Beach Road is the most difficult design element for the Access Road drainage system. In addition to simply slowing the water, minimization of maintenance was also a key mitigation parameter. The amount of silt at this location will be greatly reduced from existing conditions and, therefore, future maintenance will be less that that which is currently experienced. However, some lesser amount of sit will still be carried in the flow, which will periodically have to be removed from the "stilling" area and/ or be removed from Beach Road.

2. The main features of the rock-lined "hydraulic jump" type structure planned for this location are:

   - Energy and velocity will be dissipated for example by causing a hydraulic jump to occur at a break in grade approximately 30 feet from the end of Ditch K. The jump could be caused by the change in grade from supercritical to supercritical slope. Large boulders located in the discharge channel could restrict the discharge velocity, and act as additional resistance to force the jump to occur.

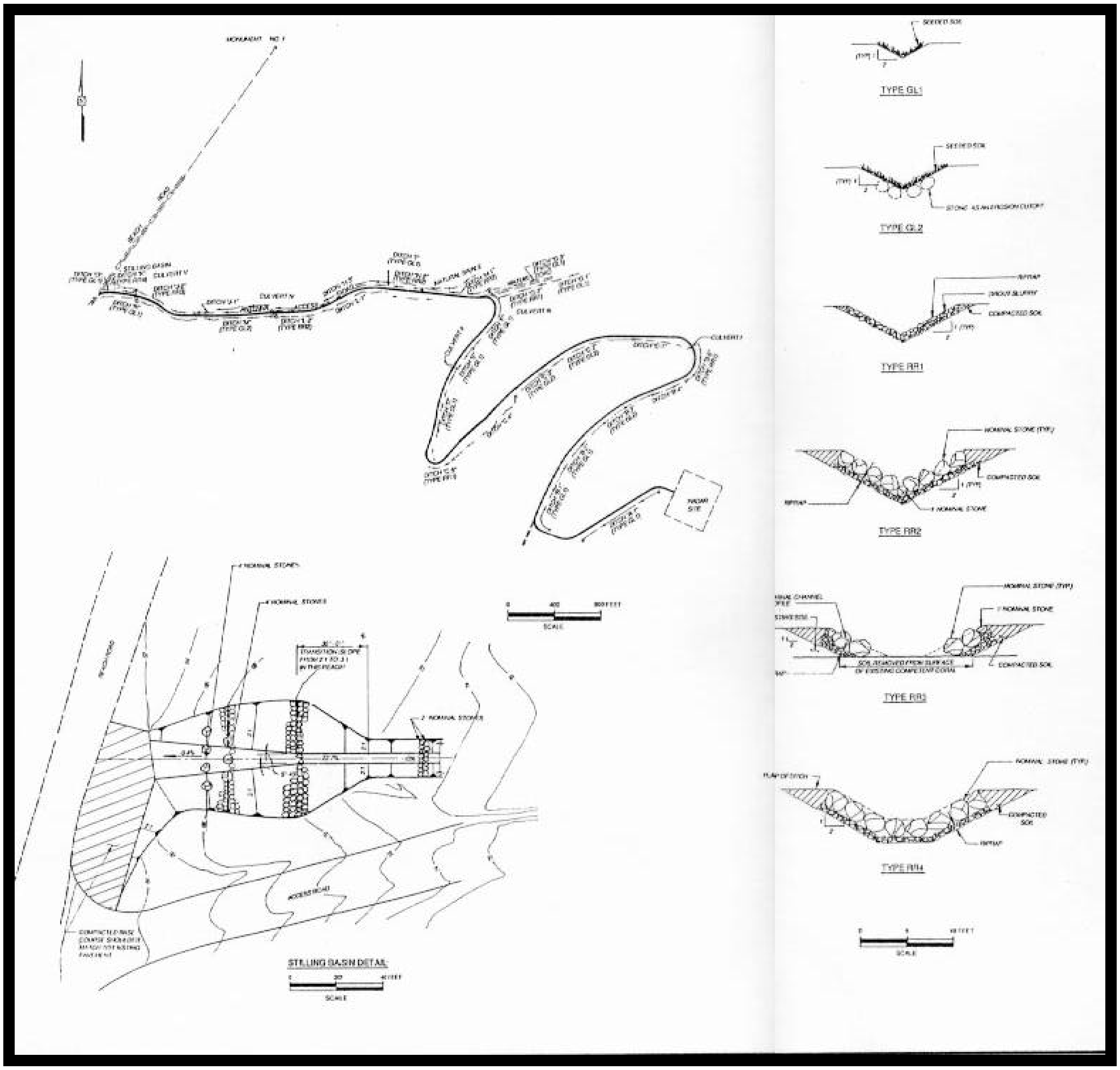
   - The rock lining throughout the stilling basin is planned to consist of 2-foot nominal stones above a layer of smaller, well- graded rock. Initially, the voids between the larger rock would fill with water during low flows. Eventually, the voids would fill with silt, leaving the rough surface of the 2-foo stones to control velocity.

   - The discharge channel is flared to permit the flow depth and velocity to decrease as the road shoulder is approached.

   - Maintenance access for silt cleanout is available.

3. The discharge from the "energy dissipating" structure ends about 15 feet from the Beach Road pavement. The area between the end of the rock and paving will be graded and compacted to provide a solid, smooth surface.

4. Finally, a small grass lined (Type GL1) Ditch "O" is planned between the stilling basin and the road to control local runoff immediately uphill from Beach Road.



NOTE

THE MITIGATION CONCEPTS PRESENTED IN THIS DRAWING FOR THE CONTROL OF DRAINAGE AND SOIL EROSION ARE BEING INCORPORATED INTO THE FINAL DESIGN FOR THE ACCESS ROAD. THE FINAL DESIGN WILL TAKE INTO ACCOUNT THE EXISTING SITE CONDITIONS SUCH AS SURVEY DATA, PROPERTY LINES AND THE ROAADWAY CONFIGURATION REQUIREMENTS.

PACBAR III
ENVIRONMENTAL ASSESSMENT

ACCESS ROAD DRAINAGE AND ERSOION CONTROL MITIGATION MEASURES