

ENVIRONMENTAL ASSESSMENT

**PROPOSED RE-CONSTRUCTION of the
GUAM FISHERMEN'S COOPERATIVE ASSOCIATION
FACILITY**

HAGATNA, GUAM



MARCH 2016

for

**Guam Fisherman's Cooperative Association
P.O. Box 24023 GMF
Guam**



Cover Sheet

Proposed Action: Proposed Re-construction of the Guam Fishermen's Cooperative Association Facility
Type of Statement: Environmental Assessment (EA)
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Abstract

This Environmental Assessment (EA) evaluates the potential environmental impacts of a proposal to replace the existing Guam Fishermen's Cooperative Association (Co-Op) facility in Hagatna. The Co-Op was established in 1977 and has been using the present building complex since the early 1980's. Fisherman Co-Op members provide fresh fish to the island's households and commercial community. Damage as a result of Typhoon Pongsona (December 2002) and advanced deterioration of the existing metal structure, combined with the growing needs of the community and Co-Op membership, necessitated the development of a new and safer facility. The proposed action includes the development of a new two-story building complex, vessel docking facilities and parking. The building complex would also include tenant spaces in addition to the Co-Op seafood processing and retail facility

The proposed action was evaluated against two additional alternatives: re-locating the Co-Op facility to another site and the No Action Alternative which would leave the current Co-Op operations status quo.

The potential consequences of each alternative was evaluated in the following areas: climate and air quality, geology and soils, topography, groundwater, freshwater surface waters, marine waters, floodplains, wetlands, noise and aesthetics, terrestrial and marine resources/habitat, threatened and endangered species, public safety, historic and cultural resources, socioeconomics, land use, parks and recreation, and infrastructure.

When compared with the other alternatives, the proposed action represents a superior alternative in terms of proximity to the Agana marina, direct access for fishing vessels, Marine Corps Drive and existing commercial and tourist activities. A new facility at the present location will also take advantage of existing long-term lease with the Government of Guam (i.e., Port Authority of Guam). A new "build-to-suit" facility will allow the Co-Op operations the room to grow and result in improvements in operational efficiency, as well as meet the needs of the local community. The proposed action would imply eventual ownership of the improvements when compared to the alternative of leasing or purchasing land at a different location. Ultimately, the new facility would improve the quality and variety of seafood products available to the community, provide lease revenue to offset debt service and serve the Co-Op staff and members well into the future.

Under the No Action Alternative the replacement of the existing building would not occur. This would perpetuate the existing inefficiencies and severely limit the growth of the fisherman's Co-Op and limit the services that could be provided to the community and its own membership. Future storms would also represent a serious threat to continued operations, structural integrity of the buildings, as well as exacerbate the present shoreline erosion. Therefore, this alternative did not meet the needs of either the Co-Op membership, or the local community.

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ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disability Act
AST	Aboveground Storage Tank
BFE	Base Flood Elevation
BMP	Best Management Practices
BOSP	Bureau of Statistics and Plans Guam
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNMI	Commonwealth of the Northern Mariana Islands
CWA	Clean Water Act
CY	Cubic Yards
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DAWR	Division of Aquatic and Wildlife Resources, Guam Dept. of Agriculture
DLM	Department of Land Management
DPR	Department of Parks and Recreation
DPW	Department of Public Works Guam
EA	Environmental Assessment
ECP	Erosion Control Plan
EFH	Essential Fish Habitat
EPP	Environmental Protection Plan
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FMP	Fisheries Management Plan
FONSI	Finding of No Significant Impact
FR	Federal Register
FWCA	Fish and Wildlife Coordination Act
GEDCA	Guam Economic Development and Commerce Authority
GEPA	Guam Environmental Protection Agency
GLUC	Guam Land Use Commission
GPA	Guam Power Authority
GSPC	Guam Seashore Protection Commission
GTA	Guam Telephone Authority
GWA	Guam Waterworks Authority
GWQS	Guam Water Quality Standards
HF	Hagatna Foundation
HPO	Historic Preservation Office, Department of Park and Recreation Guam
HRRA	Hagatna Restoration and Redevelopment Authority
MBTA	Migratory Bird Treaty Act
MHWL	Mean High Water Line
MLLWL	Mean Lower Low Water Line
MMPA	Marine Mammal Protection Act

MSA	Magnuson-Stevens Act
MSL	Mean Sea Level
MUS	Management Unit Species
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
PMUS	Pelagic Management Unit Species
PSPDDMP	Paseo de Susana Planned Development District Master Plan
SM	Square Meters
US	United States
USACE	US Army Corps of Engineers
USC	United States Code
USCG	United States Coast Guard
USDA	US Department of Agriculture
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
USGS	United States Geological Survey
W&K	Winzler and Kelly Consulting Engineers
WERI	Water and Environmental Research Institute, University of Guam
WWII	World War II

CHAPTER ONE

PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, 42 United States Code [USC] §4321 et seq.; the regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal regulations [CFR] Parts 1500-1508) implementing NEPA and the Guam Environmental Protection Agency (GEPA) Guidelines for Preparing Environmental Impact Assessment Documents.

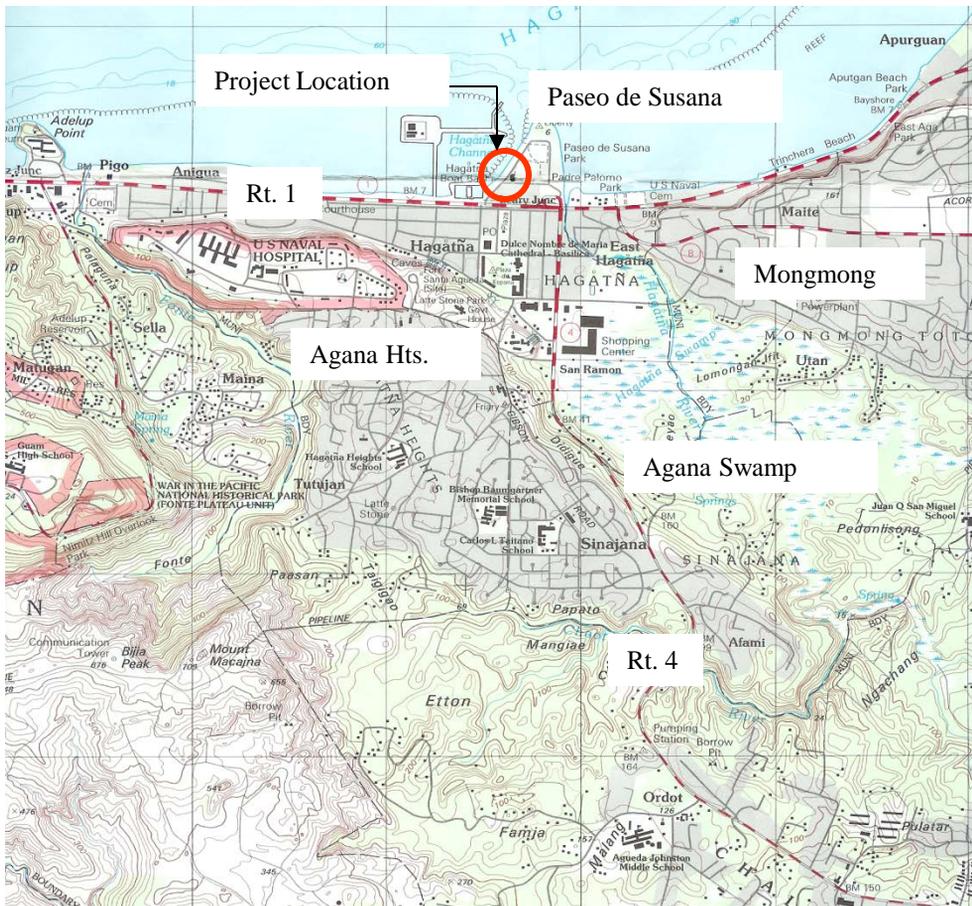
This EA identifies the purpose and need for replacing the existing Guam Fishermen's Cooperative Association (Co-Op) facility located in Hagatna, Guam. It also evaluates the environmental consequences of alternatives to the Preferred Alternative.

1.2 PURPOSE AND NEED

The existing Co-Op facility is located on Lot No. A-4 (Paseo de Susana) between the Gregorio D. Perez Marina and the Paseo complex in Hagatna (Figure 1 – Location/Vicinity Map). Lot No. A-4 comprises an area of approximately 3,000 sm. As a result of Public Law 27-24, the adjoining acre of shoreline property to the north east was leased to the Co-Op for future expansion purposes. The existing building structure is in such dire need of repair that total structure replacement is the best option. Years of deterioration and damage from storm events have undermined the structural integrity of the existing facility. The Co-Op Board of Directors has made the decision to demolish the current facility and construct a replacement in the same location. Appendix A includes photographs of the existing facility and the surrounding area. Figure 1 also highlights important features surrounding the project area. The aerial photograph (Figure 2) shows the spatial relationship of the existing Co-Op facility to the surrounding community.

The Proposed Action will entail the complete demolition of the existing structure once the new facility is constructed and can support a smooth transfer of operations. The new facility will include expanded fish processing and storage areas as well as tenant spaces within the 2-story configuration. In addition several shoreline improvements consisting of shoreline protection measures and a dock to facilitate loading and offloading of vessels is being proposed. A total of 25 parking stalls and 2 handicap stalls are proposed. This will improve efficiency in Co-Op operations and support tenant activities. Appendix B includes design drawings illustrating the various components of this proposal.

A new facility in the present location will also take advantage of the revised lease arrangements created through Public Law 27-24, maintain the advantages of customer familiarity with the current location and provide a clean, modern and safer operation to satisfy the communities demand for high quality locally caught fish and fish products.

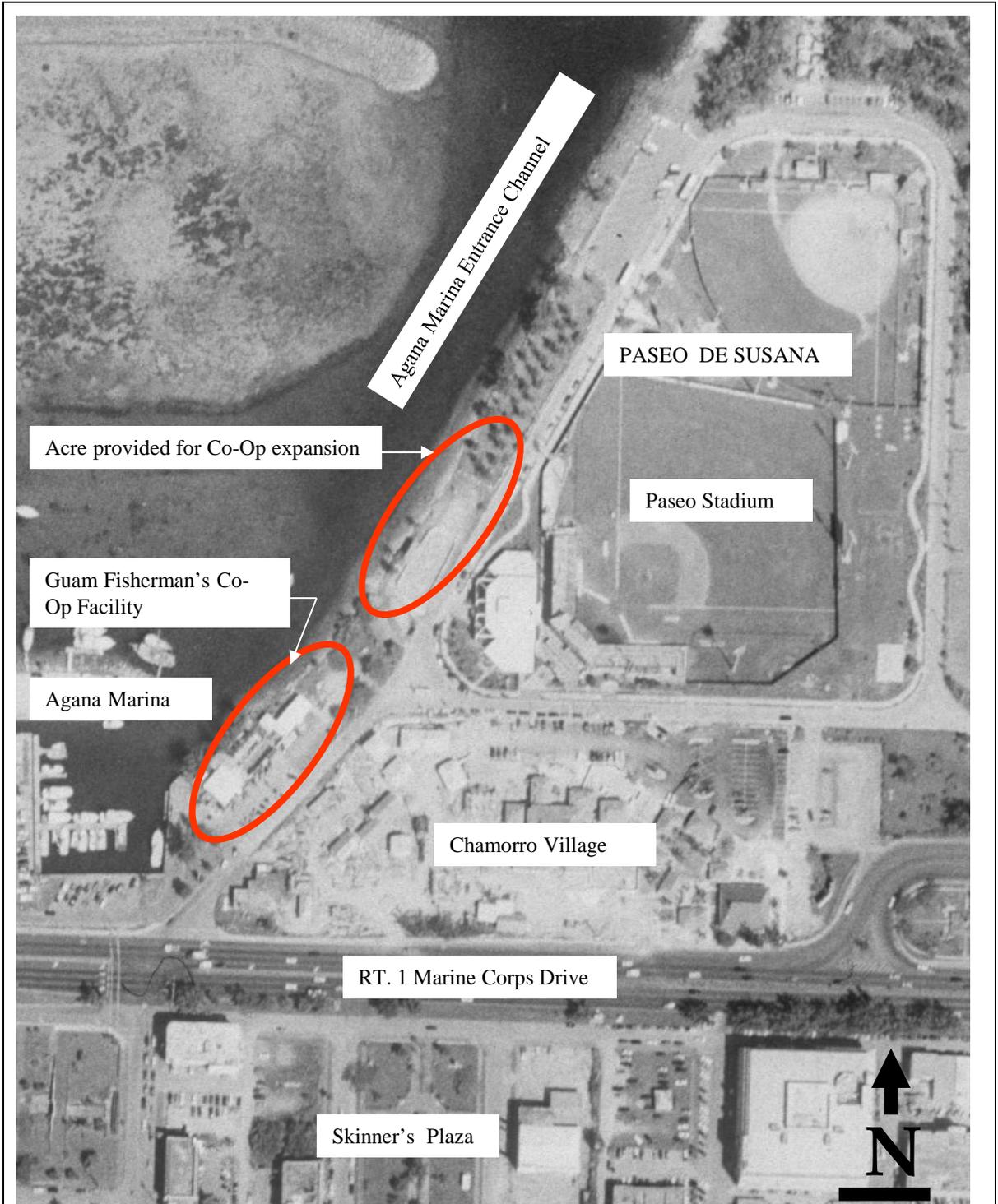


**Guam Fisherman's Co-Op Project
Location/Vicinity Map**

ARC Environmental Services

Date
March 2016

Figure No.
1



Source: Bureau of Statistics and Plans

**Guam Fisherman's Co-Op Project
Aerial Photograph - 1994**

ARC Environmental Services

Date
March 2016

Figure No.
2

1.3 OBJECTIVES

The following objectives are consistent with the primary purpose of the proposed action and related requirements. These objectives are listed below.

- Design the facility to allow vessels direct access for the unloading of fish and subsequent loading of vessel supplies or persons.
- Address the current condition of shoreline erosion through the installation of shoreline protection measures.
- Design and construct a new Co-Op facility to meet relevant local and Federal regulatory standards.
- Enlarge the retail, processing, and storage areas and modernize the processing of fresh seafood products to higher safety and health standards to better serve Co-Op members and the local community.

1.4 ISSUES AND CONCERNS

In the process of identifying issues related to a proposal to re-construct the Co-Op facility, the following Federal and Government of Guam agencies and institutions were consulted:

- United States Army Corps of Engineers (USACE),
- Guam Environmental Protection Agency (GEPA),
- Guam Department of Agriculture, Division of Aquatic and Wildlife Resources (DAWR),
- Guam Bureau of Statistics and Plans (BOSP), Coastal Zone Management Program (CZM),
- Guam Department of Parks and Recreation, Historic Resources Division (HRD),
- Guam Department of Land Management (DLM),
- Guam Economic Development and Commerce Authority (GEDCA)

During the early scoping process, a number of relevant issues emerged including; the need to minimize disruption of existing operations, protect historic resources on site, and consider floodplain issues. These issues are summarized below.

1.4.1 Existing Operations

Maintenance of the existing operations during construction is of vital importance. Significant disruption of business would negatively affect a number of groups or individuals. Members would be forced to either find another retail outlet or market their own catch, while current employees may have to be furloughed. Community residents

who rely on the Co-Op for fresh local seafood would be inconvenienced by even a brief closure. Commercial customers such as hotels and restaurants would need to substitute alternative seafood to address their need for seafood products or find another source. The Co-Op could potentially suffer a significant loss in market share and competition from outside sources of seafood could jeopardize the business. As a result, disruption to Co-Op operations should be minimized.

The existing facility comprises 800 square feet of processing area. There is 150 square feet of ancillary administrative and meeting space. Discounted fuel products are sold to Co-Op members on site from a dispensing system located next to the eastern bulkhead of the marina.

1.4.2 Historic and Cultural Resources

A World War II Japanese Pillbox occupies a portion of the coastline north of the existing Co-Op facility. Additional parking is being proposed for this area. The Pillbox fortification is listed in the Guam Historic Properties Inventory and is also listed in the Guam and National Register of Historic Places (site number 66-01-1211).

The Department of Parks and Recreation has also pointed out that the ancient Chamorro village of Hagatna, the pre-war brass foundry and public market were once located in the area. The agency also stated that much of the Paseo de Susana was created using the rubble from the WWII destruction of Hagatna. Because of these issues, the Guam Historic Preservation Office (HPO) of the Department of Parks and Recreation (DPR) requires that close consultation be conducted with their office prior to construction that may have the potential to disturb cultural resources.

Specific requirements were outlined in the agency's March 23, 2004 position statement (Appendix C) relative to an application for zone change to amend the Paseo Planned Development District. Of particular importance is the requirement to maintain a buffer with accessibility between the Co-Op facility and the fortification. Most importantly the HRD will require the development of an archeological monitoring and discovery plan to address the need to identify, recover and document artifacts that may be unearthed prior to and during construction.

1.4.3 Floodplains

The island of Guam is a participant in the National Flood Insurance Program and is currently on probation status.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map covering the Paseo de Susana coastal area of Guam indicates that the proposed Co-Op facility will be located in Zone V8 with an associated coastal base flood elevation of 10.0 feet. Given existing site topography, finished floor elevation of the proposed facility will be approximately 8 feet above MSL. Therefore, in order to meet FEMA flood insurance guidelines, a variance will be required from the Floodplain Administrator.

1.5 RELATED DOCUMENTS

The following resources were of primary importance during the development of this EA. These and other additional references are included in Chapter Six References.

- Department of Parks and Recreation Position Statement to the GLUC dated March 23, 2004 (Appendix C)
- Paseo de Susana Planned Development District Master Plan, December 2003
- Public Law 27-24 provides for extension of existing Co-Op lease and approves the use of an additional acre to address the proposed expansion plans (Appendix D)
- Environmental Assessment – Proposed Construction of an American with Disabilities Act Compliant Fishing Platform at Paseo de Susana Park Hagatna, Guam

1.6 PERMITS, APPROVALS AND CONSULTATIONS

The scoping process was used in part to develop an understanding of the various approvals required in order to construct a new Co-Op facility. The table below lists the major permits and approvals necessary under the various alternatives considered in this EA.

TABLE 1-1
PERMITS AND APPROVALS

Permit, Approval or Concurrence	Authority
Department of the Army Section 404 of the Clean Water Act	USACE
Department of the Army Section 10 of the River and Harbors Act of 1899	USACE
National Pollutant Discharge Elimination System Permit, Clean Water Act	USEPA
Section 401 of the CWA, Water Quality Certification and Drilling and Dewatering Permits	GEPA
Consistency determination under the Coastal Zone Management Act (CZMA) Program - Federal Consistency	BOSP
Seashore Clearance Permit, Seashore Protection	DLM-GSPC
National Historic Preservation Act (NHPA) Section 106 Consultation	DPR-GHPO, ACHP
Utility Clearances and Relocation Permits	GPA, GWA, GTA, Cable TV
Variance from Guam Flood Plain Administrator	DPW
Building Permit and Grading Permit, Building Code compliance	DPW

CHAPTER TWO ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This chapter summarizes the development of alternatives to meet the primary objectives listed in Section 1.3. The three (3) alternatives are discussed, compared and evaluated for their ability to meet the stated objectives while carefully documenting each alternative's potential environmental consequence.

2.2 ALTERNATIVES CONSIDERED

The alternatives included in this EA were developed to ensure that the basic objectives outlined in section 1.3 can be achieved. At the same time, unique conditions relative to existing property lease arrangements and location, limited the potential list of alternatives considered to be "reasonable" under the given circumstances.

2.2.1 Alternative No. 1: On-site Re-construction of Co-Op Facility

Alternative No. 1 is the Preferred Alternative. This alternative includes the complete replacement of the existing facility with a new 2-story concrete structure and amenities that normally are associated with a seafood processing and retail facility. This would include; tenant spaces, parking, shoreline stabilization structures, and an on-site vessel loading/unloading docking area. A detailed description of the Preferred Action is included in Section 3.1.

2.2.2 Alternative No. 2: Re-location of Co-Op Facility

The second alternative calls for the leasing of available, suitable and affordable commercial space elsewhere. The candidate location would need to include the ability to for vessels to have direct access to the facility, a central location for continuation of the existing processing/retail seafood, business, and the ability to install fuel storage and pumping facilities. A minimum of 6,000 square feet would be necessary to accommodate the current expansion and upgrade plans.

2.2.3 Alternative No. 3: No Action

The No Action alternative would maintain the status quo. Under this alternative the existing facility would continue to deteriorate and increase safety risks. This would imply escalating maintenance and repair costs an ever increasing likelihood of catastrophic typhoon damage. Co-Op operations would continue to suffer the existing inefficiencies and would be constrained against future growth. The environmental consequences of all three alternatives are presented in Chapter Four.

CHAPTER THREE

AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the resources in the potentially affected environment at Paseo de Susana, Hagatna. The chapter is divided into three (3) primary areas; the physical environment, the natural or biological environment and the human environment.

3.1.1 Proposed Action

The Proposed Action is the construction of a new Co-Op facility at the present location. The present facility is located at the southwest corner of Lot No. A-4 Paseo de Susana. This location encompasses approximately 3,000 SM and is adjacent to the Gregorio D. Perez Marina (i.e., Hagatna Boat Basin).

As a result of Public Law 27-24 (2003) (Appendix D) the Co-Op obtained a lease extension of 65 years for Parcel A-4. This legislation also made available an additional acre to the north (no established lot number designation), for the same time period. The legislature, through Public Law 27-24, has endorsed the Co-Op's expansion plans.

3.1.2 Development Plan

The terrestrial portion of the proposed Co-Op facility will include:

1. a new 2-story concrete structure able to accommodate expanded operations.
2. twenty-seven (27) parking stalls will be developed within the Lot A-4. Additional parking could be established within the acre set aside for expansion.

Landscaping will be provided throughout the property to address the visual element of the development. An open landscaped buffer feature is proposed for the northern end of Lot A-4. Table 3-1 outlines planned space utilization within the proposed 2-storey facility. Figure 3 is a site plan depicting the proposed improvements.



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PROJECT TITLE:
 GUAM FISHERY COOPERATIVE
 GUAM FISHERMAN'S COOP FACILITY
 HAGATNA, GUAM, U.S.A.

SHEET TITLE:
 SITE LAYOUT, DEMOLITION
 AND SIGNAGE PLAN



DATE: AUG 26, 2008
 EXPIRE: 100% SUBMITTAL
 DATE:
 NAME:
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 REMARKS:
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 COMMENTS: GJM
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 SCALE: AS SHOWN
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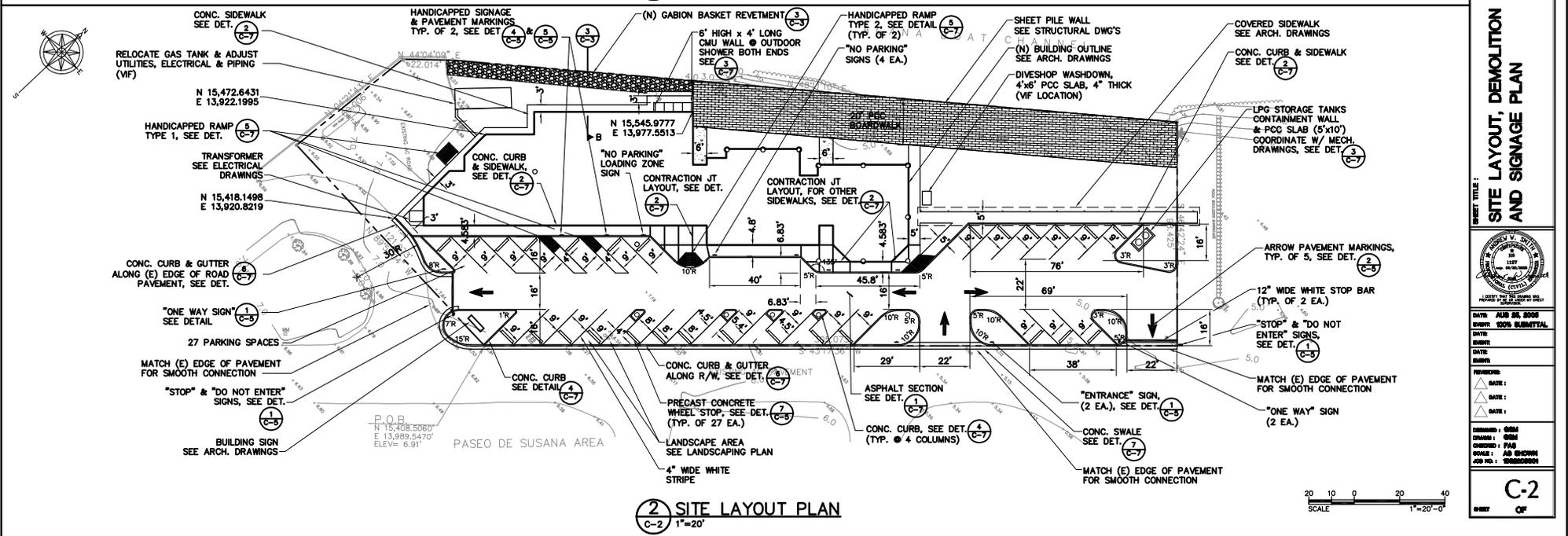
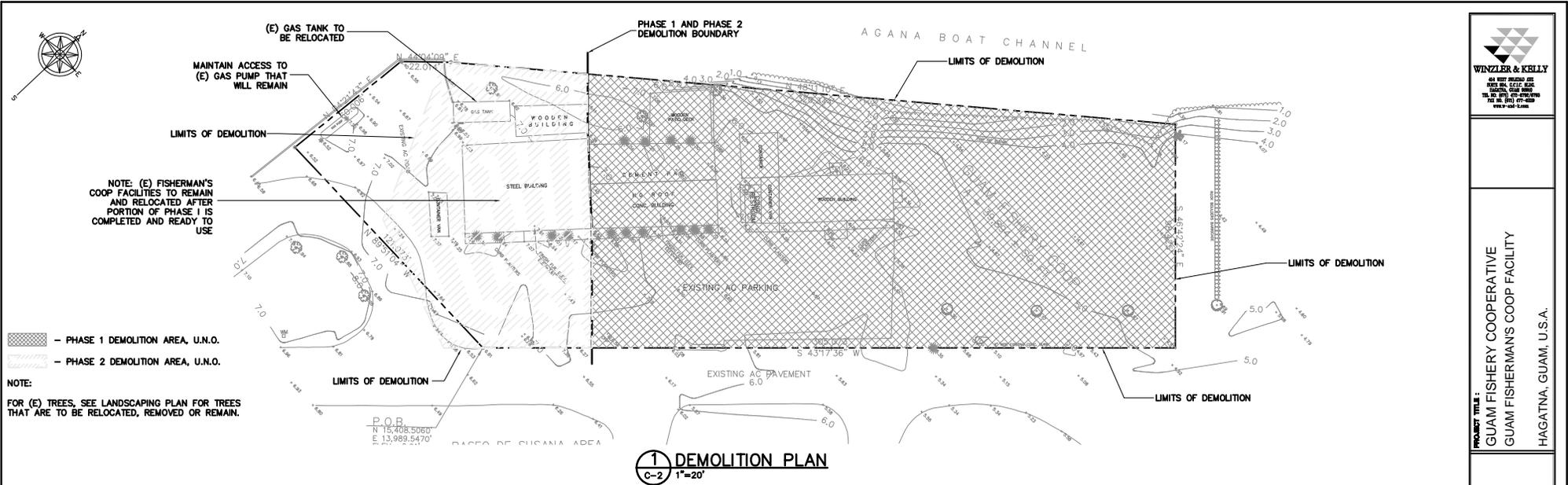


TABLE 3-1
SPACE UTILIZATION - FIRST AND SECOND FLOORS

Category	First Floor SF	Second Floor SF
Co-Op Operations	4,430	2,740
Tenant Space	2,576	3,110
Common Area	1,478	2,635

Common areas include mechanical rooms, hallways and a common meeting facility

Proposed shoreline stabilization measures and vessel access improvements are depicted in the figures in Appendix B. These elements include:

1. Shoreline protection structure:

A gabion basket structure would be constructed along the western end of the project site starting where the concrete revetment wall of the Hagatna Boat Basin ends (Figure 1 Appendix B). The toe of the gabions would be placed seaward along the property line. The shoreline protection structure would extend north-east for 110 feet where it would connect with the proposed vessel mooring facility (description below). The structure is stepped in design and is approximately 6 feet in width (Figure 3 Appendix B).

Construction would entail excavating a 990 ft² area to -2.0 feet MSL resulting in approximately 57 CY of dredge material that would subsequently be disposed at a GEPA approved off-site location. The total volume of backfill (clean coral material and gabion basket wall) below the MHWL is approximately 96 CY (Figure 3 Appendix B).

2. Vessel mooring dock:

The proposed vessel mooring dock facility would start where the gabion shoreline structure ends and continue north-east along the edge of the property line, Lot A 4, (Figure 1 Appendix B) for a distance of approximately 215 feet. As with the gabion structure, the toe of the sheet piling would extend seaward to the property line. Width of the dock would be 20 feet. (Figure 2 Appendix B).

The dock facility would be sheet piled and backfilled in lieu of a piling supported dock. A sheet pile dock facility in this location and environment would be more structurally stable and would fully address the chronic shoreline erosion along that portion of the lot.

As the dock facility extends seaward, the area below the MHWL that would be filled is approximately 3,010 ft² with a fill volume of approximately 159 CY (Figure 2 Appendix B).

To fully maximize use of the vessel mooring dock facility, a 6,450 ft² area fronting the dock face would be excavated to -8 feet MLLW. It is estimated that 1,155 CY of dredge material would be excavated and subsequently disposed at a GEPA approved off-site location (Figure 2 Appendix B).

It is recommended that an Environmental Protection Plan (EPP) be developed to specifically address the various dredging issues (e.g., de-watering procedures, final dredge material disposal, compliance with water quality standards) once construction methodology is known. The EPP can be tailored to address those comments submitted by the resource agencies during the processing of the permit application.

3.2 PHYSICAL ENVIRONMENT

In this section important aspects of the physical environment are covered including; climate and air quality, geology and soils, topography, groundwater, marine and surface water, floodplains, and noise and aesthetics.

The island of Guam is approximately 32 miles long and varies in width averaging five (5) miles wide. The island comprises an area of approximately 212 square miles. The Pacific Ocean and Philippine Sea border the island to the east and west respectively. The Co-Op facility is located at the Gregorio D. Perez Marina in the central business district of Hagatna.

3.2.1 Climate and Air Quality

Guam's climate varies little throughout the year. Temperatures range between 75 and 90 degrees. Humidity is highest during the rainy or monsoon season months from May to October. Annual rainfall averages about 100 inches per year. Typhoons usually occur during the summer and fall months. Approximately 30 tropical disturbances are generated in the area every year. Many of these storm systems track near the island.

The USEPA has established National Ambient Air Quality Standards (NAAQS). These standards are used to evaluate air quality of different jurisdictions. Criteria pollutants include carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, ozone, and lead. Generally, Guam's air quality is very good with only two power plant locations being classified as non-attainment areas. The city of Hagatna is located well outside these non-attainment buffer zones.

3.2.2 Geology and Soils

According to the Soil Survey of the Territory of Guam, the soil classification in the vicinity of the existing Co-Op facility is Urban land-Ustorthents complex, nearly level. This map unit is on coastal fill in and around Hagatna and Apra Harbors. This fill consists of crushed coral gravel and cobbles and a pockets of very gravelly clay and clay loam. Permeability of these Ustothorents is moderately rapid.

According to personnel at the Historic Resources Division of the Department of Parks and Recreation, the Paseo de Susanna peninsula was created from imported fill material. This fill material is comprised of remnants of the pre-WWII city of Hagatna. The rubble was pushed into the inner reef flat converting approximately 26 acres of lagoon area into fast land.

3.2.3 Topography

The central region of Guam is generally comprised of rolling limestone hills and plateaus. The city of Hagatna is situated in the center of the island and is bordered to the south by a combination of limestone cliffs and the Hagatna Swamp. Elevations along the bluffs above Hagatna range from 100 down to 8 above mean sea level (MSL) along the developed coastline. The project area and much of the Paseo de Susana is flat lying at an elevation of between 3 and 7 feet above MSL. Portions of the Hagatna Boat Channel surveyed for this project average 9 feet in depth. Figure 4 is a topographic survey and as-built plan completed for the project area. Figure 5 is a hydrographic survey illustrating contours along the shoreline extending to the toe of the eastern channel edge.

3.2.4 Groundwater

Guam's sole source aquifer is located in the predominantly limestone region of northern Guam. The Northern Guam Aquifer is the primary source of drinking water for the civilian population of the island. The Paseo de Susana is located in what was once the inner lagoon of Hagatna Bay. Groundwater in the project area is heavily influenced by adjacent marine waters and is not considered a source of drinking water.

3.2.5 Freshwater Surface Waters

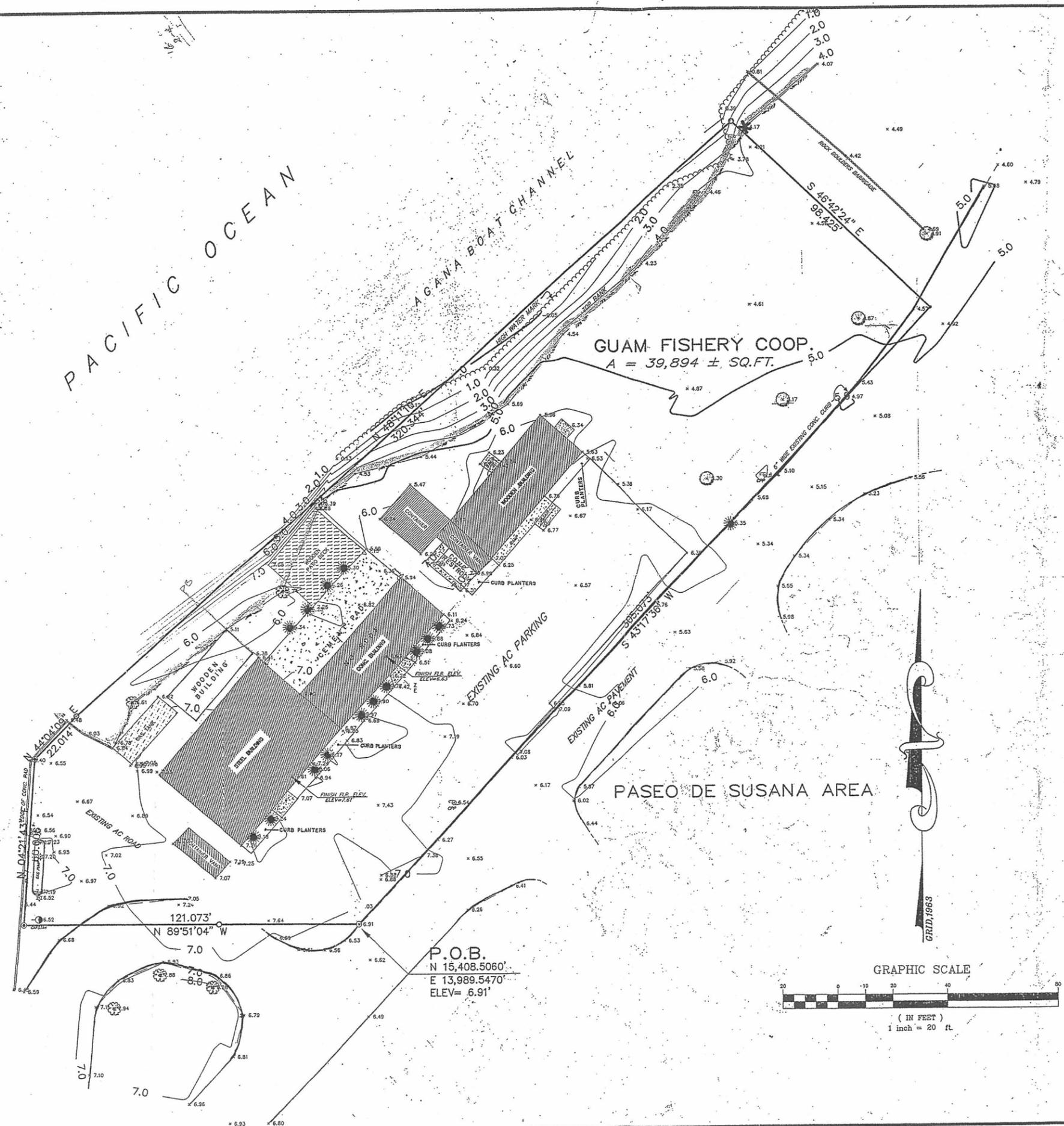
The Guam Water Quality Standards (GWQS) provide for management of Guam's surface, ground and marine waters and provides for a classification system based upon desirable chemical, physical and biological characteristics. The Hagatna River and Hagatna Swamp are major freshwater surface water features in Central Guam. Prior to heavy urban development of surrounding uplands, the spring feeding this river was once source of drinking water. While there are no freshwater surface waters present on site, the

PACIFIC OCEAN

AGANA BOAT CHANNEL

GUAM FISHERY COOP.
A = 39,894 ± SQ.FT.

PASEO DE SUSANA AREA



- NOTES:**
1. Survey was based on found corners-as shown.
 2. All distances are in feet, unless otherwise noted.
 3. All Bearing and distances are 1963 Grid.
 4. Vertical datum is based on recovered corner with Elev=6.91' as shown.
 5. Contour interval is one (1) foot.

- REFERENCES:**
1. Seen SK. No. 136F, sb No. 1144, Guam Fishery Coop.

- SYMBOLS:**
- NAIL SET ON CONC. CURB
 - ⊗ INACCESSIBLE CORNER
 - ⊙ NAIL FOUND ON CONC. PAD
 - ⊕ # 4 REBAR SET MARKED RLS # 19
 - HOLE FOUND @ CONC. CURB
 - ⊗ GAGO TREE
 - ⊕ CONC./WOODEN POWER POLE
 - ⊗ BETELNUT TREE
 - ⊕ TALISAY TREE
 - ⊗ COCONUT TREE
 - ⊕ LIGHT POST
 - 5.0 CONTOUR LINE
 - × 5.40 SPOT ELEVATION

CERTIFICATION

FRANK L.G. CASTRO hereby certify that this map was prepared by me or under my direct supervision that it is based upon a field survey made in MARCH 31, 2000 in conformance with all applicable laws and regulations. That I am responsible for the accuracy of all data and information shown hereon, I also certify that all the monuments are of the character and occupy the positions indicated on this map.

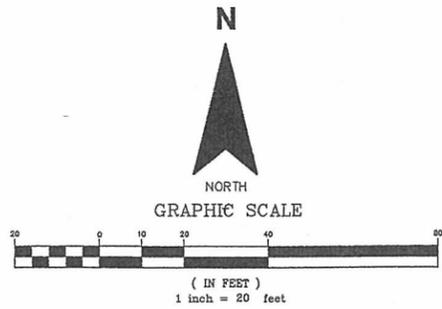
FRANK L.G. CASTRO, RLS NO. 19 DATE 04-03-00 EXP: SEPT. 30, 2000



FLGC FRANK L.G. CASTRO
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 19
ISLAND OF GUAM
P.O. BOX 1119, AGANA, GUAM 96932 TEL. NO. 649-4540/4541

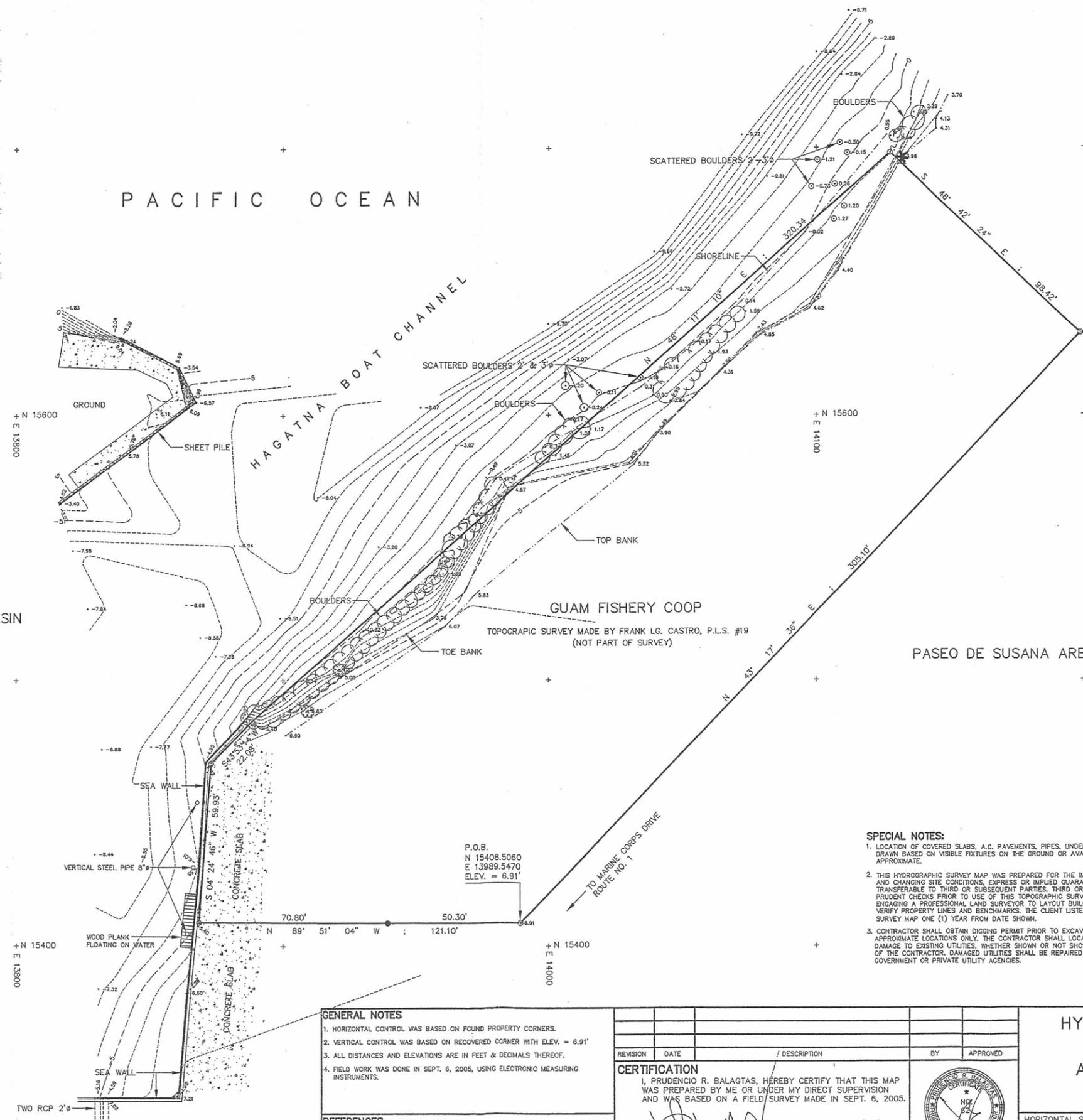
SURVEY DATA	DATE
RESEARCHED BY: FLGC	MARCH 2000
FIELD BY: FLGC-CREW	MARCH 2000
FIELD BOOK: FC-002	MARCH 2000
COMPUTED BY: GAV	MARCH 2000
CHECKED BY: FLGC	MARCH 2000

RETRACEMENT AND TOPOGRAPHIC SURVEY MAP OF GUAM FISHERY COOP.	
MUNICIPALITY OF AGANA	
LAND MANAGEMENT NO.	LOT NO.
N/A	
CERTIFICATE OF TITLE NO.	
REGISTERED ON:	
IN THE NAME OF: FIG. 4	
PREPARED FOR, SATISFACTORY TO & APPROVED BY:	
N/A	
SCALE: SEE PLAN	
SHEET NO. 1 OF 1	



**ABBREVIATIONS/
SYMBOLS/LEGEND**

- CONCRETE SLAB
- COCONUT TREE
- OTHER TREES
- PROPERTY LINE
- SHORELINE
- TOE BANK
- TOP BANK
- #4 REBAR W/ PLASTIC CAP FOUND, UNREADABLE TAG
- CONCRETE NAIL FOUND, NO IDENTIFICATION
- CORNER FALLS ON WATER



- SPECIAL NOTES:**
1. LOCATION OF COVERED SLABS, A.C. PAVEMENTS, PIPES, UNDERGROUND STRUCTURES OR OTHER UTILITIES ARE DRAWN BASED ON VISIBLE FIXTURES ON THE GROUND OR AVAILABLE DRAWINGS & THEREFORE ARE ONLY APPROXIMATE.
 2. THIS HYDROGRAPHIC SURVEY MAP WAS PREPARED FOR THE IMMEDIATE USE BY THE CLIENT LISTED. DUE TO TIME AND CHANGING SITE CONDITIONS, EXPRESS OR IMPLIED GUARANTEES FOR THIS TOPOGRAPHIC SURVEY MAP ARE NOT TRANSFERABLE TO THIRD OR SUBSEQUENT PARTIES. THIRD OR SUBSEQUENT PARTIES ARE REQUIRED TO MAKE PRUDENT CHECKS PRIOR TO USE OF THIS TOPOGRAPHIC SURVEY MAP. THE UNDERSIGNED SURVEYOR SUGGESTS ENGAGING A PROFESSIONAL LAND SURVEYOR TO LAYOUT BUILDINGS & IMPROVEMENTS PRIOR TO CONSTRUCTION TO VERIFY PROPERTY LINES AND BENCHMARKS. THE CLIENT LISTED BELOW SHOULD ALSO UPDATE TOPOGRAPHIC SURVEY MAP ONE (1) YEAR FROM DATE SHOWN.
 3. CONTRACTOR SHALL OBTAIN DIGGING PERMIT PRIOR TO EXCAVATION. EXISTING UTILITIES ARE SHOWN IN THEIR APPROXIMATE LOCATIONS ONLY. THE CONTRACTOR SHALL LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN OR NOT SHOWN ON THESE PLANS, IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. DAMAGED UTILITIES SHALL BE REPAIRED IMMEDIATELY AT NO ADDITIONAL COST TO ANY GOVERNMENT OR PRIVATE UTILITY AGENCIES.

FIG. 5

PRUDENCIO R. BALAGTAS & ASSOC., INC.
PRUDENCIO R. BALAGTAS, P.L.S. #62

GPS SURVEYING (SATELLITE) & AUTOCAD/MAPPING SERVICES
P.O. BOX 6216, TAMUNING, GU 96931
637-2042 (VOICE) 637-2041 (FAX)
surveyor@kuentos.guam.net (INTERNET)

DWG. NO. : PRB2005-102
PROJECT NO. : 2005-102.DWG
BOOK NO. : FB303/DC229
CLIENT : GUAM FISHERY COOP
JOE MORCILLA

GENERAL NOTES

1. HORIZONTAL CONTROL WAS BASED ON FOUND PROPERTY CORNERS.
2. VERTICAL CONTROL WAS BASED ON RECOVERED CORNER WITH ELEV. = 6.91'
3. ALL DISTANCES AND ELEVATIONS ARE IN FEET & DECIMALS THEREOF.
4. FIELD WORK WAS DONE IN SEPT. 6, 2005, USING ELECTRONIC MEASURING INSTRUMENTS.

REFERENCES

1. RETRACEMENT AND TOPOGRAPHIC SURVEY OF GUAM FISHERY COOP PREPARED BY FRANK LG. CASTRO, P.L.S. #19, MADE IN MARCH 21, 2000.

REVISION	DATE	DESCRIPTION	BY	APPROVED

CERTIFICATION

I, PRUDENCIO R. BALAGTAS, HEREBY CERTIFY THAT THIS MAP WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND WAS BASED ON A FIELD SURVEY MADE IN SEPT. 6, 2005.

PRUDENCIO R. BALAGTAS
 PROFESSIONAL LAND SURVEYOR # 62

09/13/05
 DATE

**HYDROGRAPHIC SURVEY MAP
OF
AGANA MARINA CHANNEL
(BEHIND FISHERMAN'S COOP)
MUNICIPALITY OF HAGATNA**

HORIZONTAL SCALE: 1"=20'	FIELD BY: PRB CREW	SEPT., 2005
	DRAWN BY: DGT	SEPT., 2005
SHEET: 1 OF 1	CHECKED BY: PRB	SEPT., 2005

Hagatna River (\approx 1,200 ft east) empties into Hagatna Bay at the opposite side of the Paseo de Susana Park.

The GWQS indicate that the Hagatna River is classified as S-2 or Medium. Surface water in this category is used for recreational purposes and can be treated to provide a potable water source. Whole body contact recreation, aesthetic enjoyment and aquatic wildlife preservation are appropriate in waters within this classification.

3.2.6 Marine Waters

Guam experiences semi-diurnal tides with pronounced diurnal inequalities. Mean tidal range is 1.2 feet while the range for spring tides are 2.1 feet. Details of tide gauge data collected over a 19-year period (1949 -1967) at Apra Harbor, Guam by the National Ocean Survey (National Oceanic and Atmospheric Administration) is displayed in the Table 3-2 (USCOE 1996).

TABLE 3-2
NOAA/NOS TIDAL DATA FOR APRA HARBOR, GUAM.

TIDE DATA VARIABLE <i>(Apra Harbor, Guam)</i>	Mean Sea Level Datum <i>(in feet)</i>	Mean Lower Low Water Datum <i>(in feet)</i>
Highest Tide Observed	1.90	3.31
Mean Higher High Water	0.99	2.40
Mean High Water	0.89	2.30
Mean Tide Level	0.04	1.45
Mean Sea Level	0.00	1.41
Mean Low Water	-0.81	0.60
Mean Lower Low Water	-1.41	0.00
Lowest Tide Observed	-3.30	-1.89

(data obtained directly from Table 1; USACE 1996)

Marine water within the neighboring marina and entrance channel is designated M-3 or Fair. The GWQS report states that surface water in this category is intended for general commercial and industrial use. This category allows for aesthetic enjoyment, limited body contact recreation and maintenance of aquatic life. Water quality in the general vicinity of the marina and entrance channel is significantly impacted by storm water disposal, marine vessel operations and the adjacent sewer treatment plant and outfall operations.

3.2.7 Floodplains

The FEMA Flood Insurance Rate Maps for covering the Paseo de Susana coastal area of Guam indicates that the proposed Co-Op facility will be located in Zone V8 with an associated coastal base flood elevation of 10.0 feet (See Figure 6). Given existing site topography, finished floor elevation of the proposed facility will be approximately 8 feet above MSL. Therefore, in order to meet Federal Emergency Management Agency (FEMA) flood insurance guidelines, a variance will be required from the Floodplain Administrator.

3.2.8 Wetlands

The Hagatna Swamp is the single largest wetland feature on island. It fulfills a number of important habitat, flood control and filtration functions. The subject property at Paseo de Susana is comprised of fill material and therefore lacks the critical properties (wetland vegetation, hydrology and hydric soils) necessary to support wetlands as defined by the Clean Water Act. The Hagatna Swamp is approximately 2,000 ft southeast of the Co-Op project site.

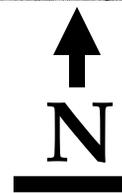
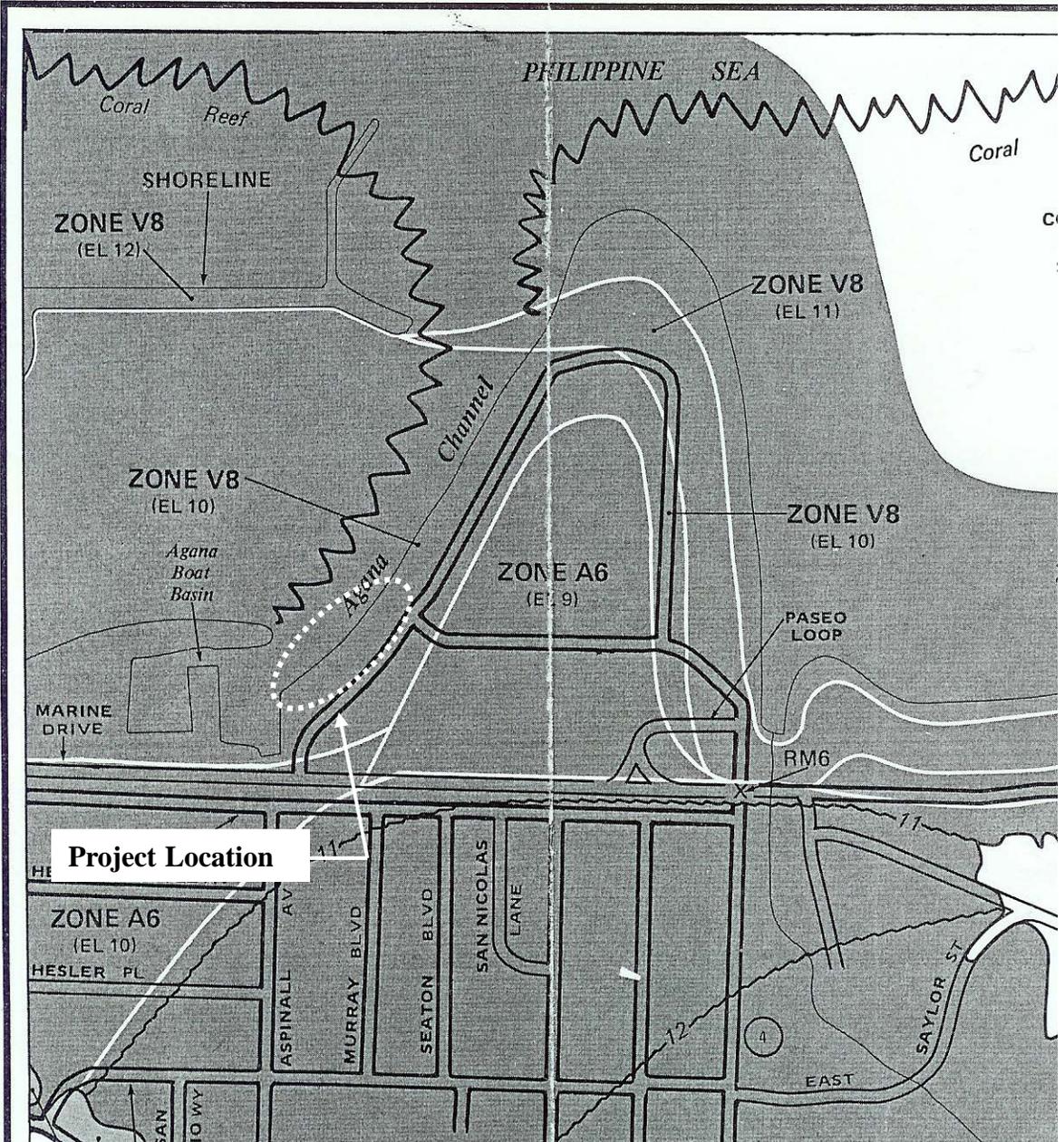
3.2.9 Noise and Aesthetics

Much of the City of Hagatna is a developed urban community. Commercial, institutional and government operations are centralized within its limits. Vehicular traffic associated with Route 1 Marine Corps Drive, Route 4 and airline traffic associated with the A.B. Wonpat Guam International Airport and vessel operations at the marina result in significant daytime noise levels.

The coastal location of the project site is visually appealing. The Paseo de Susana Park, Skinner's Plaza, the Chamorro Village, the Plaza de Espana are some of the manmade features adding to the aesthetic quality of the natural coastline. Vessel activities associated with the marina is also considered visually appealing by many. Appendix A includes photographs of the surrounding area.

3.3 BIOLOGICAL ENVIRONMENT

The natural environment is particularly susceptible to many of man's activities. New construction, infrastructure, storm water disposal and land use and development activities often translate into impacts upon the natural environment. The quality of the natural environment is steadily increasing in importance to communities and visitors.



**Guam Fisherman's Co-Op Project
Flood Map**

ARC Environmental Services

Date
March 2016

Figure No.
6

3.3.1 Wildlife Habitat Resources

The project site does not have any quality wildlife habitat of significance. Most of the lot containing the existing Co-Op building is covered by concrete with only a narrow strip of vegetation along the eroding shoreline. The second lot does not have any buildings, nor are there any being proposed in this application package.

3.3.1.1 Terrestrial

The property where the existing Co-Op building is sited, Lot A-4, is covered with either buildings or pavement (Photos 1A and 1B). Trees located inland from the shoreline are primarily used for landscaping purposes; Coconut (*Cocos nucifera*), Pacific almond (*Terminalia catappa*), ornamental betel nut, ironwood (*Casuarina equisetifolia*), and tangantangan (*Leucaena leucocephala*). Trees growing along the shoreline are dominated by pago (*Hibiscus tiliaceus*) and banalo (*Thespesia populnea*).

Various grass species observed included: coat buttons (*Tridax procumbens*), dropseed (*Sporobolus* sp.), sandbur (*Cenchrus echinatus*), beggar's tick (*Bidens alba*), and sensitive plant (*Mimosa* sp.).

The second adjoining property is landscaped and regularly maintained as a lawn (Photo 3A). A row of coconut trees line the roadway while banalo is found along the shoreline. There are also pacific almond and one fagot (*Neisosperma oppositifolia*). Besides the various species of grasses covering the lawn, the morning glory vine (*Ipomoea* sp.) was found growing on the top of the shoreline bank along some sections of the shoreline (Photo 3B). Plant identification and taxonomy followed Raulerson and Rinehart (1991) and Whistler (1995).

3.3.1.2 Marine

The marine habitat that would be affected by the proposed action fronts Lot A-4 only and covers submerged lands from the MHWL to a depth of approximately -8 feet MLLW. Marine habitats that would be impacted from the project include: intertidal zone, sand/silt substrate and rubble bottom with discreet coral resources. As previously discussed in other sections of this EA, the fastland on which the project site is located was formed from the rubble of Hagatna city when it was dumped into the bay during World War II.

Marine habitats found along the near shore region consisted of discrete areas of rubble, mostly rock boulders and concrete fragments located in the western portion of Lot A-4 closest to the entrance of Hagatna Marina. The rubble appears to have originated from previous efforts at shoreline protection measures that were subsequently destroyed by

typhoons (Photo 2B). Possibly due to the relatively more complex three dimensional structure, this “habitat type” contained a more diverse group of organisms.

In contrast, the bottom substrate becomes more sandy and silty at greater depths. Various species of sea cucumbers dominated the macro-invertebrate community in this habitat type. Coral resources are present in varying densities relative to the shoreline and depth. Benthic algae growth is sporadic and minimal with only *Halimeda opuntia*, a calcareous green algae, observed within the survey area. Algae identification and taxonomy followed Magruder and Hunt (1979).

A total of five (5) coral species were found to be present during a 2014 survey of the Area of Potential Effect and a 3 foot ancillary buffer. They included cauliflower coral (*Pocillapora damicornis*), crust coral (*Leptastrea purpurea*), boulder coral (*Porites* sp.), corrugated coral (*Pavona varians*), and lettuce coral (*Pavona decussata*). None of the three (3) recently listed (Federally under the ESA) coral species were found to be present in the survey area (ARC Environmental Services Inc. 2014). Further details are included in the coral survey report included in Appendix F.

Compounding the lack of diverse natural habitat, is the degraded water quality within the general vicinity of the project area. Storm water pipes discharge directly into Hagatna boat basin, approximately 100 feet from the Co-Op building near the fuel pumps (Photo 2A). This discharge negatively affects water quality and the magnitude of the effect is related to the rain event and the contaminants (unknown) that may be contained in the discharge. An additional compounding contributor to vicinity water quality problems is the presence of the Hagatna marina facility, also located at the Co-Op, which acts to inhibit the flushing rate of the harbor area.

3.3.2 Wildlife Resources

With no wildlife habitat of significance found on the project site, terrestrial wildlife species were very rare. No native wildlife species were observed. The marine environment, lacking diversity, offers some habitat for various fish species and sea cucumbers.

3.3.2.1 Terrestrial Wildlife Species

The on-site surveys only identified three wildlife species and they were all introduced: Eurasian tree-sparrow (*Passer montanus*), rat (*Rattus* sp.) and the American anolis (*Anolis carolinensis*). Though only one rat was found dead on the beach, it is expected that they are much more common. All three of these exotic species are known to have adapted to urban environments and therefore their presence at the site was not unexpected.

3.3.2.2 Marine Wildlife Species

The near shore area fronting Lot A-4 where the shoreline protection measures (i.e., gabion basket wall), dock and dredging are being proposed, was qualitatively surveyed by snorkel. The seaward limit of the survey was the top of the nearby dredged boat channel. Signs of various degrees of sedimentation were evident in most areas. Species identification and taxonomy for fish followed Myers (1999), coral identification followed Randall and Myers (1983) and macro-invertebrates followed Gosliner, Behrens and Williams (1996) and (Okutani 2000).

Fish species observed included both adult and juvenile humbug dascyllus (*Dascyllus aruanus*) and blue-green chromis (*Chromis viridis*) that was usually associated with the *Pocillopora damicornis* corals (Photo 5B). Juvenile individuals of Moorish idol (*Zanclus cornutus*), convict surgeonfish (*Acanthurus triostegus*), pennant bannerfish (*Heniochus chrysostomus*), yellow boxfish (*Ostracion cubicus*) and the raccoon butterflyfish (*Chaetodon lunula*). Other more benthic species, such as pipefish (Syngnathidae) and several species of unknown obiidae were observed in/on the sand/silt substrates.

The macro-invertebrate fauna included four species of sea cucumbers (*Bohadschia argus*, *Stichopus chloronotus*, *Holothuria atra*, and *Synapta* cf. *maculata*) with *Stichopus* and *Bohadschia* being more common. Several individuals of one species of pencil sea urchin Echinoidea was observed. Feather duster polychaetes (*Sabellastarte* sp.) were fairly common along the rubble field. Two banded coral shrimp (*Stenopus* cf. *hispidus*) were observed in a discarded hollow block.

The constant vessel traffic in the nearby Hagatna boat basin entrance channel likely maintains elevated turbidity levels. Some corals were observed secreting mucus (a natural response to sedimentation) and showing signs of accumulated sedimentation (Photo 5A).

Numerous small chitons (Polyplacophora) were observed in the inter-tidal zone among the rock rubble along the shoreline along with limpets (*Prosobranchia*; *Nacellidae*) and Oysters (*Ostreidae*).

3.3.3 Endangered/Threatened Species Occurring on Guam

Those wildlife species which have been determined to have dangerously low population levels or are in imminent threat of extinction are protected by the U.S. Federal Government under authority of the Endangered Species Act of 1973 (ESA), as amended. Populations of those wildlife species requiring Federal protection are either classified as endangered or threatened. Endangered is defined in Section 3(6) of the Act as

A...any species [including subspecies or qualifying distinct population segment] which is in danger of extinction throughout all or a significant portion of its range.@

A threatened species is defined in section 3(19) of the Act and is defined as

A... any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.@

Those Federal Agencies responsible for determining which species are to be listed and enforcement of existing Endangered Species laws are the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). To separate the shared responsibility, the USFWS manages land and freshwater species, while NMFS manages marine and anadromous species.

Table 3-3

FEDERALLY PROTECTED SPECIES UNDER THE ENDANGERED SPECIES ACT (ESA) THAT MAY OCCUR ON GUAM OR THE WATERS SURROUNDING GUAM. STATUS OBTAINED FROM THE NMFS AND USFWS WEBSITE. T = THREATENED, E = ENDANGERED, NR = NOT RECOGNIZED, N/A = NOT APPLICABLE.

ENDANGERED SPECIES ACT FEDERALLY PROTECTED SPECIES	DOI USFWS	NOAA NMFS
MAMMALS		
Mariana Fruit Bat (<i>Pteropus m. mariannus</i>)	T	N/A
Little Mariana Fruit Bat (<i>Pteropus tokudae</i>)	E	N/A
Blue Whale (<i>Balaenoptera musculus</i>)	N/R	E
Fin Whale (<i>Balaenoptera physalus</i>)	N/R	E
Humpback Whale (<i>Megaptera novaeangliae</i>)	N/R	E
Sei Whale (<i>Balaenoptera borealis</i>)	N/R	E
Sperm Whale (<i>Physeter macrocephalus</i>)	N/R	E

ENDANGERED SPECIES ACT FEDERALLY PROTECTED SPECIES	DOI USFWS	NOAA NMFS
Dugong (<i>Dugong dugon</i>)	N/R	E
AVIFAUNA		
Mariana Crow (<i>Corvus kubaryi</i>)	E	N/A
Guam rail (<i>Gallirallus owstoni</i>)	E	N/A
Guam Micronesian Kingfisher (<i>Todiramphus c. cinnamominus</i>)	E	N/A
Mariana Swiftlet (<i>Aerodramus bartschi</i>)	E	N/A
Mariana Common Moorhen (<i>Gallinula chloropus guami</i>)	E	N/A
REPTILES		
Green Sea Turtle (<i>Chelonia mydas</i>)	T	T
Hawksbill Sea Turtle (<i>Eretmochelys imbricata</i>)	E	E
Leatherback Sea Turtle (<i>Dermochelys coriacea</i>)	E	E
North Pacific Loggerhead Turtle (<i>Caretta caretta</i>)	T	E
Olive Ridley Turtle (<i>Lepidochelys olivacea</i>)	NR	T
PLANTS		
Fire Tree (<i>Serianthes nelsonii</i>)	E	N/A
CORALS		
Staghorn coral (<i>Acropora globiceps</i>)	N/A	T
(<i>Acropora retusa</i>)	N/A	T
(<i>Seriatopora aculeata</i>)	N/A	T

On October 1st, 2015 the USFWS added twenty-three Mariana Island species to the list for the island chain with twenty-one from Guam (USFWS Website 2015). Of 21 new species listed for Guam, 14 were plants and 7 were animals (3 tree snails, 2 butterflies, a skink and a species of bat). Outlined below are the 21 additional species recently listed from Guam:

Plants

1. Wild onion (*Bulbophyllum guamense*), Threatened
2. *fadang* (*Cycas Micronesica*), Threatened
3. *Dendrobium guamense*, Threatened
4. *Eugenia bryanii*, Endangered

5. *pao doodu* (*Hedyotis megalantha*), Endangered
6. *ufa halom tano* (*Heriteria longipetiolata*), Endangered
7. *Maesa walker*, Threatened
8. *Nervilia jacksoniae*, Threatened
9. *Phyllanthus saffordii*, Endangered
10. *aplokating palaoan* (*Psychotria malaspinae*), Endangered
11. *birengenas halom tano* (*Solanum guamense*), Endangered
12. *Tabernaemontana rotensis*, Threatened
13. *Tinospora homosepala*, Endangered
14. *Tuberolabium guamense*, Threatened

Animals

1. Pacific sheath-tailed bat (*Emballonura semicaudata rotensis*), Endangered
2. Slevin's skink (*Emoia slevini*), Endangered
3. Mariana eight-spot butterfly (*Hypolimnys octula mariannensis*), Endangered
4. Mariana wandering butterfly (*Vagrans egistina*), Endangered
5. Humped tree snail (*Partula gibba*), Endangered
6. Guam tree snail (*Partula radiolata*), Endangered
7. Fragile tree snail (*Samoana fragilis*), Endangered

3.3.3.1 Effects on Listed Species

Sea turtles are the only listed species known to occur in the vicinity of the project. No other Federally listed species (marine or terrestrial) are present. Green sea turtles (*Chelonia mydas*) are freely mobile species and have reportedly been observed in the past in the marina. There are no known records of sea turtle nesting activities and given the manmade nature of the project site it lacks suitable nesting habitat.

The proposed project involves the placement of 215 LF of sheet pile along the shoreline. Pile driving activities represent a potential acoustic impact upon sea turtles. Routinely adopted conservation measures outlined by NMFS (appended to Department of the Army permits) are protective of sea turtles in the marine environment and may include requirements for pre-pile driving visual surveys, soft startups and sea turtle detection response procedures/work stoppage protocols. Implementation of these conservation measures would reduce project impacts to a *may affect but is not likely to adversely affect* level relative to listed sea turtles.

3.3.4 Magnuson-Stevens Act: Project Impacts to Essential Fish Habitat

On October 11, 1996, the Sustainable Fisheries Act (Public Law 104-297) became law. This action amended the habitat provisions of the Magnuson Act. The re-named Magnuson-Stevens Act (MSA) calls for direct action to stop or reverse the continued loss of fish habitats. Toward this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance this habitat. The

MSA requires cooperation among NMFS, Regional Fishery Councils, fishing participants, Federal and state agencies, and others in achieving the essential fish habitat goals of habitat protection, conservation, and enhancement.

Briefly, Essential Fish Habitat (EFH) consultation is the process of satisfying the Federal agency consultation and response requirements of section 305(b)(2) and 305(b)(4)(B) of the MSA, and the EFH conservation recommendation requirement of section 305(b)(4)(A) of that Act. When completed, an EFH consultation generally consists of: 1) notification to NMFS of a Federal action that may adversely affect EFH, 2) an EFH assessment provided to NMFS, 3) EFH conservation recommendations provided by NMFS to the Federal action agency, and 4) the Federal agency's response to NMFS's EFH conservation recommendations.

The consultation requirements of ' 305(b) of the MSA (16 U.S.C. 1855(b)) provide that: Federal agencies must consult with the Secretary of Commerce (i.e., through NMFS) on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. Federal actions included under this consultation process would include the issuance of Clean Water Act section 404 and Rivers and Harbors Act section 10 permits by the U.S. Army Corps of Engineers (USACE). These federal permits would be required for the proposed Co-Op reconstruction project.

Adverse effect is defined as any impact which reduces the quality and/or quantity of essential fish habitat. Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, or reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). If the USACE determines that an adverse action may occur from the issuance of any particular permit, consultation with the NMFS becomes mandatory. During the consultation process, the Secretary of Commerce shall provide recommendations (which may include measures to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH) to conserve EFH to Federal (or state) action agencies for activities that would adversely affect EHF. It should be noted that the consultation requirements only require Federal agencies to consult with NMFS about pending federal actions that may adversely affect EFH.

The trigger for an EFH consultation is a Federal action agency's determination that an action or proposed action, funded, authorized or undertaken by that agency may adversely affect EFH. If a Federal agency makes such a determination, then EFH consultation is required. If a Federal action agency determines that an action does not meet the *may adversely affect* EFH test (i.e., the action will not adversely affect EFH), no consultation is required.

As defined in section 3(10) of the MSA, EFH are those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Examples of "*waters*" that may be considered EFH include open waters and wetlands, estuarine and riverine

habitats, wetlands hydrologically connected to productive water bodies. Water quality is interpreted to be a component of this definition. EFH should consider water to provide the appropriate parameters of quality such as physical, chemical, and biological properties. This may address nutrient levels, oxygen concentrations, turbidity levels, among others. The interpretation of "*substrate*" includes artificial reefs and shipwrecks if those areas provide EFH. Substrate may also include entirely or partially submerged structures, such as jetties. "*Biological communities*" could include mangroves, tidal marshes, mussel beds, cobble with attached fauna, mud and clay burrows, coral reefs, and submerged aquatic vegetation. Migratory routes such as rivers and passes serving as passageways to and from anadromous fish spawning grounds should be considered EFH. The definition of EFH may include habitat for an individual species or an assemblage of species, whichever is appropriate within each FMP.

EFH in the immediate vicinity of the Hagatna Boat Basin

As previously discussed in sections 3.3.1.2. and 3.3.2. the benthic marine habitats presently identified from the area that would be impacted include: sand/silt bottom and rubble bottom.

Corals identified generally were comprised of two species; Pocillopora damicornis and Leptastrea purpurea. The nektonic environment is limited to waters shallower than 8 feet which are regularly degraded by increases in turbidity due to terrestrial runoff associated with the nearby storm water discharge pipes, adjacent marina and constant use of the immediate area by vessels (i.e., the dredged access channel to Hagatna Boat Basin).

The test on whether EFH exists for the purposes of compliance with the MSA, is whether the present habitat is utilized by federally managed species, or Management Unit Species (MUS) as identified by the Western Pacific Fishery Management Council.

Assessment of Impacts on Management Unit Species as identified by Western Pacific Fishery Management Plans

At a minimum, effects on EFH should be described generally and the following information included: number of actions (actual or estimated); range of impact size; type of impacts, both direct and indirect; and any mandatory mitigation measures. If available, additional information should be included on the following: cumulative effects of the program; cumulative (of program and non-program) effects within watersheds; and effects on fish populations.

Direct impacts to the marine environment from the project include:

- a. filling approximately 3,010 ft² of benthic habitat seaward of the MHWL with 159 CY of clean coral fill to create a sheet pile dock facility that would allow vessels to on- and off-load gear and/or passengers;

- b. filling approximately 880 ft² of inter-tidal habitat seaward of the MHWL with 96 CY of clean coral fill and gabion basket wall for the purpose of shoreline protection;
- c. dredging an area approximately 6,450 ft² fronting the dock facility to a target depth of -8 ft MLLW.

Secondary impacts related to project construction activities would include the generation of a temporary sediment plume resulting from sheet pile installation, dredging and installation of the shoreline protection measures (i.e., gabion basket wall). These impacts can be minimized through the implementation of appropriate mitigation measures, such as silt curtains.

To assess impacts on EFH, Management Unit Species (MUS) were identified from each of the four existing Fishery Management Plans (FMP); Bottom fish, Pelagic, Precious Corals and Crustaceans. These FMPs were developed by the Western Pacific Regional Management Council and approved by the NMFS. Based on best available information, project related impacts were identified for each of the MUS.

The twenty-two bottom fish MUS species identified in Table 3-4 are primarily found, as adults, in deeper water reef habitats and are not generally thought to be intimately associated with shallow water harbor environments. In general, the EFH for bottom fish is not well defined or known, especially with respect to larvae and juvenile habitat requirements. There will be no substantial physical impacts to the benthic habitat required by these bottom fish MUS species from the proposed project. Impacts related to sediment plumes that would likely be generated from the project are not expected to reach the EFH at a density or duration that would substantially affect growth or reproduction, despite the lack of knowledge in this area.

TABLE 3-4
ANTICIPATED PROJECT IMPACTS TO BOTTOM FISH MUS (BMUS)¹

SCIENTIFIC NAME	COMMON NAME	ANTICIPATED IMPACTS TO EFH
<u>Aphareus rutilans</u>	red snapper/silvermouth	- none -
<u>Aprion virescens</u>	gray snapper/jobfish	- none -
<u>Caranx ignobilis</u>	giant trevally/jack	- none -
<u>C. lugubris</u>	black trevally/jack	- none -
<u>Epinephelus fasciatus</u>	blacktip grouper	- none -
<u>E. quernus</u>	sea bass	- none -
<u>Etelis carbunculus</u>	red snapper	- none -

<u>E. coruscans</u>	red snapper	- none -
<u>Lethrinus amboinensis</u>	ambon emperor	- none -
<u>L. rubrioperculatus</u>	redgill emperor	- none -
<u>Lutjanus kasmira</u>	blueline snapper	- none -
<u>Pristipomoides auricilla</u>	yellowtail snapper	- none -
<u>P. filamentosus</u>	pink snapper	- none -
<u>P. flavipinnis</u>	yelloweye snapper	- none -
<u>P. seiboldi</u>	Pink snapper	- none -
<u>P. zonatus</u>	Snapper	- none -
<u>Pseudocaranx dentex</u>	thicklip trevally	- none -
<u>Seriola dumerili</u>	Amberjack	- none -
<u>Variola louti</u>	lunartail grouper	- none -
SEAMOUNT GROUND FISH		
<u>Beryx splendens</u>	Alfonsin	- none -
<u>Hyperoglyphe japonica</u>	Ratfish/butterfish	- none -
<u>Pseudopentaceros richardsoni</u>	Armorhead	- none -

NOTE: ¹ BMUS species list was obtained directly from *Bottomfish and Seamount Groundfish Fisheries of The Western Pacific Region - 1998 Annual Report* (WPRFMC 1999a).

The EFH for the numerous pelagic MUS species (Table 3-5) could also be considered broad and includes virtually all offshore marine habitats found adjacent to Guam. With respect to this proposed project, there will be no substantial physical impacts to the benthic habitat required by these pelagic MUS species. Although sediment plumes that would be generated from the proposed project may possibly reach EFH for the pelagic MUS, it is believed the plumes will not be in a density or duration that would affect growth or reproduction.

TABLE 3-5
ANTICIPATED PROJECT IMPACTS TO PELAGIC MUS (PMUS)¹

SCIENTIFIC NAME	COMMON NAME	ANTICIPATED IMPACTS TO EFH
<u>Coryphaena</u> spp.	Mahimahi (dolphinsfishes)	- none -
<u>Acanthocybium solandri</u>	Wahoo	- none -
<u>Makaira mazara</u>	Indo-Pacific blue marlin	- none -
<u>Makaira indica</u>	Black marlin	- none -
<u>Tetrapturus audax</u>	Striped marlin	- none -
<u>T. angustirostris</u>	Shortbill spearfish	- none -
<u>Xiphias gladius</u>	Swordfish	- none -
<u>Istiophorus platypterus</u>	Sailfish	- none -
Families: Alopiidae, Sphyrnidae, Lamnidae Carcharhinidae,	Oceanic sharks	- none -
<u>Thunnus alalunga</u>	Albacore	- none -
<u>T. obesus</u>	Bigeye tuna	- none -
<u>T. albacares</u>	Yellowfin tuna	- none -
<u>T. thynnus</u>	Northern bluefin tuna	- none -
<u>Katsuwonus pelamis</u>	Skipjack tuna	- none -
<u>Euthynnus affinis</u>	Kavakava	- none -
<u>Gymnosarda unicolor</u>	Dogtooth tuna	- none -
<u>Lampris</u> spp.	Moonfish	- none -
Family: Gempylidae	Oilfish family	- none -
Family: Bramidae	Pomfret	- none -
<u>Auxis</u> spp., <u>Scomber</u> spp., <u>Allothunus</u> spp.	Other tuna relatives	- none -

NOTE: ¹ PMUS species list was obtained directly from *APelagic Fisheries of the Western Pacific Region - 1998 Annual Report* (WPRFMC 1999b).

The Precious Corals FMP recognizes pink, gold, bamboo and black corals as MUS (Table 3-6). The first three species are generally found between 350 and 1,500 meters

while black corals occur in shallower waters, typically between 30 and 100 meters in depth. Precious corals require specific depth ranges and areas of solid substrate with strong to moderate currents to help prevent the accumulation of sediments, which would otherwise smother young coral colonies and prevent settlement of new larvae. Obviously there will be no direct physical impacts to the benthic habitat required by precious corals. Impacts related to sediment plumes generated from the project are not expected to reach the deep-water EFH of these coral species at a density or duration that would affect growth or reproduction. Additionally, there is no knowledge on whether precious coral beds are found in the deeper off-shore waters seaward of the Hagatna Boat Basin.

TABLE 3-6
ANTICIPATED PROJECT IMPACTS TO PRECIOUS CORAL MUS

SCIENTIFIC NAME	COMMON NAME	ANTICIPATED IMPACTS TO EFH
<i>Corallium secundum</i>	Pink coral (= red coral)	- none -
<i>Corallium regale</i>	Pink coral (= red coral)	- none -
<i>Corallium laauense</i>	Pink coral (= red coral)	- none -
<i>Gerardia</i> spp.	Gold coral	- none -
<i>Narella</i> spp.	Gold coral	- none -
<i>Calyptrophora</i> spp.	Gold coral	- none -
<i>Lepidisis olapa</i>	Bamboo coral	- none -
<i>Acanella</i> spp.	Bamboo coral	- none -
<i>Antipathes dichotoma</i>	Black coral	- none -
<i>Antipathes grandis</i>	Black coral	- none -
<i>Antipathes ulex</i>	Black coral	- none -

The Crustacean FMP only identifies spiny and slipper lobsters as MUS (Table 3-7). The EFH for these species are known to occur in coral reef environments, especially along rocky outcroppings and areas with three dimensional relief. By definition, lobster EFH may occur in the vicinity of the Hagatna Boat Basin.

There will be no direct physical impacts to the benthic habitat required by crustacean MUS. Impacts related to sediment plumes generated from the project could possibly reach the EFH of lobsters but not at a density or duration that would affect growth or reproduction.

TABLE 3-7
ANTICIPATED PROJECT IMPACTS TO CRUSTACEAN MUS

SCIENTIFIC NAME	COMMON NAME	ANTICIPATED IMPACTS TO EFH
Panulirus spp.	Spiny lobsters	Possible increase of usable habitat through the addition of gabion shoreline protection structure
Fam. - Scyllaridae	Slipper lobsters	Possible increase of usable habitat through the addition of gabion shoreline protection structure

In summary, it is believed that issuance of a USCOE permit to authorize construction of the proposed shoreline protection structures, vessel dock and access dredging would not adversely affect EFH of any of the MUS identified in the four FMPs (Tables 3-4, 3-5, 3-6, and 3-7).

3.4 HUMAN ENVIRONMENT

3.4.1 Historical and Cultural Resources

The Department of Parks and Recreation (DPR) Historic Resources Division (HRD) is responsible for ensuring that historic resources are managed in compliance with Section 106 of the National Historic Preservation Act.

The village of Hagatna is listed on the National Historic Register. Historically the ancient Chamorro village of Hagatna was the absolute center of island residential, commercial and institutional activity. The DPR has pointed out that the pre-war brass foundry and public market were once located in the area of the current Co-Op facility. The agency also stated that much of the Paseo de Susana was created using the rubble from the WWII destruction of Hagatna.

A World War II Japanese Pillbox occupies a portion of the coastline north of the existing Co-Op facility. Additional parking is being proposed for this area. The Pillbox fortification is listed in the Guam Historic Properties Inventory and is also listed in the Guam and National Register of Historic Places.

Because of these important features, the Guam HRD will require that close consultation be conducted with their office prior to construction that may have the potential to disturb cultural resources.

Specific requirements were outlined in the agency's March 23, 2004 position statement relative to an application for zone change to amend the Paseo Planned Development District. Of particular importance is the requirement to maintain a buffer with accessibility between the Co-Op facility and the fortification. Most importantly the HRD will require the development of an archeological monitoring and discovery plan to address the need to identify, recover and document artifacts that may be unearthed prior to and during construction.

3.4.2 Socioeconomics

The 2000 census for Guam reported a total of 1,100 residents living in the district of Hagatna or approximately seven tenths of one percent of total population. This represents a 3.4% decline from the 1990 total of 1,139. While Hagatna has a small residential population, it remains a vital center of commercial, institutional and cultural activity. As such, it is one of the islands primary employment centers.

3.4.3 Land Use

The administrative, legislative and judicial functions of the government are located in Hagatna. The Hagatna Basilica is an important focal point in the city. Numerous historic and cultural features are present including the Plaza de Espana and the Angel Santos Latte Stone Park at the base of San Ramon Hill. The Paseo de Susana is home to the Chamorro Village, Paseo Stadium, the Sagan Dinana (an open air meeting facility) the existing Co-Op facility and marina and a number of picnic shelters and meeting places for the island's surfing and canoeing enthusiasts.

Every day Hagatna hosts residents from across the island who travel into the city to work, attend school, shop, worship and recreate. Still commercial and government activities began to leave Hagatna in recent years to take advantage of available space at Tiyan and in the expanding commercial areas of Tamuning. As a result, the Hagatna Restoration and Redevelopment Authority (HRRA) was formed. Together with Hagatna Foundation (HF), the HRRA primary mission is to pursue the revitalization of the Capital City of Hagatna.

3.4.4 Parks and Recreation

Hagatna is home to numerous parks and recreational facilities. The Hagatna tennis courts and the Hagatna Pool are busy facilities in considerable demand throughout the week. The Paseo Stadium and Jose Guerrero Softball field at Paseo de Susana are the largest ball fields on island. Again, boaters, surfers, paddlers and fisherman use facilities, both natural and manmade, extensively on weekends.

The entire Paseo de Susan Park is considered an important focal point located at the end of a "public corridor" extending from Government House and Fort Apugan atop San

Ramon Hill, through the Angel Santos Latte Stone Park, the Plaza de Espana and Skinners Plaza. The park was deeded to the government of Guam solely for civic, park and recreational purposes. Commercial activities are permitted within the park as long as they serve a public function and do not interfere with the ability of residents to enjoy the existing public facilities.

According to the Paseo de Susana Planed Development District Master Plan, a Heritage Walking Tour has been proposed as part of the Agana Parks Revitalization Project. This tour would link seventeen (17) historic sites in Hagatna and feature many of the remaining Spanish era ruins and other structures that are still present. The pan includes repairs and enhancements to existing structures as well as paths and other new park features.

3.4.5 Infrastructure

Guam's main highway, Route 1 Marine Corps Drive, runs through Hagatna and ties northern and southern villages into the Capital city. Route 4 intersects Route 1 at the Paseo de Susana providing an important transportation link to the city from villages along the island's southeastern coastline.

According to the Paseo de Susana Planned Development District Master Plan (PSPDDMP), basic water, sewer and power services are present throughout the project area. Waterlines measuring 6, 12 and 18 –inches in diameter are located within the park or on adjacent roadways. Telephone service is available throughout the park.

Storm water within the park is collected and transmitted via a curb and gutter system to the municipal system along Marine Corps Drive. Evidently this system discharges into the marina a short distance away via two 24-inch storm drain pipes. Other storm water sheet flows into nearby shoreline areas.

Parking facilities are present throughout the Paseo de Susana Park. According to the PSPDDMP, there are a total of 680 paved parking spaces within the marina, the Co-Op and the Paseo and Chamorro village areas. There is enough parking capacity on a daily basis, however there are not enough spaces during peak demand activities. This has led to occasional use of parking spaces on the other side of Marine Corps Drive at Skinner's Plaza. The risks associated with crossing the island's busiest roadway and the need to accommodate future growth has resulted in the consideration of a permanent parking structure.

CHAPTER FOUR

ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter on environmental consequences is arranged by resource/issue. The anticipated consequences associated with each alternative will be outlined. Potential mitigation measures will be discussed if relevant.

4.2 PHYSICAL ENVIRONMENT

This section outlines the anticipated consequences of each of the alternatives upon elements of the physical environment including: climate and air quality, geology and soils, topography, groundwater, freshwater surface waters, marine waters, floodplains, wetlands, and noise and aesthetics.

4.2.1 Climate and Air Quality

Construction activities usually imply the use of heavy equipment and other machinery that result in fuel combustion emissions and dust. These emissions can degrade air quality and become a nuisance to nearby residents and businesses.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

Increased emissions can be expected during the short term construction period. Grading, dredging and pile driving will be conducted by heavy machinery and may include the use of cranes, excavators, dump trucks, and other equipment that emit fuel combustion emissions. Construction of a Co-Op facility would add cement mixers, roller/compactors, material delivery, stockpiling and grading activities to the list of potential emissions sources. These sources can also produce fugitive dust emissions in addition to exhaust emissions, if dry conditions are present. Water sprinkling trucks are routinely used to reduce fugitive dust emissions.

Over the long term fish smoking operations would imply emissions. These emissions would likely occur on a periodic basis and are not usually considered unpleasant. Under normal wind conditions these emissions would dissipate toward the marina and across Route 1 and therefore are not anticipated to significantly degrade air quality.

Suggested Mitigation: Stacked or second story emissions point

Alternative No. 2: Re-location of Co-Op Facility

Under a facility lease scenario no new construction of any significance would be anticipated. Therefore, no impacts to the surrounding climate or air quality at the new location would result.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action Alternative would leave the existing facility in place and therefore not result in increased emissions over the short or long term.

4.2.2 Geology and Soils

In general, earthwork can impact geological features, soils and topographic features. The extent of potential impacts depends upon the physical characteristics of soils, slopes etc. and the scope of proposed grading and earthwork activities associated with each alternative.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The existing site is already developed and will require little grading. The site is comprised of fill material so there are no unique geologic features or highly erodible soils present. Additional fill material will be needed to establish the fast-land behind the sheet pile proposed for the property boundary along the marina entrance channel. Fill material would be obtained from local quarries or other sites that are not contaminated. Any earth work proposed for coastal areas will require erosion and sedimentation control measures.

Suggested Mitigation: Develop standard Erosion Control and Sedimentation Control Plans (ECP) and employ best management practices (BMP) to minimize erosion and sedimentation into nearby marine waters.

Alternative No. 2: Re-location of Co-Op Facility

Under this alternative there is no new construction and therefore no potential for impacts to site geology and soils.

Suggested Mitigation: None

Alternative No. 3: No Action

Under the No Action alternative, erosion along the shoreline would continue. This is of particular concern during storms. Without protection measures in place, the shoreline

would continue to erode and facilities such as the aboveground storage tank (AST) could be undermined.

4.2.3 Topography

Each location has features specific topographic features. Hilly areas or areas with special scenic qualities require careful consideration when grading activities are planned. Preservation of unique topographic features and the prevention of drastic cuts or inappropriate fills can help maintain the visual quality of areas and prevent the acceleration (erosion) or ponding of storm water.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The construction of a new facility at the existing location will have no impact on important topographic features. Drastic cut and or fill is not planned with the exception of the construction of the wharf facility along the western property boundary. This effort will not result in accelerated storm water flows or flooding issues.

Suggested Mitigation: None proposed

Alternative No. 2: Re-location of Co-Op Facility

Topographic features would not be affected under a lease scenario.

Suggested Mitigation: None proposed

Alternative No. 3: No Action

Under the No Action alternative shoreline erosion would continue. This erosion could gradually affect site topography and impact the foundations of existing facilities.

4.2.4 Groundwater

The island of Guam depends heavily upon ground water from the Northern Aquifer as a primary drinking water source. Land use activities that could potentially affect this resource are coming under increased scrutiny.

Ground water at the Paseo de Susana area is not considered a source of drinking water.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

During construction the use of petroleum products such as fuel, oils and greases used in machinery can pose a risk if not used in a proper manner. Project contractors are routinely required to present plans to regulatory agencies describing what mitigation

measures will be adopted to address issues such as discharge water, sedimentation and erosion control, and petroleum products safeguards in order to obtain building permit approval.

Suggested Mitigation: Develop standard Environmental Protection Plan (EPP) to ensure that environmental protection measures are protective of baseline water quality.

Alternative No. 2: Re-location of Co-Op Facility

Leasing commercial space will have no affect upon groundwater.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action Alterative would not affect groundwater.

4.2.5 Freshwater Surface Waters

Preventing the degradation of water quality on Guam is an important issue facing the community. The GWQS requires water quality to be maintained and protected unless specific requirements are met to address review under NEPA, public notice, and GEPA Administrator approval. There are no fresh surface water bodies within the project area or the immediate vicinity.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The proposed action would have no impact upon fresh surface water quality.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

The alternative to lease an existing facility in a different location would result in impacts to freshwater surface water.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would not impact freshwater surface water quality.

4.2.6 Marine Waters

Preventing the degradation of water quality (freshwater surface or marine) on Guam is an important issue facing the community. The GWQS requires water quality to be maintained and protected unless specific requirements are met to address review under NEPA, public notice, and GEPA Administrator approval.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

Marine water quality at the present location is impaired as a result of a variety of activities to include storm water disposal, vessel maintenance and operations and perhaps even sewage disposal associated with the Hagatna Sewer Treatment Plant. Despite these conditions, new construction could present additional temporary threats. These threats however can be mitigated through the adoption of an EPP and Best Management Practices developed for work in the marine environment.

Suggested Mitigation: Development of an EPP and Best Management Practices

Alternative No. 2: Re-location of Co-Op Facility

Moving Co-Op operations to an existing commercial space would have no impact upon marine water quality.

Suggested Mitigation: None

Alternative No. 3: No Action

Continuing to operate in the same facility would present no new potential impacts to neighboring marine water quality.

4.2.7 Floodplains

New construction within floodplains must meet FEMA's Flood Insurance Program. The existing Co-Op facility is located in a floodplain where proposed improvements must have a finished elevation of +10 feet.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The proposed new Co-Op structure will include a finished floor elevation of +8 feet. This will require the issuance of a variance from the floodplain administrator.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

Leasing an existing commercial facility will have no impact upon floodplains.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative will not affect floodplains, however the existing structure does not comply with floodplain guidelines.

4.2.8 Wetlands

There are no jurisdictional wetlands present on the subject property.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

There will be no impacts to jurisdictional wetlands on site as none are present.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

There will be no jurisdictional wetlands impacts anticipated as a result of leasing an existing facility.

Suggested Mitigation: None

Alternative No. 3: No Action

Taking no action will not impact jurisdictional wetlands.

4.2.9 Noise and Aesthetics

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The Co-Op is located in an urban corridor where traffic noise, vessel operations and occasional airline approaches represent normal levels of noise. New construction will require activities such as pile driving, grading, excavation, demolition, paving and fabrication. These activities will result in noise from trucks/heavy equipment, machinery and hand tools. Mufflers and other sound reduction devices are required on all equipment. Noise impacts will be limited to the construction period. Noise volume and duration will vary with construction activities and is not anticipated to represent a

significant impact. Long term operations will not exceed existing background noise levels.

Impacts to the visual quality would mostly be positive. The existing building, while only a single storey, is significantly deteriorated. The proposed structure would greatly enhance the visual appearance of the area. The overall size of the proposed facility will not significantly affect surrounding view sheds. Landscaping and the use of pavers on parking surfaces would soften appearance of the new structure.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

The option of leasing of an existing commercial structure would not introduce new impacts to noise levels or aesthetics in the area.

Suggested Mitigation: None

Alternative No. 3: No Action

The existing Co-Op facility is in an advanced stage of deterioration. Typhoon damaged structures remain on site. These conditions would persist under the No Action alternative. The facility would eventually become unsafe for use.

4.3 BIOLOGICAL ENVIRONMENT

4.3.1 Wildlife Habitat Resources

4.3.1.1 Terrestrial Habitat

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

There is no wildlife habitat of any quality or substance either on-site or immediately surrounding the project site that would warrant specific conservation or mitigation measures. The project site is located at the Hagatna Boat Basin in the heart of Hagatna within an urban environmental setting.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

Relocating to an alternative and pre-existing facility would not result in impacts to terrestrial habitat.

Suggested Mitigation: None

Alternative No. 3: No Action

As indicated above, the existing location does not feature important terrestrial habitat and therefore would have no impact upon such resources.

4.3.1.2 Marine Habitat

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

There is no marine habitat of special significance either on-site or immediately surrounding the project site that would warrant specific conservation or mitigation measures. The project site is located at the Hagatna Boat Basin in the heart of Hagatna within an urban environmental setting.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

Relocating to an alternative and pre-existing facility would not imply new impacts to marine habitat.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would preserve the status quo and not impact marine resources.

4.3.2 Wildlife Resources

4.3.2.1 Terrestrial Wildlife Species

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

There were no native vertebrate terrestrial wildlife species recorded from the project site, therefore the proposed action is expected to have little to no impact to these species.

Suggested Mitigation: A vermin control program should be implemented to address mitigation of any rodent problems.

Alternative No. 2: Re-location of Co-Op Facility

Relocation to an existing facility would not result in impacts to terrestrial wildlife.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would preserve the status quo and not impact terrestrial wildlife species.

4.3.2.2 Marine Wildlife Species

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

Those slow-moving or stationary benthic organisms (i.e., sea cucumbers, mollusks, corals, some species of fish and various small crab and infaunal species) found within the footprint of the dredge/fill area could be killed during construction activities.

Suggested Mitigation: Relocate macro-invertebrates (i.e., sea cucumbers) from the proposed dredge/fill area prior to commencement of dredging work. Remove abandoned fishing net from the proposed dredge area during the dredging operation and properly dispose of it.

Alternative No. 2: Re-location of Co-Op Facility

Facility relocation would take advantage of an existing facility and would imply no new impacts to marine wildlife species.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would maintain existing conditions and not impact marine wildlife species.

4.3.3 Endangered/Threatened Species Occurring on Guam

4.3.3.1 Mammalian Fauna

There were no Federally protected terrestrial or marine mammalian species recorded from the project site nor was quality habitat required to support those species of concern observed. In addition, no designated or proposed critical habitat for these species overlays the project site area. Therefore the proposed action would not directly affect any Federally listed mammalian species.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

Project related impacts to Federally protected marine mammals, such as direct take incidents during dredge/fill activities are not expected. The footprint of the work area is small, shallow and located in a Marina setting with high vessel traffic (e.g., not optimal habitat). Any marine mammal that may possibly enter the work area would be easily observed and therefore avoided. Generation of turbidity plumes during the proposed in-water dredge/fill work is not expected to have any detrimental affect on marine mammals as they have the ability to simply swim away without affecting the health of the animals.

Impacts to the two Federally protected bat species are not expected as there is no habitat of any quality or substance either on-site or immediately surrounding the project site that would attract these species.

Suggested Mitigation: Should any marine mammals enter the project work area, all dredge/fill work would cease until the animal left the area. Adoption of Conservation Measures routinely appended to Department of the Army permits involving in-water work.

Alternative No. 2: Re-location of Co-Op Facility

Facility relocation would take advantage of an existing facility and would imply no new impacts to marine special status species.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would maintain existing conditions and not impact special status species.

4.3.3.2 Avifauna

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

There were no Federally protected avifaunal species recorded from the project site nor was quality habitat required to support those species of concern observed. In addition, no designated or proposed critical habitat for these species overlays the project site area. Therefore the proposed action would not directly affect any Federally listed avifaunal species.

Suggested Mitigation: To the greatest extent practical, incorporate plant species that are utilized by native wildlife species into landscaping plans.

Alternative No. 2: Re-location of Co-Op Facility

Facility relocation would take advantage of an existing facility and would imply no new impacts to avifauna.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would maintain existing conditions and not impact avifauna.

4.3.3.3 Herpetological Fauna

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

Project related impacts to Federally protected sea turtles, such as direct take incidents during dredge/fill activities are not expected. The footprint of the work area is small, shallow and located in a Marina setting with high vessel traffic (e.g., not optimal habitat). Any marine turtles that may possibly enter the work area would be easily observed and therefore avoided. Generation of turbidity plumes during the proposed in-water dredge/fill work is not expected to have any detrimental affect on sea turtles as they have the ability to simply swim away without affecting the health of the animals. Sea turtles are not known to currently nest on the beach area fronting the Co-Op and therefore no active nesting beach would be affected.

Suggested Mitigation: Should any sea turtles enter the project work area, all dredge/fill work would cease until the animal left the area. Adoption of Conservation Measures routinely appended to Department of the Army permits involving in-water work.

Alternative No. 2: Re-location of Co-Op Facility

Facility relocation would take advantage of an existing facility and would imply no new impacts to herpetological fauna.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would maintain existing conditions and not impact avifauna.

4.3.3.4 Invertebrate Fauna

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The three (3) Federally listed tree snail species and two (2) butterfly species are not present on site nor are their preferred habitat or host plants present therefore, none would be affected by the proposed action.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

Facility relocation would take advantage of an existing facility and would imply no new impacts to invertebrate fauna.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would maintain existing conditions and not impact invertebrate fauna.

4.3.3.5 Flora

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The ESA has specific limitations on situations where federally protected plant species are found on private property. However, for the proposed action these limitations are irrelevant as no Federally protected plant species were found on the project site. In summary, no Federally protected plant species would be affected by the proposed action.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

Relocation to an existing facility would not impact flora.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would maintain existing conditions and not impact site flora.

4.4 HUMAN ENVIRONMENT

4.4.1 Historical and Cultural Resources

Federal and local laws require that historical and cultural resources be carefully considered prior to construction and that when appropriate, mitigation plans are adopted to properly safeguard these resources from degradation and loss.

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

Suggested Mitigation: Develop monitoring and mitigation plans in close coordination with the Historic Resources Division of the Department of Parks and Recreation to ensure protection of historic and cultural resources.

Alternative No. 2: Re-location of Co-Op Facility

No impacts to historic or cultural resources would occur under the Commercial Lease alternative.

Suggested Mitigation: None

Alternative No. 3: No Action

No impacts to historic or cultural resources would occur under the No Action alternative.

4.4.2 Socioeconomics

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The construction of a new Co-Op facility would result in a number of positive socioeconomic impacts. Construction activity results in construction jobs and wages,

taxes, permit fees, insurance fees, materials and supplies sales and other commercial activity.

When the facility is in operation significant benefits will result from the enhanced Co-Op operations. Additional jobs will be created, an increase in import substitution will likely result from increases in market size and overall Co-Op membership growth. Consumers will to enjoy an ever improving, reliable and affordable source of fresh local fish which is an important cultural food.

Vendor spaces will attract tenants and spur further commercial activity in the area such as potential increases in marine activities at the marina. This activity will compliment the Chamorro Village traffic and improve the overall appeal of the Paseo de Susana to tourists. The local community will have additional options when visiting the park during the throughout the week and in particular during the popular Wednesday night market.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

Leasing an existing space will result in a net increase in commercial activity at the new location. However increases in Co-Op operations may be modest due to the interruption in sales as a result of relocating. It is quite possible that an alternative location may result in less business activity for the Co-Op as they loose some of the advantages of being “dockside” at the marina. Less business activity would have detrimental effects upon jobs, wages and tax revenue and ultimately a loss of Co-Op members.

Suggested Mitigation: None

Alternative No. 3: No Action

Under the No Action Alternative Co-Op membership, employee numbers and business activity would likely remain status quo.

4.4.3 Land Use

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

Constructing a new Co-Op facility would improve upon it’s current use and represent a more appropriate utilization level of the existing property. The new facility would not preclude other land use activities at the Paseo de Susana or the proposed ADA compliant fishing platform from being built or existing exist. It is possible that the new facility will attract additional land use activities on the marina side of the property.

Suggested Mitigation: None

Alternative No. 2: Re-location of Co-Op Facility

Relocation to an existing commercial space would take away a vital land use activity from the marina and the Paseo de Susana. This would probably have some affect upon users of the marina who depend upon the nearby Co-Op to market their catch and for fuel and other services. It is not likely that any changes to neighboring land use at the new location will be able to offset the loss in the complimentary nature of land use activities at the present location.

Suggested Mitigation: None

Alternative No. 3: No Action

Taking no action would neither significantly increase or decrease the volume or quality of land use activity surrounding current location.

4.4.4 Parks and Recreation

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

The proposed Co-Op facility will enhance the number of patrons visiting the Paseo de Susana. It is anticipated that the new facility will compliment activities throughout the area by increasing interest in the Paseo de Susana benefiting the existing Chamorro Village operations.

Currently the islands paddling community uses a portion of the acre north of the existing Co-Op property. The area is used to launch and retrieve canoes and kayaks and the wooden shelter is used for gatherings. The PL 27-24 stipulates that the proposed Co-Op facility (including potential auxiliary parking and ponding basin construction) not impede public access to the shoreline except when necessary for public safety and security and for use of proposed docking or wharf improvements.

An ADA compliant fishing platform is proposed for an area to the north of the project site. Use of the facility will not be affected by the proposed project as they will be separated by approximately 500 feet.

Suggested Mitigation: Preserve access to the beach and to the WWII pillbox. Retain shelters on site.

Alternative No. 2: Re-location of Co-Op Facility

A commercial lease arrangement at an alternative location will not impact parks and recreation resources.

Suggested Mitigation: None

Alternative No. 3: No Action

The No Action alternative would result in no impacts to parks and recreation facilities.

4.4.5 Infrastructure

Alternative No. 1 (Preferred Alternative): On-site Re-construction of Co-Op Facility

It is anticipated that the proposed facility will require an increase in supply of electricity, water and sewer disposal. According to agency personnel, adequate capacity exists for each of these utility services to accommodate the proposed facility. No negative impacts to existing utility service levels are anticipated during construction or over the longer term operations of the new facility.

Storm water disposal will be handled on site in compliance with related Guam EPA regulations. Storm water from impervious surface will be channeled to a ponding basin proposed for a portion of the additional acre acquired by the GFCA under PL 27-24.

Parking has been identified as a growing problem at the Paseo de Susana during peak demand events. Developers of the PSPDDMP believe that alternative parking solutions such as a structure will need to be considered in order to address peak demand. As proposed, the new Co-Op facility will have twenty-seven (27) parking stalls including two (2) handicap parking stalls. Additional parking could be developed on the acre of property to the north. This area could accommodate approximately twenty-five (25) vehicles if needed.

Suggested Mitigation: Develop plans to establish parking stalls on the lot to the north provided for expansion.

Alternative No. 2: Re-location of Co-Op Facility

Moving the Co-Op operations to an alternative facility that was built to handle such commercial activities would likely not result in detrimental impacts to levels of service in the area.

Suggested Mitigation: Contractor should coordinate temporary relocations with utility agencies.

Alternative No. 3: No Action

The No Action alternative would not replace the existing facility and therefore would not represent additional demand for infrastructure in the area.

4.5 CUMULATIVE IMPACTS

As the proposed action is generally reconstructing an existing facility, there are no anticipated significant cumulative impacts that would result from the project.

4.6 UNAVOIDABLE ADVERSE AFFECTS

There are no unavoidable significant adverse impacts that would result from the project if the suggested mitigation measures are followed.

4.7 IRRETRIEVABLE, IRREVERSIBLE COMMITMENT OF RESOURCES

Short term resource commitments would be required to construct a new facility. These resources would be in the areas of labor, materials and equipment and energy (electricity and fuel). These construction related inputs would not threaten the long term viability or availability of important natural, institutional or other resources.

4.8 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The short-term commitment of resources associated with constructing a new facility would be considered to be beneficial when compared against the long term benefits of job creation, increased economic activity and availability of fresh local seafood to island residents. Increasing the availability of fresh seafood provides for import substitution, supports Co-Op membership livelihood, and promotes economic activity in a business sector that is well suited to the island environment.

4.9 LIST OF APPLICABLE REGULATIONS

Proposals involving construction activities in and adjacent to tidal waters would likely require compliance with the following regulations.

Federal Regulations

- National Environmental Policy Act of 1969 (NEPA) (42 US Code [USC] 4321 et seq.)
- Clean Air Act (CAA) Conformity (42 US Code 7401, Section 176(c))
- Rivers and Harbors Act of 1899, Section 10 (33 US Code 403)
- Federal Water Pollution Control Act as amended by the Clean Water Act of 1977, Sections 401, 402, and 404 (33 US Code 1251 et seq.)
- Water Pollution Control Act, Title 10, CH. 47, Guam Code Annotated (as amended by Public Law 17-87)
- Coastal Zone Management Act (CZMA) of 1972 (16 US Code 145 et seq.)
- National Historic Preservation Act of 1966 (US Code 470 et seq.)
- Endangered Species Act of 1973 (16 US Code 1531 et seq.)
- Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 US Code 703 et seq.)
- Marine Mammal Protection Act (MMPA) (Title 17 Chapter 32)
- Fish and Wildlife Coordination Act (FWCA) (16 USCA §§ 661-668ee)

Government of Guam Regulations

- Guam 401 Water Quality Certification
- Guam Water Quality Standards
- Guam Soil Erosion and Sediment Control Regulations
- Dewatering Regulations
- Guam Seashore Protection Act
- Coastal Zone Management Act

4.10 PREFERRED ALTERNATIVE

The preferred alternative is the Proposed Action. The preferred alternative features many advantages when compared to either the No Action or relocation alternatives. Advantages were present in a number of areas within the category of socioeconomics. The preferred action also presents advantages in the areas of land use and aesthetics. The preferred alternative was least advantageous in the areas of parking infrastructure and floodplains.

4.11 MITIGATION

The following environmental protection and mitigation measures are recommended to address potential impacts associated with the preferred alternative.

1. A standard Environmental Protection Plan should be developed to address potential threats to the environment resulting from replacing the existing facility. This plan must recognize the sensitive nature of protecting resources along the coastline.
2. Erosion Control and Sedimentation Control Plans should be developed to minimize the potential for adding additional sources of silt to nearby waters. Earthwork and discharges of water pumped from behind temporary coffer dams are two potential sources of sediment. Temporary berms, silt curtains and fences are measures used to control erosion and sedimentation.
3. Adopt standard BMPs (Conservation Measures) to mitigate the potential for the project to impact sea turtles. These measures are routinely included in Department of the Army authorizations for in-water work.
4. Best Management Practices should be utilized where feasible to prevent further degradation of area water quality.
5. Dust suppression during construction should be accomplished through water sprinkling.
6. An Archeological Monitoring and Discovery Plan should be developed in consultation with the DPR-HPO to address monitoring and reporting requirements during periods when significant earthwork will be conducted to include dredging activities.
7. A Water Quality Monitoring Plan may be required. This would be included in the EPP and function to allow for measurable monitoring of water quality in the vicinity of the project.
8. Develop an additional 25 parking stalls.
9. Relocation of macro-invertebrates from proposed dredge/fill areas.
10. Remove abandoned fishing net during dredge operations.
11. Water from dewatering operations should be injected into the subsurface on site rather than directly into nearby waters.

CHAPTER FIVE LIST OF PREPARERS

In accordance with Section 1502.6 of the Council on Environmental Quality (CEQ) regulations, this EA was prepared by an interdisciplinary team of professionals. Areas of expertise included environmental sciences, land use planning, biology and civil engineering.

The identities of the principal preparers are:

ARC Environmental Services

Joel Sablan, Environmental Project Manager

CHAPTER SIX

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Appendix A

Photographs

1A



1B



1A: View of Co-Op complex from the east

1B: Co-Op unloading area, pump out facility and AST from the south

Date

March 2006

Photo Plate

1

ARC Environmental Services

2A



2B



2A: Fuel dispensing facilities along east edge of marina
2B: View of shoreline edge north to south

Date
March 2006

Photo Plate
2

3A



3B



3A: View of acre north of Co-Op facility provided for expansion
3B: WWII bunker located on additional acre to the north

Date
March 2006

Photo Plate
3

ARC *Environmental Services*

4A



4B



4A: Agana Marina channel entrance
4B: Shoreline fronting Co-Op building

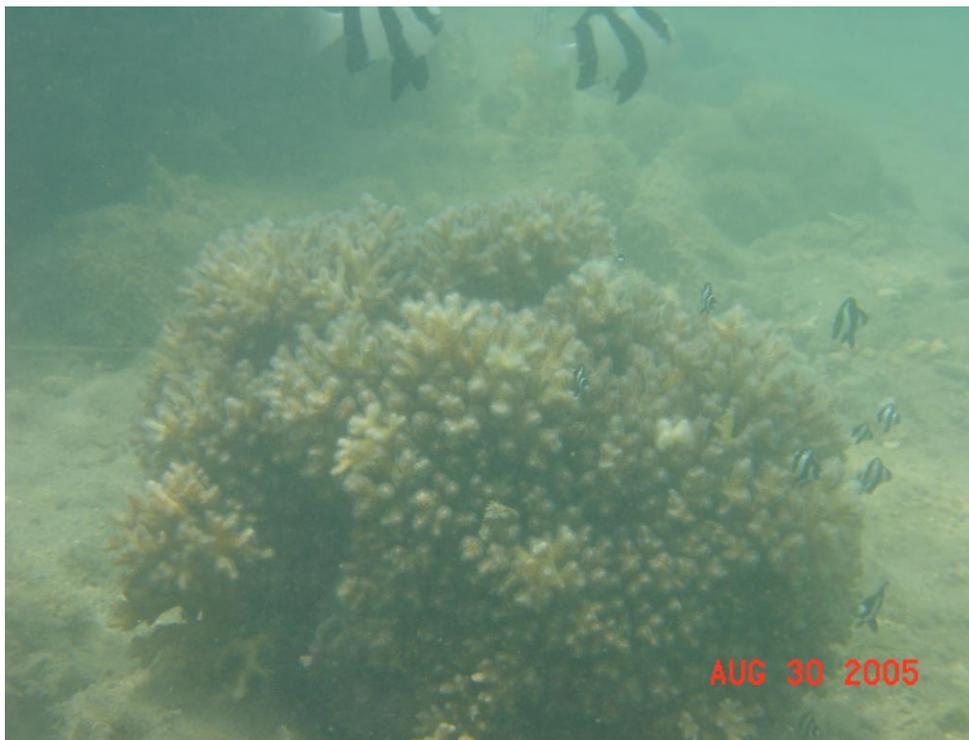
Date
March 2006

Photo Plate
4

5A



5B



5A: View of coral showing sedimentation levels

5B: View of the common coral (*Pocilipora damicornis*)

Date
March 2006

Photo Plate
5

ARC *Environmental Services*

Appendix B

Civil and Architectural Drawings

GENERAL NOTES (CIVIL):

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE OSHA REGULATIONS.
2. THE OWNER WILL PROVIDE A DPW BUILDING PERMIT. THE CONTRACTOR WILL BE RESPONSIBLE FOR COMPLYING WITH ALL CONDITIONS CONTAINED IN THESE PERMITS AND IN OBTAINING ANY OTHER PERMITS THAT MAY BE REQUIRED, INCLUDING GUAM EPA.
3. THE TYPES, LOCATIONS, SIZES AND OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THE IMPROVEMENT PLANS WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, AND DEPTHS OF SUCH UNDERGROUND UTILITIES. (A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE ALL KNOWN UNDERGROUND UTILITIES.) HOWEVER, THE ENGINEER CAN ASSUME NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THE DELINEATION OF SUCH UNDERGROUND UTILITIES WHICH MAY BE ENCOUNTERED, BUT WHICH ARE NOT SHOWN ON THESE DRAWINGS.
4. CONTRACTOR SHALL COORDINATE WITH THE OWNER REGARDING THE RELOCATION OF ALL EXISTING UTILITIES.
5. SHOULD DISCREPANCIES EXIST BETWEEN ANY ACTUAL ELEVATIONS AND THESE PLANS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER BEFORE ADJUSTING THE DESIGN. CONTRACTOR TO SUBMIT SHOP DRAWINGS AND/OR RELATED DOCUMENTS FOR ACCEPTANCE.
6. CONTRACTOR SHALL UNCOVER AND EXPOSE ALL EXISTING UTILITY LINES WHERE THEY ARE TO BE GROSSED ABOVE OR BELOW BY THE NEW FACILITIES BEING CONSTRUCTED IN ORDER TO VERIFY THE GRADE AND TO ASSURE THAT THERE IS SUFFICIENT CLEARANCE. PIPE SHALL NOT BE STRINGED NOR TRENCHING COMMENCED UNTIL ALL CROSSINGS HAVE BEEN VERIFIED FOR CLEARANCE. IF THE CONTRACTOR FAILS TO FOLLOW THIS PROCEDURE, HE WILL BE SOLELY RESPONSIBLE FOR ANY EXTRA WORK OR MATERIAL REQUIRED IF MODIFICATIONS TO THE DESIGN ARE NECESSARY.
7. ALL AREAS SUBJECT TO REMOVAL OF THE NATURAL VEGETATION DUE TO EARTHWORK OPERATIONS SHALL BE SEEDED WITH GRASS PER SPECIFICATIONS. THIS INCLUDES ALL SLOPES AND AREAS DISTURBED BY THE CONTRACTOR NOT SHOWN ON THE PLAN.
8. THE CONTRACTOR SHALL MAINTAIN SIDEWALKS IN A CLEAN SAFE AND USABLE CONDITION.
9. ALL TREES AND PLANTS REMOVED BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE RELOCATED AS DIRECTED BY THE OWNER AT NO EXPENSE TO THE OWNER.
10. EXISTING FACILITIES INCLUDING, BUT NOT LIMITED TO ROADS, WALLS, FENCES AND STRUCTURES DAMAGED BY CONTRACTOR'S OPERATIONS, SHALL BE RESTORED TO MATCH ORIGINAL CONDITION AND TO THE SATISFACTION AND WITHOUT ADDITIONAL COST TO THE OWNER.
11. THE CONTRACTOR SHALL END PLACEMENT FOR ALL SURFACE CONCRETE WORK AT EITHER EXPANSION OR CONSTRUCTION JOINTS.
12. CONNECTIONS TO EXISTING WATERLINES SHALL BE DONE IN AN APPROVED MANNER AND WITH MINIMUM INTERRUPTION OF SERVICE.
13. EXISTING WATER MAINS REQUIRING CONNECTION SHALL BE FIELD LOCATED BY THE CONTRACTOR.
14. THE CONTRACTOR SHALL MAINTAIN SERVICE TO ALL EXISTING WATER SERVICE CONNECTIONS DURING CONSTRUCTION OF NEW IMPROVEMENTS, UNLESS APPROVED OTHERWISE BY THE OWNER.
15. CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY.

16. SURVEY NOTES BY FRANK CASTRO, REGISTERED LAND SURVEYOR.

1. SURVEY WAS BASED ON FOUND CORNERS AS SHOWN.
2. ALL DISTANCES ARE IN FEET, UNLESS OTHERWISE NOTED.
3. ALL BEARING AND DISTANCES ARE 1983 GRID.
4. VERTICAL CONTROL IS BASED ON RECOVERED CORNER WITH ELEV.=8.91 AS SHOWN.
5. CONTOUR INTERVAL IS ONE (1) FOOT.
6. REFERENCES: SEEN SK. NO. 1366, JOB NO. 1144, GUAM FISHERY COOP.
7. LEGEND AND SYMBOLS

- NAIL SET ON CONG. CURB
- ⊙ INACCESSIBLE CORNER
- ⊙ NAIL FOUND ON CONG. PAD
- ⊙ #4 REBAR SET MARKED RLS #19
- HOLE FOUND ON CONG. CURB
- ⊙ CONG./WOODEN POWER POLE
- LIGHT POST
- CONTOUR LINE
- 14.0 SPOT ELEVATION

TREES:



ABBREVIATIONS (CIVIL):

CONC	CONCRETE
Ø	DIAMETER
DS1	DOWNSPOUT AT COLUMN WITHOUT CONCRETE BOX
DS2	DOWNSPOUT AT COLUMN WITH CONCRETE BOX
(E)	EXISTING ELEVATION
ELEV	FINISHED GRADE
FG	FINISHED SURFACE
FS	FEET
FT	HIGH DENSITY POLYETHYLENE PIPE
HDPE	INVERT
INV.	MINIMUM
MIN	NEW
(N)	NOT TO SCALE
NTS	SLOPE
S	TYPICAL UNLESS NOTED OTHERWISE
TYP	VERIFY IN FIELD
UNO	
VF	

LEGEND & SYMBOLS (CIVIL):

	SEWER LINE
	WATERLINE
	CURB
	CURB & GUTTER
	(N) FINISH GRADE ELEV.
	MATCH (N) TO (E) GRADE
	TOP OF CURB (N) ELEV. FINISH GRADE ELEV.
	CATCH POINT TOP OF SLOPE
	CATCH POINT TOE OF SLOPE
	GRATED INLET
	ASPHALT PAVEMENT
	CONCRETE
DETAIL NO.	DETAIL OR SECTION CALLOUT
REF. SHEET	



PROJECT TITLE:
 GUAM FISHERY COOPERATIVE
 GUAM FISHERMAN'S COOP FACILITY
 HAGATNA, GUAM, U.S.A.

GENERAL NOTES,
 ABBREVIATIONS,
 LEGEND & SYMBOLS (CIVIL)



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 CHECKED: PAB
 SCALE: AS SHOWN
 JOB NO.: 080800001



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 ANNE ARUNDEL COUNTY, MD
 TEL: 410.421.4700
 FAX: 410.421.4701
 WWW: W&K.COM

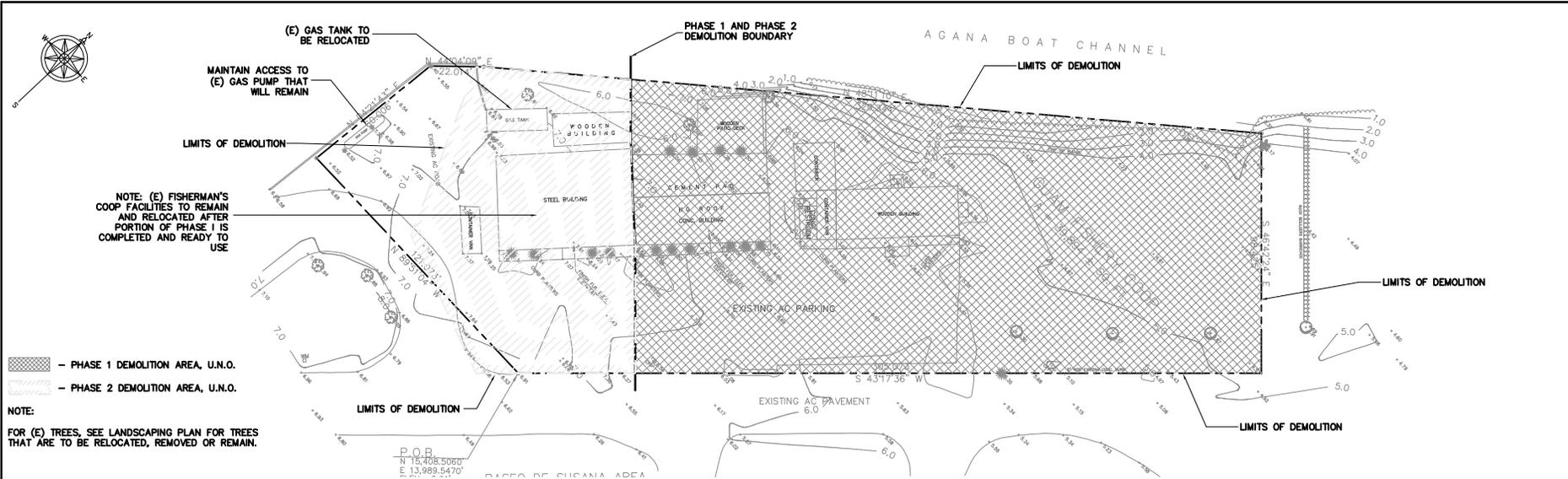
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 GUAM FISHERY COOPERATIVE
 GUAM FISHERMAN'S COOP FACILITY
 HAGATNA, GUAM, U.S.A.

SHEET TITLE:
 DEMOLITION
 SITE LAYOUT, DEMOLITION
 AND SIGNAGE PLAN

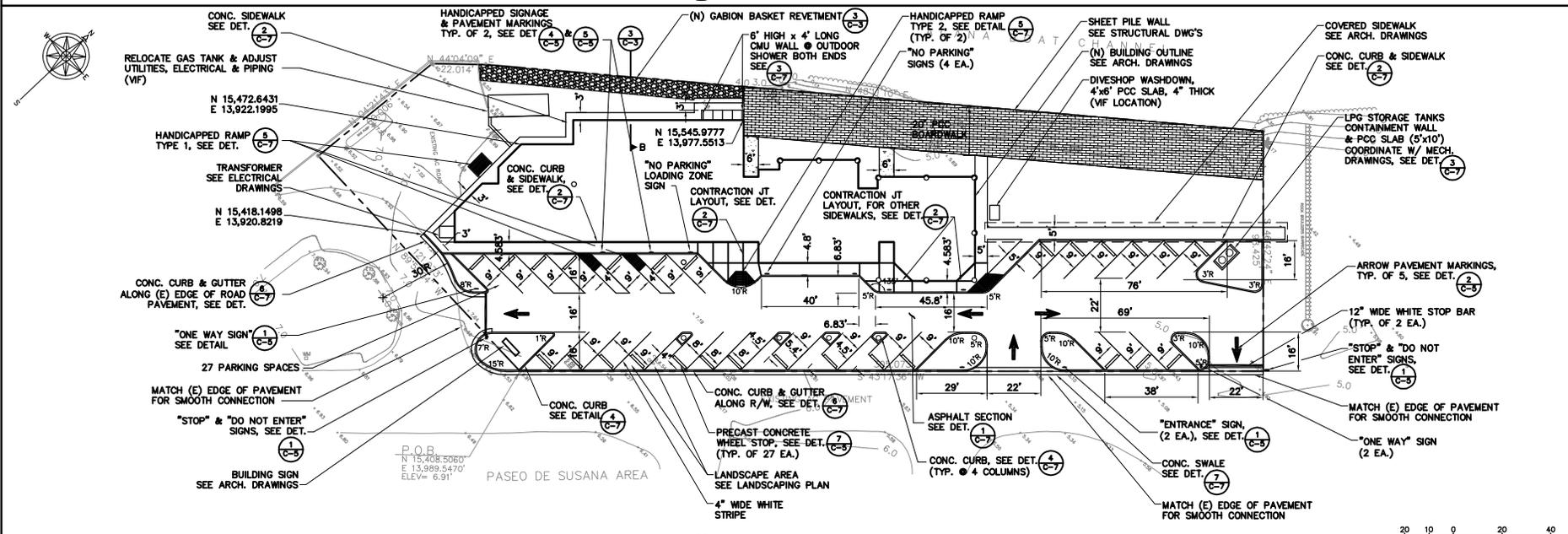


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C-2
 OF

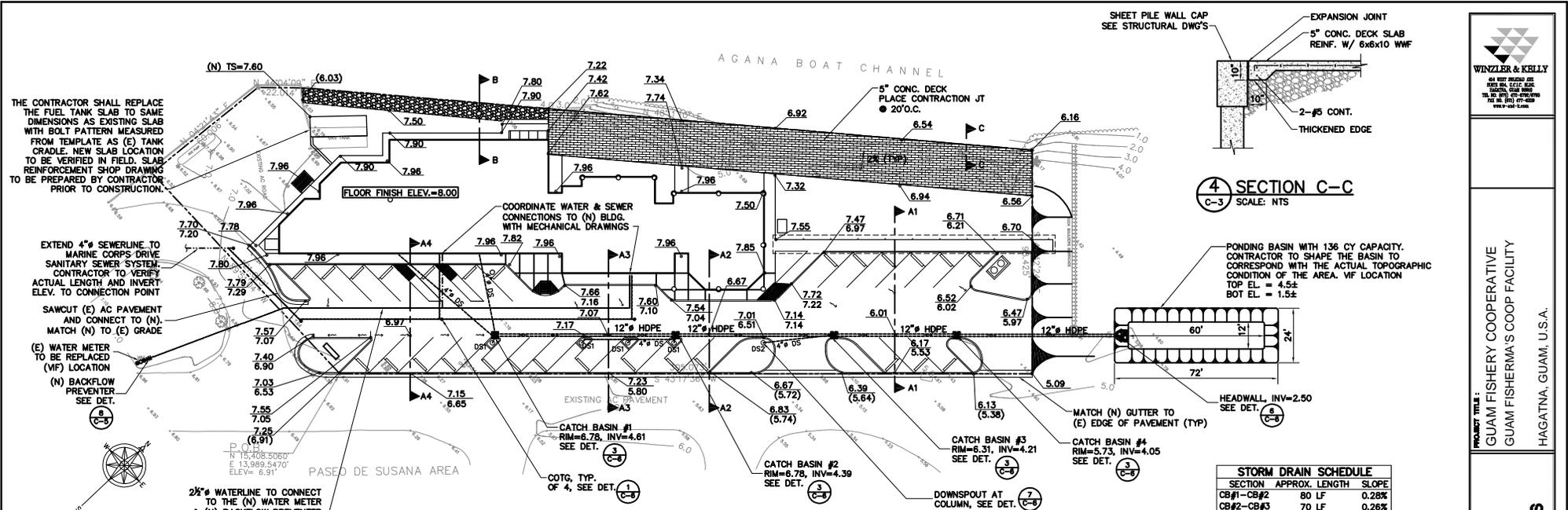


1 DEMOLITION PLAN
 C-2 1"=20'



2 SITE LAYOUT PLAN
 C-2 1"=20'





4 SECTION C-C
C-3 SCALE: NTS

SECTION	APPROX. LENGTH	SLOPE
CB#1-CB#2	80 LF	0.28%
CB#2-CB#3	70 LF	0.26%
CB#3-CB#4	55 LF	0.29%
CB#4-HW	70 LF	2.21%

1 GRADING, DRAINAGE AND UTILITY PLAN
C-3 1"=20'

PERMANENT EROSION CONTROL
25 YEAR STORM DURATION

RAINFALL INTENSITY (IN/HR), I

- I = 6.80 (5 MIN.)
- I = 5.81 (10 MIN.)
- I = 3.30 (60 MIN.)
- I = 0.93 (12 HR)
- I = 0.67 (24 HR)

SITE AREA 1 = 0.92 ACRES

RUNOFF COEFFICIENT, C AND SURFACE AREA

SURFACE	AREA	COEFFICIENT
PAVED AREA	0.23	0.98
ROOF AREA	0.32	0.98
UNDEVELOPED AREA	0.37	0.50

$C = (0.23 \times 0.98) + (0.32 \times 0.98) + (0.37 \times 0.50) / 0.92 = 0.77$ AVE.

ADDITIONAL INFLOW (CFS), Q

- Q = 0.77 x 6.80 x 0.92 = 4.82 (5 MIN.)
- Q = 0.77 x 5.81 x 0.92 = 4.12 (10 MIN.)
- Q = 0.77 x 3.30 x 0.92 = 2.34 (60 MIN.)
- Q = 0.77 x 0.93 x 0.92 = 0.66 (12 HR)
- Q = 0.77 x 0.67 x 0.92 = 0.47 (24 HR)

OUTFLOW (CFS), Qo

ASSUMED PERCOLATION RATE = 0.05 FT/MIN=0.00083 FT/SEC

USE TRAPEZOIDAL PONDING BASIN WITH 2:1 SIDE SLOPES

DEPTH OF PONDING BASIN = 3.00 FT

BOTTOM AREA OF PONDING BASIN = 60 FT x 12 FT

VOLUME OF PONDING BASIN = 3,672 CF

PERCOLATION AREA OF PONDING BASIN = 1,728 SF

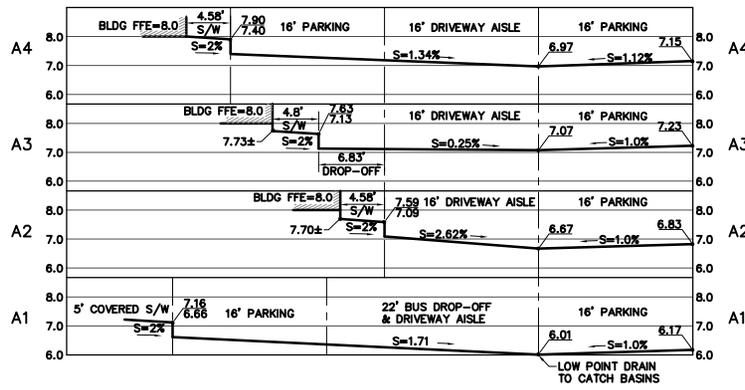
$Q_o = (0.00083 \times 1,728) = 1.43$ CFS

VOLUME OF PONDING BASIN (CU FT), V

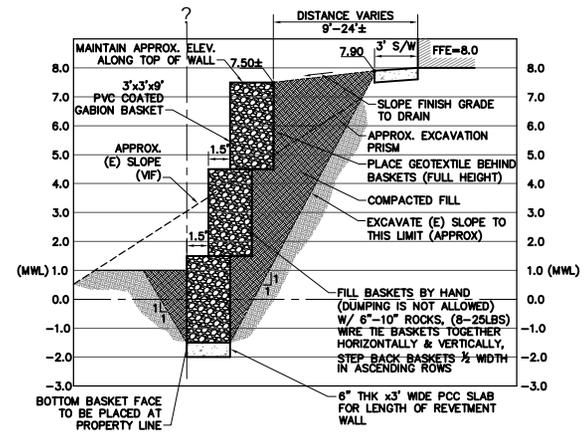
- V = (4.82-1.43) x 5 x 60 = 1,017 (5 MIN.)
- V = (4.12-1.43) x 10 x 60 = 1,614 (10 MIN.)
- V = (2.34-1.43) x 60 x 60 = 3,276 (60 MIN.)
- V = (0.66-1.43) x 12 x 60 x 60 = -33,264 (12 HR)
- V = (0.47-1.43) x 24 x 60 x 60 = -82,944 (24 HR)

REQUIRED VOLUME OF PONDING BASIN=3,276 CU. FT.

3,276 CF < 3,672 CF THEREFORE VOLUME OF PONDING BASIN IS OK FOR 25-YR/1-HR FLOW



2 SECTIONS A-A (1,2,3,4)
C-3 SCALE: HOR.=1:6 VERT.=1:2



3 SECTION B-B (L=110 LF)
GABION BASKET RETEMENT
C-3 SCALE: HOR.=1:4 VERT.=1:2



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44 WEST WINDY RD
SUITE 200
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FAX: (972) 412-1101
WWW.WK-K.COM

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GUAM FISHERMA'S COOP FACILITY
HAGATNA, GUAM, U.S.A.

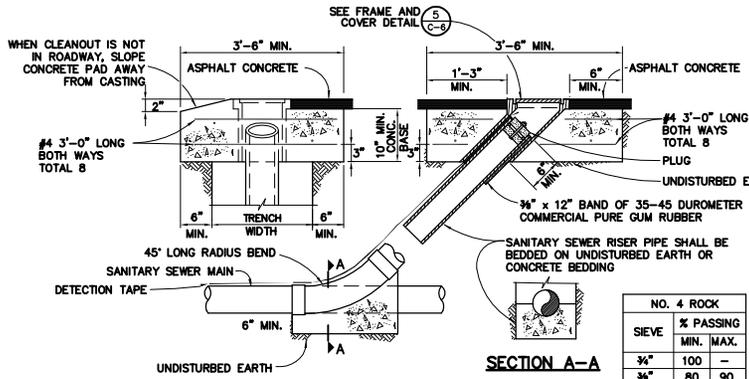
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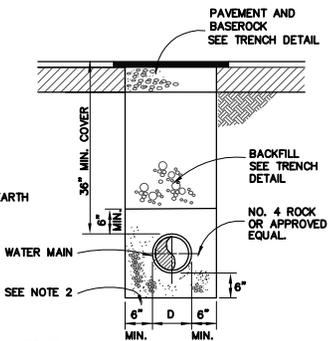
C-3

0807 CF



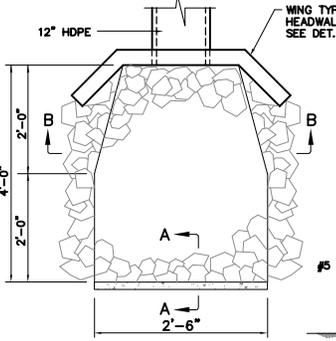
1 GROUND CLEANOUT
C-6 NTS

NO. 4 ROCK		
SIEVE	% PASSING	MIN. MAX.
3/4"	100	-
3/8"	80	90
#4	10	15
#8	0	5

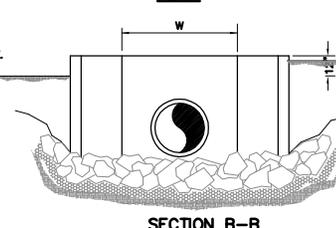


4 TYP. PIPE BEDDING
C-6 NTS

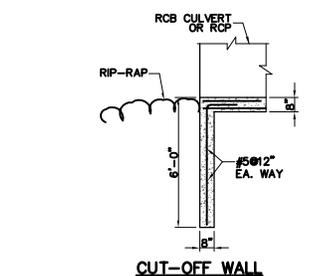
- NOTES:**
- ANY OVEREXCAVATION SHALL BE BACKFILLED WITH AN APPROVED BEDDING MATERIAL.
 - PIPE DIAMETER 18" OR LESS: 6" MIN., 9" MAX. PIPE DIAMETER GREATER THAN 18": 9" MIN., 12" MAX.



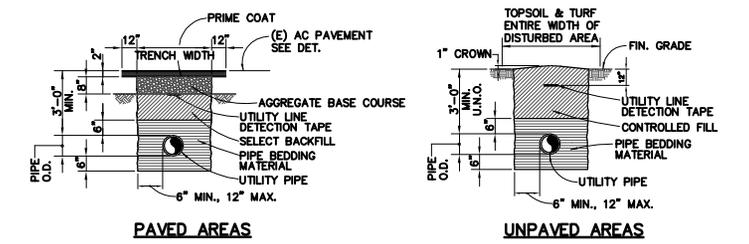
5 STANDARD FRAME AND COVER
C-6 NTS



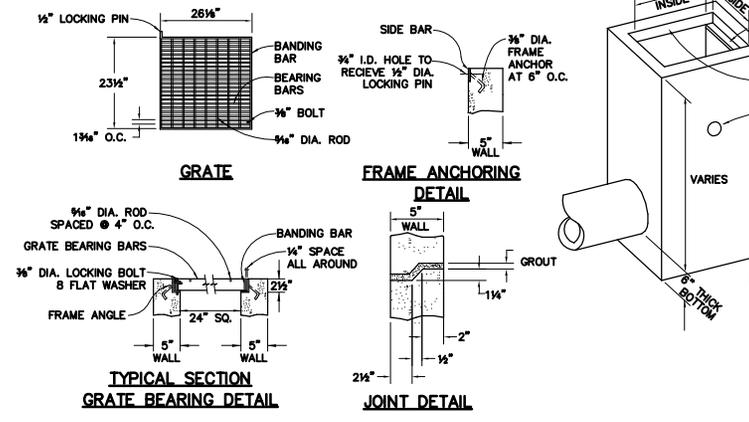
END ELEVATION



7 TYP. AT COLUMN DOWNSPOUT TRANSITION
C-6 NTS

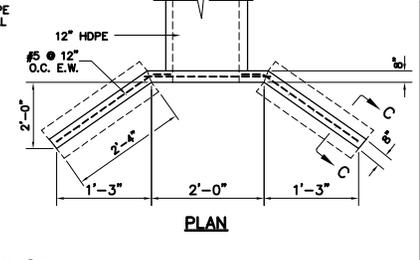


2 TYP. PIPE TRENCH
C-6 NTS

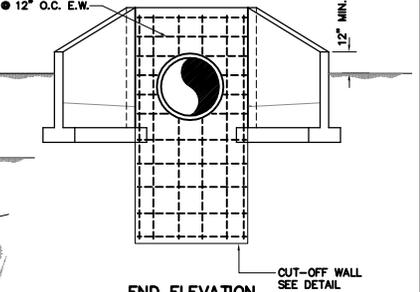


3 PRECAST CONCRETE CATCH BASIN
C-6 NTS

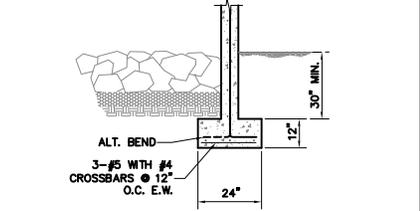
- NOTES:**
- GRATE MATERIAL TO BE: 2" BEARING BARS, 2 1/4" x 3/4" 2-BANDING BARS, 2" x 3/4"
 - GRATE FRAME MATERIAL TO BE: 2 1/2" x 1 1/2" x 3/4" ANGLES 2 1/2" x 1/2" SIDE BARS
 - GROUT JOINTS BETWEEN UNITS OVER 5 FT. HIGH.
 - REINFORCE WALLS & BOTTOM WITH #4 @ 6" O.C. BOTH WAYS
 - CONTRACTOR SHALL MATCH FINISH GRADES WHERE INSTALLED IN SWALE



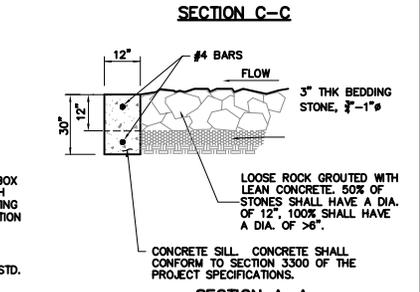
PLAN



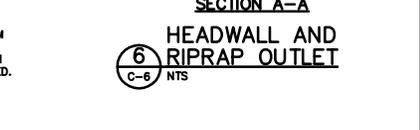
END ELEVATION



SECTION C-C



TYPICAL SECTION GRATE BEARING DETAIL



JOINT DETAIL

WENZLER & KELLY
44 WEST WINDY RD.
SUITE 200, SUITE 200
MOUNTAIN VIEW, CA 94039
TEL: 415.947.4700
FAX: 415.947.4701
WWW.WK-K.COM

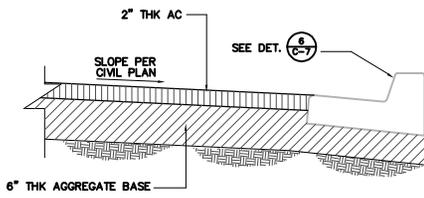
PROJECT TITLE:
**GUAM FISHERY COOPERATIVE
GUAM FISHERMAN'S COOP FACILITY**
HAGATNA, GUAM, U.S.A.

DATE: AUG 08, 2008
EXPIRE: 100% SUBMITTAL
DATE: _____
REVISION: _____

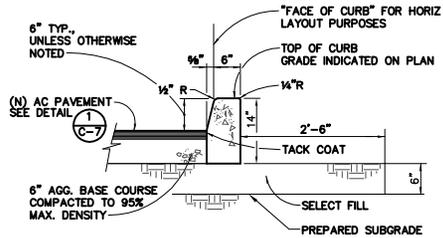
REVISIONS:
 △ DATE: _____
 △ DATE: _____
 △ DATE: _____

DESIGNED BY: JAA
 CHECKED BY: JAA
 DRAWN BY: JAA
 SCALE: AS SHOWN
 JOB NO.: 08080001

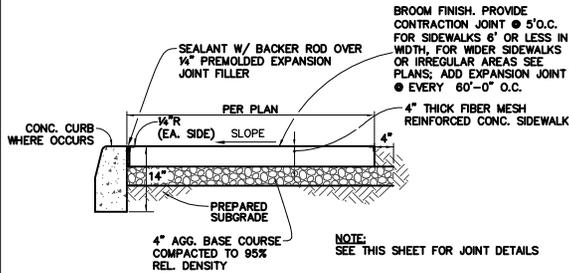
C-6
of



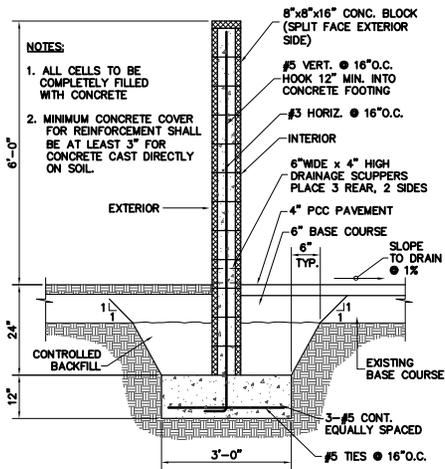
1 AC PAVEMENT SECTION
C-7



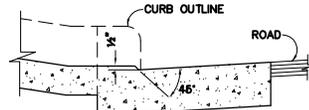
4 ON-SITE CURB AND PAVEMENT
C-7 NTS



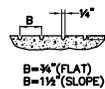
2 CONCRETE CURB AND SIDEWALK DETAIL
C-7 NTS



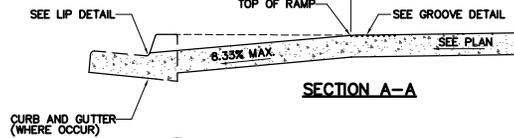
3 LPG TANK ENCLOSURE WALL
C-7 NTS



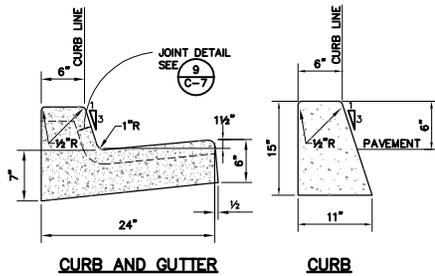
LIP DETAIL



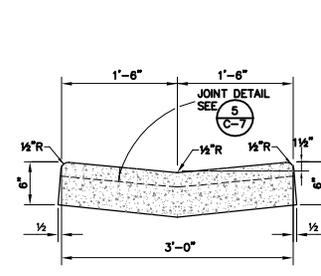
GROOVE DETAIL



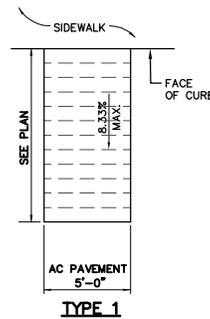
5 WHEELCHAIR RAMP SECTION
C-7 NTS



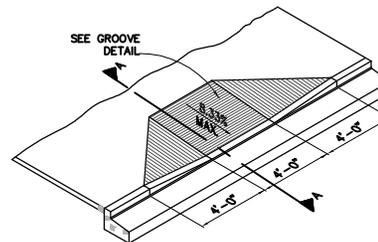
6 TYP. CONC. CURB & GUTTER
C-7 NTS



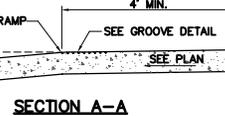
7 SWALE SECTION
C-7 NTS



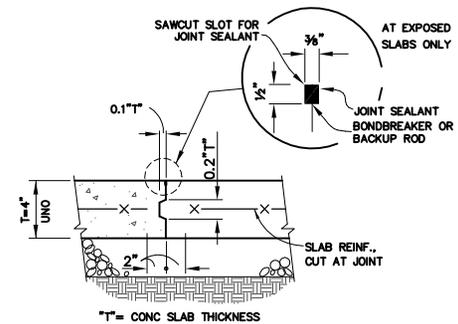
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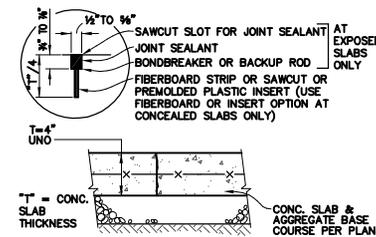
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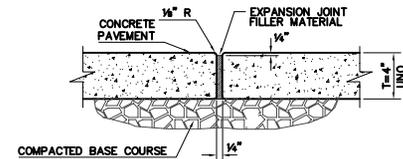
SECTION A-A



8 TYPICAL CONSTRUCTION JOINT IN CONCRETE SLAB ON GRADE
C-7 NTS



9 TYPICAL CONTRACTION (WEAKENED PLANE) JOINT IN CONCRETE SLAB ON GRADE
C-7 NTS



10 TYPICAL EXPANSION JOINT IN CONCRETE SLAB ON GRADE
C-7 NTS



PROJECT TITLE:
GUAM FISHERY COOPERATIVE
GUAM FISHERMAN'S COOP FACILITY
HAGATNA, GUAM, U.S.A.

PROJECT TITLE:
CIVIL DETAILS



DATE: AUG 28, 2008
EXPIRE: 2008 SUBMITTAL
DATE:
DATE:
REVISIONS:
△ DATE:
△ DATE:
△ DATE:
COMPILED: JAL
DRAWN: JAL
CHECKED: JAL
SCALE: AS SHOWN
JOB NO.: 080800001

C-7
of

Appendix C

Agency Position Statements to the Guam Land Use Commission

Aturidad InadillantonIkunumihan Guahan

Governor
Felix P. CamachoLieutenant Governor
Kaleo S. Moylan

April 25, 2005

Mr. Manny Duenas
President
Guam Fishermen's Cooperative Association
P.O. Box 24023 GMF
Barrigada, Guam 96921

Re: Position Statements -- Paseo de Susana Planned Development District Master Plan

Hafa Adai Mr. Duenas:

Attached for your agency's review are the position statements previously submitted to the Department of Land Management (DLM) from the Department of Parks and Recreation (DPR), and the Guam Environmental Protection Agency (GEPA) concerning the proposed Paseo de Susana Planned Development District Master Plan. As noted in their respective statements, these agencies have identified certain conditions that must be agreed to prior to approval of the plan by the Guam Land Use Commission (GLUC).

Please provide this office with your written comments NLT Friday, April 29, 2005, so that we can be better prepared to address any concerns raised by members of the GLUC during the hearing scheduled for Thursday, May 12, 2005. Alternatively, should you or your designee attend the GLUC meeting, please be prepared to provide your position on these conditions.

Should you have any questions, please contact Mike Cruz or Larry Toves from our agency at 647-4332. Dangkolo na Si Yu'os Ma'ase'.

Sincerely,


GERALD S.A. PERZ
Administrator

Guam USA ~ The Ultimate Destination

ITC Building • Suite 511 • 590 South Marine Drive • Tamuning, Guam 96913 • (671)642-4332 • Fax (671)649-4146 • E-mail: help@geda.guam.net
www.investguam.com

Appendix D

Public Law 27-24 (Co-Op Lease Extension)

PUBLIC LAW 27-24

I MINA'BENTE SIETE NA LIHESLATURAN GUÁHAN
2003 (FIRST) Regular Session

Bill No. 18 (LS)
As amended by the
Committee on Utilities and Land
and as further amended on the Floor.

Introduced by:

J. M. Quinata
F. B. Aguon, Jr.
T. R. Muña-Barnes
R. J. Respicio
J. M. S. Brown
F. R. Cunliffe
C. Fernandez
Mark Forbes
L. F. Kasperbauer
R. Klitzkie
L. A. Leon Guerrero
J. A. Lujan
v. c. pangelinan
Toni Sanford
Ray Tenorio

AN ACT TO ENABLE THE GUAM FISHERMEN'S COOPERATIVE ASSOCIATION TO EXPAND ITS CURRENT FACILITIES BY AMENDING THE LEASE AUTHORIZED BY PUBLIC LAW 14-149 AND BY CLARIFYING THE PASEO DE SUSANA PLANNED DEVELOPMENT DISTRICT BY ADDING NEW §§61215, 61215.1, AND 61635(h) TO TITLE 21, GUAM CODE ANNOTATED.

BE IT ENACTED BY THE PEOPLE OF GUAM:

Section 1. Legislative Findings and Intent. *I Liheslaturan Guáhan* finds and recognizes that there is a need to allow the Guam Fishermen's Cooperative Association to expand its current facilities, as part of the *Paseo de Susana* Planned Development District. *Paseo de Susana* has historically been Guam's social center for culture, fishing, baseball, and other active and passive recreational opportunities. Most residents and tourists realize that it is a destination-oriented facility for those activities.

Paseo de Susana was transferred to the government of Guam in 1960 from the Naval Government by United States Public Law 86-664. The Law establishes an inclusionary covenant providing that the property is used solely for civic, park, and recreational purposes. Two (2) aspiring projects have designated this lot for development. In 1978, Governor Ricardo J. Bordallo proposed the Agana Deep Draft Harbor project. Subsequently, the Jose D. Leon Guerrero Port Authority of Guam (PAG), in 1989, with International Design Consortium (IDC), proposed the Agana Marina Project with a synthesized marina facility with hotel, commercial three hundred (300) boat slip marina and fishery support facilities. Both projects attempted to revitalize the *Hagátina* proper by luring development from Tumon. The projects did not materialize; however, IDC's zone change request was approved by the Guam Land Use Commission (GLUC) and Governor Joseph F. Ada prior to forwarding a lease request to *I Liheslaturan Guáhan* for approval. Through the advice of counsel and their project planners, the Planned Development District rezoning of the *Paseo de Susana* was determined by GLUC to be the best zoning designation to meet the highest and best use of the parcel while complying with the inclusionary covenances mandated by United States Public Law 86-664.

Subsequently, the Department of Commerce in 1992 received GLUC approval to build the *I Sengson, Chamorro (Chamorro Village)*. Approved was a conditional use and zone variance permit to build within an "A" rural zone. Commerce's application did not consider amending IDC's master plan. The approval did not match the existing zone designation. The GLUC could not down zone the parcel back to an agricultural zone as it is prohibited pursuant to §61637 of Title 21, Guam Code Annotated.

The Act reaffirms the Planned Development Zone (PD) of *Paseo de Susana* by integrating the combination of uses compliant with the restrictions of United States Public Law 86-664. Any facility or activity which may be considered a primary use under the zone will now be considered an accessory facility or use if the facility or activity is secondary to a civic, park, or recreational use. The Act also attempts to streamline the process in which a master plan for the area is created and approved. The Act also adds a provision to the Zoning Law clarifying the spatial relationship between what is considered an open area and a structure within a Planned Development District. Currently, the Planned Development District allows for thirty percent (30%) of the development to be occupied by structures. Recreational facilities, roads, walks, parking areas are considered

Appendix E

Correspondence

DEPARTMENT OF THE ARMY PERMIT

Permittee: Guam's Fisherman's Cooperative Association

Permit No: POH-2005-309

Issuing Office: U.S. ARMY CORPS OF ENGINEERS, Honolulu Engineer District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The applicant proposes to construct a sheet pile bulkhead 215 feet in length and a gabion basket retaining wall 110 feet in length in the Agana Small Boat Harbor. This work will result in a loss of approximately 3,890 square feet of navigable waters of the United States as shown on the attached plans. Approximately 255 cubic yards of coralline fill material from upland commercial quarries would be discharged landward of the bulkhead and gabion retaining wall. In order to maximize the use of the vessel mooring dock an area 6,450 square feet in area will be dredged to -8' mllw. An estimated 1,155 cubic yards of eroded fill material would be dredged and disposed of at an off site upland location suitably contained to prevent its re-entry into any waterway or wetland area.

Purpose: To provide a safer vessel docking facility for commercial and recreational vessels

Project Location: Agana Small Boat Harbor, Guam at 13°-28'-02" N latitude 144°-44'- 55" E longitude.

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2009. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

Appendix F

Coral Survey Guam Fisherman's Co-Op

Coral Survey

Guam Fisherman's Co-Op Facility

For: Guam Fisherman's Cooperative Association



August 27, 2014

Descriptive Summary

Introduction:

Guam, the southern-most island in the Mariana Archipelago, is an unincorporated territory of the U.S. that is located at 13° 28' N latitude and 144° 45' E longitude. Its tropical climate and proximity to the Indo-Pacific center of coral reef diversity (Veron, 2000¹) allow Guam to have a relatively high diversity of marine species, especially on its coral reefs. In the Mariana Archipelago there are 377 species of scleratinian coral (hard coral) (Randall, 2003) though the actual number for Guam may be lower or higher. A resource review totaled 5,137 species of marine organisms documented on Guam (Micronesica 35 – 36, 2003²).

The Guam Fishermen's Co-Operative Association Facility (Co-Op) is located at the entrance of the Hagatna Boat Basin (referred to as the Agana Marina in previous reports). The Co-Op is located off of Route 1 (Marine Corps Drive) and is next to the western entrance of the Chamorro Village (Figure 1) in the village of Hagatna.

The existing Co-Op facility was built in 1977 across from the entrance to the Chamorro Village and Paseo de Susana. The Chamorro Village and the Paseo de Susana sit on a peninsula that was filled in with rubble and other debris during the rebuilding that occurred after World War II.

Construction activities proposed for the Co-Op include the complete demolition of the existing facility, and the construction of a new facility along with expansion and reinforcement of the seawall. More detailed information about the proposed project activities is available in the Environmental Assessment³ and the US Army Corps of Engineers Public Notice Application for Permit⁴

Survey Area

On 07 July 2014, a coral count and species identification survey was completed in the marine area of construction. The survey area is between the Co-Op property and the Hagatna Boat Basin Channel (Figure 2).

The length of the survey area extended from the northern end of the Co-Op property, furthest away from the Hagatna Boat Basin, to 215 feet toward the Hagatna Boat Basin. A tape was used to measure 30 feet from the property shoreline (Figure 3). Buoys were used to mark the corners and approximate mid-point survey area away from the shoreline (Figure 4). The survey area was organized into three

¹ Veron, J.E.N. 2000. Corals of the World, Volume 3. Australian Institute of Marine Science and CRR Qld Pty Ltd. Queensland, Australia. 490 pp.

² Paulay, G. 2003. Marine Biodiversity of Guam and the Marianas: overview. *Micronesica* 35 – 36: 3 – 25. Arc Environmental Services (March 2006)³ Draft Environmental Assessment Proposed Re-Construction of the Guam Fishermen's Cooperative Association Facility, Agana, Guam for Guam Fishermen's Cooperative Association. 70 pages.

⁴ US Army Corps of Engineers Public Notice of Application for Permit. Permit File Number POH-2005-309.

zones within the proposed dredge/fill area, each with three sections (Table 1). The survey area was extended three feet outside of the original survey area – sections J, K and L (Table 1) to include the area immediately adjacent to the proposed area of impact. Though ancillary, the added three feet was surveyed in order to record data of coral presence and abundance in the area immediately outside of the proposed project area which may also be impacted by the proposed project activities.

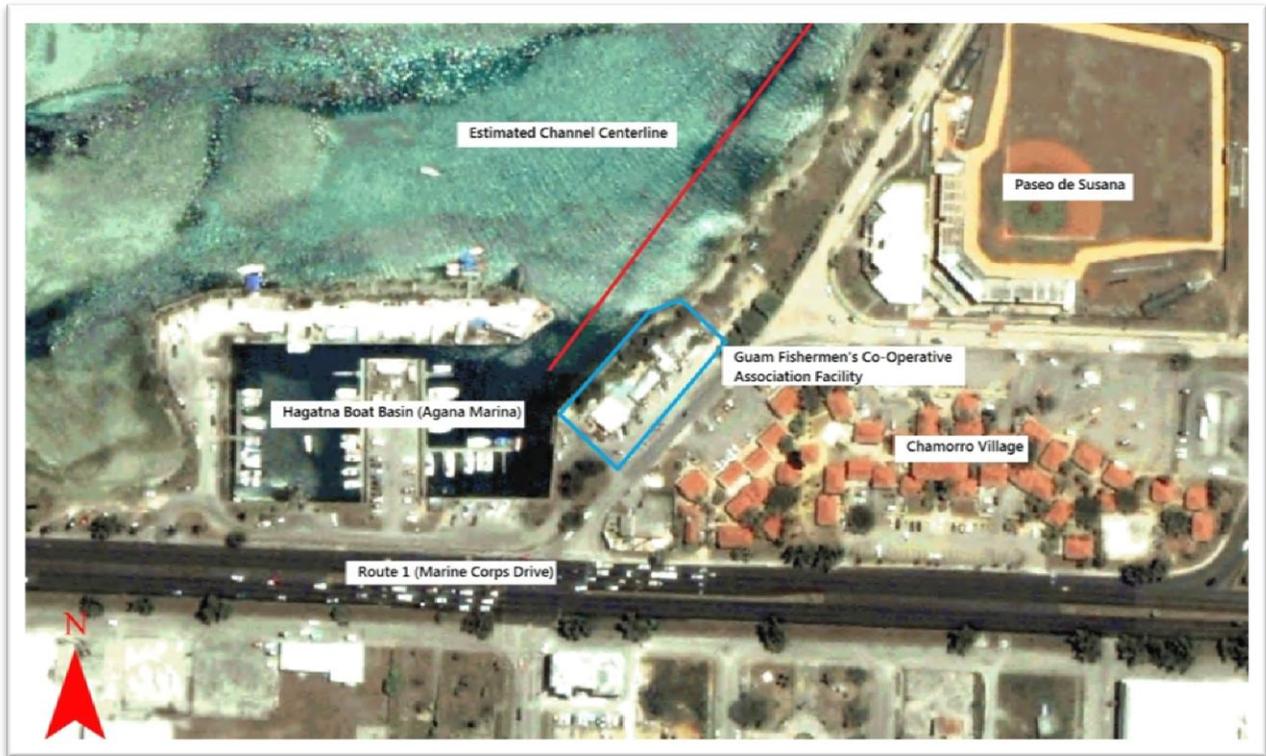


Figure 1 Survey area orientation.



Figure 2 Approximate survey area outlined in red.

Zone (ft. away from shore)	Section		
Shoreline	A (North)	B	C
Shoreline – 15 ft	D	E	F
15 – 30 ft	G	H	I
30 – 33 ft (Ancillary)	J	K	L

Table 1 Partition of the survey area into zones and sections.



Figure 3 Sample of the shoreline at the time of the survey, which was done between 2:00 and 3:30 PM. The darker band of rocks above the water line shows the level of fluctuation of the shoreline.

The survey was conducted in the afternoon, between 2:00 and 3:30, with the second high tide of 1.7 feet at 3:46 PM. Wake from watercraft traversing the Hagatna Boat Basin Channel may have affected the shoreline for this period. The shoreline was defined by the location of the edge of the water line at that time (Figure 3), though a distinct dark band is visible and indicates the level of fluctuation in the shoreline.



Figure 4 View of the survey area looking south, into the Hagatna Boat Basin. Buoys mark the survey corners and midpoint approximately 30 feet away from the shoreline.



Figure 5 View of the survey area looking north, away from the Hagatna Boat Basin. Buoys mark the survey corners and midpoint approximately 30 feet away from the shoreline.

Methods

Surveying was conducted by snorkeling, and by walking along the shoreline and in areas too shallow to snorkel. The survey progressed in an S-pattern through the zones identified in Table 1, moving through the sections of one zone before proceeding to section in the next zone. This pattern was carried out in an effort maintain a consistent depth as the survey progressed.

Corals were identified to species level when possible. Coral counts were also recorded to note coral abundance.

Results

A total of five coral species were recorded during the survey: ***Pocillopora damicornis*** (*P. damicornis*); ***Leptastrea purpurea*** (*L. purpurea*); ***Pavona varians*** (*P. varians*); ***Pavona decussata*** (*P. decussata*); and ***Porites sp.*** Without sampling the *Porites* sp. to study its morphology through a microscope, it could not be identified to the species level. Figures 7, 8, and 9 shows *P. damicornis* and *L. purpurea*. The data record of the survey is provided in Table 2.

Based on the coral count, the two dominant coral species were *P. damicornis* and *L. purpurea* which was 51.80% and 47.86% of the total number of coral colonies recorded (Table 4).

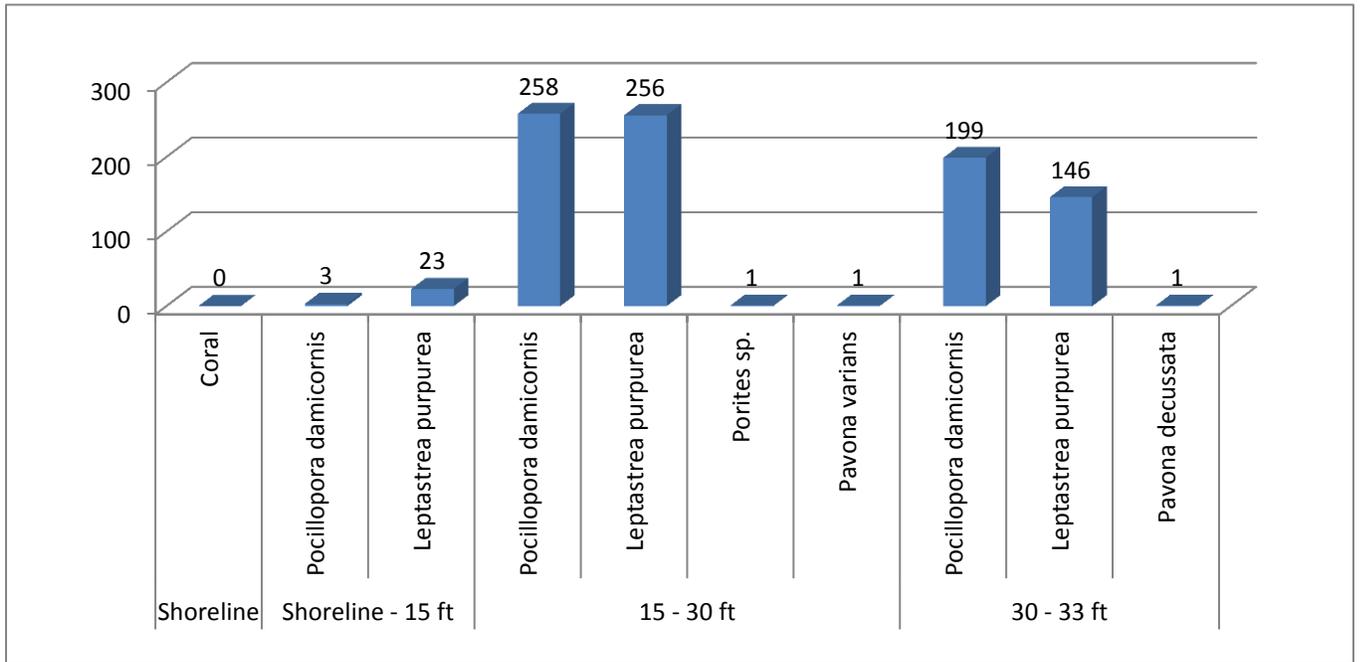


Figure 6 Graph of the data collected per zone, moving from the shoreline to approximately 33 ft away from the shoreline, toward the Hagatna Boat Basin Channel.



Figure 6 *Pocillopora damicornis* (branching coral) and *Leptastrea purpurea* (massive coral) colonies.



Figure 8 *Pocillopora damicornis* (branching coral) and *Leptastrea purpurea* (massive coral) colonies.



Figure 9 *Pocillopora damicornis* (branching coral) and *Leptastrea purpurea* (massive coral) colonies.

Zone	Quadrant	Species	Count
Shoreline	A	Coral	0
	B	Coral	0
	C	Coral	0
Shoreline – 15 ft	D	Pocillopora damicornis	0
	D	Leptastrea purpurea	1
	E	Pocillopora damicornis	2
	E	Leptastrea purpurea	17
	F	Pocillopora damicornis	1
	F	Leptastrea purpurea	5
15 – 30 ft	G	Pocillopora damicornis	69
	G	Leptastrea purpurea	67
	G	Porites sp.	1
	H	Pocillopora damicornis	13
	H	Leptastrea purpurea	114
	I	Pocillopora damicornis	176
	I	Leptastrea purpurea	75
	I	Pavona varians	1
30 – 33 ft	J	Pocillopora damicornis	74
	J	Leptastrea purpurea	58
	J	Pavona decussata	1
	K	Pocillopora damicornis	17
	K	Leptastrea purpurea	20
	L	Pocillopora damicornis	108
	L	Leptastrea purpurea	68

Table 2 Coral identification and count per section and zone.

Zone	Percent Coral Count per Zone
Shoreline	0
Shoreline - 15 ft	2.93
15 - 30 ft	58.11
30 - 33 ft	38.96

Table 3 Percent of coral recorded per zone.

P. damicornis	L. pupurea	P. decussata	P. varians	Porites sp.
51.80	47.86	0.11	0.11	0.11

Table 4 Species percent abundance.

No corals were observed at the shoreline zone. The shoreline was comprised of coarse pieces of rubble that include dead coral, rock, and artificial pieces, such as concrete rubble (Figure 3). The location of the

shoreline fluctuates with the tide as well as from wake created by watercraft traversing the channel. It was assumed that coral presence in this zone would be unlikely due to potential exposure to air and extreme high temperatures for coral growth. However, corals are known to occur in shallow/intertidal areas, especially where pockets of water may create reservoirs during the low tide that would maintain coral growth. Therefore, the shoreline was included in the survey area and is separately identified in the data record.

In the shoreline – 15 ft. zone, the bottom topography slopes slightly, moving away from the shoreline. The depth the area furthest from the shore line was approximately three feet. The bottom topography was comprised of rubble primarily (pieces of dead coral rock, and sand) and larger boulders (Figure 3). Coral was recorded in this area, but in low numbers. Coral recorded in this zone was 2.93% of the total survey area.

In the 15 – 30 ft. zone, the bottom topography slopes slightly, moving away from the shoreline, and became steeper nearer to the center of the channel. The bottom topography in this zone was comprised of sand, some coral boulders and man-made debris, such as concrete and pieces and piping. No signs were observed that would indicate that this zone is exposed during low tide. Coral was present in this zone in a series of clusters throughout the different sections. The two dominant species recorded were *P. damicornis* and *L. purpurea* (Table 2). Coral recorded in this zone was 58.11% of the total survey area.

In the 30 – 33 ft. zone the slope away from shore is greater as it leads into the Hagatna Boat Basin Channel. The bottom topography in this zone is comprised of mainly of sand. Some coral boulders and man-made debris, such as concrete and pieces and piping were present. Coral was present in this zone in a series of clusters throughout the different sections. The two dominant species recorded were *P. damicornis* and *L. purpurea* (Table 2). Coral recorded in this zone was 38.96% of the total survey area.

Summary

The surveyed area, between the Guam Fishermen's Co-Operative Facility and the Hagatna Boat Basin channel, showed signs of artificial modification, including previous filling and dredging. Throughout the survey area, coral diversity was low relative to the number of coral species known to occur in Guam's waters. In the survey area, *P. damicornis* and *L. purpurea* were the dominant coral species; and the 15 – 30 ft. zone had the greatest number of corals recorded. The other corals in the survey area, singularly recorded, were the following: *P. decussata*, *P. varians*, and *Porites* sp.

In 2013, a petition was issued to the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service to list 81 marine species as threatened or endangered under the Endangered Species Act (ESA), including 23 coral species; and NOAA Fisheries proposes 66 coral species for ESA coral

listing⁵. Though a final ruling has not yet to be published as of this report, none of the species proposed were observed during the survey.

⁵ NOAA Fisheries Office of Protected Resources. Corals Proposed for Listing under ESA. <http://www.nmfs.noaa.gov/pr/species/invertebrates/corals.htm>. Accessed on 04 August 2014.