

CHAPTER 3 OUTLINE OF THE PROJECT

CHAPTER 3 OUTLINE OF THE PROJECT

3.1 Request and Discussion Results

3.1.1 Contents of the Request

(1) Contents of the Request

Contents of the request are as follows:

1) Project site

Central Market in Honiara, Guadalcanal Province

2) Facilities

Components of Fish Landing Quaywall

Wharf Length: 60.0m

Apron 15m x 110m 1,650m²

Related facilities Three stairs, Handlift

Revetment Length: 45.0m

Boat Ramp Width 10.0m x Length 25.0m

3.1.2 Discussion Results

The results of the discussion with the executing agency in Solomon Islands conducted during the field survey are as follows:

- (1) Main purpose of the wharf is to provide a facility to moor small boats transporting fresh fish to Honiara and land eskies containing fresh fish. Concrete structure with excellent durability is preferable for the wharf.
- (2) As all the small boats transporting fresh fish from Florida Islands to Honiara cannot return within the same day coupled with the necessity to avoid strong waves, a facility with vessel placement yard is required where boat landing can be conducted at night. It should also be used for other purposes such as a rest area or fish landing area.
- (3) Wharf face line should be located to minimize effects on the currents and drift sand, and to take account of the existing jetty and the geographical features especially the shore line. It should not interfere with the access to the jetty.
- (4) The apron should be designed for sorting and transporting landed fish, and measures should be taken to prevent over-topping waves.
- (5) Related facilities such as handlift, fender and drainage should be limited to the minimum necessary facilities and they should be highly durable and easy for operation and maintenance.

- (6) When the layout plan of the fish landing quaywall is completed, it should be sent to the Government of Solomon Islands so that the scale of the facility, layout and location of wharf face line can be mutually confirmed.

Minutes of Discussion signed with the responsible organization in Solomon Islands is attached in Appendix 4.

3.2 Outline of Project Site

3.2.1 Location of Project Site and Surrounding Infrastructure Condition

(1) Location of Project Site

The project site is located in front of the Central Market in Honiara. It is a part of the northern coast of the Central Market, facing Kua Bay which is gently curved between Point Cruz and Point Lungga. The extended shore line with a length of approximately 120 meters has been allocated for constructing the projected facility. About 500 meters to the east of the Project site is the Mataniko River, with its source in the mountains to the south, which flows into Kua Bay.

(2) Surrounding Infrastructure Condition

The Project site have a direct access to the main trunk road (Mendana Avenue) at the southern end of the Central Market running parallel with the shore. Main water supply pipe with a diameter of 150mm (6 inch), power supply line of 415V/240V and telephone line are laid along Mendana Avenue all of which are connected to the Central Market.

There is a concrete jetty adjacent to the Project site with a length of 40m for medium size cargo and passengers vessels. This Project site is located close to the main transportation routes since the jetty and wharf facilities of the Honiara commercial port are located 500 meters away to the east.

3.2.2 Natural Conditions

(1) Weather

1) Temperature, Humidity and Rainfall

Since Honiara is located at 9 degrees 30 minutes south and 160 degrees east, it has a tropical climate. Both temperature and humidity are high with little changes all the year round. Average temperature is around 26°C, and humidity is 71% ~ 76% all through the year. Rainfall is approximately 2,000mm a year which is rather

less than that in the rest of the country. They have much rain during December through March when many cyclones attack the area and precipitation exceeds 200mm a month in this season. The temperature, humidity and rainfall in Honiara are shown in the following Table 3.1.

Table 3.1 Temperature, Humidity and Rainfall in Honiara

Month Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average temperature	26.8	26.7	26.6	26.6	26.6	26.3	26.0	26.1	26.4	26.6	26.6	26.8	26.5
Average humidity	78	76	79	77	77	75	76	74	71	76	75	79	76
Average rainfall	256	277	301	191	134	89	93	98	100	133	146	218	2,036
Rainfall (max.)	956	561	636	641	437	339	306	271	211	377	453	579	2,925
Rainfall (min.)	32	36	66	24	24	0	15	7	12	9	27	16	1,361

Remarks: Record Period; Temperature; 1951 ~ 1980, Humidity; 1964 ~ 1967, Rainfall; 1955 ~ 1982 (Max. rainfall records from 1967, Min. rainfall records from 1992)

Source : Solomon Islands Meteorological Service (S.I.M.S.) Honiara

2) Wind Direction and Velocity

a. Direction and Velocity

In Honiara they normally have many mild days with light breeze. According to the observation from 1950 to 1974 (See Appendix Table 1. Wind Frequency Analysis, by S.I.M.S. Honiara), the velocity is less than 5.4m/sec. for more than 90 % of a year. During January to March west winds are prominent, and from April through December east winds rise. However, all through the year southerly winds are prominent and comprise 44 % of the entire wind directions including southeasterly and southwesterly winds.

b. Winds generated by cyclones

As the Solomon Islands is close to a place where cyclones originate, most of the cyclones that affect Solomon Islands are in their initial stage of development. Illustrated in Figure 3.1 are the routes taken by major cyclones which passed through the neighboring sea of Guadalcanal Island that were observed to have affected Honiara to some degree.

Details are not known of the behavior of winds at Honiara attacked by a cyclone, but from the past weather chart it is estimated that wind velocity at the center of a cyclone directly hitting Honiara to be 30m/sec. with center atmospheric pressure of

980hPa, or 36m/sec. with 970hPa. It is anticipated that the wind in the vicinity of Honiara generated by a cyclone moving south through the west of Honiara to be from the north, and from the south when a cyclone is moving south through the east of Honiara.

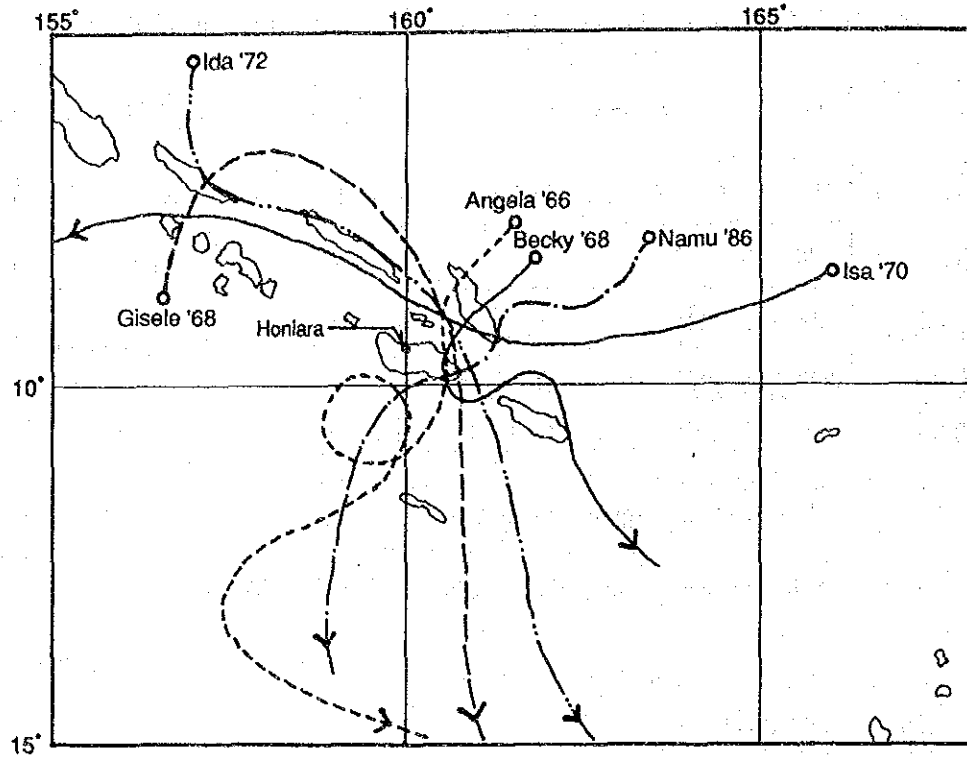
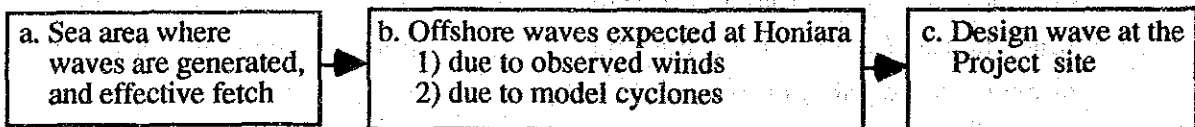


Figure 3.1 Routes of Cyclones

(2) Marine condition

1) Waves

In Solomon Islands there is no proper system to observe waves. Therefore, we estimated the waves from meteorological data including winds, taking topographic characteristics into consideration, and calculated design wave in the area of the project site. Details of estimation process are included in Appendix 6 - Estimation of Offshore Wave. The calculation process is as follows:



Wave heights at the face of project facilities on the site (C.D.L. -0.5m) are calculated as heights of converted offshore waves after breaking and transformation

(critical design wave height) The result is shown in Table 3.2. Calculation assumptions are; sea bottom slope is 1/30, depth (0.5m + tide level 1m) = 1.5m.

Table 3.2 Wave Height in Front of the Facilities

	N Direction Waves	NNE~ENE Direction Waves	N~ENE Direction Waves
Period Of Converted Off Shore Waves (Second)	9.1	8.2	6.3
Wave Height Of Converted Off Shore Waves (m)	5.5	5.0	2.4
Wave Length Of Converted Off Shore Waves (m)	130	105	55
Wave Height In Front Of The Facilities (m)	1.5	1.6	1.4

2) Tide level

In Honiara, tide level has been observed since a tide gauge was installed in 1974. The analysis of tidal curve has given the relations between each tide level as shown in Figure 3.2 below.

(m)		
0.70	M.H.H.W.	Mean Higher High Water (Land Map Datum Level)
0.43	S. L.	Sea Level
0.20	M.L.L.W.	Mean Lower Low Water
0.00	C.D.L.	Chart Datum Level

Figure 3.2 Tide Level Relation Chart

3) Current condition

The tidal range in Honiara is small, and difference between M.H.H.W. and M.L.L.W. is no more than 0.5m (See Figure of Relations between each tide level.) Thus, tidal current due to tidal range is mild. On 23 and 25 October 1993, survey was conducted on the tidal current through 13 monitoring of the movement of a float thrown into the sea in front of the project site (Refer to Appendix Figure 2. Current Information Plan). Current velocity measured varied from 0.02m/sec. to 0.12m/sec.

(or 0.04 ~ 0.23 knots) with an average velocity of 0.06m/sec. (0.1 knots). Out of a total of fourteen observations (the float reversed movement was counted as a separate observation), total nine float movements to the west and five float movements to the east were observed. As the entire sea area of Solomon Islands including this observed spot is located in the sphere of the South Equator Current which constantly runs to the west, it is considered that west bound current generally dominants.

(3) Soil Condition

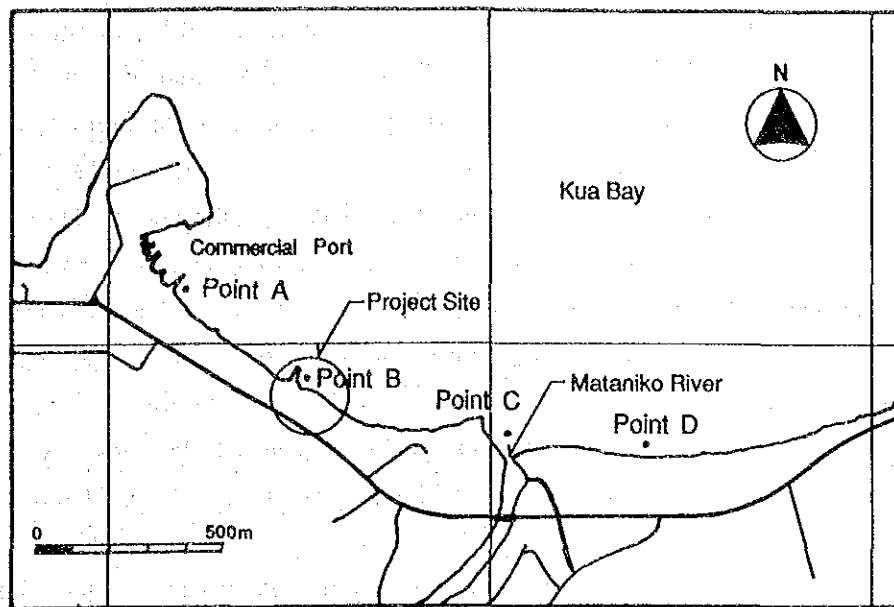
To investigate soil condition, we conducted a boring at one spot on the land (35m deep), and three spots in the sea (30m deep each). The location of the spots and boring logs are illustrated in the attached Figure 3.

The common characteristic of the soil surveyed throughout the boring depth is a mixture of weathered coral gravel, sand and silt. N value of the Standard Penetration Test changes at every 10m of upper, middle and lower layers (10 to 15m only at lower layer). N value at upper layer is generally not more than 10, 10 to 20 at middle layer, and more than 20 at lower layer. However, among the three boring spots in the sea, the east end boring (S-3) has somewhat more gravel at middle layer, and N value is more than 40 in most of the layers.

In general, the soil in the upper layer is comparatively soft with mixture of sandy coral and silt. The middle layer has a little more gravel, and the lower layer is comparatively solid mainly composed of sand and silt. Typical soil of each layer and particle size accumulation curve could be gleaned from boring (S-2) as shown in Appendix Figure 4.

(4) Drift Sand

We conducted particle size analysis of bottom sediment to obtain data indicating movement of drift sand. Spots to collect samples are illustrated in Figure 3.3. Two sampling spots were located west of the mouth of Mataniko River, one spot east of the mouth, and one at the mouth. The sampling at all four spots was at a level of about -0.5m C.D.L..



Remarks ; Points A.B.C and D indicate sampling spots.

Figure 3.3 Sampling Spots of Bottom Sediment

The results of the particle size analysis of bottom sediment is shown in Table 3.3.

Table 3.3 Particle Size Analysis of Bottom Sediment

	Sampling Spots			
	A	B	C	D
D ₆₀ (mm)	20.00	0.25	0.50	17.00
D ₃₀ (mm)	15.00	0.18	0.31	0.50
D ₁₀ (mm)	11.00	0.13	0.21	0.30
D _{60/10}	1.82	1.92	2.38	56.70

Remarks: D₆₀, D₃₀ and D₁₀ represent partial size which pass through a sieve with the rates of 60%, 30% and 10%.

Topographic features show a shoal at the mouth of Mataniko River curving towards the west thereby diverting the river mouth to the west. This topography indicates that soil and sand from the river flows toward the west in the sea.

Particle size analysis shows that equality coefficient, or the ratio of D₆₀ against D₁₀, of spot C at the mouth of the river and those of spots A and B both on the west of the mouth are similar to each other but far different from that of spot D on the east of the mouth. As soil and sand flows out of the mouth of the river and moves toward the west, it is washed out by the force of waves. At spot A in the west end, particles containing much gravel are found. At the spot D in the east of the mouth, it seems that the soil has been accumulated by the force of waves from further east without being affected by sand flowing from the river. (Refer to Appendix Figure 5 Bottom Sediment Particle Size Accumulation Curve.) Between the existing jetty of the Central Market and the Honiara Port, there is a protruding bank of stone masonry (5m ~ 10m) into the sea. On the east side of the masonry, silted deposition of sand is observed. This proves the movement of drift sand from east to west as described above.

Judging from the fact that maintenance dredging has never been conducted in the Honiara port, and that Mataniko River is rather small with a width of not more than 50m, drift sand will not have a significant effect on the project site.

3.3 Basic Policy of the Project

3.3.1 Study and Examination on Appropriateness and Necessity of the Project

(1) Current Situation of the Central Market

The Project site is located in the center of the commercial area in Honiara Zoning Plan where development have taken place. Along Mendana Avenue beside the Central Market, large supermarkets and stores are under construction.

Currently, the Central Market is retailing meat, vegetables, fruits, confectionery as well as fish. Due to the convenient location in the center of the capital, it is crowded with nearly 20,000 visitors at weekends. Most of the fresh fish supplied to the Honiara is transported by sea and sold in the Central Market. They are chilled with ice in large eskies and transported by small boats from other islands. These eskies are landed on the shores in front of the Central Market or beside the near-by yacht harbor. The fish is sold from the eskies on the shore of the Central Market under the direct sun as there is no built shelter. The survey conducted for thirty days from September to October 1993 indicates that the average volume of fish sold in the Central Market varies between 1.2 tons/day and 3 tons/day depending on the season and day of the week.

The amount handled at the Central Market indicated by the survey conducted in 1993 is shown below.

1993	Unit : ton/day	
	13 October (Wed)	16 October (Sat)
Fruits	11.93	42.93
Roots	3.48	13.98
Vegetables	2.19	11.89
Fishery Products	2.57	3.53
Others	3.18	13.50
Total	23.35	85.83

The amount of fresh fish handled at the Central Market comprises about 90 percent of the entire distribution volume in Honiara. Thus, the market which is the largest terminal of fishery products in the capital supplies most of the protein in Honiara.

In view of the amount handled and number of visitors at weekends, the site area of about 0.8ha is too small. Besides, facilities for drainage, sales and sanitation have not been sufficiently improved. Fresh foods are often displayed on the ground where dirty drain water pools whenever it rains. In addition to these sanitary problems the insufficient landing and drainage facilities for the retail sales of fresh and frozen fish creates a health and safety hazard.

(2) Necessity of Requested Facilities

1) Necessity of Development Based on Honiara Zoning Plan

Improvement plans of the Central Market which are directly related with the Project are included in the Provincial Plan, Honiara Zoning Plan and Honiara Town Council Program of Action Four-Year Development Plan.

Honiara Town Council Program of Action Four-Year Development Plan (1990-1993) includes construction of Kukum Commercial Center, widening of Mendana Avenue and Kukum Highway and infrastructure improvement including sewage facilities as well as improvement of the Central Market. These plans except the improvement of the Central Market have been implemented gradually.

Construction of the quaywall under the Project is planned as a part of the improvement project of the Central Market. It is also regarded as a part of the zoning plan of central Honiara to renovate a terminal of fishery products in the capital. It is considered to be urgently required and appropriate to construct the requested facilities as it falls in with the plans to improve the infrastructure of the central area of the capital.

2) Necessity of Improvement of the Infrastructure for the Fishing Port

At present, there is no quaywall or jetty for small fishing boats in Honiara, and fish landing is conducted at the shore in front of the market or several other shores near the market. The Central Market where fishery products are sold is not sufficiently equipped with fish landing facility for small fish boats. Furthermore, the rubbles littered shore directly in front of the site is hindering the market's function as the terminal for the sea and the land distribution network. It requires a great amount of time and labor to land and deliver fish eskies (100kg-200kg) which are transported by fishermen on the rubbles littered shores with its ensuring safety problems.

Under such circumstances, it is considered that improvement of the facilities including fish landing quaywall suitable for small vessels is essential to enhance fish landing efficiency, protect the shore and upgrade the sanitation conditions of the Central Market located in the back.

3.3.2 Study and Examination on Relationship and Duplication with Similar Projects and Grant Aids of International Organizations

The improvement of Honiara fish market is one of the future development plans identified for the model zones in the Development Study on Improvement of Nationwide Fish Marketing System in Solomon Islands which is conducted by Japan International Cooperation Agency (JICA). There are no other aid projects which is directly related with this Project.

3.3.3 Study and Examination on Components of the Project

Major components to achieve the goal of the Project include;(1) wharf (quaywall) used for fish landing from small fishing boats, (2) boat ramp for landing small boats, and (3) apron, approach revetment and small groin is considered to be necessary as measures to protect the shore against the effects of cyclones, over-topping waves, improve drainage and minimise accumulation of drift sand.

A breakwater facility is not included in the request for the Project. Damages caused by waves will be reduced by landing the boats onto the vessel placement yard and prohibiting fish landing at the wharf in stormy weathers.

3.3.4 Study and Examination on Content of Requested Facilities

Prerequisites in planning requested facilities are summarized as follows based on results of discussion mentioned previously, existing Project site conditions, results of the survey on natural condition, and so on.

(1) Recipient Vessels and Fish Landing Volume

Currently, small boats of 6-7 meters length with outboard engine each carrying one esky containing fresh fish of 100kg, deliver 210 tons of fresh fish annually to Honaira. The number of incoming boats will be estimated from this distribution volume of fish.

The Government of Solomon Islands are planning an improvement project for distribution of fishery products, and by year 2000 they plan to transport a maximum of twenty eskies/trip by a special transport vessel of 18 meters length from Florida Islands. This future improvement in transport will result in most of delivery volume of fresh fish from Florida Islands being transported by the special transport vessel to provide 252 tons/year in the year 2000.

(2) Scale and Use of Wharf and Boat Ramp

It is planned to construct a wharf for use by present as well as future vessel types to meet the current and future needs. The boat ramp for landing of eskies from small boats is designed with a vessel placement yard with a lamp-post to enable landing at night and in addition may be used as a rest area.

(3) Apron

Apron will be useful for efficient handling of fresh fish after landing. Measures should be taken against over-topping waves when a cyclone attacks.

(4) Location of Face Line

Face line will be located so that it will not have a negative effect on the shore line near the existing jetty, underwater topography, current condition, drift sand, and so on.

(5) Attached Facilities

Facilities will be selected which are useful and highly durable to ensure safety and efficiency in landing presently used eskies containing fresh fish.

3.3.5 Study and Examination on Necessity of Technical Assistance

The quaywall to be constructed under the Project is a permanent structure which will not require a large amount of maintenance cost in the future nor require special skills to operate the facility. Furthermore, Honiara City which is the executing agency has been involved in the operation of the Central Market, and technical staff of the SIPA will provide advice when necessary. Therefore, it is considered that technical assistance will not be required for operation and maintenance of the quaywall.

3.3.6 Basic Policy of Implementation of the Grant Aid

As the necessity and priority of the Project and the operation capability in Solomon Islands were confirmed, and public convenience is greatly anticipated, it is considered to be appropriate to implement the Project with Japanese grant aid. Therefore, the outline of the Project will be discussed to conduct the most appropriate basic design on the premise that Japanese grant aid will be provided. It should be a basic policy to provide the facility almost as it was requested since there is no need to make a considerable change in the components of the request regarding the content of the Project.

3.4 Outline of Executing Agency

3.4.1 Executing Agency and Operational Structure

(1) Organization of Executing Agency

The facilities under the Project will be operated by Honiara Town Council. The Planning Division will be involved in studying the content of the Project in the planning stages, and the Works division will be in charge of actual operation. Organization of the relevant divisions of Honiara Town Council is illustrated in Figure 3.4.

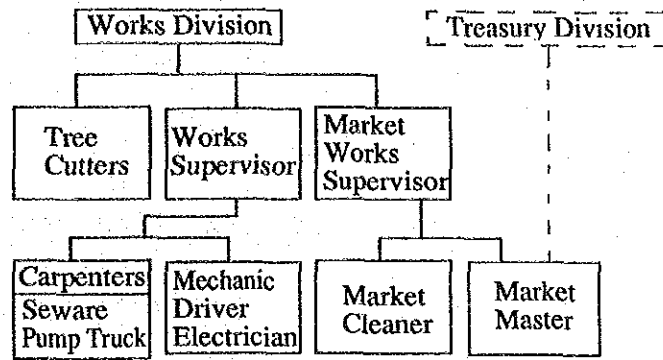


Figure 3.4 Organization Chart of Relevant Divisions of Honiara Town Council

Works Supervisor for Market works under the direction of Works Division as well as Treasury Division. Supervisor of the Central Market is in charge of the following personnel whose duties are:

- 1) Market Master : To collect SI\$20 per esky from fishermen who are retail sellers in the market and SI\$2 per petty sellers. No fees are envisaged for use of the facilities provided under the Project.
- 2) Market Cleaner : To dispose of trash in the market using a trash collection vehicle.

(2) Staff of Executing Agency

It is planned to appoint the staff of Works Supervisor of Works Division for the maintenance and operation of the facilities under the Project.

Works Division			
Works Supervisor	Market Master		2 Persons
	<u>Staff</u>		<u>6 Persons</u>
	Total		8 Persons

3.4.2 Plan of Operation

(1) Actual Records of Operation and Maintenance

Actual records of personnel, operation and maintenance expenses for the Central Market since 1985 are shown in Table 3.4. The number of the operation staff which was five in 1988 was increased to eight in 1989. Income from market fees collected at the Central Market as well as the operation an maintenance expenses for the facilities have been increasing steadily.

Table 3.4 Income and Expenditure for Operation of Central Market

Unit: SI\$

Breakdown	1985	1986	1987	1988	1989	1990	1991
1. Income							
Market Fee	11,462	29,633	57,115	47,968	67,724	85,223	95,866
2. Expenditure	3,083	3,302	7,041	4,879	5,926	6,839	10,954
Personnel Expense	2,250	2,530	3,030	3,500	4,170	4,250	7,280
Operation & Maintenance Expense	833	772	4,011	1,379	1,756	2,589	3,674

It is necessary to appropriate a budget for operation and maintenance expenses such as electricity and service charges on the assumption that the operation of the Project's facilities will start in 1995.

Estimated annual operation and maintenance expenses for the fish landing quaywall are shown in Table 3.5.

Table 3.5 Annual Operation and Maintenance Expenses

Unit: SI\$

Item	
Electricity, Replacement of electric bulbs	692
Water supply	138
Painting	180
Dredging *	3,050
Total	4,060

* Operation and maintenance cost for dredging is budgeted annually although dredging is to be conducted once every few years.

(2) Operation and Maintenance of Facilities

Currently, Honiara Town Council is a subordinate organization under the Ministry of Home Affairs in charge of operation and maintenance of public facilities including the Central Market. Honiara Town Council has a policy to provide sufficient staff and finance required for the operation and maintenance of the facilities under the Project as part of the Central Market.

CHAPTER 4 BASIC DESIGN

CHAPTER 4 BASIC DESIGN

4.1 Design Policy

The facilities of this project will be designed in conformity with the following design policy.

- (1) The design of the facilities will take account of the present transportation system using small boats and the case of the introduction of an exclusive transportation vessel in the future.
- (2) Regarding frequency and number of incoming vessels, the distribution pattern with a peak at week-ends and stormy weather conditions will be taken into account.
- (3) Topographical conditions including shore lines, existing jetty and topographical situations of the market area on the rear will be taken into account. Face line and locations of facilities will be determined to minimize the impact on the environment.
- (4) The structure of the facilities will take account of the ground conditions mainly consisting of coral sand, and to prevent over-topping waves and scour caused by cyclone.
- (5) Eskies transported by small boats are too heavy to be comfortably handled manually. Wharf facilities will have equipment, structure and dimensions to secure safe and convenient unloading, and thus achieve a balance between improved convenience and safety as well as prevention of hazards.
- (6) Minimum necessary facilities will be installed considering the drainage requirements and drift sand to comply with the natural environmental conditions at the project site such as localized torrential downpour or local sea current condition.
- (7) Facilities and equipment will have good durability against the forces of nature such as waves or earthquakes and against the natural environment such as sea water and salty breezes or strong direct sun rays.
- (8) Facilities and equipment will be easy to handle in accordance with the capability of local people.
- (9) Priority will be placed on local products and local procurement for construction material in view of overall consideration on purposes, durability, cost, etc. Overseas procurement of construction machines, engineers and skilled labor will be limited to a minimum considering the availability of local expertise and material.

4.2. Study and Examination on Design Criteria

4.2.1 Conditions of the Design of the Facilities

(1) Conditions of the Design of the Facilities

Based on the study on distribution and the related situations, and researches on the natural environment, the design conditions of the facilities have been determined as follows:

1) Recipient vessels

Average daily number of incoming vessels was estimated from the transportation volume of fresh fish into Honiara, particularly from Florida Islands which comprises the majority and from types of the vessels used for the transportation. Number of annual working days of vessels was computed as 270 excluding holidays and days with unfavorable weather.

The following table shows number of incoming vessels and other data.

Table 4.1 Number of Recipient Incoming Vessels

	Present (year of 1992)	Future (year of 2000)		
Transportation Volume of Fresh Fish from Florida Islands	210 ton/year (ave. 0.8 ton/day)	252 ton/year		
		by small boat 252 ton/year	The case of adopting transportation vessel	
Type of Vessel	Vessel Length 7m	Vessel Length 7m	Vessel Length 18m	Vessel Length 7m
	Vessel Width 1.7m	Vessel Width 1.7m	Vessel Width 2.6m	Vessel Width 1.7m
	FRP Boat with Draft 0.5m (max.)	FRP Boat with Draft 0.5m (max.)	Transport Vessel with Draft 0.5m (max.)	FRP Boat with Draft 0.5m (max.)
Cargo Volume per Vessel	Fresh Fish about 100kg Ice about 100kg Packed in 1 esky and transported as 1 esky/vessel	Fresh Fish about 100kg Ice about 100kg Packed in 1 esky and transported as 1 esky/vessel	5~20 eskies/vessel same as left transported	Fresh Fish about 100kg Ice about 100kg Packed in 1 esky and transported as 1 esky/vessel
Average daily no. of incoming vessels	9 vessels/day	11 vessels/day	1 vessel/day	2 vessels/day
Max. daily no. of incoming vessels	16 vessels/day	20 vessels/day	1 vessel/day	4 vessels/day

- Remarks: 1) The tonnage of fish is net without guts.
2) Both ave. and max. daily no. of incoming vessels is actual numbers observed during Oct.~Nov. (for one month) 1993. These numbers were adopted as the present value (base year 1992).

2) Design wave

- Waves due to cyclone: Height (H)=1.5m, Period (T)=9sec.
- Waves due to measured wind: (H)=1.4m, Period (T)= 6sec.

3) Tide level

- Mean Higher High Water: M.H.H.W.=+0.70m
- Mean Lower Low Water: M.L.L.W.=+0.2m

4) Soil

Back-filling rubble

Internal friction angle	$\phi=35$ degrees
Wall friction angle	$\delta=0$ deg.
Weight per volume (in the air)	$\gamma=1.8$ t/cubic meter
- ditto - (in the water)	$\gamma'=1.0$ t/c.m.

Rubble base

Internal friction angle	$\phi=35$ degrees
Weight per volume (in the air)	$\gamma=1.8$ t/cubic meter

Base ground

- ditto - (in the water)	$\gamma'=1.0$ t/c.m.
Internal friction angle	$\phi=30$ degrees
Weight per volume (in the air)	$\gamma=1.8$ t/cubic meter
- ditto - (in the water)	$\gamma'=1.0$ t/c.m.

5) Earthquakes

Design seismic coefficient by seismic coefficient method

$$K=0.1$$

(2) Determination of Face Line

The present shore line runs from the vicinity of the mound of existing jetty towards the East in a slightly concave shape. About 130 ~ 140 meters east, it comes close to the line-of-sight which runs from the mound in right angle (see Fig.4.1).

The shore line on the east side of the existing jetty protrudes compared with the west side. This is due to accumulation of drift sand. From the above topographic conditions it is necessary that the face line of the projected unloading quaywall should be built inside of the line-of-sight running through the mound to reduce effect on the change of contour lines by drift sand. As the line connecting the top of the mound and shore line located about 130 ~ 140 meters east makes almost a right angle with the existing jetty, the line-of-sight should be the face line of projected facilities.

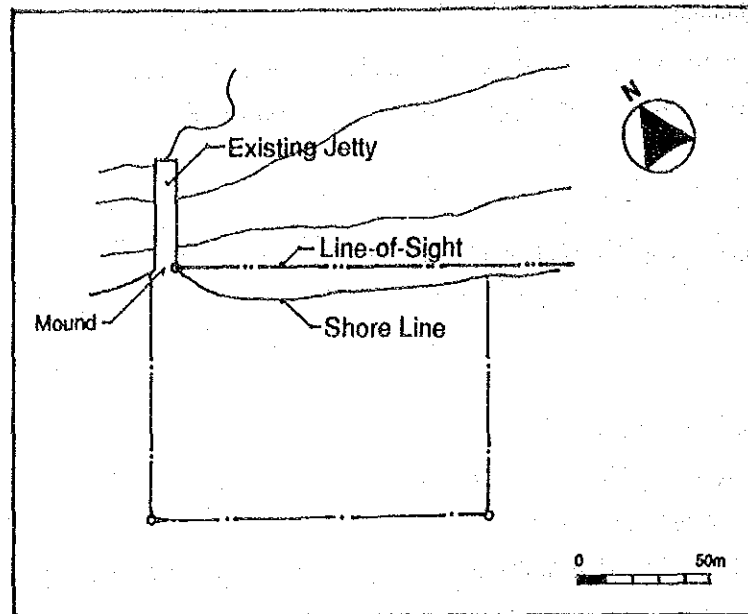


Figure 4.1 Selection of Face Line Point

(3) Methods of Structuring (Prevention against disasters due to waves)

Permissible volume of over-topping wave as the prerequisite of structures of quaywall, revetment and apron will be determined considering the importance of the Central Market located right in the back. From the Table 4.2 of criterion of fishery harbor, permissible volume of over-topping waves is $0.02 \text{ m}^3/\text{m}\cdot\text{sec}$.

Table 4.2 Criterion to determine the volume of over-topping waves

Prerequisite	Permissible volume of over - topping waves: q (cu.m./m.sec.)
Area with residential houses and public facilities right in the back, where serious damage is expected due to soaring waves.	Approximately 0.01
Other important areas	Approx. 0.02
Other areas	Approx. 0.02 ~ 0.06

(4) Others

1) Boat ramp

Pulling up boats will remain unchanged i.e. boats will be handled manually on the boat ramp.

2) Small groin

The prerequisite is prevention of drift sand caused by facilities.

3) Drain facilities

The prerequisite is smooth drainage of rain and other waste water flowing out of the existing market.

4.2.2 Conditions of the Scale of Facilities

The scale of facilities will be estimated based on present situation of size, number of incoming vessels, transportation volume and the future estimate. Regarding allocation of available facilities, priority should be on using wharf for fish landing, preparation and rest (in the day time), and on using boat ramp for rests.

When using wharf for fish landing and preparations, vessels will lie alongside the quay to secure safety in loading or unloading and boarding or unboarding. For rests, vessels will lie at right angle with the quay. Necessary length of the wharf (quaywall) for each use is estimated as follows.

a. Fish landing quaywall

Fish landing quay is for landing catch from fishing boats. Estimation formula of necessary length is as follows:

$$\text{Necessary length} = \Sigma N/\gamma \times L$$

Where: L: berth length = vessel's length + allowance

N: standard number of in-coming vessels per day

γ : berth turnover = available time for landing/landing time per vessel.

b. Preparation quaywall

Preparation quay is the wharf to load boats with ice and fuel employing exclusive facilities. Formula of necessary length is as follows:

$$\text{Necessary length} = \Sigma N'/\gamma' \times L'$$

Where: L': berth length = vessel's length + allowance

N': standard number of in-coming vessels per day

γ' : berth turnover = available time for landing/landing time per vessel.

c. Quaywall for resting

Quay for resting and to moor fishing boats. Formula of necessary length is as follows:

$$\text{Necessary length} = \Sigma n \times B$$

Where: n: Number of mooring boats per day

B: Necessary berth length per boat

(1) Present Situation (1992)

Average number of daily vessel traffic is nine/day which is the basic figure. For computation of facility scale, the maximum no. of vessels observed of 16/day is applied to comply with peaks at week ends.

The computation of necessary number of berths is shown in the Table below.

Use of Facility	Type of Vessel		Ave. Berth Length	Ave. No. of daily traffic	Available Time for unloading		Berth Turnover (3)/(4)	Necessary No. of berths (2)/(5)		Necessary Length (m) (6)x(1) (7)
	Max. Draft (m)	Ave. Vessel Length (m)			hr	hr/vessel		Real Number	Integer	
	(m)	(m)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
For Unloading	0.5	7	9	16	4	0.4	10	1.6	2	18
For Preparing	0.5	7	9	16	8	0.6	13	1.2	1	9
Total										27
Remarks:		Ave. = Average		max. = maximum		No. = Number				

For rests:

At quay; 2.5m/vessel x 5 = 12.5m

At boat ramp; 2.5m /vessel x 11 = 27.5m

Out of necessary 40 meters, length for 5 vessels is assigned for quay, 11 for boat ramp.

(2) In Future (as of 2000)

The necessary number of berths is shown in the following Table.

1) Transportation system using small boats

Use of Facility	Type of Vessel		Ave. Berth Length	Ave. No. of Daily Traffic	Available Time for unloading		Berth Turnover (3)/(4)	Necessary No. of Berths		Necessary Length (m) (6)x(1) (7)
	Max. Draft (m)	Ave. Vessel Length (m)			hr	hr/vessel		Real Number	integer	
	(m)	(m)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
For Unloading	0.5	7.0	9.0	20	4	0.4	10	2.0	2	18
For Preparing	0.5	7.0	9.0	20	4	0.6	10	1.5	2	18
Total										36
Remarks:		Ave. = Average		max. = maximum		No. = Number				

For rests:

At quay; 2.5m/vessel x 8 = 20m

At boat ramp; 2.5m /vessel x 12 = 30m

Out of necessary 50 meters, length for 8 vessels is assigned for quay, 12 for boat ramp.

2) The case of adopting transportation vessel.

Use of Facility	Type of Vessel		Ave. Berth Length	Ave. No. of daily Traffic	Operating Time of Facility		Berth Turnover	Necessary No. of Berths		Necessary Length (m)	
	Class of Vessel	max. Draft			Ave. Vessel Length	hr		hr/vessel	Real Number		Integer
		(m)	(m)	(1)	(2)	(3)	(4)	(3)/(4) (5)	(6)	(7)	(6)x(1) (7)
For Unload- ing	Transport Vessel	0.5	18.0	21.0	1	4	0.5	8	0.13		
	Small Boat	0.5	7.0	9.0	4	4	0.4	10	0.4	1	9~21
For Prepar- ing	Transport Vessel	0.5	18.0	21.0	1	8	1.0	8	0.13		
	Small Boat	0.5	8.5	9.0	4	8	0.8	10	0.4	1	9~21
Total											18~30

Remarks: Ave.= Average Max. = Maximum No. = Number

Since there will be only one transportation vessel on duty, its length will be counted for either unloading or preparatory berth when calculating necessary total length.

For rests, four small boats are included, and 30m boat ramp is enough for the purpose. It is considered that any surplus space at the boat ramp will be increasingly utilized by canoes with outboard motors or FRP boats which transport fishery products or other sundries from neighboring islands.

(3) Quaywall, boat ramp and revetment

From the results of the calculation above, the necessary length and scale are as follows:

- a. Quaywall: total length 40m (necessary length is 36m.)
- b. Boat ramp: total length 30m (necessary length is 30m.)

Out of the total length of 120m at the project site, deduction of 70m (total length of quaywall and boat ramp) leaves 50m. 44m is assigned to the revetment, and within the remaining 6m, other facilities (groin and drain pipes) will be installed.

(4) Apron

To secure enough width necessary to prevent over-topping waves, safety of facilities against cyclones and width and height of the planned apron were considered as shown below:

<p>In permissible volume of over-topping waves, frequencies of uses of the Central Market at the back of the site are taken into account. The expected volume of over-topping waves q will be 0.02 cubic m/m.sec. according to the following fishery harbor standard. Criteria of Computing Over-topping Waves</p>	
Prerequisite	Permissible volume of over-topping waves: q (cu.m./m.sec.)
Area with residential houses and public facilities right in the back, where serious damage is expected due to soaring waves.	Approximately 0.01
Other important areas	Approx. 0.02
Other areas	Approx. 0.02 ~ 0.06
<p>From estimation of offshore waves: $h = 1.7\text{m}$ (Total of front depth -1.0m and tide level +0.7m) $H_o' = 5.5\text{m}$ The front sea bottom slope $1/30$ $h/H_o' = 1.7\text{m}/5.5\text{m} = 0.31$ $H_o'/L_o = 5.5\text{m}/130\text{m} = 0.042$ The following hc/H_o' value was extrapolated from Appendix Figure 6 - Wave Overtopping Rate Vertical Sea Dike: $hc/H_o' = 0.25$ Therefore $hc = 0.25 \times 5.5\text{m} = 1.4\text{m}$ From tide level of +0.7m, the necessary height of breakwater is 1.4m. As the width of planned apron is 16m, we examine necessary height of breakwater at 16m recessed point from the face line of quay. From attached Figure 6, variation in necessary height of top face due to recess distance of parapet; $X/H_o' = 16\text{m}/5.5\text{m} = 2.9$ $hc/hc' = 0.65$ $hc' = 0.65 \times 1.4\text{m} = 0.9\text{m}$ Supposing full tide is 0.7m, the necessary height from the base surface will be; $0.7\text{m} + 0.9\text{m} = 1.6\text{m C.D.L}$ $+ 1.6\text{m C.D.L} < +2.3\text{m C.D.L}$ (Design height of parapet) Thus, the design height is enough to include necessary height.</p>	
<p>Where: h : Depth of water in front of project facilities H_o' : Wave height of converted offshore wave hc' : Necessary height of breakwater at recessed point hc : Necessary height of breakwater at the face line of revetment L_o : Converted height of offshore waves H_o'/L_o : Slope of converted height of offshore waves X : Recess width of breakwater.</p>	

4.3 Basic Design

4.3.1 Site and Layout Plan

(1) Layout Plan of Facilities

The existing jetty is located near the western end of the construction site, and natural shore at the eastern side. A boat ramp will therefore be installed in the eastern side so that the adjacent natural shore can be used as a vessel placement yard. A wharf will be located between the boat ramp and the existing jetty with an approach revetment in between and an apron in the back. A small groin will be located along the eastern end of the boat ramp. Drain ditch will be installed in the external portion of the small breakwater and the existing jetty. The layout of these facilities is shown in Figure 4.2.

(2) Usage Plan

It is planned that fresh fish discharged from a small boat or a ship at the wharf will be smoothly carried into the site of the Central Market, located adjacently to the quaywall, to be sold. The layout of the facilities is designed to cope with future transport mechanization.

Space for a vessel placement yard is provided in the land side of the boat ramp to accommodate twelve boats ($30\text{m} + 2.5\text{m}/\text{boat} = 12$ boats) so that they may replenish water, fuel and other necessary materials.

(3) Relationship with Land Facilities

The western end of the Central Market to the existing jetty serves as a passage connecting the jetty and Mendana Avenue. The western end of the apron serves as an entrance for vehicles coming into the apron and the eastern end serves as an exit.

It is planned to construct drain ditch along the edge of the apron to drain the rain water from the site without affecting the apron. In the apron and the boat ramp, bumps and walls should be avoided as much as possible except for emergency needs to facilitate smooth transports from the back yard and market site.

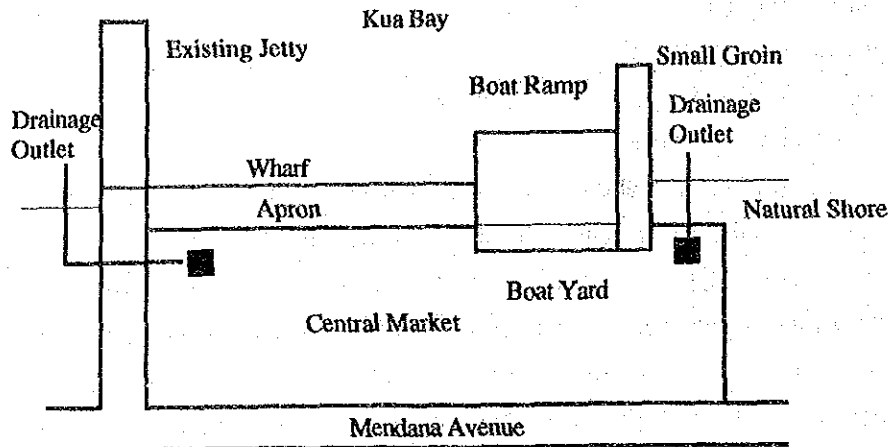


Figure 4.2 Layout of Fish Landing Quaywall

4.3.2 Facility Plan

(1) Wharf and Revetment

1) Crown Height and Width of the Wharf

It is clear that the crown height of the wharf should be equal to or a little lower than the top of a bulwark of a boat for ease of use. Height of the bulwark of present and future vessels is shown below.

Unit: m			
	Present (1992)	Future(2000)	
	Small Boat	Transport Vessel	Small Boat
Height of Bulwark	Approx. 0.35	Approx. 1.0	Approx. 0.35

For the future it is considered adopting a transport vessel with the height of bulwark of approximately 1m, but the crown height of a quaywall which is too high will specially affect a small boat. Therefore, the crown height was estimated to be +1.0m which is the sum of M.H.H.W (+0.7m) plus 0.3m which is a little lower than a bulwark of a small boat. As a result, people will be able to go on and off the boat at low tide. Consequently, the request for installation of three stairs to embark and disembark at low tide was reviewed, and it was determined to install just one staircase.

The width of 4m for fish landing was secured in consideration of future mechanization, with stairs installed in a convenient location.

2) Crown Height of Apron

Apron is connected across the drain ditch in the site of the Central Market (existing level +2.3m). It will be 12m wide with a slope from a height of +2.1m on the land side to +1.7m on the sea side to eliminate sea water from waves washing over the apron.

3) Crown Height of Revetment

Standard height will be +1.7m which is equivalent to the height of the ocean side of the apron, with a slope inclined at 5 % to connect to +1.0m wharf level.

4) Structure of Wharf, Revetment and Apron

The same structure was adopted for both wharf and approach revetment. Two layers of concrete block are mounted on the foundation mound which is 1.0m thick so that the height of the concrete in site can be adjusted to meet the required height of each section. Back-filling rubble is filled in the back, and at the bottom and rear of the apron the ground is filled with excavated soil or pit sand. Width of the foundation mound is 4.9-5.1m at the bottom so that the reaction force of the block may be absorbed and distributed to the ground. In front of the blocks, concrete slabs with thickness of 50cm, width of 3.5m and crest height of -1.0m will be installed to prevent scour on top the front mound. A wall which serves as a parapet with crown height of +1.7m will be installed behind the wharf (+1.0m), and curbs will be installed on the crest to secure safety of passing vehicles. Front water depth for both wharf and approach revetment will be -1.0m to cope with larger vessels in the future. Design seismic coefficient of 0.1 is adopted to secure the required safety at the time of an earthquake.

(2) Boat Ramp

Height of front end of the boat ramp is -0.5m with a slope which is 26 m long inclining up to +2.1m at a gradient of 1/10. Structure is comprised of concrete block or concrete pavement. The part below the average high tide level on the sea side is adaptable for underwater work by the block installation method.

Flat pavement part with the width of 8m is connected behind the quaywall to be used as a placement yard of vessels drawn up on the slope. Height of the placement yard will be +2.1m which is equal to the height of the apron, and the height of the concrete at the end will be +2.3m to prevent wave splashes from coming into the back

yard. Plastic sleepers will be embedded into the slope every 60cm to facilitate pulling up the boats.

(3) Small Groin

The length of the small groin installed in the eastern side of the quaywall is 40 m. Seawards from the face line, concrete block will be mounted on the rubble-base mound, with the upper part to be finished with concrete in-situ to function as a gravity type wave protection structure. Landwards from the face line for a length of 18m, a steel sheet pile structure (L=7m) will be adopted.

(4) Related Facilities

Drain pipes will be installed with outlets in the western side of the existing jetty and in the eastern side of the quaywall. Rainwater is collected from the market site and drained through drain ditches, catch-basins and drain pipes into the ocean. The outlets which serve to flow out sediment with rainwater will be installed in places except at the location of the loading quaywall.

The request for two units of handlift was reviewed and it was determined that only one unit was needed in view of the number of vessels and the scale of the quaywall.

Winch was not included in the request, but considering the number and frequency of vessels using the quaywall as well as the tendency that vessels will be larger in the future, it was determined to install one unit of simple winch which can be manually operated.

Lamp post was not requested, but it was determined to install one unit in the boat ramp to facilitate the work especially at night.

Details of planned facilities are shown in Table 4.3.

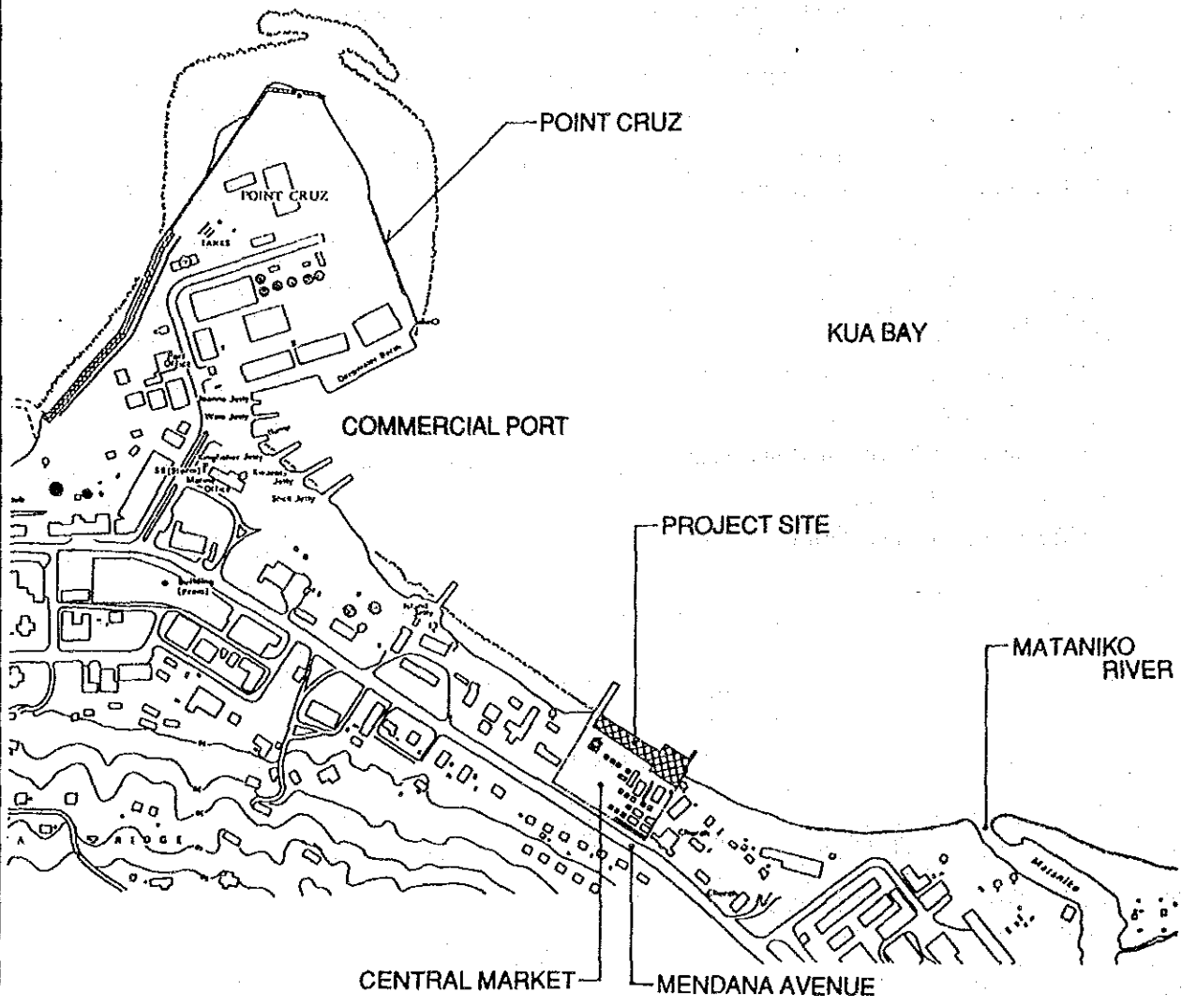
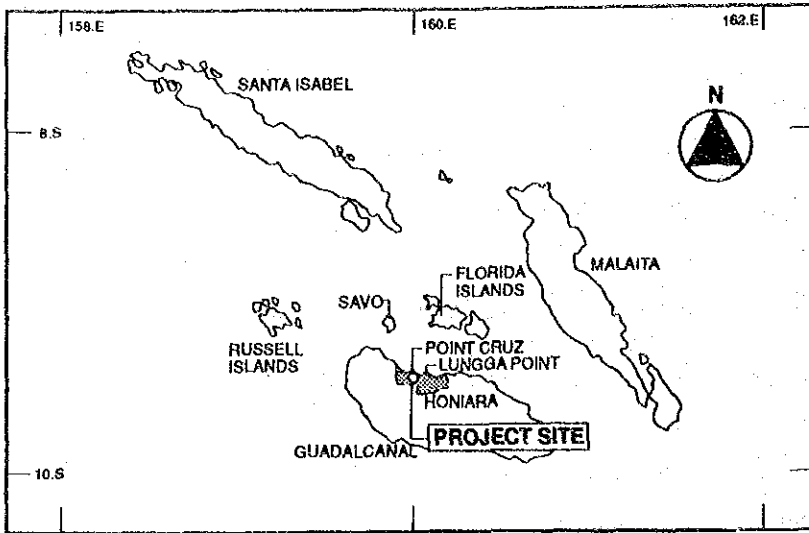
Table 4.3 Details of Fish Landing Quaywall

Wharf	Length	40.0m		
	Crown height	C.D.L. + 1.0m		
	Structure	Concrete Block with one set of stairs		
	Apron	16m x 84m	1,344m ²	
Revetment	Length	44.0m (west side 23m, east side 21m)		
	Crown height	C.D.L. + 1.0m ~ + 1.7m		
	Structure	Concrete Block		
Boat Ramp	Width 30.0m x Length 34.0m	Slope 1/10		
Small Groin	Length	40.0m		
	Crown height	C.D.L. + 1.0m ~ + 2.6m		
	Structure	Concrete Block		
Related Facilities	Hand Lift	one set	Water Faucet	one set
	Mooring Ring	one set	Lamp-post	one set
	Fender (used tire)	one set	Winch	one set

4.3.3 Basic Design Drawing

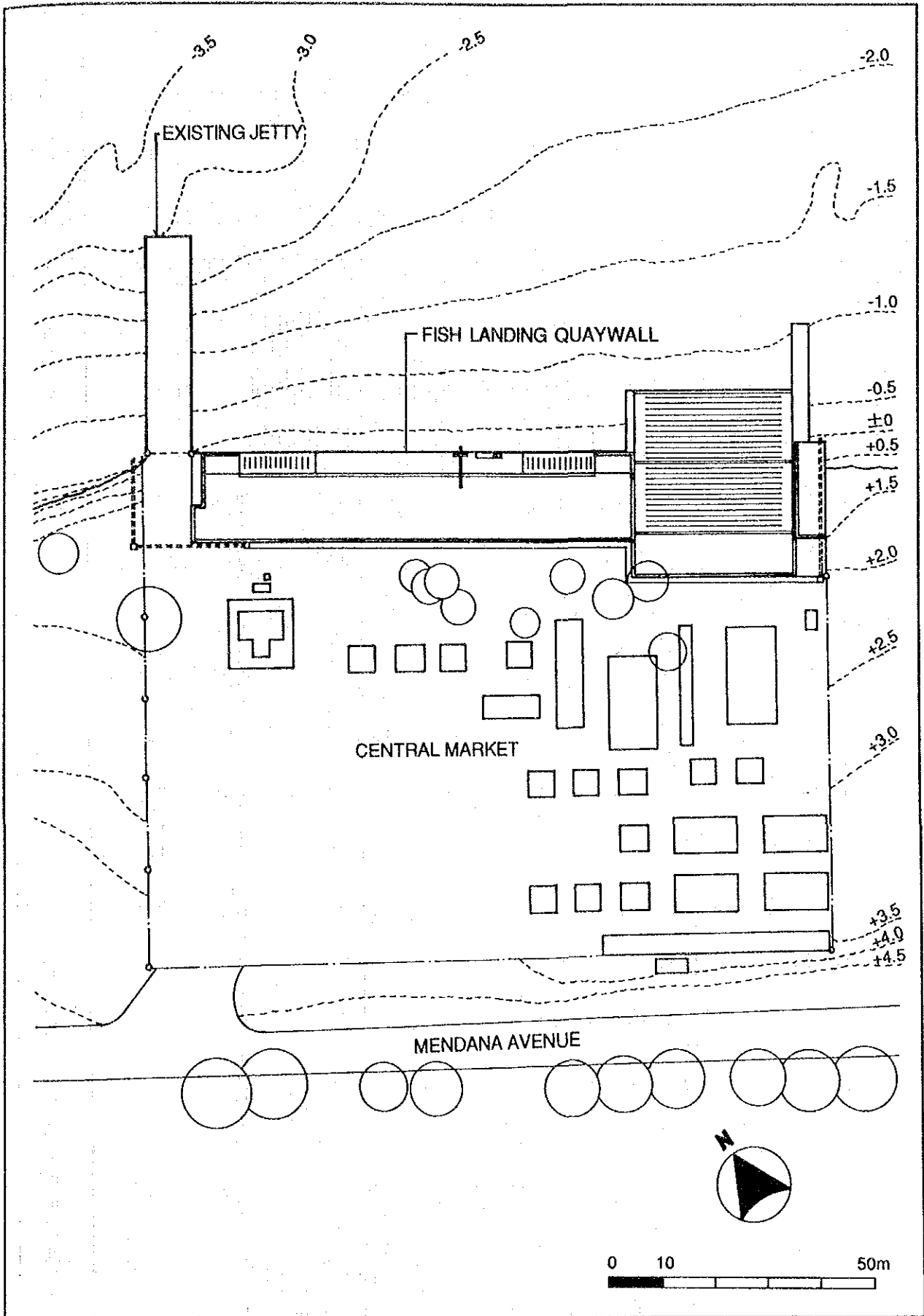
Basic design drawings of the facilities in the Project are shown in the following pages.

- (1) Project Site
- (2) Layout Plan
- (3) Plan of Fish Landing Quaywall
- (4) Section of Wharf
- (5) Section of Boat Ramp



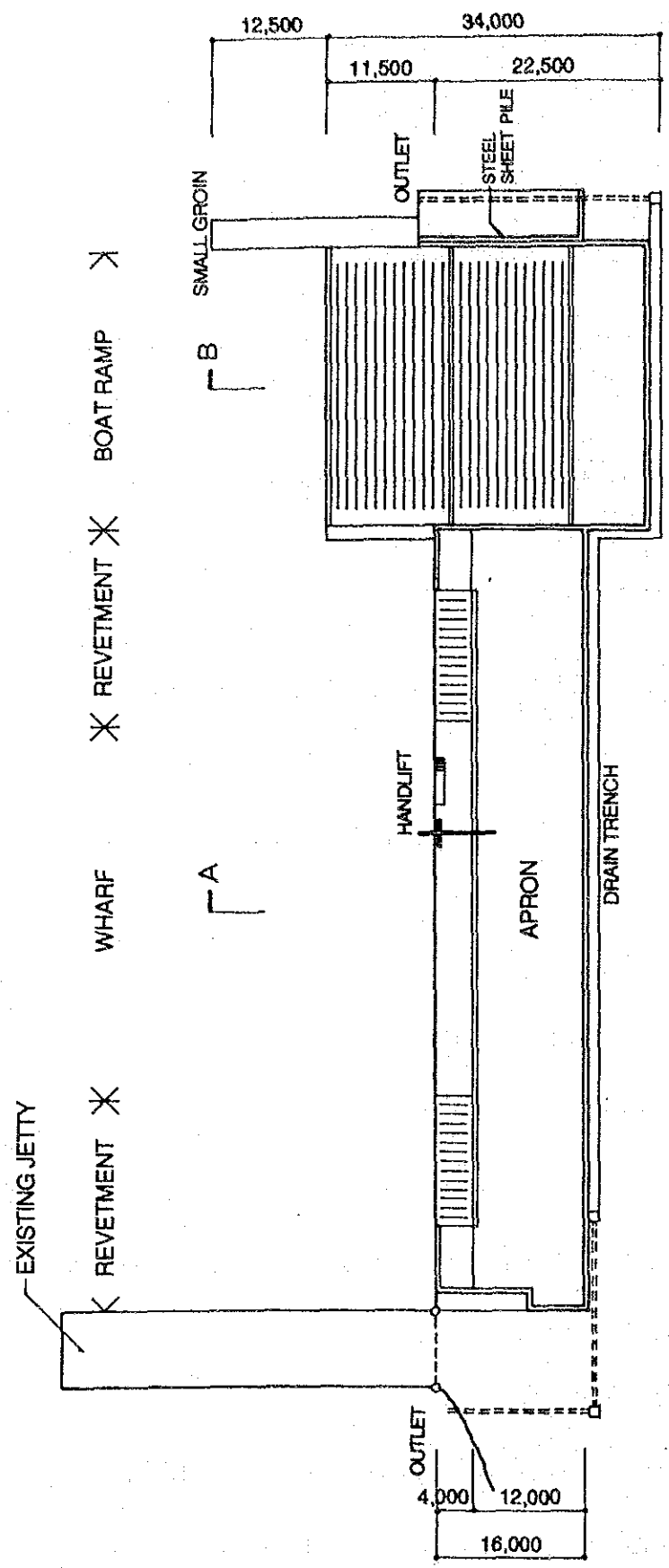
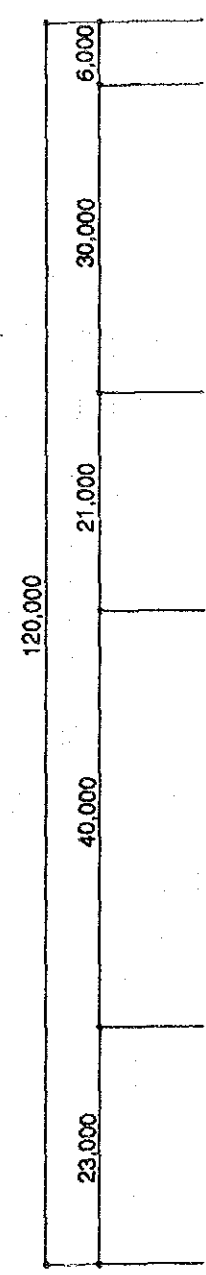
1. PROJECT SITE

THE PROJECT FOR
THE HONIARA FISH MARKET DEVELOPMENT
IN SOLOMON ISLANDS



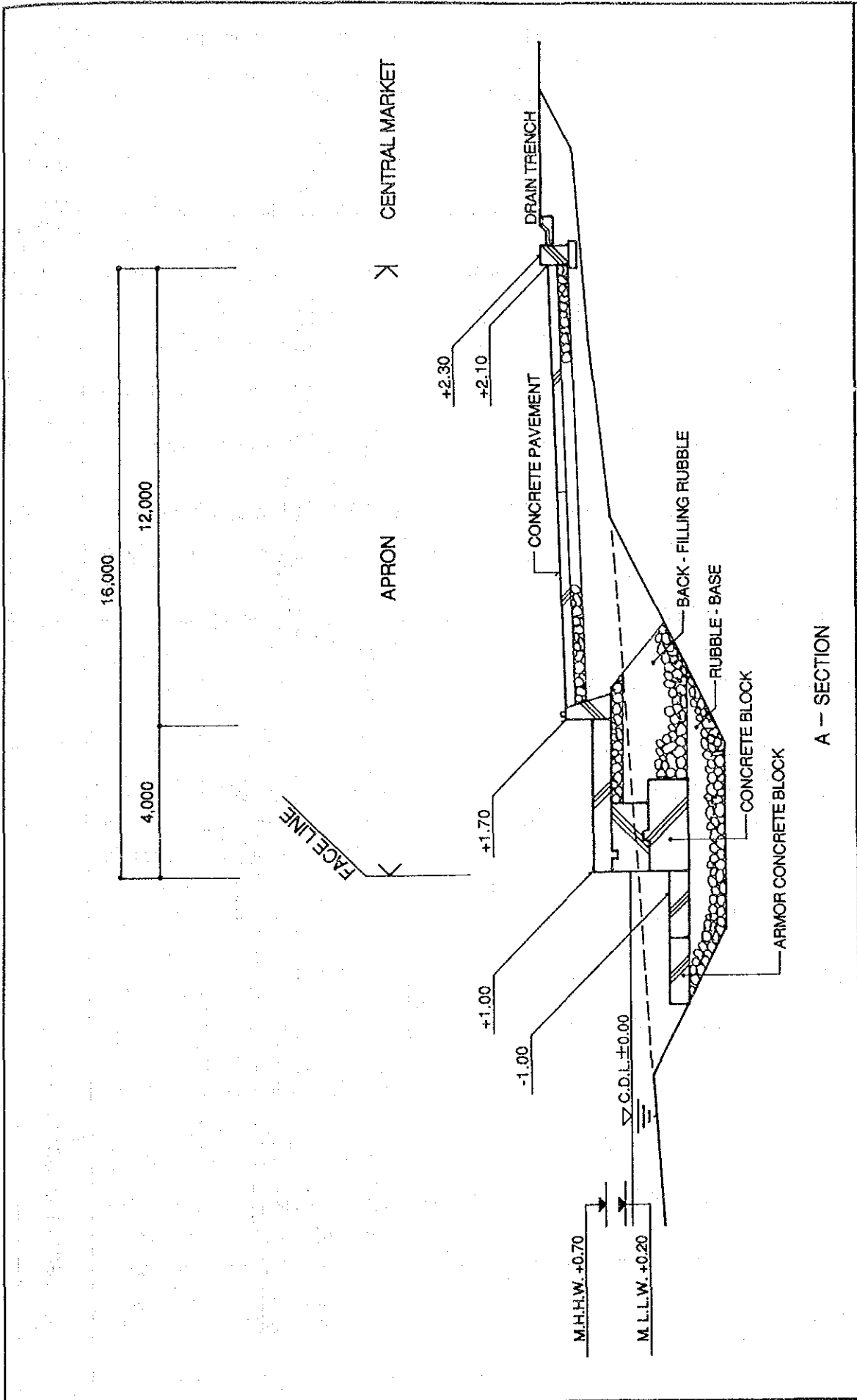
2. LAYOUT PLAN

THE PROJECT FOR
THE HONIARA FISH MARKET DEVELOPMENT
IN SOLOMON ISLANDS



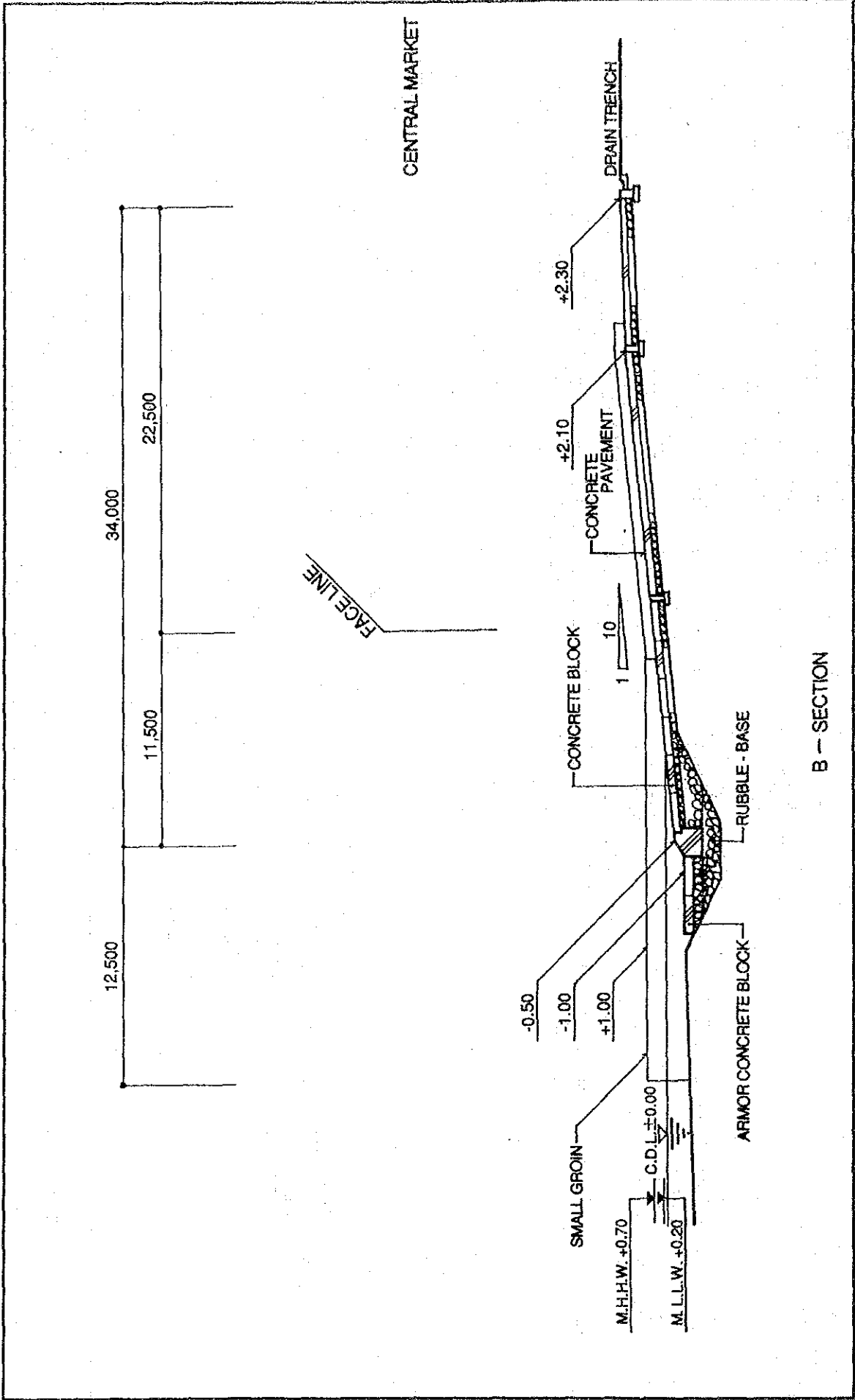
THE PROJECT FOR
THE HONIARA FISH MARKET DEVELOPMENT
IN SOLOMON ISLANDS

3. PLAN OF FISH LANDING QUAYWALL



THE PROJECT FOR
 THE HONIARA FISH MARKET DEVELOPMENT
 IN SOLOMON ISLANDS

4. SECTION OF WHARF



B - SECTION

5. SECTION OF BOAT RAMP

THE PROJECT FOR
THE HONIARA FISH MARKET DEVELOPMENT
IN SOLOMON ISLANDS

4.4 Implementation Plan

4.4.1 Implementing Organization

The executing agency of the Project is the Fisheries Division of the Ministry of Natural Resources. After the Exchange of Notes is concluded between the Government of Japan and the Government of Solomon Islands, the consultant in Japan will promptly enter into contract for the detailed design and supervision with the Government of Solomon Islands. Then, a Japanese construction company will enter into contract with the Government of Solomon Islands to conduct the work and procure the equipment under the supervision of the consultant.

4.4.2 Construction Work Policy

Considering that the Project will be implemented under the Japanese grant aid program, it is to be implemented based on the following policies.

- (1) Good communication should be maintained so that the opinions may be exchanged openly and freely between the Fisheries Division of the Ministry of Natural Resources, the consultant and the construction company in order to facilitate the execution of the work.
- (2) As the construction site is located in the center of Honiara, it seems to be relatively easy to procure manpower and materials. An efficient plan should be made to procure construction machines and skilled labor to secure good quality and with minimum wastage.
- (3) The ownership of the construction site is by the Government of Solomon Islands, but the lease has been given to Honiara Town for a certain period of fifty years through the land management committee. In executing the construction work, execution method should be selected to minimize effects on the surrounding areas and prevent problems caused by topographical changes, and an approval from the government should be obtained beforehand concerning the temporary facilities plan and the execution method.
- (4) The following points should be taken into consideration in securing accuracy and quality of the execution.
 - As the project site is located in a place subject to salt damage by sea breezes, construction materials which are not easily damaged should be selected, and measures should be taken to protect construction materials and equipment against salt breezes during the construction.

- Concrete should be mixed properly, and design strength should be secured by performing slump test and compression test.

4.4.3 Construction Conditions and Implementation

Large scale construction work in Honiara is limited to foreign grant aid projects, and at present the trunk road renovation work by Japanese grant aid and the new construction work of the House of Parliament by US grant aid are underway.

Leading local construction companies are Solomon Islands/New Zealand joint venture and Japanese enterprises.

- (1) A local contractor with its head office in New Zealand has been widely engaged in ADB projects in Europe and Australia. Recently they were involved in the renovation work of the Honiara commercial wharf. There are overseas affiliated companies which have actual experience working with Japanese companies. Construction market is small and formation of specialized and promising vendors has not been sufficiently conducted. Due to shortage of skilled engineers, specialists and divers, it is necessary to hire such manpower from other areas outside the country.

- (2) Annual precipitation in Honiara which amounts to approximately 2,100mm is rather concentrated during the three months from January to March with the monthly volume of less than 300mm, with many squalls throughout the year. Outdoor environment for construction work is under severe condition with the average temperature of 26.5°C and humidity of 76%. Governmental organizations are on a five-day week, but the construction work of some private companies is in operation on Saturdays. As the project site is located in a corner of the site for the Central Market which is especially crowded on Saturdays and Sundays, work schedule should be planned to comply with the local customs and conditions as well as natural conditions.

As for marine condition, wind with velocity more than 5m/sec causing rough waves arise with an annual average probability rate of approximately 5%. These rough sea conditions will therefore affect construction work. The changeover of land breeze (in the morning) and sea breeze (in the afternoon) is clear due to geographical features in Honiara, and it is important to utilize the morning time when calmness probability is high to secure safety in marine work and work schedule.

4.4.4 Construction Supervisory Plan

The basic policies and important points in supervision of construction of the Project are as follows.

- (1) The consultant should coordinate closely with the Fisheries Division of the Ministry of Natural Resources which is the executing agency of the Project in order to conduct the construction work smoothly. Especially in treatment of unexploded shells (already treated), transfer of existing sewerage pipes and equipment installation, the timing of the work is so important that it is necessary to hold meetings beforehand concerning the work schedule and specifications to coordinate the works to be done by the Japanese side.
- (2) Before starting the work, the execution plan and shop drawings submitted by the construction company will be carefully reviewed and the appropriateness of the temporary work plan, work schedule, quality of planned materials and the construction methods will be examined.
- (3) In the completion and handing over, construction work and delivered equipment will be examined to see that they meet design specifications, and appropriate instructions will be provided in case revision is required.
- (4) Civil engineers will be responsible for the general supervision of the work.

4.4.5 Procurement Plan

Construction materials available locally are limited to aggregate, sand, gravel, earth filling soil, etc. Aggregate and ready mixed concrete are available through a local aggregate vendor. Stones are supplied from Veravaolu Village located in the west of Honiara. Procurement of cement, reinforcement, steel, plywood, etc. is dependent on imports from New Zealand and Australia, but some of them are available from local stock. The construction materials required for the construction work such as cement, steel, wooden and metal moulding materials, etc. are to be procured locally. Materials which are not available locally and not adaptable for the work due to quality and stock quantity problems will be procured in Japan and transported by ship to Solomon Islands.

As for construction machines, large cranes more than 35T are required to be transported from outside the country.

Items to be procured from Japan are listed in Table 4.4.

Table 4.4 Materials and Equipment Procurement List

Item	Transportation Method
1. Materials and Equipment 1) Construction Machines Crawler Crane Vibro Hammer 2) Construction Materials Sealant Steel Sheet Pile Plastic Sleepers Hoisting Equipment Filter Cloth	Shipped from Japan Shipped from Japan

4.4.6 Implementation Schedule

The scope of work assigned to Japan and Solomon Islands is described in the following table 4.5.

Table 4.5 Scope of Work of the Project

Scope of Work	Japan	Solomon
1. To secure land.		O
2. To provide facilities for the Project site. (Electricity, Water)		O
3. To treat unexploded shells.		O
4. To conduct construction work. (Wharf, Boat Ramp and others)	O	
5. To ensure customs clearance		
(1) Transportation to Solomon Islands and Internal Transportation	O	
(2) Tax Exemption & Customs Clearance		O
6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the B/A.		O
7. To accord Japanese nationals in connection with the Project such facilities as may be necessary for their entry into Solomon Islands and stay therein for the performance of their work.		O
8. To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant.		O
9. To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.		O
10. To perform all the approval application procedures required for the construction work.		O
11. To exempt Japanese nationals from internal taxes including value added taxes which may be imposed in Solomon Islands with respect to the supply of the products and services under the verified contracts.		O

If the Project is executed under grant aid from the government of Japan, tender documents will be prepared after the Exchange of Notes is concluded between the two countries. The tender and contract pertaining to the construction work will then be conducted, and the construction work will subsequently be executed. The implementation schedule will follow the sequence below.

1) Detailed Design Work

The detailed design is conducted by the consultant based on this basic design study report, and tender documents are prepared to select vendors. The work period required is expected to be 2.7 months.

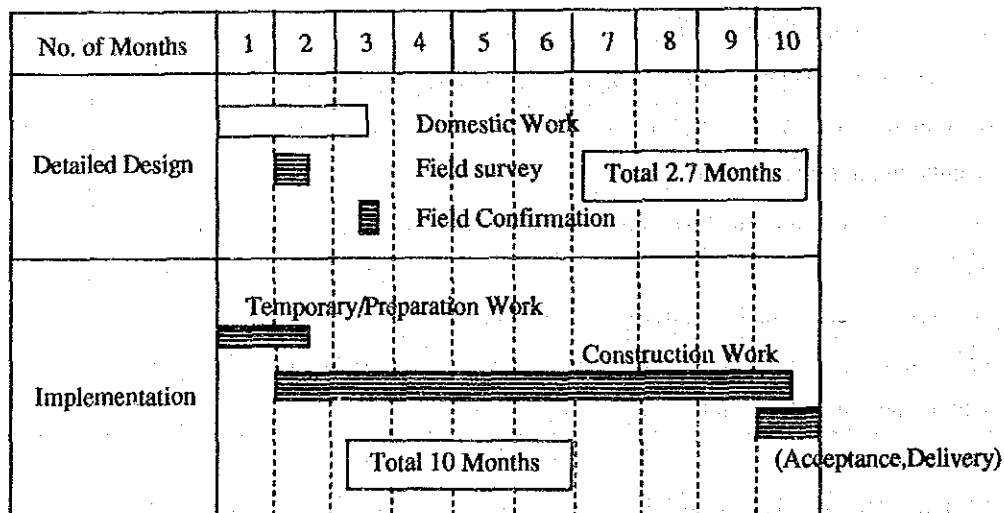
(2) Tender Work

After the completion of the detailed design, participants in the tender of the construction work and equipment procurement for the Project will be invited by public announcement, and their qualifications will be examined to select participants in the tender. Based on the result of the pre-qualification, the executing agency will invite the participants in the tender and conduct the tender in Japan in the presence of the relevant parties. The period required from the time of tender announcement to the contract is expected to be 1.3 months

(3) Construction Work

After the contract is signed, the work will start with the approval of the government of Japan. If the work assigned to the Government of Solomon Islands is conducted smoothly, the period required is expected to be 10 months.

Table 4.6 Implementation Schedule



4.4.7 Cost Allotted to Solomon Islands

(1) Cost Allotted to Solomon Islands

Cost allotted to Solomon Island is estimated to be approximately SI\$13,400 (approximately ¥458,800), and the breakdown is shown below.

Table 4.7 Cost Allotted to Solomon Islands

	Unit: SI\$
1) Treatment of explosives (already treated)	—
2) Transfer of existing sewage pipes	3,000
3) Power supply work	300
4) Water supply work	1,200
5) Others (Bank service fee)	8,900

It is necessary to conduct treatment of explosives, transfer work of existing sewage pipes, power and water supply work before the construction work starts.

(2) Cost Estimation Conditions

Cost estimation conditions are as follows.

- 1) Estimation Time October 1993
- 2) Exchange Rate 1 US\$ = ¥108.73
 1 US \$= SI\$3.1736
 1 SI\$ = ¥34.260
- 3) Construction Period 10 months
- 4) Others This Project is to be conducted in accordance with the grant aid system of the government of Japan.

4.4.8 Effects on Environment and Measures

Although a comprehensive Environment Act has not been adopted, effects on the surrounding environment by the facility work under the Project and necessary measures were studied and the results are summarized in the following Table 4.8.

Table 4.8 Environmental Effects and Measures

Factors	Possible Effects	Measures
[During Construction]		
1. Banking work for dredging equipment scaffold	Turbidity	It will be surrounded by sand bags to minimize sand flow.
2. Dredging work	Turbidity	Dredging work will be conducted inside the temporary steel sheet-pile placed in the offshore side to minimize excavated volume and protect excavated line.
3. Concrete placing work	Leakage of cement paste	(1) Concrete Block setting will be conducted to eliminate leakage of cement paste. (2) Concreting in-situ will be minimized.
[After Construction]		
4. Drain pipes	Turbidity	Screens will be installed at catch-basins and drain ditches to prevent vegetable and fruit scraps from flowing into the sea.
5. Drift sand	Accumulated sand	Installation of small groins will reduce the chance of accumulated sand.

CHAPTER 5
PROJECT EVALUATION AND CONCLUSION

CHAPTER 5 PROJECT EVALUATION AND CONCLUSION

5.1 Project Evaluation

The current problems in the improvement of the fish landing quaywall in Honiara, the measures to be taken and effects/improvements in the Project are summarized as follows.

List of Project Evaluation

Current Problems	Measures Taken in the Project	Effects and Improvements
<p>(1) Currently, fishery catch is discharged in several places of the shore, but they have to be transported on land by taxis to the Central Market. The shore in front of the market is inconvenient for fish landing and lacks safety due to presence of rubbles from the old revetment.</p>	<p>To construct a fish landing quaywall (wharf) and install Mooring Ring, Handlift, Apron, etc.</p>	<ul style="list-style-type: none"> - As fresh fish will be carried directly to the market located behind the quaywall after being landed, there will be no need for land transportation. - The wharf and its incidental facilities will make fish landing safe and easy.
<p>(2) Presently the use of small boats with outboard engines predominate. There is shortage of exclusive landing facilities subsequently landing is conducted on the beach. Thus, the condition of the landing facilities and equipment is far from providing stable transportation.</p>	<ul style="list-style-type: none"> - To renovate the wharf to provide supplies and rests, and construct boat ramp. 	<ul style="list-style-type: none"> - Improvement of facilities such as exclusive fish landing wharf, mooring, boat ramp, etc. will also enable boats with high safety and bigger capacity to be introduced in the future for fish transport.
<p>(3) The water front for marine transport routes of the Central Market as a distribution basis of fishery products is not functioning properly as a linkage point. This water front is not functioning as shore protection of the market site.</p>	<ul style="list-style-type: none"> - To construct fish landing quaywall (wharf). - To construct apron used also as access and sorting. - To construct groin. - To provide facilities for preventing scours and over-topping waves. - To install drainage facilities. 	<ul style="list-style-type: none"> - It is expected to improve distribution of fishery products and prevent waves washing over the market site, accumulation of drift sand on the shore and scours. - Sanitary standard of the market will be upgraded by establishing a basis for improving the drainage facilities in the market site.

Current Problems	Measures Taken in the Project	Effects and Improvements
(4) Fish from Florida Island has been provided by fishermen who are engaged in fishing, transportation and sales with low efficiency.	<ul style="list-style-type: none"> - To provide facilities for mooring and landing for fish transport vessels. - To renovate a part of the distribution of fish products in the large consumption town of Honiara which will facilitate the promotion of fishery. 	<ul style="list-style-type: none"> - Improvement of the distribution system of fishery products brought forth by enhanced efficiency of transportation will increase income of fishermen and thereby activate the entire economy.

5.2 Conclusion and Recommendation

The objective of the Project is construction of a fish landing quaywall as the first step of the improvement plan for the Fish Market in Honiara in order to increase cash income of fishermen and enhance self-sufficiency of fishery products by improving the distribution of fishery products of coastal artisanal fishery and small scale semi-commercial fishery.

Implementation of the Project will improve loading efficiency and safety by using a fish landing quaywall designed specially for small boats, enhance safety of sailing boats, and facilitate stable transportation. It will also renovate basic facilities required for protection of water front of the market site against over-topping waves, accumulation of drift sand, scours, and improve drainage and sanitation in the market. The enhanced functions as a sea and land transportation terminal and improved efficiency in transportation will facilitate supplies of fishery products. It is also expected to promote the local fishery in Florida Islands through efficient activities of fishermen. It is therefore considered appropriate to implement the Project by the grant aid.

We would like to recommend that the Government of Solomon Islands take the following measures in implementing the Project to ensure more efficient use of the facilities.

(1) Maintaining depth in front of the facilities

It is planned to construct a small groin to prevent drift sand in front of the facilities. We would like to suggest that the depth near the facilities and shore line be measured regularly once every two or three years. It may be necessary to allocate a budget to conduct dredging once every four or five years.

(2) Inspection and maintenance of the facilities and equipment

Facilities and equipment are designed to be durable, but it is recommended to conduct proper maintenance such as oiling, removal of rust, painting and other repair work as required as well as daily inspection especially for handlift and winch by an assigned person as these equipment are installed in places which are exposed to salty environment and sea splashes.

APPENDIX

Appendix 1 Member List of the Study Team

Members of the field survey team
for
Basic Design Study
on
The Project for the Honiara Fish Market Development
in
Solomon Islands

- (1) Takeru KATO (Leader) Chief Engineer, Fishing Port Construction
Division, Fishing Port Department,
Fisheries Agency
- (2) Mitsuhiro ISHIDA (Coordinator) Associate Specialist on Fisheries,
Fisheries Cooperation Division, Forestry and
Fisheries Development Cooperation Department,
Japan International Cooperation Agency(JICA)
- (3) Mikio TANAKA (Chief Consultant, Fisheries
Development Specialist/Port Engineer)
System Science Consultants Inc.
- (4) Shinji OKADA (Natural Conditions Surveyor)
System Science Consultants Inc.

Appendix 2 Field Survey Schedule

	DATE	PLACE	ACTIVITY	OFFICIAL	TANA KA	OKA DA
1	OCT. 12 (TUE.)	(NARITA) →		○	○	○
2	13 (WED.)	→ (CAIRNS) (CAIRNS) → (HONIARA)		○	○	○
3	14 (THU.)	HONIARA	AM : Courtesy Call to Embassy of Japan, MNR and MFA PM : Joint Meeting w/FD, HTC, SIPA etc. : Natural Condition Survey	○	○	○
4	15 (FRI.)	do.	AM : Site investigation w/HTC, SIPA PM : Construction Condition Survey : Natural Condition Survey	○	○	○
5	16 (SAT.)	do.	AM : Internal Meeting PM : Internal Meeting : Natural Condition Survey	○	○	○
6	17 (SUN.)	do.	: Data Arrangement : Design of Basic Plan	○	○	○
7	18 (MON.)	do.	AM : Joint Meeting w/FD, MAL PM : Meeting w/FD : Natural Condition Survey	○	○	○
8	19 (TUE.)	do.	: Joint Meeting w/FD, HTC, SIPA, MAL : Natural Condition Survey	○	○	○
9	20 (WED.)	do.	AM : Preparation of Draft Minutes : Courtesy Call to MFA PM : Meeting w/ FD (Draft Minutes) : Natural Condition Survey	○	○	○
10	21 (THU.)	do.	AM : Signing of Minutes of Discussions PM : Report to Embassy of Japan : Natural Condition Survey	○	○	○
11	22 (FRI.)	(HONIARA) → (BRISBANE) HONIARA	: Data collection (Marine Condition Data)	○	○	○
12	23 (SAT.)	(BRISBANE) → (NARITA) HONIARA	: Data Arrangement	○	○	○
13	24 (SUN.)	HONIARA	: Data Arrangement			○
14	25 (MON.)	do.	: Natural Condition Survey			○
15	26 (TUE.)	do.	: Natural Condition Survey			○
16	27 (WED.)	do.	: Natural Condition Survey			○
17	28 (THU.)	do.	: Natural Condition Survey			○
18	29 (FRI.)	do.	: Natural Condition Survey			○
19	30 (SAT.)	do.	: Data Arrangement			○
20	31 (SUN.)	do.	: Data Arrangement			○
21	NOV. 1 (MON.)	do.	AM : Construction Condition Survey PM : Report to Embassy of Japan			○
22	2 (TUE.)	(HONIARA) → (BRISBANE)				○
23	3 (WED.)	(BRISBANE) → (NARITA)				○

MNR : Ministry of Natural Resources
 FD : Fisheries Division
 SIPA: Solomon Islands Port Authority

MFA : Ministry of Foreign Affairs
 HTC : Honiara Town Council
 MAL : Ministry of Agriculture & Lands

Appendix 3 Member List of Concerned Parties

- (1) Ministry of Natural Resources
 - Ms. Ruby Titiulu : Under Secretary
- (2) Fisheries Division
 - Mr. Albert Wata : Director of Fisheries
 - Mr. Kitchener Collinson : Senior Fisheries Officer
- (3) Ministry of Agriculture and Land
 - Mr. Jerry Tanito : Deputy Commissioner of Lands
 - Mr. Steve Likaveka : Chief Physical Planner
- (4) Ministry of Home Affairs
 - Mr. Daniel V. Buto : Chief Physical Planner
- (5) Honiara Town Council
 - Mr. Joseph Hasiau : Town Clerk
 - Mr. Solomon Mua : Project Planner
 - Mr. Buddley Ronnie : Assistant Physical Planner
 - Mr. Bill Johnson : Engineer
- (6) Solomon Islands Port Authority
 - Mr. Ngenomea Buaeda Kabui : General Manager
 - Mr. Nicholas J. Constatine : Secretary
 - Mr. Mark Waite : Chief Civil Enginner
 - Mr. William Barile : Port Enginner
- (7) Ministry of Foreign Affairs
 - Mr. Fred Fakarii : Chief Desk Officer (Asia)
- (8) Ministry of Transport, Works & Utilities
 - Mr. Aliko T. Ha'apio : Principal Architect
- (9) Solomon Islands Meteorological Service
 - Mr. Festus Ahikau : Senior Meteorological Officer
- (10) Others
 - Mr. Jock Stevenson : Architect
 - Mr. Fred Barton : Quantity Surveyer
- (11) Embassy of Japan
 - Mr. Noboru Kawagishi : Chargé d'affaires
 - Mr. Nobuyoshi Watanabe : First Secretary
 - Mr. Isami Takada :
- (12) Japan Overseas Cooperation Volunteer (JOCV)
 - Mr. Yasuo Kasai : Coodinator
 - Mr. Tokurou Watanabe : Coodinator

Appendix 4 Minutes of Discussions

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT FOR THE HONIARA FISH MARKET DEVELOPMENT
IN SOLOMON ISLANDS

In response to the request from the Government of Solomon Islands, the Government of Japan decided to conduct a basic design study on the Project for the Honiara Fish Market Development (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Solomon Islands a study team, which is headed by Mr. Takeru Kato, Chief Engineer, Fishing Port Construction Division, Fishing Port Department, Fisheries Agency, and is scheduled to stay in the country from 13 October to 2 November, 1993.

The team held discussions with the officials concerned of the Government of Solomon Islands and conducted a field survey in the study area.

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed with further works and prepare the basic design study report.

Honiara, 21 October, 1993

加藤 武留

Mr. Takeru Kato
Leader
Basic Design Study Team
Japan International
Cooperation Agency

Ms. Ruby Titiulu

Ms. Ruby Titiulu
Under Secretary
for : Permanent Secretary
Ministry of Natural Resources

ATTACHMENT

1. Objectives

The objective of the Project is to improve shore front of the Honiara Central Market (HCM) providing necessary facilities for fish landing.

2. Project site

The project site is in Honiara Central Market as shown in Annex I.

3. Executing agency

Fisheries Division, Ministry of Natural Resources

4. Items requested by the Government of Solomon Islands

After discussions with the basic design study team, the items listed in ANNEX-II were finally requested by Solomon Islands side.

However, the final components of the Project will be decided after further studies.

5. Japan's Grant Aid system

(1) The Government of Solomon Islands has understood the system of Japanese Grant Aid explained by the team.

(2) The Government of Solomon Islands will take necessary measures, described in ANNEX III for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the study

(1) The consultants will proceed to carry out further studies in Solomon Islands until 2 November, 1993.

(2) JICA will complete the final report and send it to the Government of Solomon Islands by March in 1994, bypassing the need for the explanation of draft final report as required under the procedures.

Kato

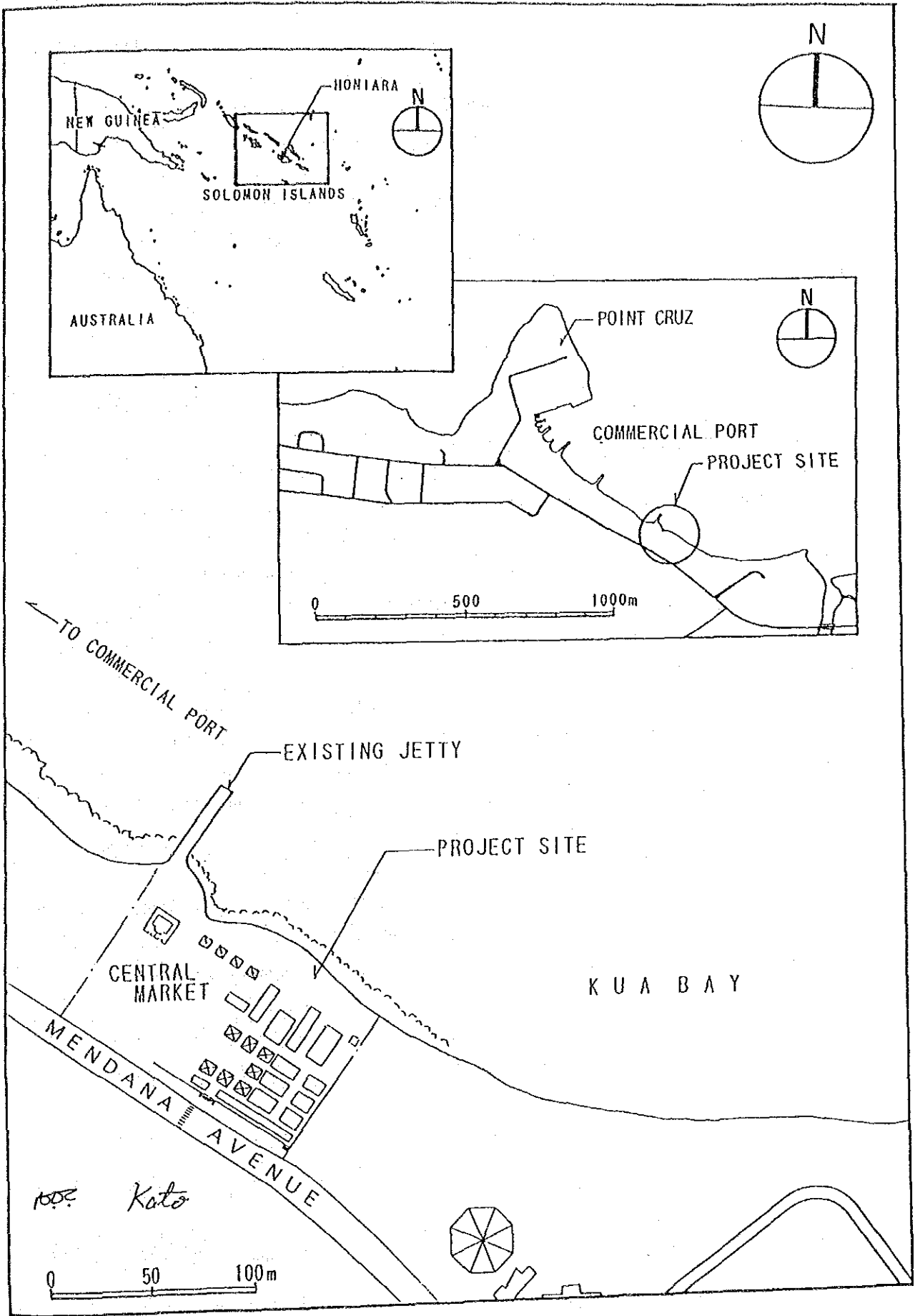
7. Particular note

- (1) The Government of Solomon Islands will secure temporary yard for construction work within the site.
- (2) The Government of Solomon Islands shall carry out a metal detection survey at the project site with charges paid by JICA. The Government of Solomon Islands shall be responsible for the removal and disposal of any ordnance found during the metal detection survey at the expense of the Government of Solomon Islands.
- (3) The Government of Solomon Islands will close off the project site during the construction period as shown in ANNEX IV.

1552

Kato

ANNEX I



LOCATION OF PROJECT SITE

ANNEX II

1. Fresh Fish Landing Apron (Quaywall)
2. Revetment
3. Boat Ramp

~~see~~ Kato

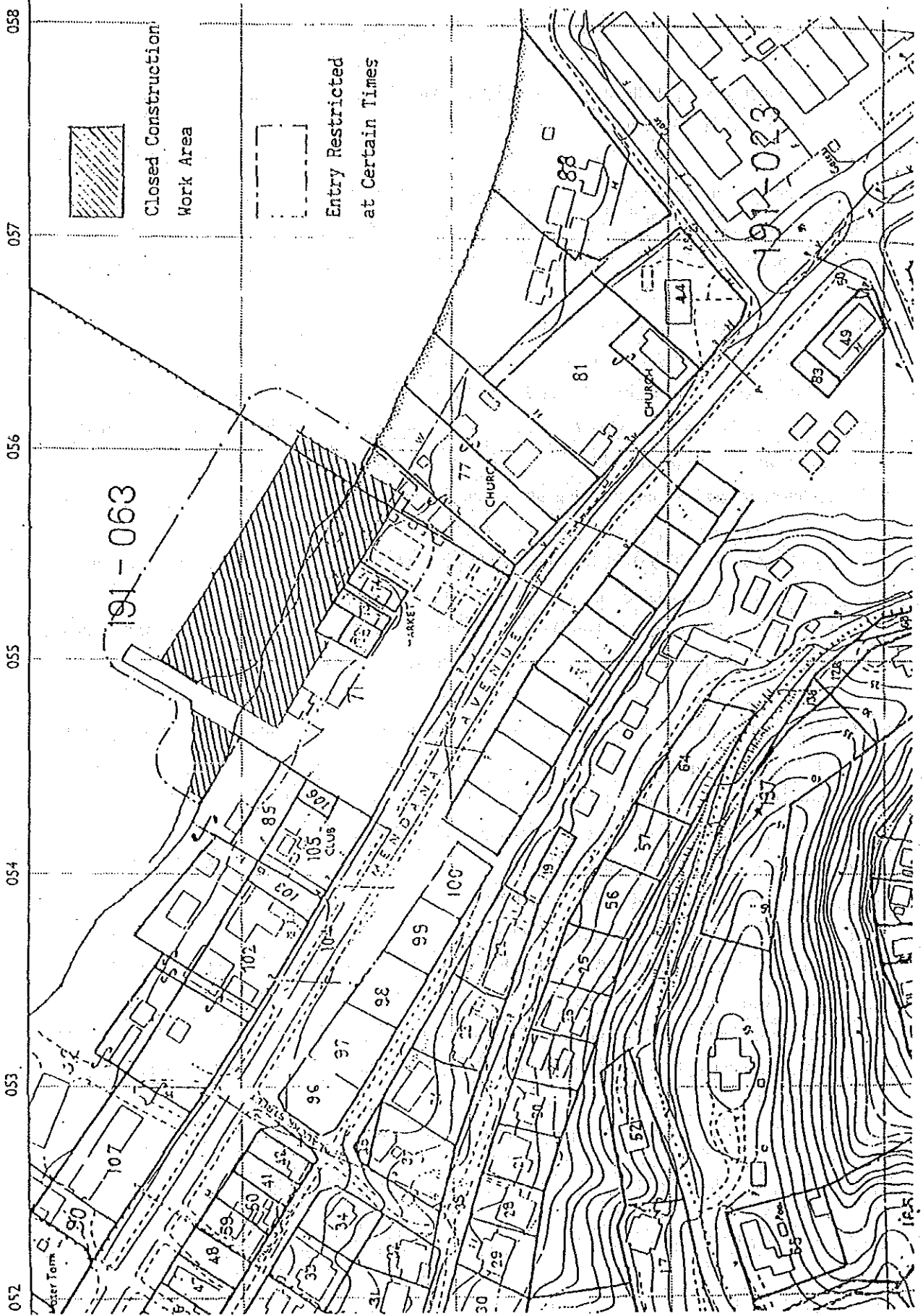
ANNEX III

Necessary measures to be taken by the Government of Solomon Islands in case Japan's Grant Aid is executed.

1. To secure the ownership and/or right of sites for the Project.
2. To clear the site prior to commencement of the Project.
3. To secure yard for stocking material and constructing temporary facilities at the Project site.
4. To ensure the access to the Project site.
5. To provide necessary permissions, licenses and other authorizations for smooth implementation of the Project.
6. To provide facilities for distribution of electricity, water supply, drainage, telephone line and other incidental facilities.
7. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
8. To ensure prompt unloading and customs clearance of project equipments and materials at ports of disembarkation in Solomon Islands.
9. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Solomon Islands with respect to the supply of the products and services under the Verified Contracts.
10. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into Solomon Islands and stay therein for the performance of their work.
11. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.
12. To bear all expenses other than those to be borne by the Grant, necessary for construction of facilities as well as for transportation and installation of equipment.
13. To coordinate and solve any matters which may arise with third parties and inhabitants living in the Project area during implementation of the Project.

RSR Kato

Annex IV



per Kato

Appendix 5 List of Data

Name of Data	Publisher	Date
(1) Solomon Islands Government Organization Structure	Fishery Division	'93 10
(2) Fisheries Division / MNR	Fishery Division	'93 10
(3) Honiara Minicipal Authority Organization Structure	Honiara Minicipal Authority	'93 10
(4) Solomon Islands Port Authority (SIPA) Annual Report 1992	SIPA	'92
(5) Honiara Town Council Programme of Action Four Year Development Plan 1990-1993	Honiara Town Council	'89 12
(6) Acquisition Flow Chart	Ministry of Agriculture	'93 10
(7) Honiara Town Council Approved Recurrent/Capital Estimated 1989, 1988, 1985	Honiara Town Council	'85, '88 '89
(8) New Zealand Standard No. 4203 (Earthquake)	Standard Association of Australia	'84
(9) Wharf Design Report under the Earthquake Level	Murray-North	'90
(10) National Building Code	Ministry of Transport,	'93 10
(11) The Regional Distribution of Earthquake	Ministry of Natural Resources	'81
(12) The General Earthquake 1984	Ministry of Natural	'84
(13) Report Summarising known Occurrence of Earthquake	Ministry of Natural Resources	'93
(14) Wind Frequency Honiara, 1950 ~ 1974	Solomon Islands Meteorological Service	'93
(15) Tropical Cyclones that Affect Solomon Islands, 1966-1993	Solomon Islands Meteorological Service	'93
(16) Tidal Harmonic Constants, Honiara	Department of Marine	'93
(17) Weather Charts 1971 ~ 1993	Bureau of Meteorology Melbourne	