in our judgment the most suitable location for the Center.

The Center at Christmas Island is primarily intended to be a base for shipping fish out of the Island rather than as a facility for intra-island distribution. Also, at the present time, the main target species will be lobster and milkfish, neither of which requires the use of deep-sea fishing vessels. For this reason, the catch to be supplied to the Center can be brought in by land. Thus, the most desirable location for the facility will be one convenient for shipping product.

Christmas Island presently relies almost entirely on the once-a-week Tarawa-Honolulu air service for shipping its produce. In the case of fishery products, no use can be contemplated of the inter-island sea cargo service, with a frequency of only 2-3 calls a year, or the tramp steamers to Honolulu, operating only about twice a year.

Considering the above factors, we feel that the most desirable location for the Center would be that adjoining the freezer that has been built for brine shrimp use, located between Banana Village and the airport.

SECTION THREE

THE BASIC DESIGN

3.1 The Skipjack Fishery Training Vessel

This vessel is to be a pole and line skipjack fishery training vessel of a deck house type. Its operating area, we anticipate, will be mainly between the Equator and 5° N/S within the Kiribati exclusive fishery zone. This is a calm area posing at no danger of typhoons. The vessel will be registered by J.G. Its main purpose will be to give training in skipjack pole and line fishery techniques. To maximize the effectiveness of this training, the crew will total 24 members, so as to provide a capacity for regularly accommodating about 20 trainees.

The horsepower of the main engine should be kept as low as possible, in view of the probable continued escalation in fuel prices and the attendant need to hold down fuel consumption. In the case of Japanese skipjack vessels, there is continual competition in the fleet to out-run other vessels to fishing grounds, which of course inevitably leads to the fitting of high horsepower engines. But in the case of the subject vessel, from the standpoint of operating economy, the horsepower has been set at 600 or less, even at some sacrifice of speed.

Needless to say, since even the slightest increase in load is significant, the hold capacity should be as large as possible. Also, the physique of the I-Kiribati should be taken into account in establishing bunk length and ceiling height in the bridge and mess room. And, since the vessel will be operating in high-temperature tropical waters, in order to enhance conditions for on-vessel bait cultivation, specific design efforts should be paid to a heavy-duty circulating pump and the placement of draining holes mobilizing fully existing knowledge in this field.

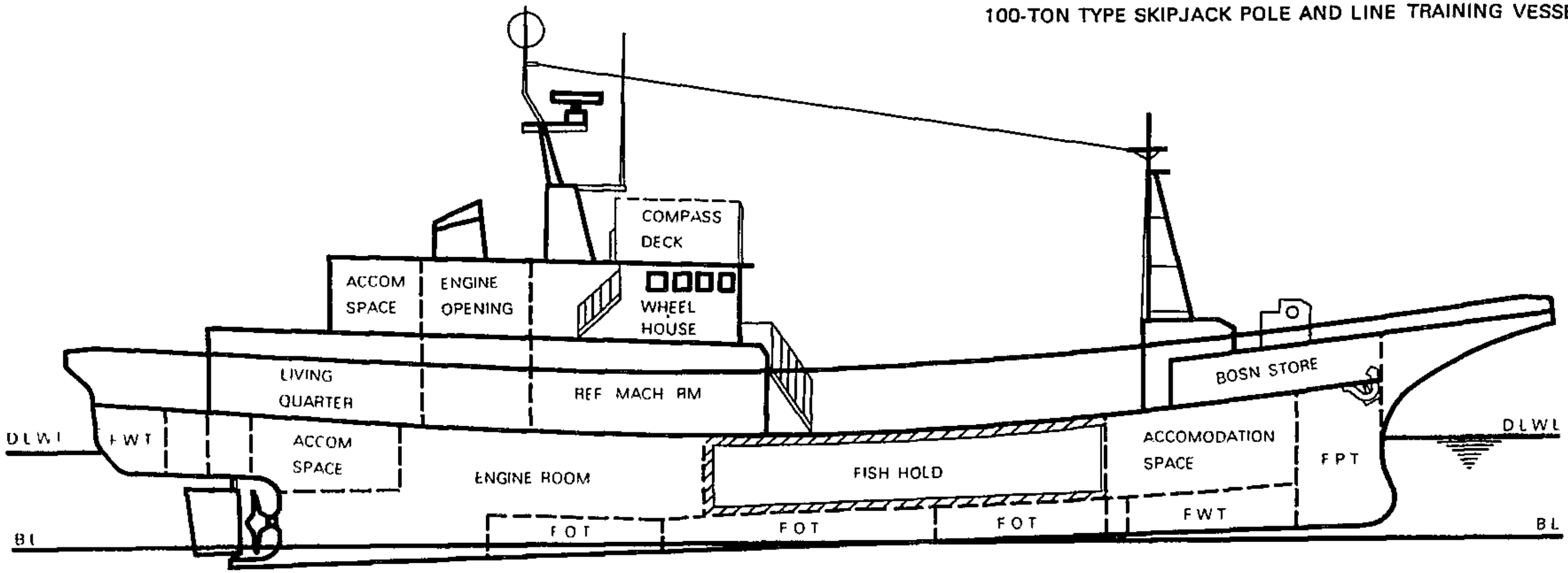
The other specifications can be essentially the same as for the Neimanganibuka and are shown below. All of these values are approximate and subject to change in the detailed design.

Skipjack Fishery Training Vessel Specifications

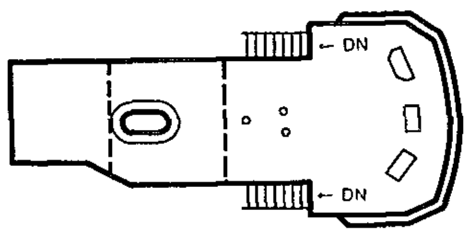
1. Vessel Type	Pole and Line Skipjack Fishery Training Vessel (Deck House Type)
2. Classification	J.G.
3. Basic Specifications:	
Length overall	35.00 m (approximately)
Length between perpendiculars	27.00 m "
Moulded breadth	5.70 m "
Depth	2.60 m "
Designed draft when fully loaded	2.35 m "
Gross tonnage	100 tons "
Fish hold capacity (bale)	28.00 m^3 "
Live bait hold capacity (bale)	27.00 m^3 "
Fuel tank	38.00 m^3 "
Lubricating oil tank	3.00 m^3 "
Fresh water tank	15.00 m^3 "
Main engine	4-cycle, diesel, 600 PS
Propeller	Solid-construction, 4 blades
Service speed	9.5 knots (approx.)
4. Complement	24 persons
5. Power Supply	100 KVA, AC225V, 3Ø, 60 HZ
6. Instruments for Navigation, Fishing, and Communication Use:	
Magnetic Compass	2 (units)
Electro-magnetic log	1 "
Radar	1 "
Fish-finder	1 "
N.N.S.S.	1 "
SSB transmitter-receiver	1 "

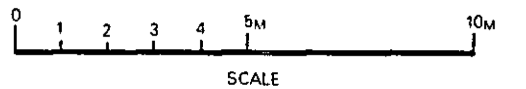
The concept design for the general arrangement of the training vessel is shown on the following pages.

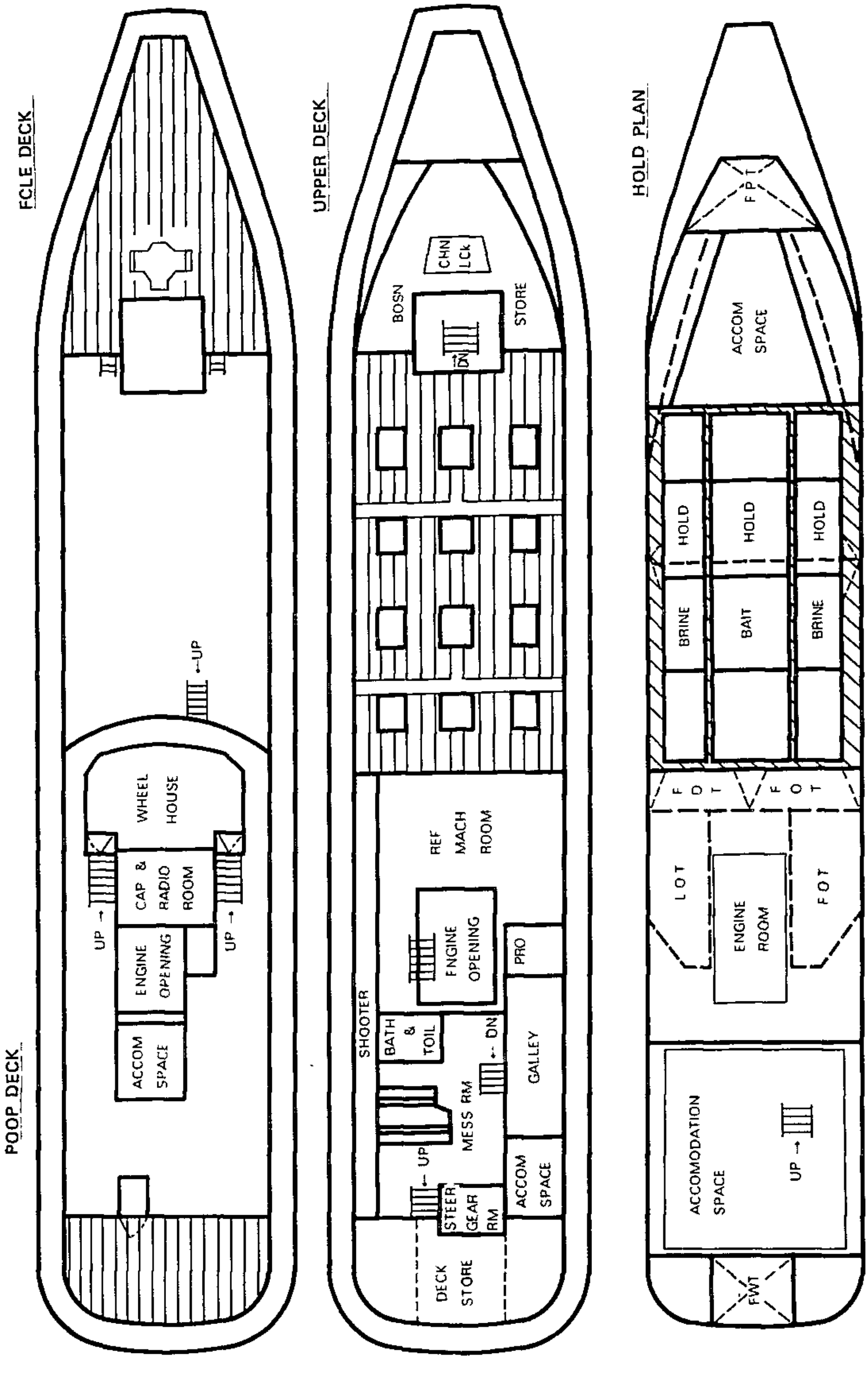
ROUGH GENERAL ARRANGEMENT FOR
100-TON TYPE SKIPJACK POLE AND LINE TRAINING VESSEL



COMP DECK





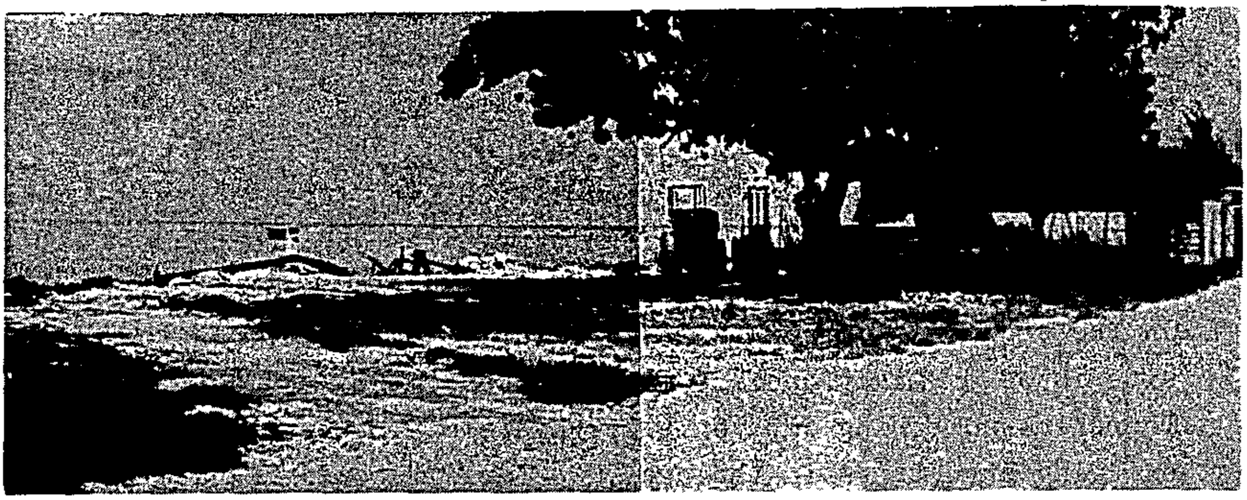

FCLE DECK
POOP DECK
WHEEL HOUSE
CAP & RADIO ROOM
UP
ENGINE OPENING
ACCOM SPACE
UPPER DECK
CHN LCK
BOSN
STORE
DN
REF MACH ROOM
ENGINE OPENING
PRO
SHOOTER
BATH & TOIL
GALLEY
MESS RM
ACCOM SPACE
STEER GEAR RM
DECK STORE
HOLD PLAN
F P T
ACCOM SPACE
HOLD
BRINE
BAIT
F D T
F O T
L O T
ENGINE ROOM
ACCOMODATION SPACE
FWT

3.2 Fish Marketing Center Facilities

1) Site Conditions

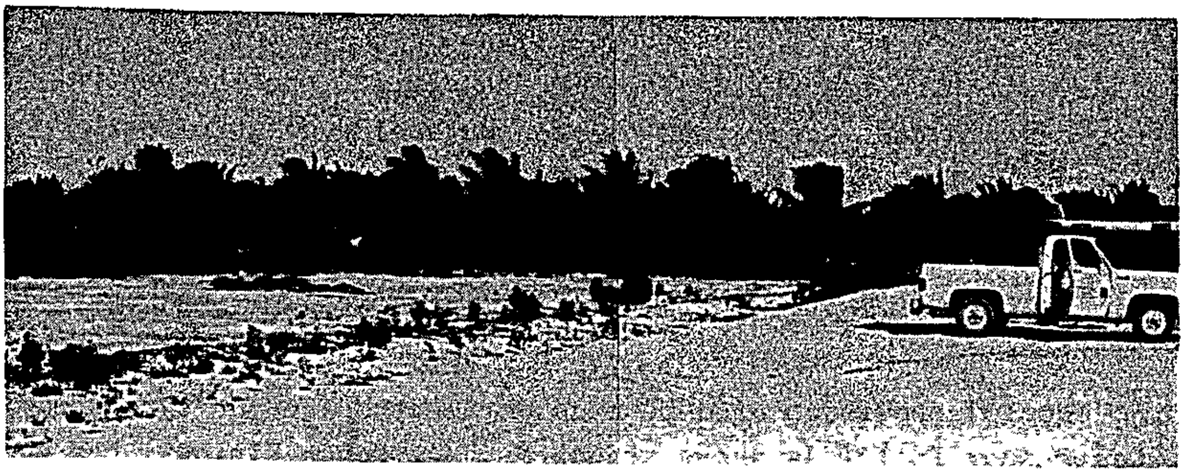
The Center at South Tawara is to be located at Betio. The site will be located about 100 meters direct line distance from the Betio wharf and comprises some 500 square meters of public-owned land in an area adjacent to the existing 50-ton freezer. The west portion of the site faces on the sea; to the east, there is a road of 4.5 m width; to the north, an existing freezer; to the south, a memorial park. On the seaward side, there is a masonry embankment, but the site is on a slight decline in the direction of the sea. There are no boring data on site physiology, but, judging by existing structures in the area, we feel it would be safe to estimate soil-bearing strength at not less than 5 tons per sq. mtr.

The front road runs in a north-south direction; to the south, it leads to the city; to the north, it leads to a boat yard, slipway, and pub, then dead ends. Consequently, we see no danger in the Center's functions being impaired by a future growth of traffic on this road. Nevertheless, to facilitate the receiving and dispatching of fish, we should consider providing a direct vehicular approach to the Center.



Proposed construction site for
South Tarawa Fish Marketing Center

The Center at Christmas Island is in the vicinity of the end of the airport runway, using the site of a former hangar. Christmas Island, from the late 1950's to the early 1960's, was used jointly by the U.S. and U.K. as a nuclear testing area; as a result, the island's roads are in good condition, and approaches present no problems. The land base is firm, with an anticipated soil-bearing strength of 10 tons per square meter. There is a freezer facility housed in a former hangar just adjoining the site, and a new federal office is being built in the vicinity for the Line and Phoenix Groups Ministry. Site size is ample. The land is publicly owned.



Proposed construction site for Christmas Is. Fish Marketing Center (On the existing concrete slab shown on the left)

2) Arrangement Plan

The functions of the Betio Center are to be divided generally into: processing and storage of catch and retail sales. Thus, the retail facility should be located on the south side of the property close to the city, while the processing and warehousing functions should be concentrated in the northern portion. Since the contours of the site are restricive, the fence between the site and the existing freezer should be removed to allow the placement of generating plant and elevated water tank, both of which must be supplied from outside the compound.

Since both the generator and freezer will be dissipating heat, overhead ventilation should be in a north-westerly direction so as to utilize the year-round breezes. On the seaward side, there will be a workshop for repair and maintenance, a warehouse, and an administration office.

The Center at Christmas Island, though small in size, should be designed for the functions of collecting, processing, and shipping out the catch. Receipts and dispatches will be effected via the front paved road. The site is ample in size so that facilities may be freely positioned. We propose that these be located in a north-south direction along the road. Office and superintendent quarters should be on the windward side, with the processing area in the center, and the generator and elevated water tank on the south side. As in South Tarawa, full consideration will be given to natural ventilation and hygienic aspects.

3) Structural Plans

No special provision need be made for earthquakes or typhoons. Design can follow Japanese standards. Although Kiribati has district zoning ordinances, there are no basic regulations regarding construction structure itself. Very few materials can be procured locally other than sand. The structure will be steel-frame, prefabricated and assembled locally from fully fabricated components.

4) Water Supply and Sewerage

Water Supply:

Drinking water will be provided by means of an elevated water tank which will collect rain-water from the Center's roof. This will supply water for ice-making equipment and the freezer as well as drinking water to required locations in the offices and plant.

Other water requirements will be met from an elevated well-water tank from which water will be supplied as needed to processing locations and lavatories. Water lorries will deliver water to this elevated tank. In view of the high salinity of the well-water, pipes will be vinyl-chloride.

Sewerage:

The dirty water from the lavatories will be collected in a septic tank built to WHO specifications. Other water will seep in a seepage pit.

5) Ice Making Plant

In order to keep fish fresh through all distribution stages, ice is absolutely indispensable, particularly during the period between catch and landing. The ice-making equipment design is a function of the shape of ice required. These shapes generally fall into three categories:

1)	Block Ice	40 kg/ ; 50 kg/ ; 360 kg/slab
2)	Plate Ice	Width: 6mm-18mm; 2-10 cm^2/piece
3)	Flake Ice	In snow-flake shapes

From the standpoint of avoiding injury to the fish while icing, the flake shape is ideal; for maximizing ice life, the block shape is preferable. The block shape is best suited to large production runs; the flake shape to small volume runs. After considering the size and volume of fish involved in the projected operations, we have decided on the plate-type ice-maker.

The ice storage bin will be of a capacity to permit storage of approximately 1.5 times the ice-making capacity. This calculation was based on projected demand at times of peak catch loads. We plan to install a freezer in the ice-storage bin, in which temperatures will be continuously maintained at between 0-5°C, so that ice-supply needs can continually be met. Construction will be section steel. The ice-making equipment will be placed above the storage bin. Ice-making, ice-crushing, and ice-storage operations will all be automatic.

South Tarawa ice-making capacity:

Required ice-making capacity:		2 tons/day (at maximum catch)
		x 0.9 (ice requirements per ton of fish, including anticipated loss during 1 round-trip)
	=	1.8 tons
	Market sale requirements	1.0
	Other needs	0.2
	Total	3.0 tons/day

A 5-ton ice bin will be provided to meet any demands above these levels. Since the well-water has a very high salinity of about 1%, the freezing section will be of brine ice specifications.

Christmas Islands ice-making capacity:

Required ice-making capacity:		3 tons/week (at maximum catch)
		5 days x 0.9 (ice needed per ton of fish) =
		0.6 ton
	Air transport/ misc. uses	0.4
	Total	1.0 ton

The ice-storage bin will be a large 5 m^3. The freezer section will be to brine-ice specifications.

6) Quick-Freezing Facilities

In order to preserve freshness and taste, catches must be frozen as promptly and speedily as possible. Fish should be divided into two groups: 1) fish landed ice-chilled and destined immediately for the fresh market; and 2) fish to be sold at a later time; this would be quick-frozen to a body temperature of -25°C and stored in the freezer until shipment.

At South Tarawa:

We have assumed a quick-freezing requirement of 1 ton/day -- or 50% of the 2 ton/day maximum catch. (The remaining 50% would be sold on the fresh market.)

The facility should have racks able to accommodate skipjack of any size up to 160 mm dorsal diameter.

Freezer temperatures should be maintained at $-35^{\circ}C$, using a forced circulation pressurized fan activated by a high-powered cooling unit. The unit should be capable of freezing the fish within 8-12 hours.

At Christmas Island:

Since no significant local demand can be anticipated, the bulk of the catch will be exported in frozen form. Fish species will be lobsters and milkfish.

Lobsters will mostly be shipped live. A once-a-week air service linking Tarawa, Christmas Island, and Honolulu is expected to be inaugurated from 1980 but, in view of the limited number of flights, daily shipments of lobsters will obviously be impossible. Thus, in anticipation of future requirements, we have set processing capacity at 3 tons per week:

3 tons/week ÷ 5 days ÷ 3 freezing cycles/day = 200 kg/8 hour period

The main items to be frozen will be lobster and various sizes of milkfish. We have, accordingly, specified plate freezers with easily adjustable racks geared to small quantities.

7) Freezer and Refrigerator

A freezer will be required to maintain the quick-frozen fish in frozen form. This freezer can also provide standby capacity in case of a breakdown of the existing 50-ton freezer or in the event that this freezer reaches capacity.

The freezing equipment has been selected to provide a temperature inside the freezer of -25° C. Construction is to be prefabricated panels, with insulation sandwiched in. For ease of freezer operation, shelfs will be provided along with slatted drainboards on the floor.

If the fish that are landed cannot all be simultaneously quick-frozen, iced fish will be temporarily stored in the refrigerator along with fish destined for sale in the fresh market. Thus, the refrigerator will have a wide range of applications. Its interior temperature will be specified at -5°C. Paneling will be the same as that in the freezer.

At South Tarawa:

(1) Freezer

Capacity---

1 ton/day (quick freezing capability)

$\times$ 10 days = 10 tons

10 tons $\div$ 0.4 m^3/ton = 25 m^3

Heat-resistance entrance door equipped with an air-curtain fan.

Water-tight lighting inside freezer

semi-sealed condensing unit, air-cooled type, on wall

Inside temperature: -25°C

Construction: prefabricated, with insulating panels

(2) Refrigerator

Interior capacity---

2 tons (at maximum catch volume) x 2 days =	4 ton
Other	1 "
	5 "

5 ton ÷ 0.4 m^3 = 12.5 m^3

Heat-resistant entrance door

Water-tight lighting inside

Semi-sealed air-cooled condensing unit on wall

Inside temperature: -5°C

Construction: pre-fabricated with insulating panels

At Christmas Island:

Freezer

Capacity---

200 kg/8 $\frac{\text{hour}}{\text{period}}$ x 2 $\frac{\text{freezing}}{\text{cycles}}$/day x 10 days = 4 tons

4 tons ÷ 0.4 m^3/ton = 10 m^3

Heat-resistant entrance door

Air-curtain fan above the heat-resistant door

Water-tight lighting inside

Air-cooled, semi-sealed condensing unit on wall

Freezer temperature: -25°C

Construction: Prefabricated with insulating panels

8) Generating Plant

A regular generator will provide electricity for power and lighting at both the South Tarawa and Christmas Island Centers. Since the generator motor is to be operated at a high 1500-1800 RPM, specified inspections must be made at 2000 hour intervals. The generator will be directly coupled to the engine flywheel via a shock-absorbing coupling plate. The generator body will be installed on a common stand with all necessary auxiliary units, such as control devices, radiator, and battery.

At South Tarawa:

Load Calculation:

	Rated at:	Power Input:
1. Freezer	8.28 KW	11.89 KVA
2. Refrigerator	2.65	3.63
3. Ice-making plant	21.4	30.2
4. Quick-freezer	22.86	33.11
5. Lighting and outlets	--	3
	Total Input	81.83 KVA

Based on quick-freezer start-up requirements, superimposed on the other four loads (1,2,3,5), the maximum power load will be:

(11.89 KVA + 3.63 KVA + 30.2 KVA + 3 KVA) + 50.5 KVA = 99.22/KVA
of which 50.5 KVA represents initial load.

On this basis, the generator should have a 100 KVA capacity.

At Christmas Island:

Load Calculation:

	Rated at:	Power Input:
1. Freezer	5.6 KW	7.97 KVA
2. Ice plant	8.22	11.82
3. Quick freezer	9.05	13.3
4. Lighting and outlets	--	2
	Total Input	35.09 KVA

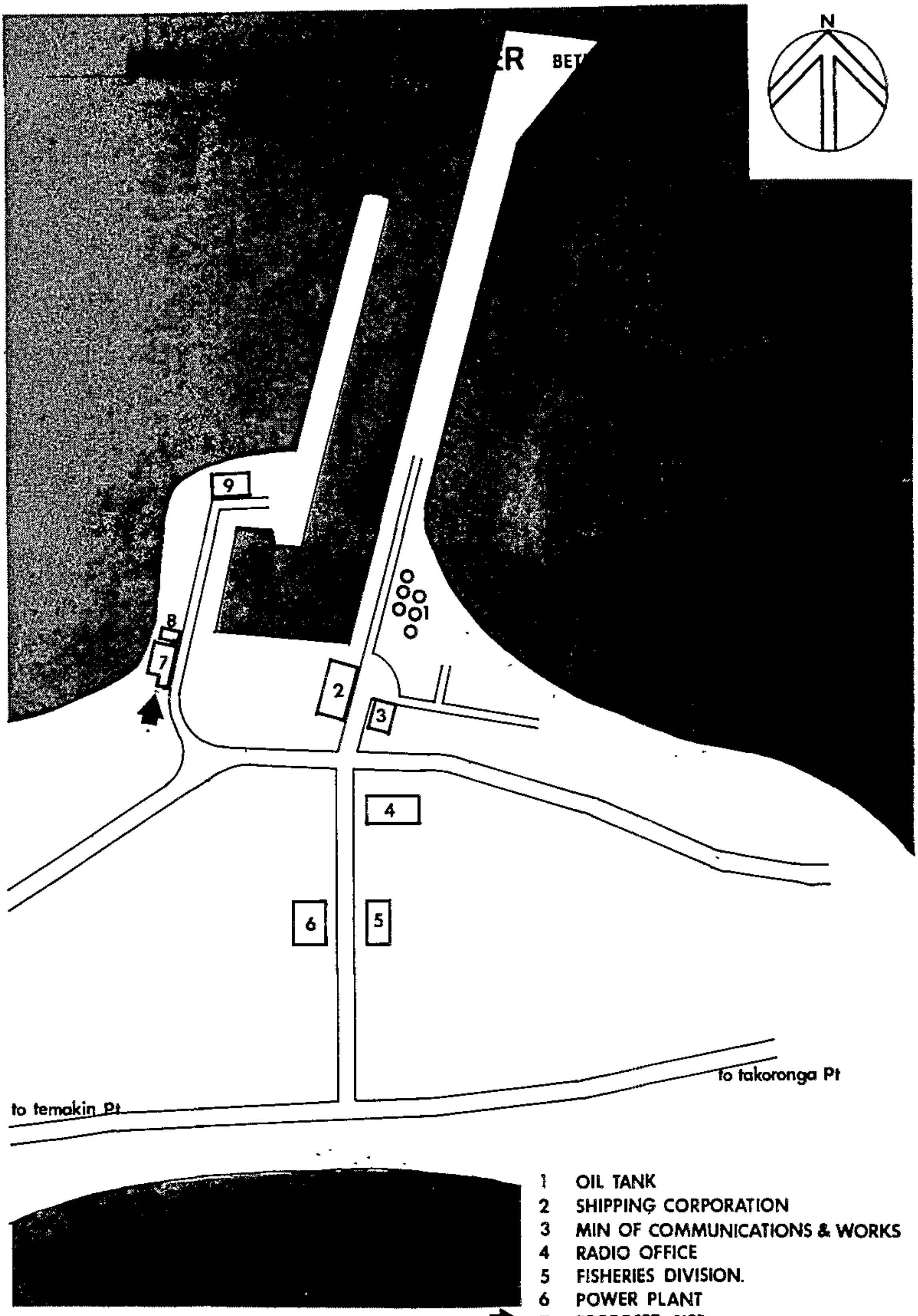
Based on quick freezer start-up requirements superimposed on the other three loads (1,2,4), the maximum load would be:

(7.97 KVA + 11.82 KVA + 2 KVA) + 32.4 KVA = 54.19 KVA
where 32.4 KVA represents initial load.

On this basis, the generator should have a 55 KVA capacity.

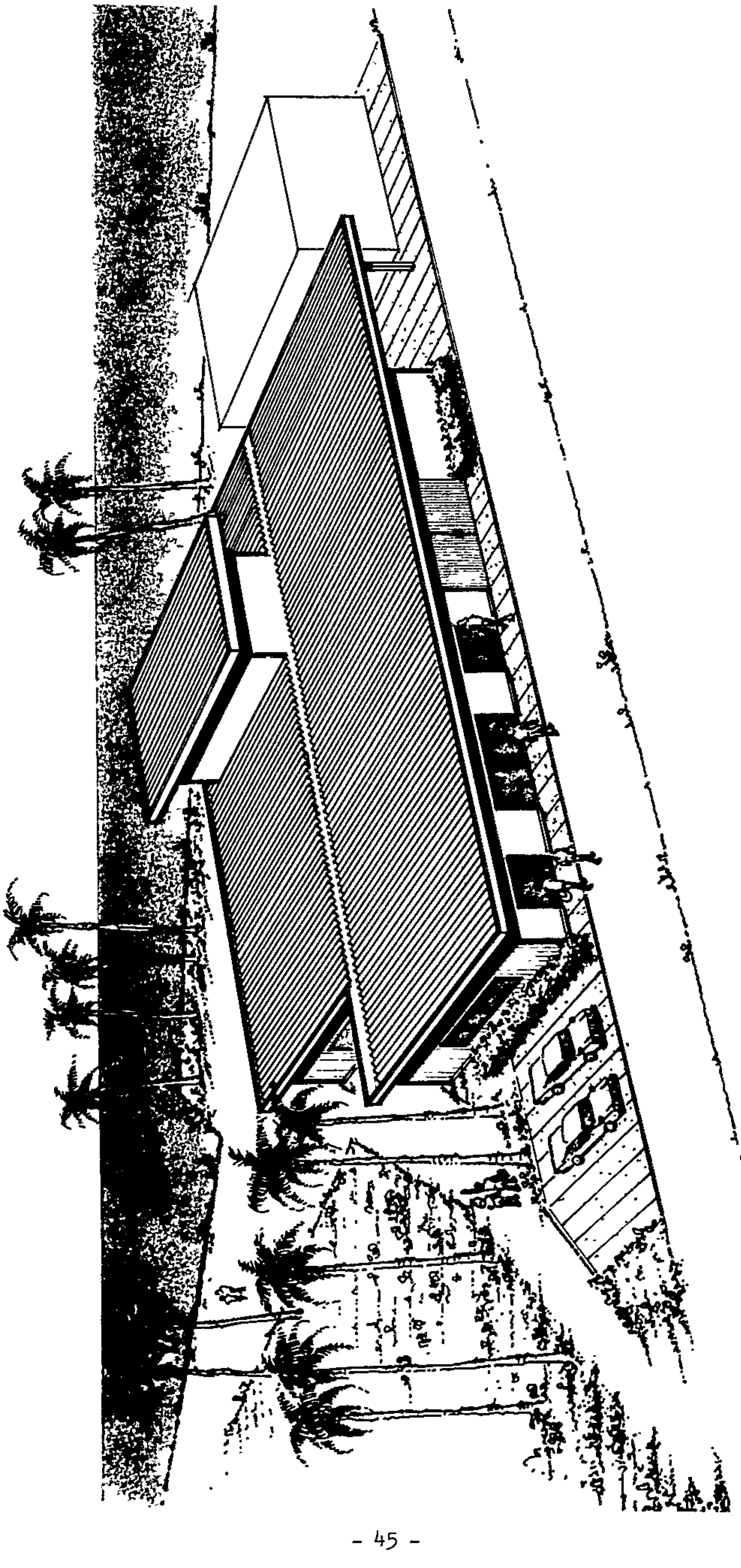
Power supply specifications are as follows:

At South Tarawa:	50 HZ	3Ø	200 V
		1Ø	240 V
At Christmas Island:	60 HZ	3Ø	200 V
		1Ø	110 V

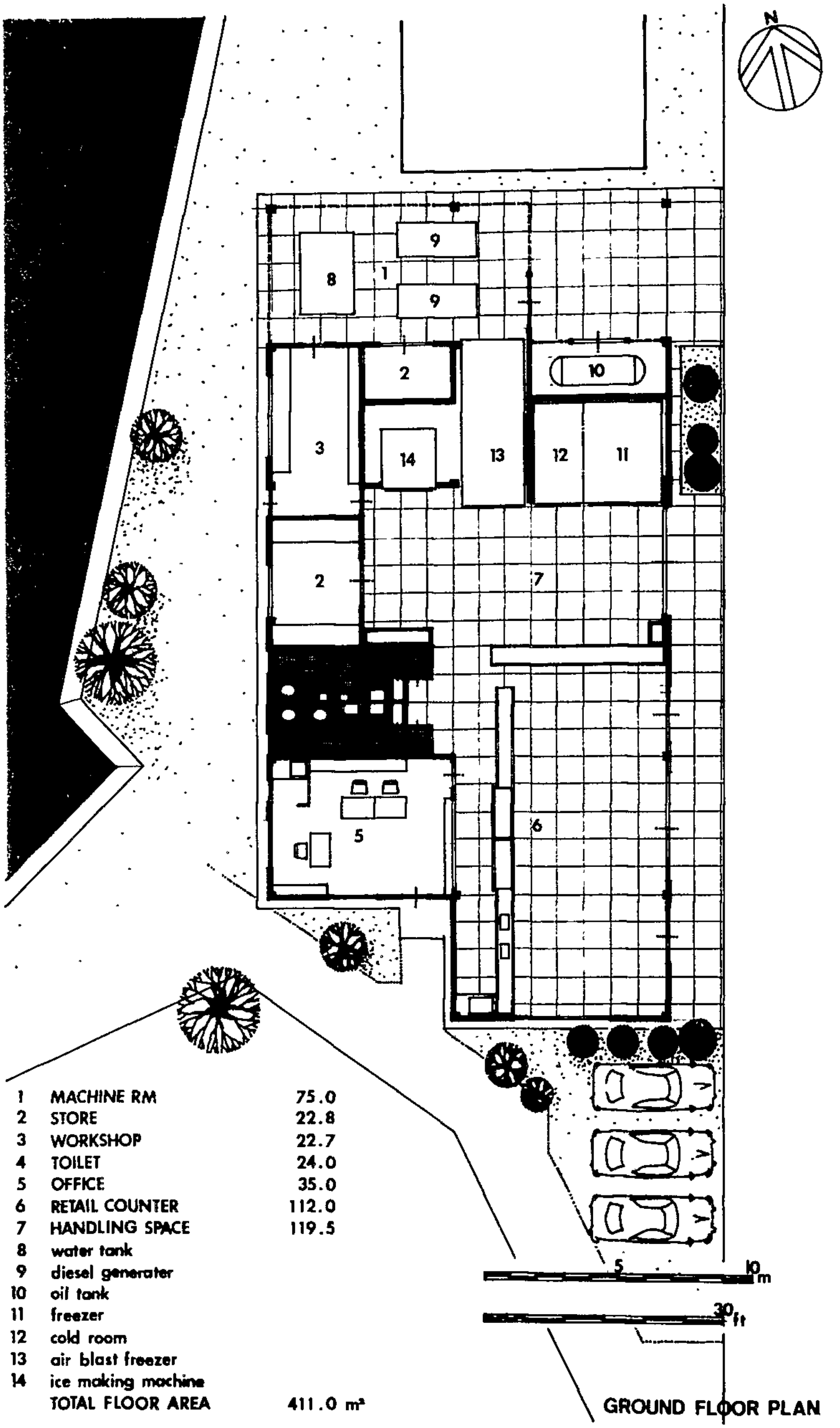


1 OIL TANK
2 SHIPPING CORPORATION
3 MIN OF COMMUNICATIONS & WORKS
4 RADIO OFFICE
5 FISHERIES DIVISION.
6 POWER PLANT
7 PROPOSED SITE
8 EXISTING FREEZER
9 PUBLIC UTILITY BOARD

LOCATION MAP no scale

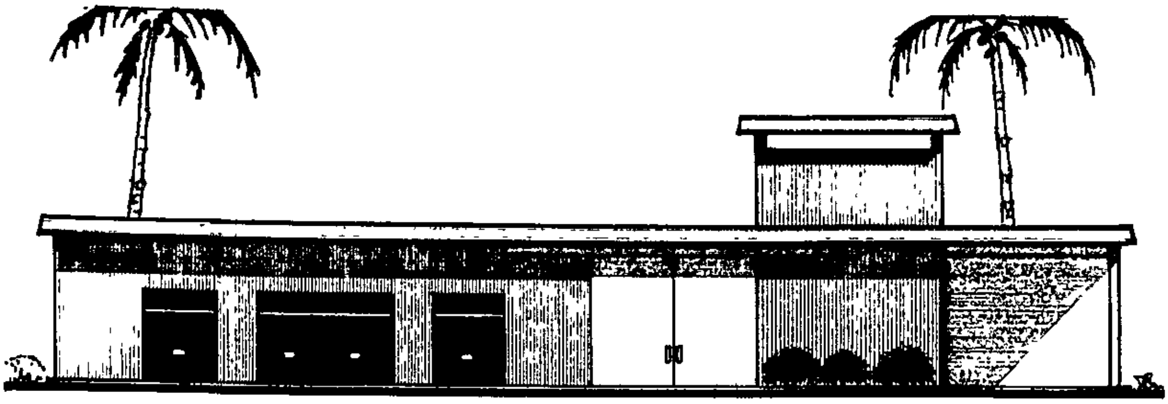


PERSPECTIVE no scale

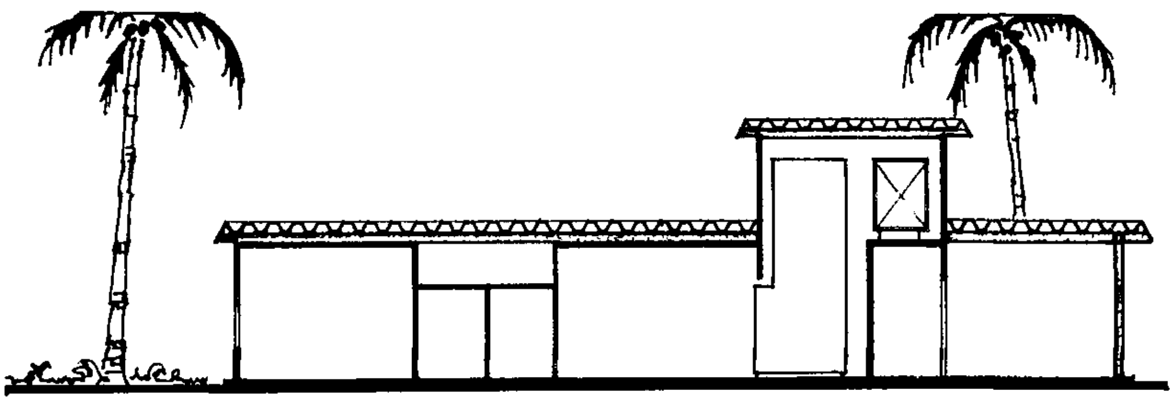


1	MACHINE RM	75.0
2	STORE	22.8
3	WORKSHOP	22.7
4	TOILET	24.0
5	OFFICE	35.0
6	RETAIL COUNTER	112.0
7	HANDLING SPACE	119.5
8	water tank	
9	diesel generater	
10	oil tank	
11	freezer	
12	cold room	
13	air blast freezer	
14	ice making machine	
	TOTAL FLOOR AREA	411.0 m²

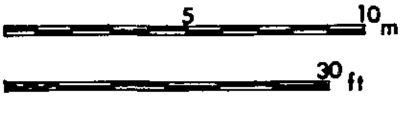
GROUND FLOOR PLAN

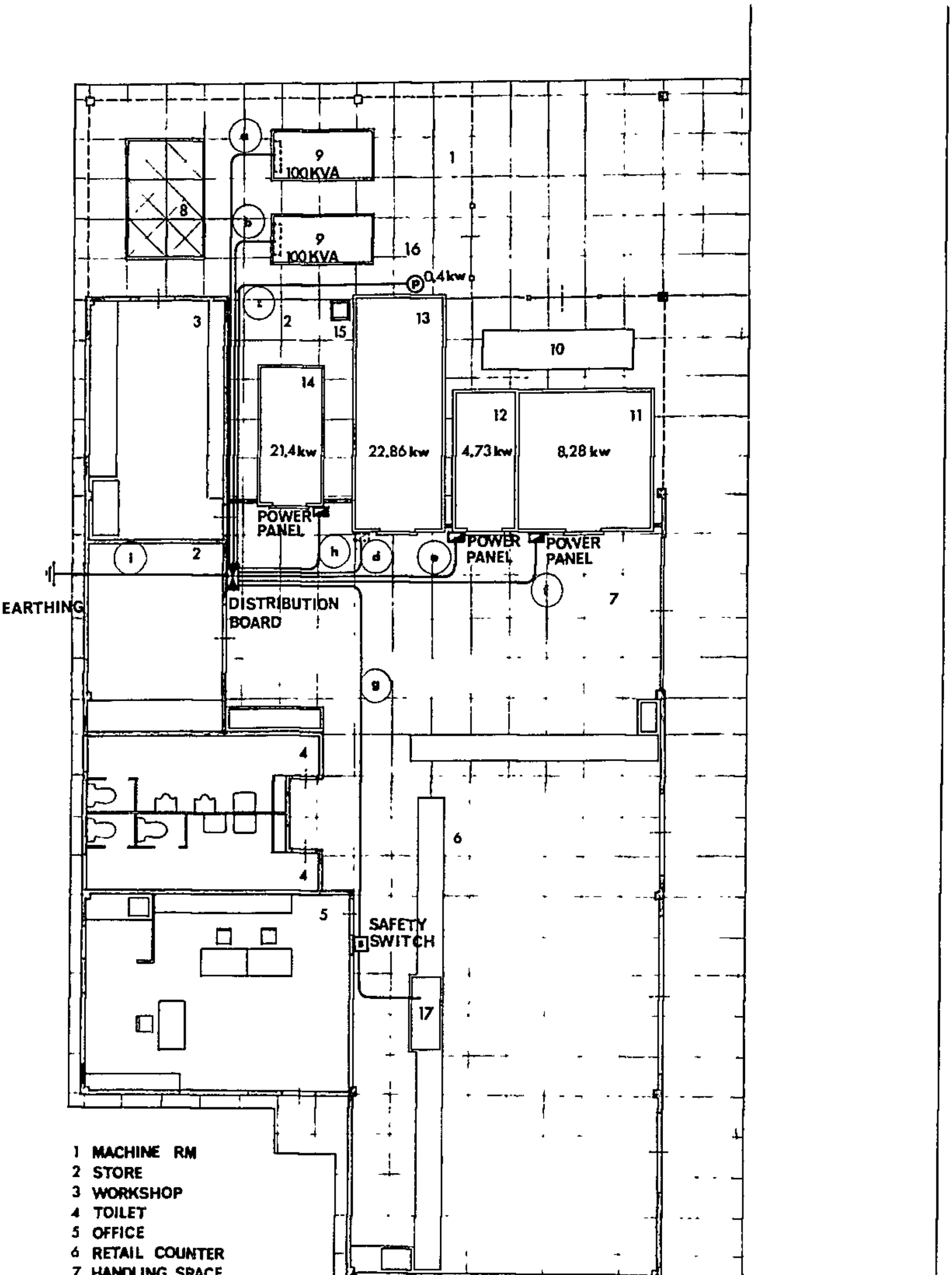


ELEVATION



SECTION



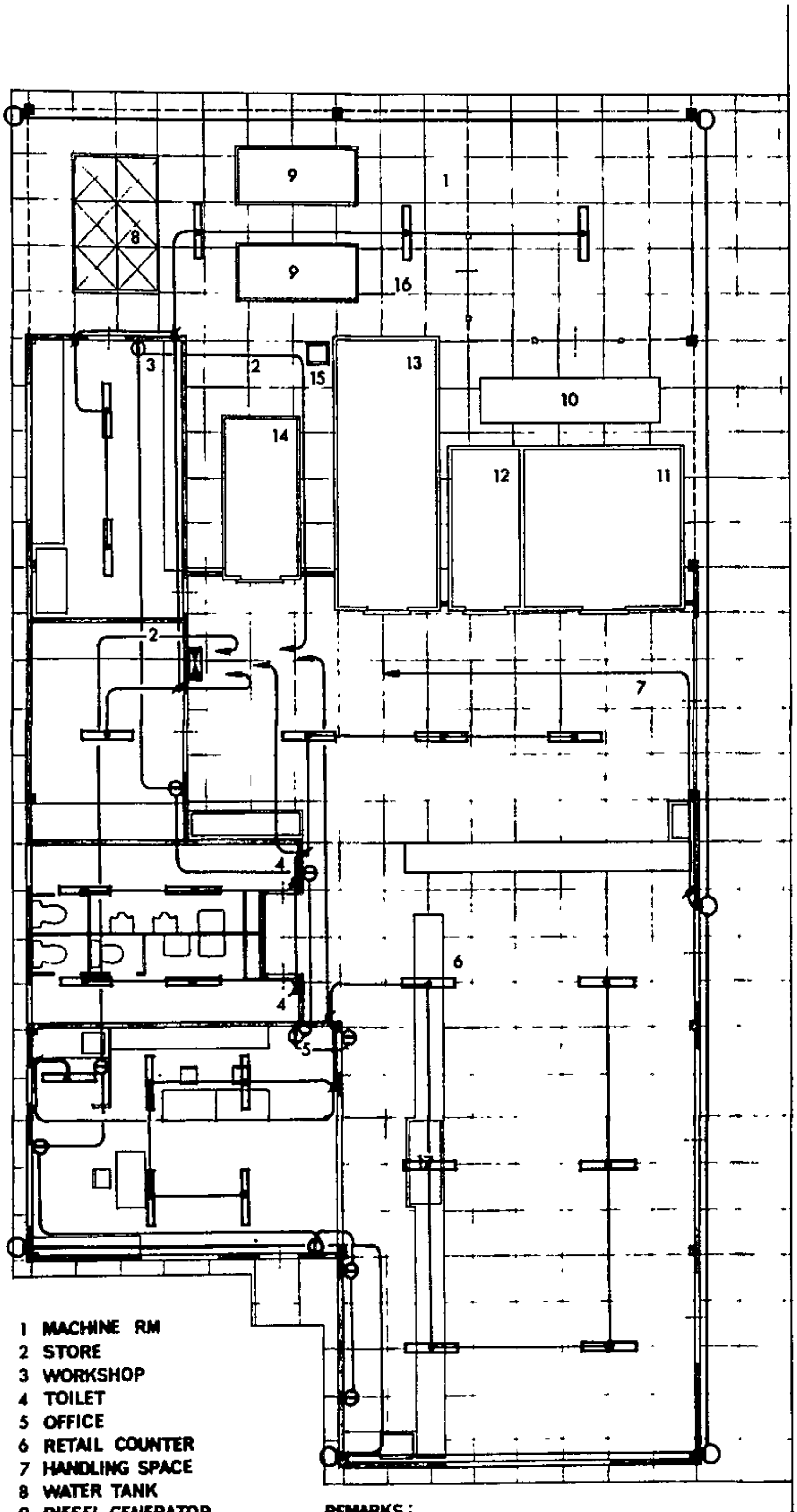


1 MACHINE RM
2 STORE
3 WORKSHOP
4 TOILET
5 OFFICE
6 RETAIL COUNTER
7 HANDLING SPACE
8 WATER TANK
9 DIESEL GENERATOR
10 OIL TANK
11 25cuM FREEZER
12 12.5cuM COLD STORAGE
13 AIR BLAST FREEZER
14 ICE MAKING MACHINE
15 OIL SERVICE TANK
16 OIL FEED PUMP
17 CHILLED CABINET

REMARKS :

a ;	600V	CV– 200 sqmm – 3C , IV 22 sqmm – 1C (FP 100)			
b ;		DITTO			
c ;	600V	CV–	2.0 sqmm –	4C	(25)
d ;	"	"	38	"	(51)
e ;	"	"	5.5	"	(31)
f ;	"	"	14	"	(39)
g ;	"	"	5.5	"	(31)
h ;	"	"	38	"	(51)
i ;	"	IV	38	1C	(25)

ELECTRIC.



1 MACHINE RM
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5 OFFICE
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13 AIR BLAST FREEZER
14 ICE MAKING MACHINE
15 OIL SERVICE TANK
16 OIL FEED PUMP
17 CHILLED CABINET

REMARKS:

— - 600V VV-F 2.0^{mm}-3C

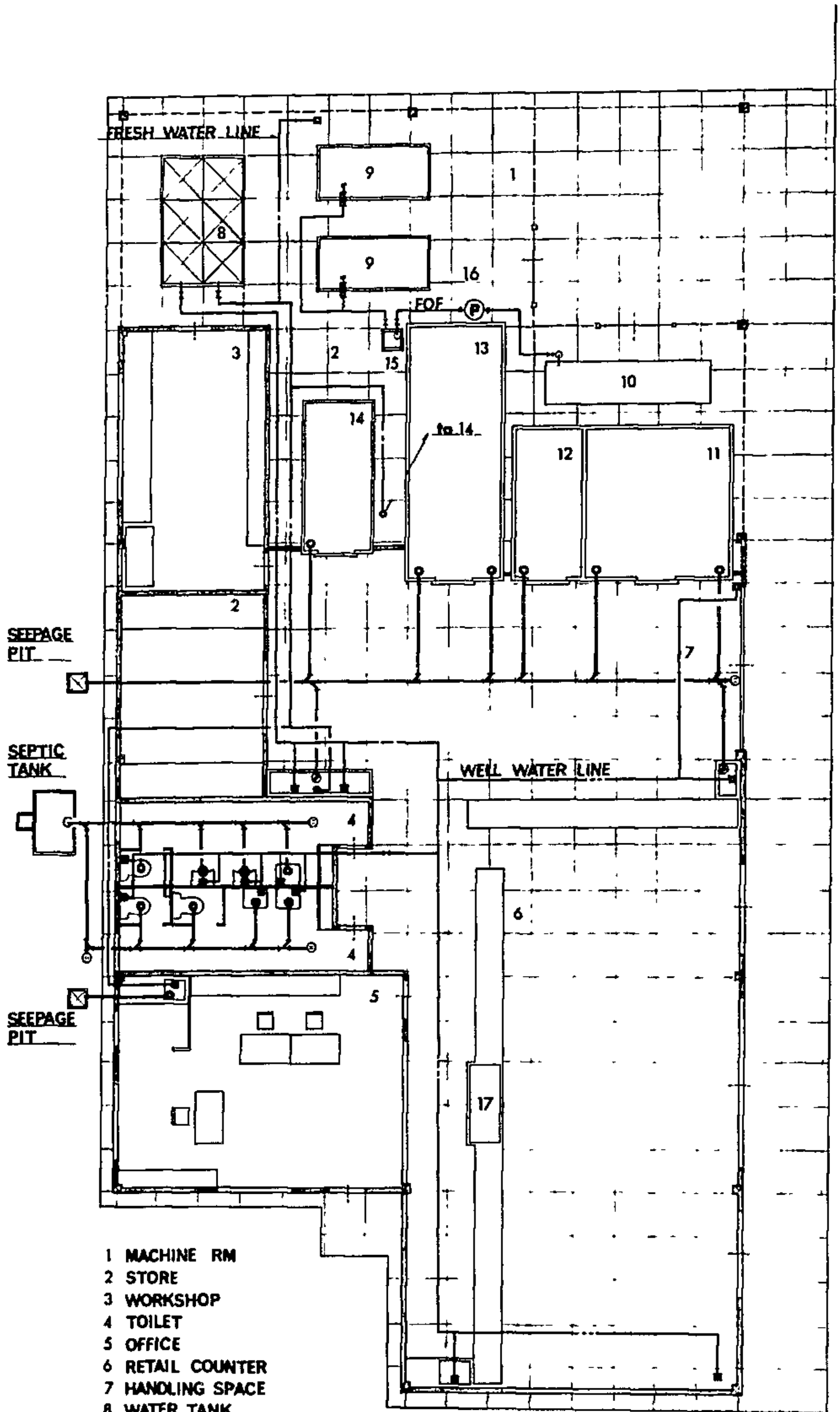
▭ - FLUORESCENT LIGHT 40^{W}

○ - INCANDESCENT LIGHT 60^{W}

⦶ - POWER POINT

⸗ - SWITCH

ELECTRIC.



1 MACHINE RM
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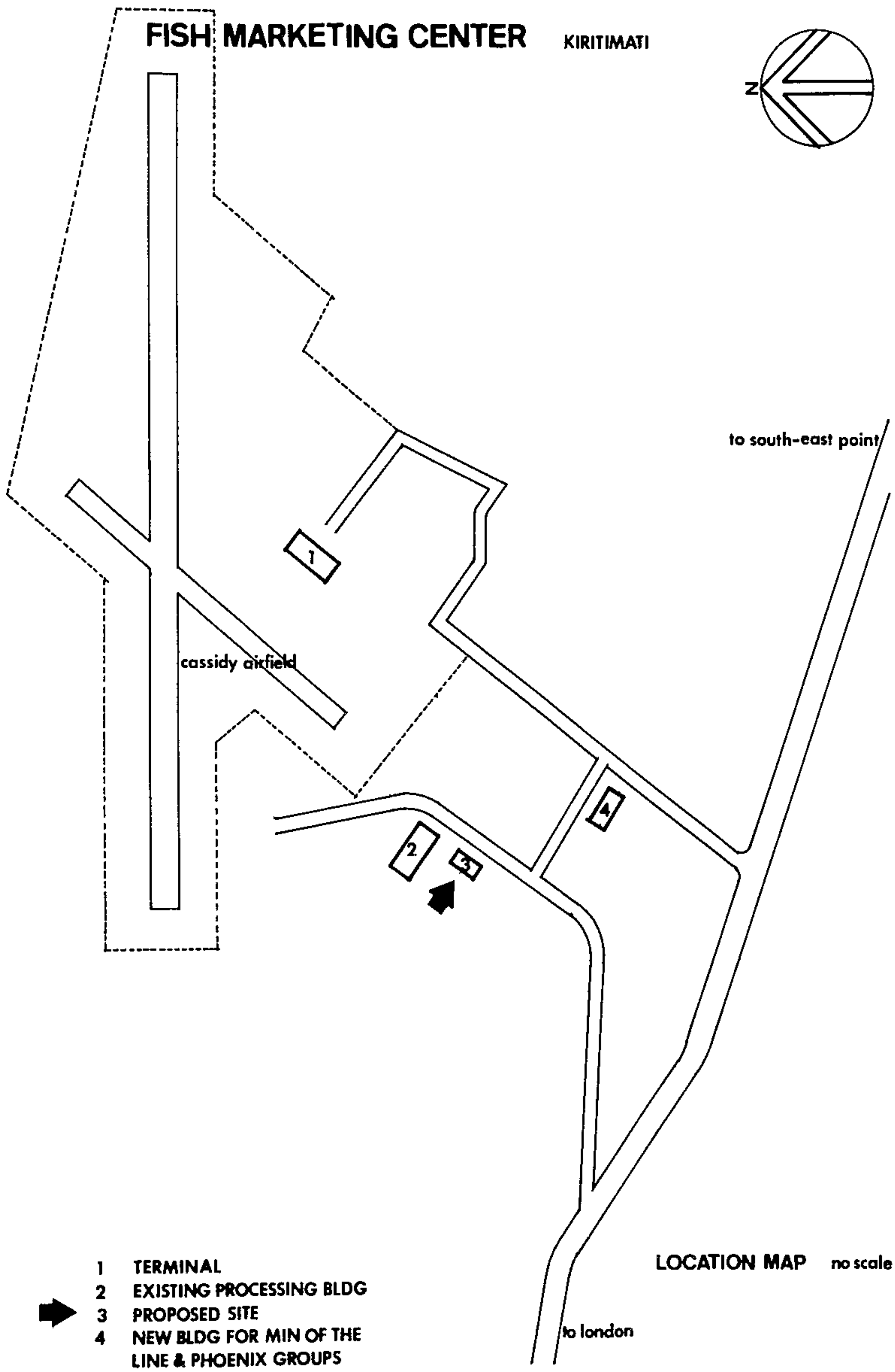
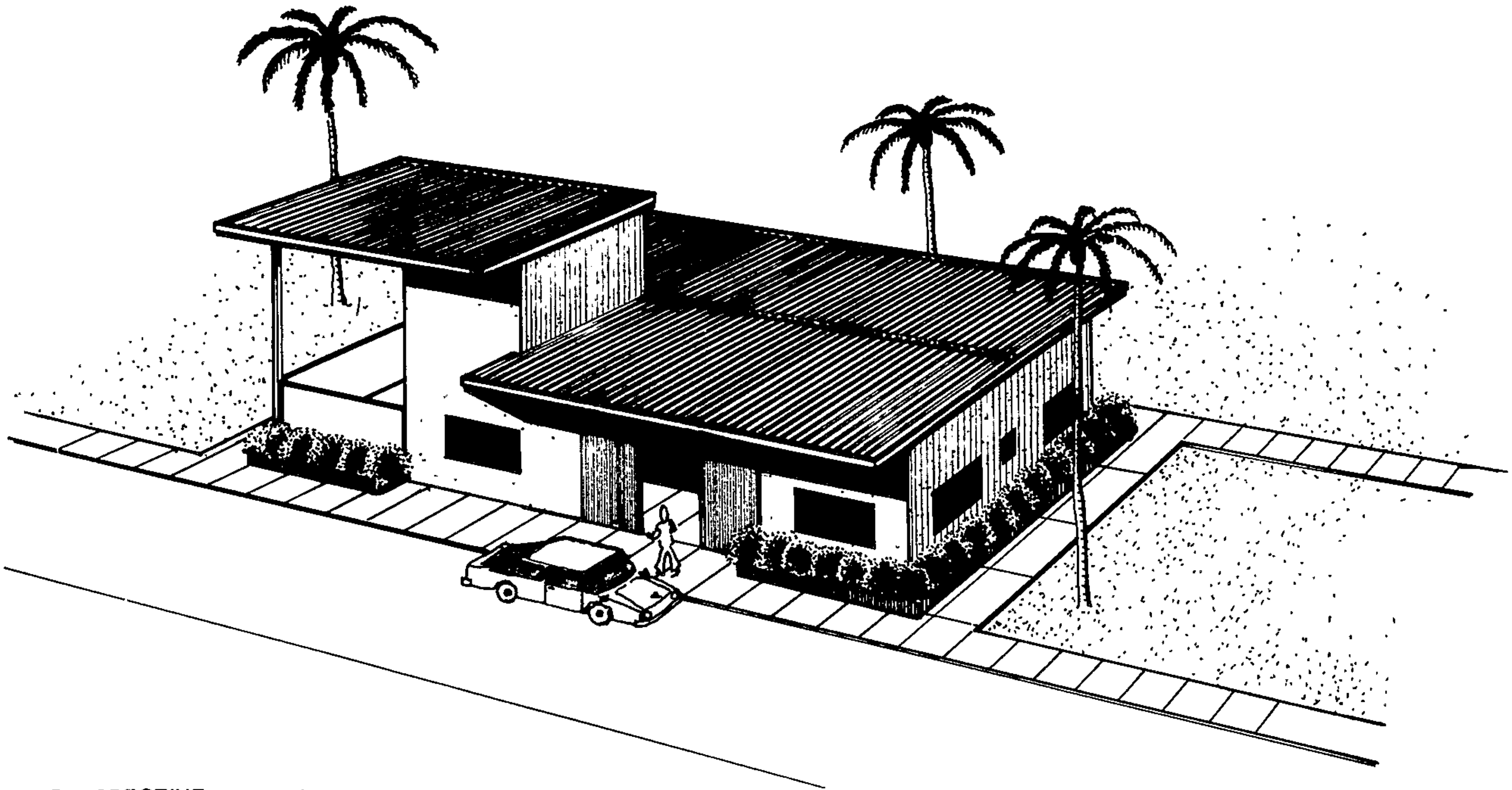
16 OIL FEED PUMP
17 CHILLED CABINET

REMARKS:

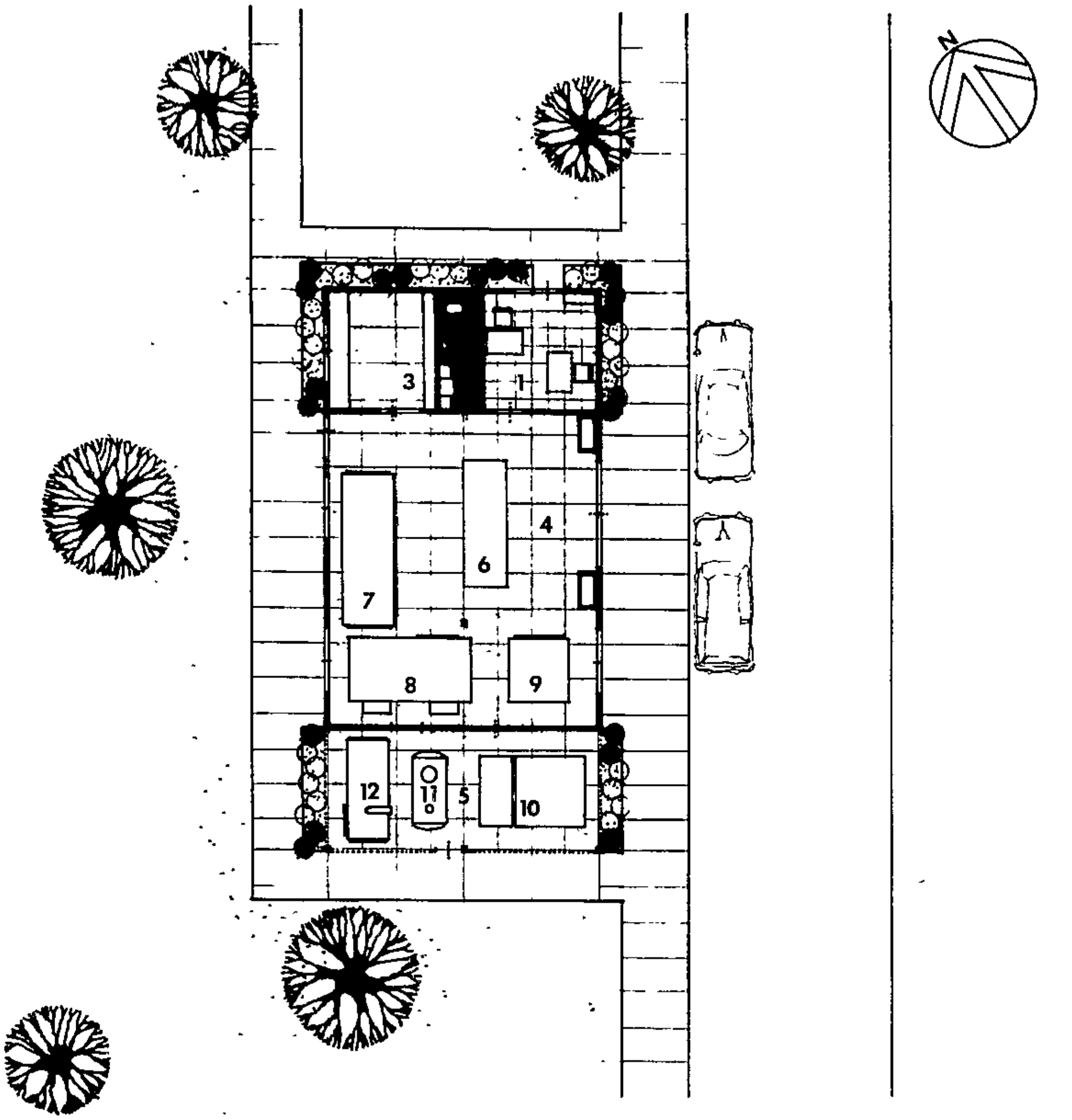
—·—·— - FRESH WATER LINE
—··—·· - WELL WATER LINE
——— - DRAINAGE LINE
⊙ - CLEAN OUT
▣ - TAP
FOF - FUEL OIL FLOW

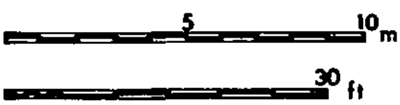
PLUMBING.


FISH MARKETING CENTER KIRITIMATI
N
to south-east point
cassidy airfield
1
2
3
4
1 TERMINAL
2 EXISTING PROCESSING BLDG
3 PROPOSED SITE
4 NEW BLDG FOR MIN OF THE LINE & PHOENIX GROUPS
LOCATION MAP no scale
to london



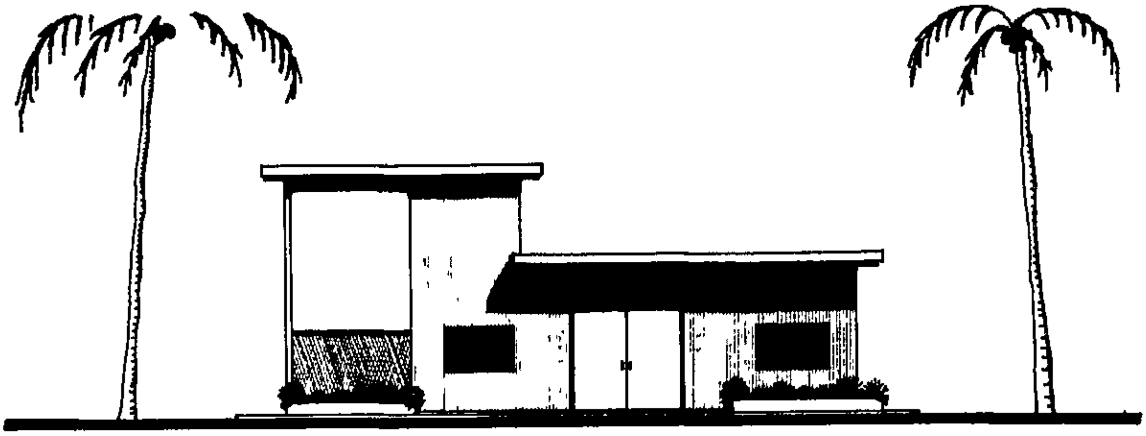
PERSPECTIVE no scale



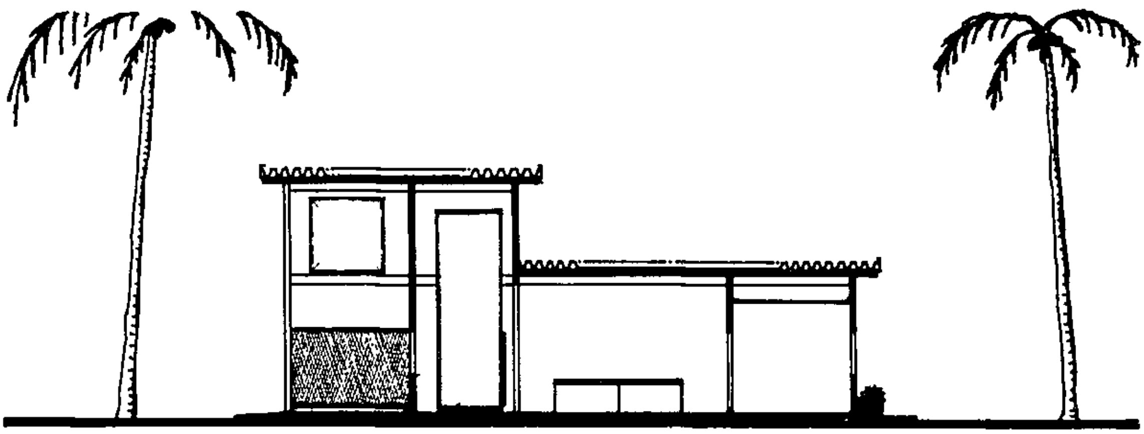


1	OFFICE	12.3
2	TOILET	4.5
3	STORE	11.2
4	PROCESSING RM	72.0
5	MACHINE RM	28.0
6	processing table	
7	plate freezer	
8	freezer	
9	ice making machine	
10	water tank	
11	oil tank	
12	generator	
	TOTAL FLOOR AREA	128.0 m²

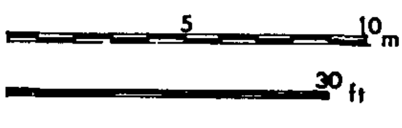
GROUND FLOOR PLAN

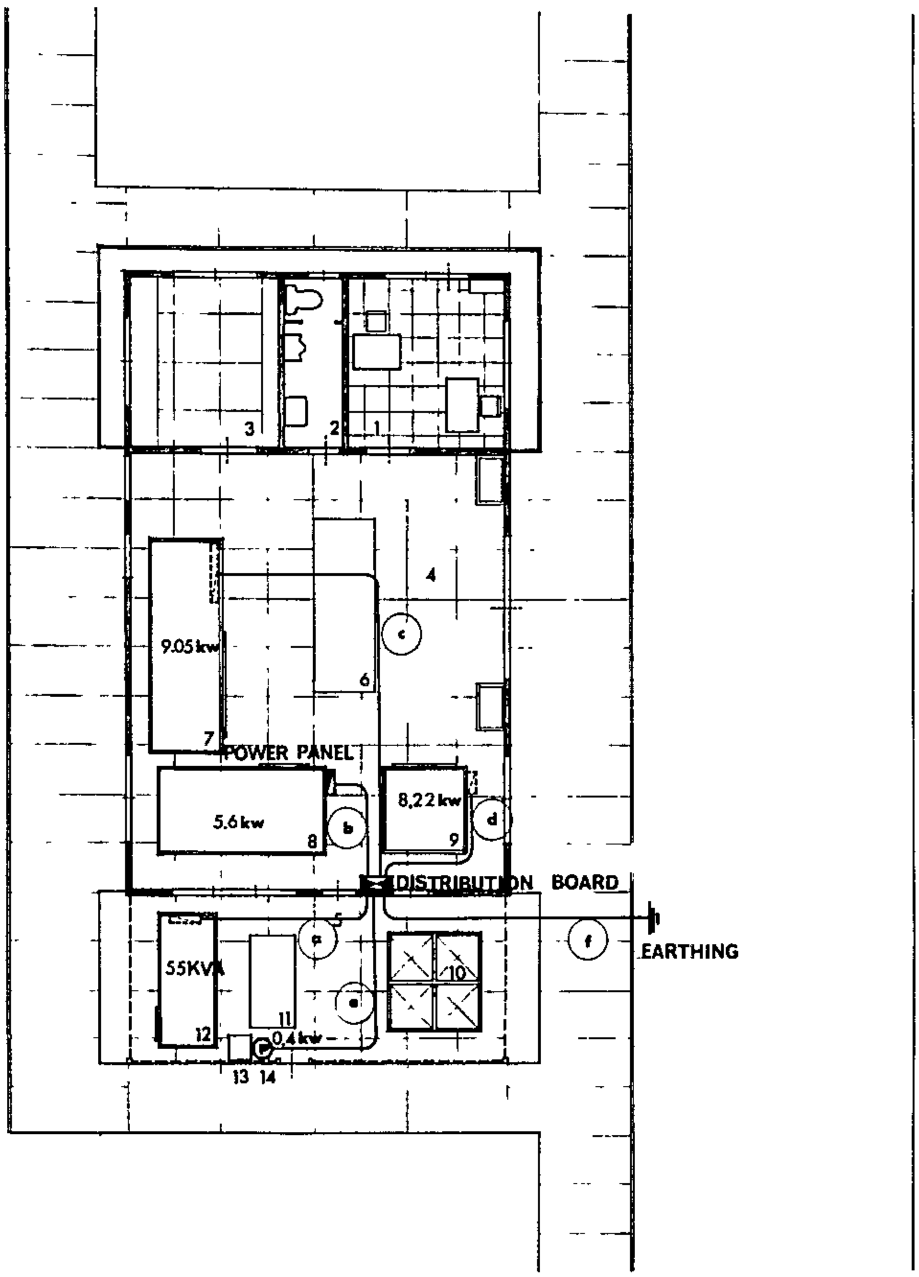


ELEVATION



SECTION



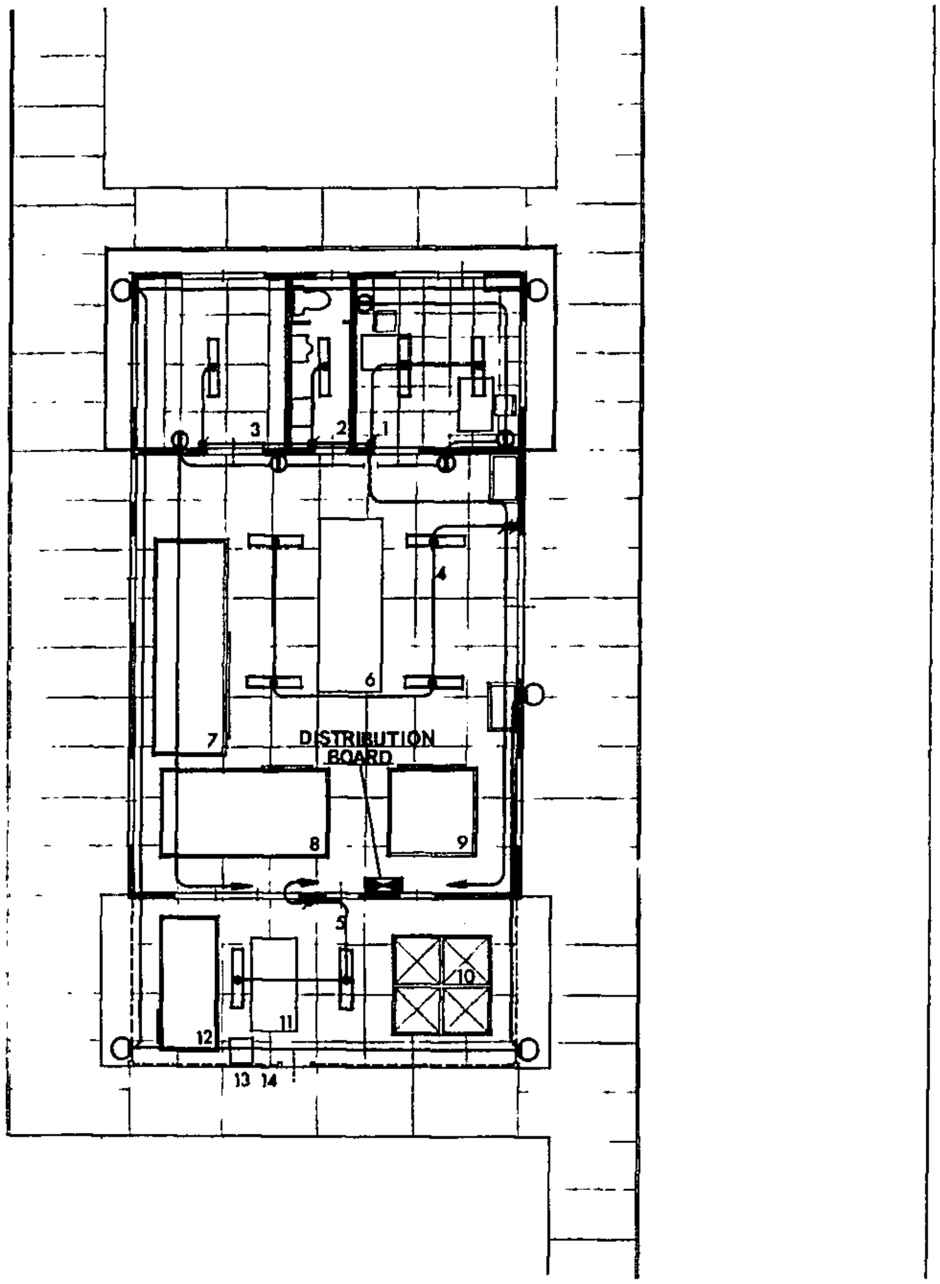


1 OFFICE
2 TOILET
3 STORE
4 PROCESSING RM
5 MACHINE RM
6 PROCESSING TABLE
7 PLATE FREEZER
8 10cuM FREEZER
9 ICE MAKING MACHINE
10 WATER TANK
11 OIL TANK
12 DIESEL GENERATOR
13 OIL SERVICE TANK
14 OIL FEED PUMP

REMARKS;

a ;	600V	CV −	80 sqmm −	4C	(63)
b ;	〃	〃	5.5	〃	(31)
c ;	〃	〃	14	〃	(39)
d ;	〃	〃	14	〃	(39)
e ;	〃	〃	2	〃	(25)
f ;	〃	IV	22	1C	(25)

ELECTRIC.

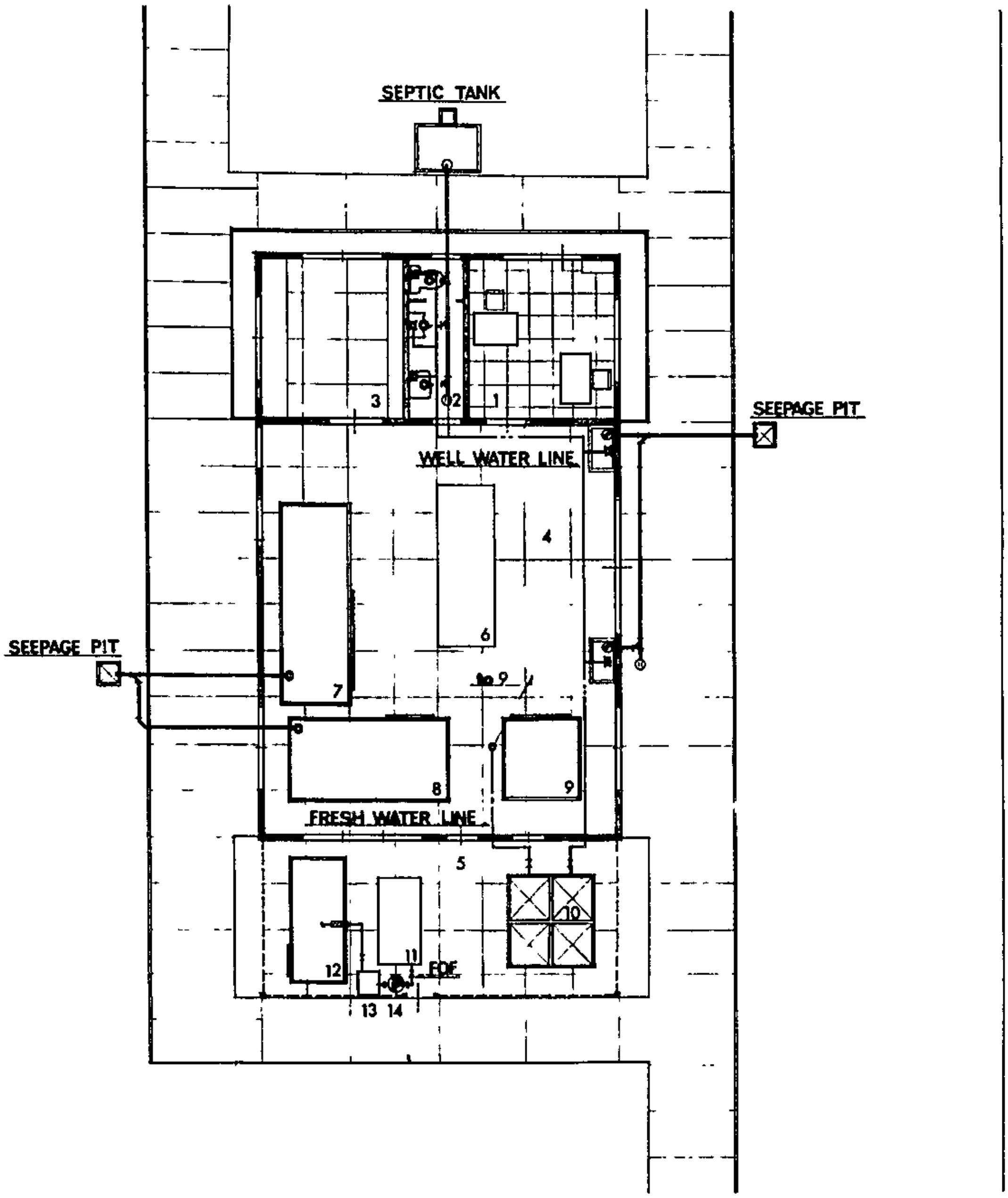


1 OFFICE
2 TOILET
3 STORE
4 PROCESSING RM
5 MACHINE RM
6 PROCESSING TABLE
7 PLATE FREEZER
8 10cuM FREEZER
9 ICE MAKING MACHINE
10 WATER TANK
11 OIL TANK
12 DIESEL GENERATOR
13 OIL SERVICE TANK
14 OIL FEED PUMP

REMARKS:

——	600V VV-F 2.0 mm-3C
▭	FLUORESCENT LIGHT 40w
○	INCANDESCENT LIGHT 60w
⦶	POWER POINT
⁄	SWITCH

ELECTRIC.



1 OFFICE
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8 10cuM FREEZER
9 ICE MAKING MACHINE
10 WATER TANK
11 OIL TANK
12 DIESEL GENERATOR
13 OIL SERVICE TANK
14 OIL FEED PUMP

REMARKS:

- FRESH WATER LINE
- WELL WATER LINE
- DRAINAGE LINE
- TAP
FOF - FUEL OIL FLOW

PLUMBING.

3.3 Fishing Equipment

As already noted, fishing equipment will provided under three categories: a bulldozer to be used in constructing the skipjack bait fish production pond; a fishery research boat; and fishing gear for the extension purpose. Equipment specifications are as follows:

1) Bulldozer: 1 unit

Flywheel horsepower	60-65 HP
Ground pressure	0.3 kg/cm^2 or less
Total weight	not over 7500 kg

... to be equipped with back-hoe and shovel; shovel should be of a type that can also serve as an dozer plate.

... to be accompanied by a normal quantity of spare parts for 2 years' use.

2) Research boat: 1 unit

Hull material	FRP
Overall length	10 meters
Engine output	40-50 HP; diesel
Accessories	Deck awning cover

Fish-finder for shallow-water use (up to 150 m)
Drum coupled to engine for gear operation

3) Fishing gear for extension work to include;

gill net, troll line, cast net, minnow net, lures, floats, sinkers, nylon rope, various pieces of operating gear, outboard engines (25 and 40 HP), small operating skiff (FRP; overall length 5.5 meters)

3.4 Management and Operational Plan

The personnel and funding requirements for operation of the Skipjack Training Vessel and the South Tarawa and Christmas

Island Marketing Centers incorporated in this program are outlined in Sections 4.1, 4.2, and 4.3 following. We feel that, as therein discussed, with the exception of the initial fixed capital investment, all of the operating expenses for these projects can be covered from operating income.

The training vessel will be owned and operated by the Fisheries Division, Ministry of Natural Resource Development. The Neimanganibuka Project, presently being conducted with FAO/UNDP aid, is due to be concluded in December, 1980. While it is not clear at this stage whether this project will be extended, it would, in any case, be necessary to establish a new locus of responsibility within the Fisheries Division for operation of the training vessel.

With respect to the Marketing Centers, for the time being, the functions involving purchases from fishermen and sales to consumers can be put under the direct aegis of the Fisheries Division. It is vital that efforts be made to develop a smooth flow of product collection and an appropriate price structure.

For the Center at South Tarawa, we envisage eventually having the landing operation handled by the Betio City Council and the retail operation either under the joint supervision of the Betio City Council and the cooperative associations or delegated entirely to the cooperatives.

As to the fishing equipment, the bulldozer will be used mainly in the FAO/UNDP aquaculture project, with the Project Manager taking responsibility for management and operation. All of the other equipment would come under the direct management and use of the Fisheries Division. Considering that the items will not be distributed directly to the fishermen, we anticipate relatively few problems.

From the preceding, it can be concluded the ability to manage the project according to plan will depend for the most part on the quality of personnel selected.

With regard to the training vessel, we feel that, judging by the past traditions of I-Kiribati and the training achievement of the Marine Training School, it should be quite feasible to attract compatible trainees for service as crew members. But the training instructors for these candidates -- particularly in the fields of fishery operations and engines -- may be difficult to recruit locally. For this reason, the Government of the Republic of Kiribati is attempting to recruit overseas experts, with Japan having already been the recipient of such a request.

The length of time required for technical transfer will depend mainly on the technical competence and determination of those on the receiving side. In this connection, a review should be made of the training results from the Neimanganibuka Project with the FAO and JICA experts already on the scene, but our feeling is that 3-4 years would probably be required.

The most critically needed personnel for operation of the Fish Marketing Centers will be the Manager and freezer technicians. Given the complexity of the facilities involved, a manager is required who will be continually seeking to maximize their efficient utilization. For only in this way can the operating efficiency of the equipment be raised, operating costs reduced, and the volume of fish handling capacity increased -- which cycle of events will in turn further improve the operating efficiency of the equipment.

Freezer technicians are vital to secure a high level of equipment utilization. This category of personnel should not only be expert in freezing technology but also knowledgeable and well versed in the electrical and mechanical fields.

We believe it would be desirable to recruit a highly capable manager locally either from among civil servants or via a selective recruitment program among the general population.

At the present juncture, however, it would be difficult to recruit the freezer technicians locally. The Fisheries Division, therefore, should give thought to putting this function in the hands of the foreign experts who are expected to arrive in January, 1980.

Unless Kiribati develops alternate resources to replace the depleted phosphate mines, true economic independence may prove difficult to achieve. Fortunately, the adjacent islands are richly endowed with skipjack resources, while, from the standpoint of domestic distribution, I-Kiribati have been mostly reared on a fish diet.

We trust that the Government of the Republic of Kiribati will take the responsibility and initiative for insuring that the management of this program is put in the hands of persons who fully understand and are totally committed to the program objectives. It is particularly important, in the case of the vessels, for the crews to appreciate the fact that an entirely different attitude is required for fishing activity, as opposed to work on land. Only in this way can Kiribati implement this program to mobilize the resource base with which it is so richly endowed.

3.5 Construction Program

The skipjack training vessel will be built in Japan and, after completion, sailed to Tarawa for delivery. Similarly, the fishing equipment will be procured in Japan and shipped as finished goods to Kiribati.

Since the Marketing Centers are to be constructed in two locations -- Betio and Christmas Island -- careful thought has been given to the construction program. Prior to the start of construction of these facilities, the following construction-related activities are required on the part of the Government of the Republic of Kiribati: viz.,

1) Verification of the final construction site and obtaining the necessary approvals and clearances from appropriate official agencies.

2) Ground-leveling of the site and filling, as necessary.

3) Procedures for obtaining construction permits.

4) Removal of the fence on the south side of the existing freezer.

5) Arranging for the installation of telephone lines.

6) Landscaping work, following the completion of construction.

Building materials that can be procured locally include: sand, blocks, U-shaped concrete forms and other concrete products. Other than this limited range of items, all materials will have to be imported.

Construction equipment, such as truck cranes, forklifts, and concrete mixers, can be hired in the necessary quantity and size from either the Department of Public Works or private distributors. However, in view of the high lease rates and limited availability of concrete mixers, prior confirmation is necessary.

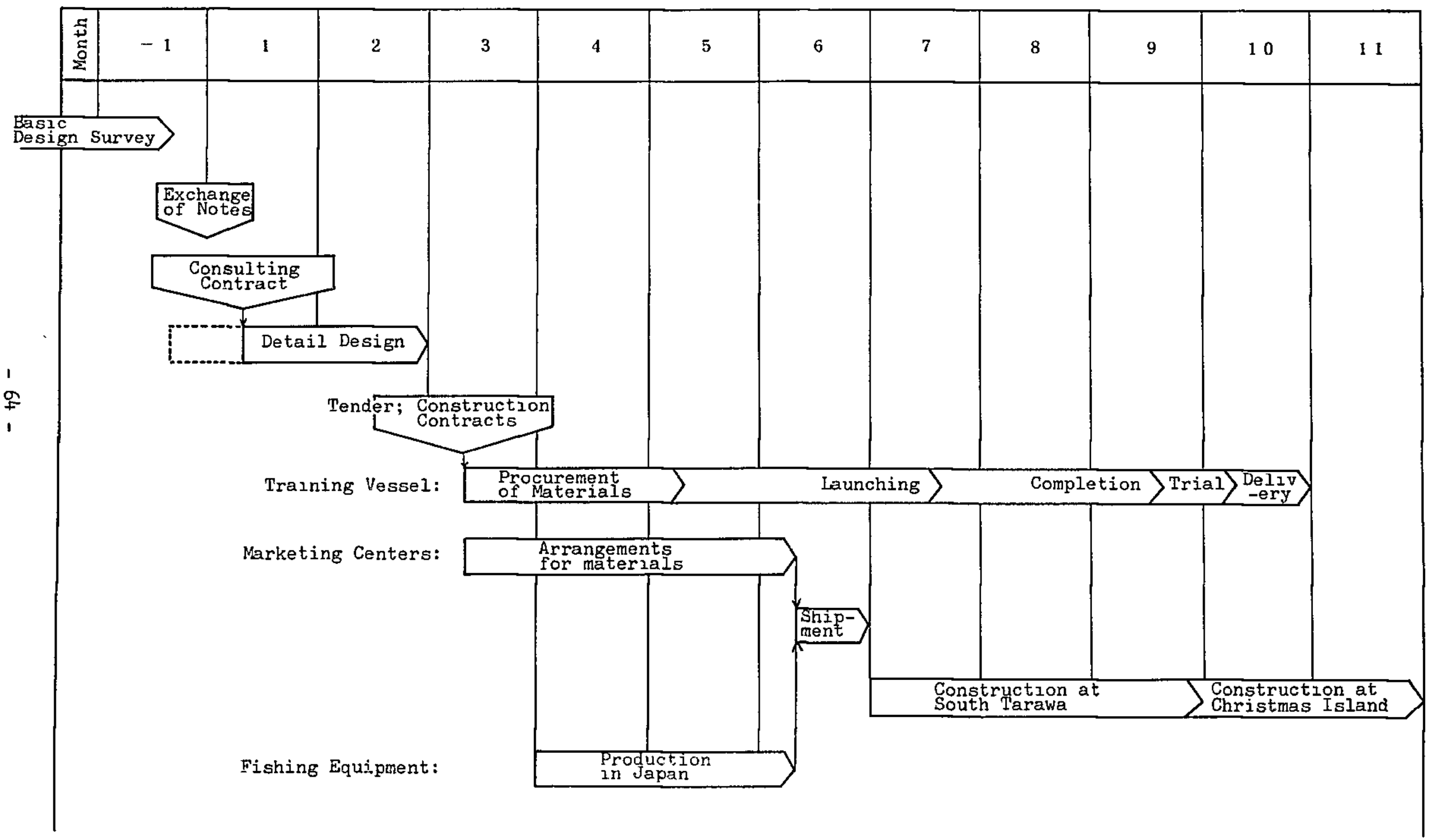
Ordinary construction workers are readily available, but it will probably be necessary to use the services of the Department of Public Works in recruiting skilled workers.

To shorten construction time and efficiently execute this dual-location project all preparatory construction that can be accomplished locally should be contracted out to either a local construction company or to the Department of Public Works.

3.6 Construction Scheduling:

The subject program has been developed to utilize funding under the Government of Japan's budget for Fiscal 1979. Thus, preparations should be made to start implementation as soon as the Notes have been exchanged between two Governments. An outline of construction stages and progress chart is given on the following page.

PROJECT PROGRESS CHART



3.7 Approximate Budget

		(¥000)
1.	100-ton Skipjack Fishery Training Vessel (1)--- 100 GT, 600 HP engine.................	¥ 220,000
2.	Fish Marketing Centers: At South Tarawa (1) At Christmas Island (1)	154,000
3.	Fishing Equipment and Gear.................	51,000
4.	Ocean freight and delivery of Training Vessel (from Japan).............	38,000
	TOTAL ABOVE ITEMS	463,800
5.	Detail Design and Construction Supervision	36,200
	GRAND TOTAL	¥ 500,000

SECTION FOUR

FINANCIAL AND ECONOMIC ANALYSES

Introduction

Techniques for economic analysis for social infrastructure project have not yet been refined in general. Very few examples exist with respect to Japanese grant aid projects, which tend to be oriented to the social infrastructure. For this reason, the target project, as a rule, results in unprofitable operations. In such cases, a decision has to be made on the true social benefits of the project, which transcend the question of profitability, and this in itself obviates the need for financial analysis.

Although the concepts of financial and economic analysis are clearly quite different, when one considers that financial analysis is a step along the way to economic, the latter cannot be considered without the former.

In recent years, determination of project priorities and the establishment of optimum aid scale are beginning to be called into play as evaluation criteria in carrying out effective aid programs. This Section is an attempt to answer this demand.

This analysis attempts to evaluate the appropriateness of the proposed aid for Fisheries Development Project in Kiribati under conditions where the analytical techniques themselves are not yet fully developed and benchmark data from the target country are inadequate. Nevertheless, such an exercise will give a basis for reassessing the benefits and costs entailed in the project and will also provide benchmarks for effective project operation. It also provides material for a case study analysis to assess which criteria are suitable for measuring the economic viability of a project on the basis of profitability and the social benefits accruing therefrom. We would welcome any comments or suggestions regarding the subject analysis from the parties concerned.

In conducting this economic analysis, the particular areas of concern were the following:

1) Given the underdeveloped state of the Kiribati society and

economy, we could not obtain significant data with which to measure the effectiveness of the project and so were forced in many instances to forego measurement of indirect benefits. This means that, in the case of a project of no or small profit, such as one involving grants-in-aid, net present value or internal rate of return will inevitably be calculated at low levels. Thus, despite a poor economic evaluation, or perhaps for the very reason that it is poor, the need for the aid is probably very great on the basis of the unmeasurable indirect benefits.

2) The amount of aid being planned in this case represents a high 5.5% of the GDP of the receiving country (Kiribati) and 13.4% (Fiscal 1977) of its ordinary government revenues. In a case of this sort, is it proper to use unadjusted conversion factors that have been calculated from past data in measuring post-grant effects.

3) As a result of the depletion of the phosphate resource, which had accounted for 37% (Fiscal 1977) of gross exports, a major secular shift in the Kiribati economic structure can be anticipated. In such a case, are past data any longer valid?

In conducting this analysis, though fully aware of these various problems, we were unable to come up with meaningful answers to them. Furthermore, the Fisheries Development Project is very wide in scope, making overall analysis difficult. Accordingly, we elected to carry out our analysis on individual program items only.

4.1 Skipjack Fishery Training Vessel

Calculation of Operating Costs

Outline of Operations:

For purposes of estimating operating costs, the following operational conditions were postulated:

...The subject vessel will be based at Betio and will operate year-round in the waters surrounding Tarawa Island.

...For each day of operations at the fishing ground, the following breakdown is assumed:

Drifting from sunset to sunrise:	12 hours
Cruising for bait and fish detection:	10 "
Fishing operations	2 "
Total	24 hours

Note: Round-trip sailing time between home port and fishing grounds has been included in the above cruising allowance

...The annual operational pattern has been assumed as follows:

Cruising and operating	208 days
Unloading, reprovisioning, preparations for sailing, crew rest and recreation	112 "
In dock	45 "
Total	365 "

(1) Cost of Materials:

(All calculations are in Australian dollars.)

1) Fuel Costs:

Main engine: consumption--

175 g/hp/hr x 600 hp x 10 hrs x 208 days = 218.4 kl

Auxiliary engine consumption--

195 g/hp/hr x 300 hp x 24 hrs x 0.5 x 208 days = 146.0 kl

We have assumed a fuel cost of $275/kl. On this basis:

(218.4 kl + 146 kl) x $275/kl = $100,210/year

Fuel oil prices are difficult to forecast at this time. We have not allowed for any future cost inflation.

2) Lubricants:

Main engine consumption--

2.5 g/hp/hr x 600 hp x 10 hrs x 208 days = 3.12 kl

Auxiliary engine consumption--

2.5 g/hp/hr x 300 hp x 24 hrs x 0.5 x 208 days = 1.87 kl

Assuming a price of $825/kl, we have:

(3.12 kl + 1.87 kl) x $825/kl = $4,117 per year

3) Ship supply articles--

... reckoned at $4,800/year

4) Fishing gear--

... estimated at $3,200/year

5) Fresh water--

... 15 m^3 x 16 trips x $1.54/$m^3$ = $370/year

6) Expendable items--

... included under the categories for ship supply articles (3) and fishing gear (4)

7) Bait--

... in principle, self-supplied

(2) Labor Cost:

1) Officers--

... assume a complement of four officers: Captain, Chief Engineer, Master Fisherman, and Chief Navigator.

4 persons x $4,500/year = $18,000/year

2) Crew--

... 20 persons x $1,560/year = $31,200/year

3) Food Expense--

assumed at:

Officers:	$3.00/person/day
Crew:	$1.70/person/day

4 persons x $3.00 x 320 days = $3,840/year
20 persons x $1.70 x 320 days = $10,880/year
$3,840 + $10,880 = $14,720/year

(3) Operating Expenses:

1) Insurance--

... Hull insurance figured at $20,000 per year

2) Administrative:

... estimated at 2% of the sum of material, labor and insurance expense.

(4) Repairs and Maintenance:

... obtained by multiplying ship cost by a repair ratio factor based on the number of years of service from year of construction. The following repair ratio chart has been applied:

Years in Service	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Repair ratio (%)	2	3.3	3.96	4.6	5.25	5.9	6.56	7.2	7.85	8.5	9.18	9.83	10.49	11.15	11.77

(5) Depreciation:

A constant-sum method, for 15 years

Note: Depreciation expense has of course not been calculated in the cash-flow analysis.

Income Calculations

Based on a projected first-year catch averaging 2 tons per operating day, we have assumed a 5% per year increase in catch volume. This means that the average catch rate at the final year of the operation will reach to 3.96 tons per year.

We assume that 90% of the catch will be of export quality; the remaining 10% will be for domestic sale.

Export prices are assumed at $500/ton FOB; domestic sales at 63 cents/kg.

Cash-Flow Analysis

We have assumed a project life of 15 years (1980-1994). Based on the above assumptions, we have developed a cash-flow projection, calculated on the basis of 1980 prices. This is shown in Table 4-1.

It will be seen from this table that, over the entire project life, operating expenses of the training vessel are expected to be defrayed by income from sale of catches, with cash balances on hand increasing from year to year.

Net Present Value (NPV)

We understand that the minimum interest rate in Kiribati is 7%.

Given the top priority and importance that has been accorded the Fisheries Development Project in overall official planning in the wake of the depletion of the phosphate resource, we have based our calculation of NPV on a minimum 7% discount rate. The results of our analysis are shown in Table 4-2.

If we exclude the initial capital investment (i.e., grant-in-aid from the Government of Japan for the purchase of the training vessel), the NPV comes to A$ 445,784.

However, if we include the initial investment, the NPV becomes a negative value, at (- A$ 488,750).

This means that, assuming that the training activity of the vessel will be made on a commercial operation basis, even by the final year of project life, reinvestment will not be covered by income.

From the preceding, it can be concluded that, although operating costs can be fully defrayed from operating income, the project will find it difficult to generate funds for continuing reinvestment. Thus, in order that it may continue to function as an independently funded enterprise, some sort of financial aid (such as extremely low interest loans) will be required at the time of reinvestment (i.e., when a new vessel has to be purchased).

If we next perform a sensitivity analysis based on raising catch efficiency by a factor of 10% per year, the NPV becomes:

A$ 849,334.
IRR = 17%

This underscores the importance to profitability of improving catch efficiency -- that is to say, of generating maximum benefits from the training operation.

Economic Analysis

Conversion Coefficient

To convert from market prices to border prices, the standard conversion coefficient (SCF) was calculated as follows:

$$SCF = \frac{M + X}{M(1+T) \times X(1+S-T_X)}$$

where:

M = Total import value (CIF)

X = Total export value (FOB)

T = Total import duties

S = Total export subsidies

T_X = Total export duties

Using 1978 trade customs data, the SCF works out to 0.87. However, since the so-called Phosphate Tax is considered a mining, rather than export, tax, this has been excluded from the calculation.

In the matter of wage valuation, for skilled labor, domestic market wages are seen as reflecting opportunity costs. A saving premium was not considered. Thus, the shadow wage rate (SWR) for skilled workers was set at:

$$SWF = SCF = 0.87$$

Based on official labor statistics*, even villages exhibit below full employment conditions. Thus, the opportunity costs for unskilled workers are seen as being the marginal production value of agricultural labor. The SWR for unskilled workers was calculated on the basis of the following equation:

$$SWR = \frac{D_i}{S_i} \times SCF$$

* National Development Plan -- 1979-1982; p.46

where:

D_i = Number of agricultural workers

S_i = Total labor supply

$$SWR = \frac{10{,}127 \text{ persons}}{18{,}997 \text{ persons}} \times 0.87 = 0.46$$

Social Benefits

Benefits accruing from the skipjack training vessel would include:

1) increased exports of fishery products.
2) income from the domestic sale of fishery products
3) development of fishing technology through training
4) increased employment opportunities
5) gaining an understanding of the country's fishery resources

With respect to Item (1) -- increasing exports--, since these are valued on an FOB basis, the figures have been carried over from the Financial Analysis.

With regard to Item (2) -- domestic sales revenue--, we applied the standard conversion factor (SCF) to market prices.

As to Item (3) -- training effectiveness--, in general, the rate of return may be estimated by solving the following equation:

$$I_t = \frac{E_{t1} - E_{w1}}{(1 + r)} + \frac{E_{t2} - E_{w2}}{(1 + r)^2} \cdots\cdots \frac{E_{tn} - E_{wn}}{(1 + r)^n}$$

where:

I_t = Training Investment

E_{tn} = Earnings of graduates of training program in year "n"

E_{wn} = Earnings of those not receiving training in year "n"

r = Rate of return

However, at the present stage, data do not permit an estimation of opportunity costs for graduates of the training program. Accordingly, this calculation could not be made.

With regard to Item (4) -- expansion of employment opportunities--, we considered only direct employment, as calculated by applying shadow wage rates to respective market wages for skilled and unskilled workers.

As to Item (5), while there can of course be no argument that an understanding of the fishery resources will intrinsically produce benefits, we did not use this factor, owing to lack of a definitive estimating method.

Calculation of NPV/IRR

Table 4.3 shows social benefit costs converted to a border price level. Using a 7% discount rate, the NPV comes to:

(- A$ 19,440)

while the Internal Rate of Return (IRR), as roughtly calculated, comes to:

6.7%

This means that investment and revenues are in approximate balance at a discount rate of 6.7%.

TABLE 4.1 SKIPJACK TRAINING VESSEL -- FINANCIAL ANALYSIS
CASH FLOW

(In 1980 Price A$)

			1980	1981	1982	1983	1984	1985	1986
Revenues:	Export Sales	—	187,200	196,560	206,856	217,152	227,448	238,680	250,848
	Domestic Sales	—	26,208	27,518	28,959	30,401	31,842	33,415	35,118
	Total	—	213,408	224,078	235,815	247,553	259,290	272,095	285,966
Expenditures:	Vessel cost	896,073	—	—	—	—	—	—	—
	Vessel delivery cost	38,461	—	—	—	—	—	—	—
	Materials cost	—	112,697	112,697	112,697	112,697	112,697	112,697	112,697
	Labor cost	—	63,920	63,920	63,920	63,920	63,920	63,920	63,920
	Other operating costs	—	23,932	23,932	23,932	23,932	23,932	23,932	23,932
	Repairs and maintenance	—	0	16,538	27,288	32,746	38,038	43,413	48,788
	Total	934,534	200,549	217,087	227,837	233,295	238,587	243,962	249,337
Net Cash Inflow:		Δ934,534	12,859	6,991	7,978	14,258	20,703	28,133	36,629

TABLE 4.1 Continued

		1987	1988	1989	1990	1991	1992	1993	1994
Revenues:	Export Sales	263,016	276,120	290,160	305,136	320,112	336,024	352,872	370,656
	Domestic Sales	36,822	38,656	40,622	42,719	44,815	47,043	49,402	51,891
	Total	299,838	314,776	330,782	347,855	364,927	383,067	402,274	422,547
Expenditures:	Vessel cost	—	—	—	—	—	—	—	—
	Vessel delivery cost	—	—	—	—	—	—	—	—
	Materials cost	112,697	112,697	112,697	112,697	112,697	112,697	112,697	112,697
	Labor cost	63,920	63,920	63,920	63,920	63,920	63,920	63,920	63,920
	Other operating costs	23,932	23,932	23,932	23,932	23,932	23,932	23,932	23,932
	Repairs and maintenance	54,246	59,538	63,913	70,228	75,911	81,286	86,744	92,201
	Total	254,795	260,087	264,462	270,777	276,460	281,835	287,293	292,750
Net Cash Inflow:		45,043	54,689	66,320	77,078	88,467	101,232	114,981	129,797

TABLE 4.2 SKIPJACK TRAINING VESSEL -- FINANCIAL ANALYSIS
CALCULATION ON THE NET PRESENT VALUE (NPV)

(In A$)

Year	Operating Revenues	Benefits at the end of the Project	Vessel Purchase Cost	Operating Costs	Net Income	Present Value @7%
					(Δ934,534)	(Δ934,534)
1980	213,408	-	(934,534)	200,549	12,859	12,859
1981	224,078	-	-	217,087	6,991	6,539
1982	235,815	-	-	227,837	7,978	6,973
1983	247,553	-	-	233,295	14,258	11,649
1984	259,290	-	-	238,587	20,703	15,817
1985	272,095	-	-	243,962	28,133	20,087
1986	285,966	-	-	249,337	36,629	24,432
1987	299,838	-	-	254,795	45,043	28,062
1988	314,776	-	-	260,087	54,689	31,829
1989	330,782	-	-	264,462	66,320	36,078
1990	347,855	-	-	270,777	77,078	39,156
1991	364,927	-	-	276,460	88,467	42,022
1992	383,067	-	-	281,835	101,232	44,947
1993	402,274	-	-	287,293	114,981	47,717
1994	422,547	84,615	-	292,750	214,412	77,617
Total	4,604,271	84,615	(934,534)	3,799,113	889,773	445,784
					(Δ44,761)	(Δ488,750)

TABLE 4.3 SKIPJACK TRAINING VESSEL -- ECONOMIC ANALYSIS

CALCULATION OF NPV/IRR

(In A$)

YEAR	SOCIAL BENEFITS				SOCIAL COSTS			NET BALANCE	PRESENT VALUE	
	Increase in Exports	Domestic Sales Revenue	Incremental Employment	Total	Fixed Capital Investment	Operating Costs	Total		@ 6%	@ 7%
1980	187,200	22,801	30,012	240,013	934,534	174,265	1,108,799	Δ868,786	Δ868,786	Δ868,786
1981	196,560	23,941	30,012	250,513	-	190,803	190,803	59,710	56,307	55,829
1982	206,856	25,149	30,012	262,017	-	201,553	201,553	60,464	53,813	52,846
1983	217,152	26,449	30,012	273,613	-	207,011	207,011	66,602	55,946	54,414
1984	227,448	27,703	30,012	285,163	-	212,303	212,303	72,860	57,705	55,665
1985	238,680	29,071	30,012	297,763	-	217,678	217,678	80,085	59,823	57,181
1986	250,848	30,553	30,012	311,413	-	223,053	223,053	88,360	62,294	56,285
1987	263,016	32,035	30,012	325,063	-	228,511	228,511	96,552	64,207	60,152
1988	276,120	33,631	30,012	339,763	-	233,803	233,803	105,960	66,437	61,669
1989	290,160	35,341	30,012	355,513	-	238,178	238,178	117,335	69,462	63,830
1990	305,136	37,166	30,012	372,314	-	244,493	244,493	127,821	71,324	64,933
1991	320,112	38,989	30,012	389,113	-	250,176	250,176	138,937	73,081	65,995
1992	336,024	40,927	30,012	406,963	-	255,551	255,551	151,412	75,100	67,227
1993	352,872	42,980	30,012	425,864	-	261,009	261,009	164,855	77,152	68,415
1994	370,656	45,145	30,012	445,813	-	266,406	266,406	179,407	79,298	64,905
Total	4,038,840	491,881	450,180	4,980,900	934,534	3,404,853	4,339,327	641,573	53,168	Δ19,440

$$IRR = 6 + (7 - 6) \times \frac{53,168}{53,168 + 19,440} \fallingdotseq 6.73\%$$

4.2 Fish Marketing Center at South Tarawa

Calculation of Operating Costs

The same financial and economic analyses will be done as in the case of the Skipjack Training Vessel. We may postulate the following conditions:

Generator: 24 hours/day operation
Normal operating load -- 50%
Utilization rate -- 60%

Ice-making Plant: In principle, water will be internally supplied from rain water catchment, but we assume 10% will be purchased.

Maintenance and Supervisory Personnel:

Manager (1)
Freezer Mechanic (1)
Electrician (1)
Workers (4)
Driver (1)

Depreciation: Building -- 25 years
Freezer, Refrigerator, Ice-making Plant, Quick-Freezer --- all 9 years
Generator, Refrigeration Lorries -- 5 years
A constant-sum method will be used; assume that facilities will be sold for scrap value and new equipment purchased at a point when the remaining value falls to 10%.

Repairs:

The following repair cost ratios have been applied by year of life for the various items of equipment:

Years in Use	1	2	3	4	5	6	7	8	9
Repair Ratio (%)	1	1.65	1.98	2.3	2.63	2.95	3.28	3.6	3.93

Revenue Calculations

Demand:

Based on the survey results* for fish catch and consumption in South Tarawa, the following demand volumes are projected. The demand and consumption figures include that of restaurants, Government institutions and non-Government organizations. Canned fish consumption is calculated assuming that the net volume per can is 15 oz which is multiplied by the total number of can consumed.

... Fish consumed per capita: 126.5 kg/yr.
... Potential fish demand per capita: 31.3 "
... Consumption of canned fish per capita: 9.04 "

Population:

We assume an annual growth rate of 3.5% for South Tarawa, a bit less than the present 4.1%.

Supply Capacity:

The above mentioned survey has disclosed that in case of canoes the total operational hours was 12.3 per week and for powered boat 14.8 hours. This operation level indicates that increase in supply can be attained simply by extending the operation hours. Fish collection from the outer islands may also augment supply. Therefore the potential supply capacity is considered to be in excess of present demand, even including projected demand increase. Furthermore we can expect the Center will function, when completed, to improve the existing fish distribution. Thus we assume the potential demand will be fully met by 1985.

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* A Report on Fish Catch and Fish Consumption in the South Tarawa Region

Shift in Canned Fish Consumption:

With the opening of the Marketing Center, a part of present consumption on the imported canned fish can be expected to shift over to fresh fish. The estimation of substitute demand for canned fish includes such uncertain factors as people's preference and storability, but in the meantime, there is a selective policy of the Government to suppress canned fish import for the purpose of foreign exchange saving. Thus as a result of the Center's operations, we assume that half of the present canned fish consumption will shift over to fresh fish by 1985. The weight of fresh fish required for one unit of substituted canned fish is however calculated at the rate of 2 to 1.

Self-Supplied Consumption:

Those families newly moved to South Tarawa area will have less opportunities to engage in self-supply fisheries than those presently living in the urban area. We are projecting, therefore, self-supplied consumption at 850,000 tons/year, only slightly larger than at present.

Volume of Fish to be Handled by the Center:

Based on the above assumptions, we assume that 50% of all fish distribution in South Tarawa will flow through the Center. The volume of fish to be handled during the initial year (1980) is then estimated at about 890 tons. Sales commission for the Center has been postulated at 8 cents/kg which corresponds to 5% to 10% of the current retail price.

Ice Sales:

We assume that 15% of total ice production or 90 tons per year will be sold to fishermen at 2 cents/kg.

Project Life:

This has been set at 25 years, the depreciation period established for the building.

Cash Flow Analysis

Cash flow projections, based on the above assumptions, are presented in Table 4-4. As this table shows, operating income should amply cover both operating costs and working capital requirements.

At a discount rate of 8.5%, the normal interest rate in Kiribati, the NPV works out to A$ 149,116 and the IRR to 11.6%.

The project is thus shown to be eminently sound, and there is a high probability that it will be able to establish itself on an independent financial base (i.e., will become a self-supporting operation).

Economic Analysis

The following benefits may be anticipated from the project:

1. Operating income.
2. Reduction in imported meat and fish products based on expansion of the domestic supply of fresh fish.
3. Increase in fishermen's incomes as a result of the improved distribution facilities and expanded supply of fish.
4. Expansion of employment opportunities.
5. Raising of nutritional levels, based on a stable supply of fish.

In this analysis, we have made estimates for Items 1-3 and for the direct employment benefits under Item 4.

(1) Operating income:

We have converted the cash flow projections from the financial analysis to border prices by applying the SCF viz. 0.87.

(2) Reduction in Imports:

The anticipated shift from canned to fresh fish has been valued on the basis of CIF prices for canned products. We have assumed a 50% causal effect resulted from the operations of the Center on the shift from canned foods and have, accordingly, applied 50% of the above CIF values for benefit estimation.

(3) Increased Fishermen Incomes:

We have applied a factor of 50% to the projected growth in fish supply on the basis of a presumed elimination of the current supply gap and the expected shift from canned foods to fresh fish. These values have been converted to border prices.

(4) Employment:

We have considered only direct employment effects.

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The results the above analysis are shown in Table 4-6. As may be seen in this table, assuming a discount rate of 30%, we have:

NPV = A$ 456,509
IRR = 43.4%

On this basis, we may conclude that, from a socio-economic standpoint, the subject project has considerable merit.