BASIC DESIGN STUDY REPORT

ON

THE PROJECT FOR IMPROVEMENT OF FISHERY HARBOUR FACILITIES AND FISHERIES TRAINNING CENTER AT TANGALLE

IN

THE DEMOCRATIC SOCIALIST REPUBLIC

OF

SRI LANKA

January, 2000

JAPAN INTERNATIONAL COOPERATION AGENCY

OVERSEAS AGRO-FISHERIES CONSULTANTS CO., LTD.

PREFACE

In response to a request from the Government of the Democratic Socialist Republic of Sri Lanka the Government of Japan decided to conduct a basic design study on the Project for Improvement of Fishery Harbour Facilities and Fisheries Training Center at Tangalle and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Sri Lanka a study team from July 18 to August 10, 1999.

The team held discussions with the officials concerned of the Government of Sri Lanka, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Sri Lanka in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Democratic Socialist Republic of Sri Lanka for their close cooperation extended to the teams.

January, 2000

Kimio Fujita
President
Japan International Cooperation Agency

January, 2000

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Fishery Harbour Facilities and Fisheries Training Center at Tangalle in the Democratic Socialist Republic of Sri Lanka.

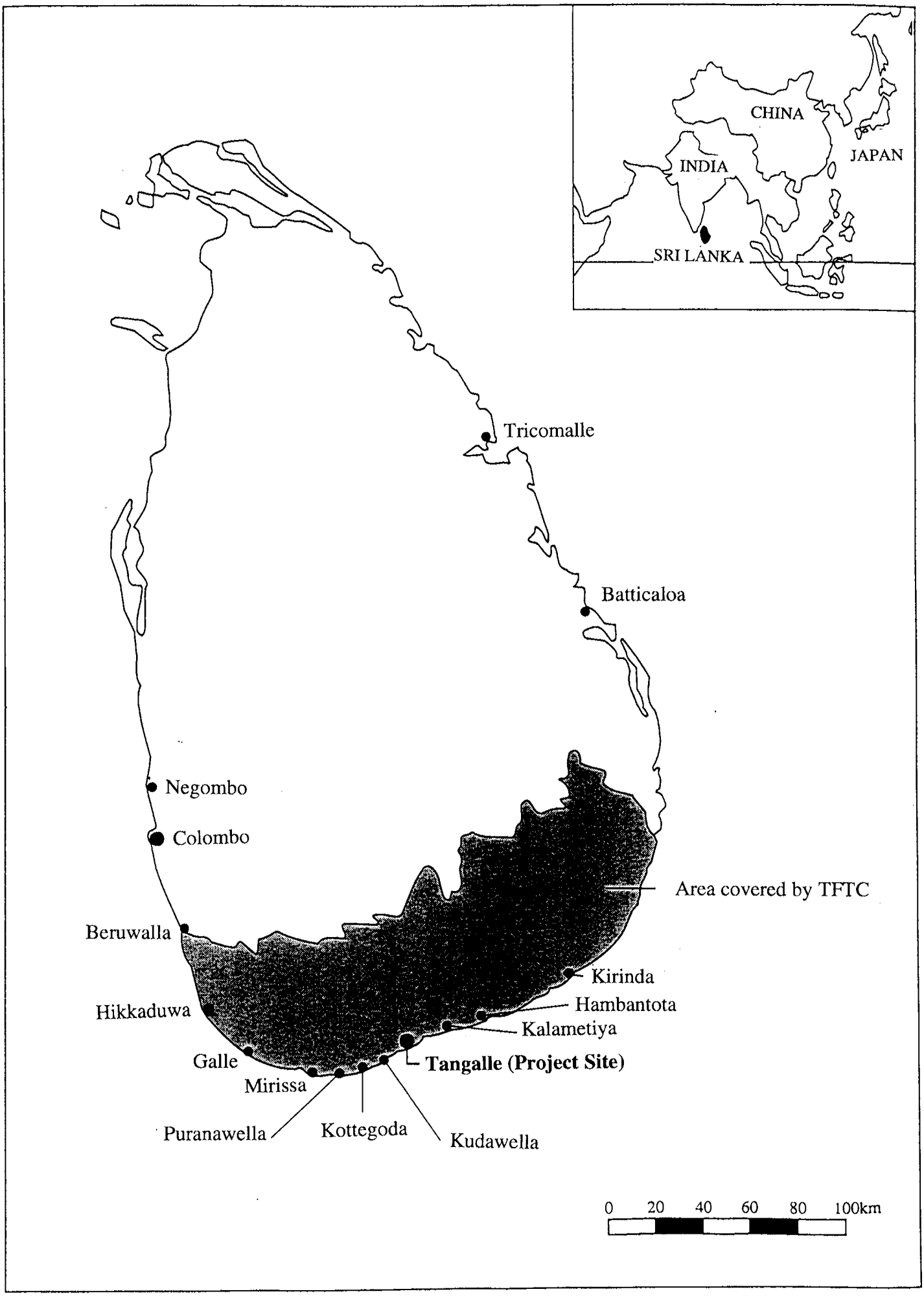
This study was conducted by Overseas Agro-Fisheries Consultants Co., Ltd., under a contract to JICA, during the period from July 12, 1999 to January 31, 2000. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Sri Lanka and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

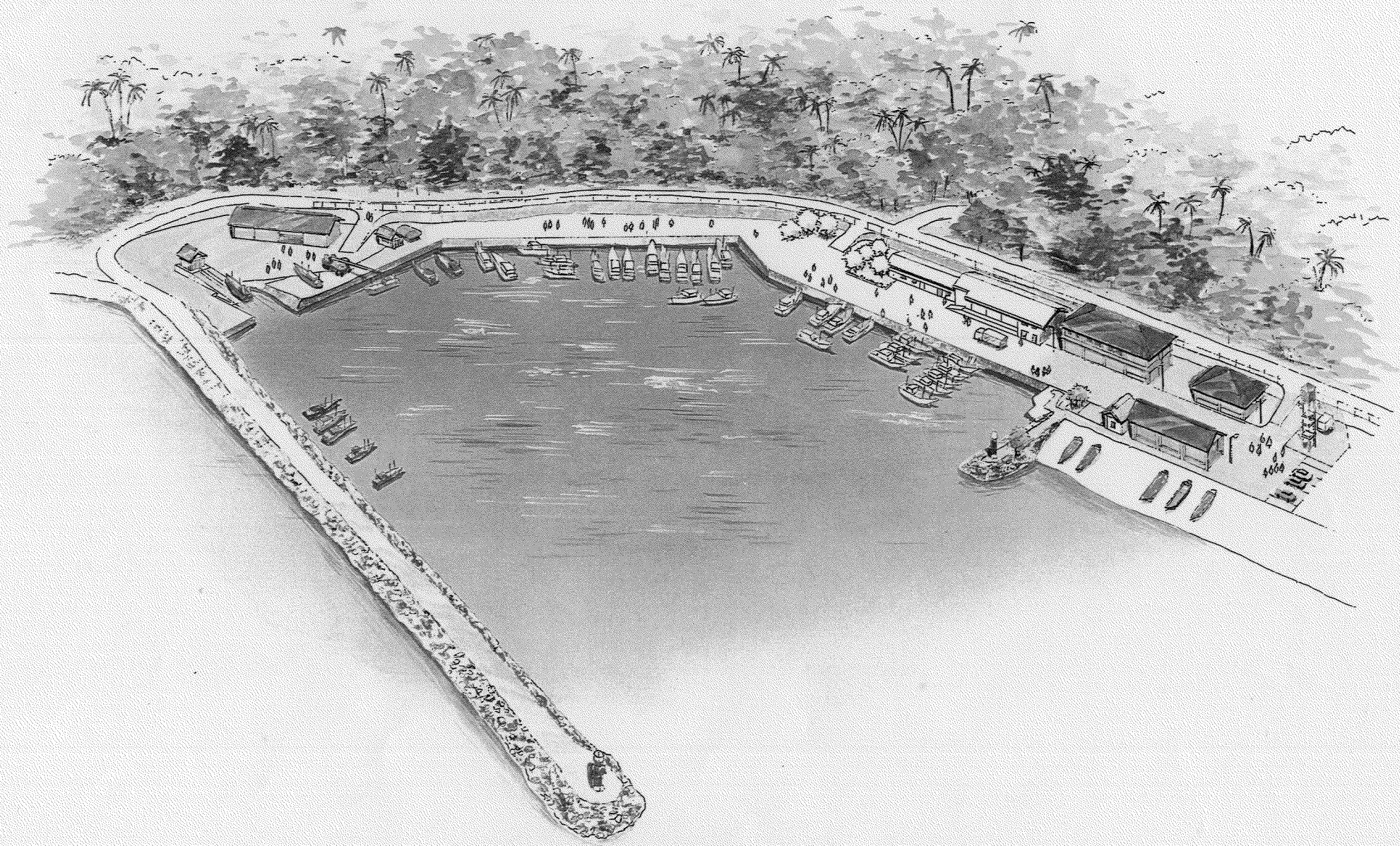
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Munehiro Shimada
Project manager,
Basic design study team on
the Project for Improvement of
Fishery Harbour Facilities and
Fisheries Training Center at Tangalle
Overseas Agro-Fisheries Consultants Co., Ltd.

LOCATION MAP





Tangalle Fishery Harbour

Tangalle Fisheries Training Center

Abbreviations

MFARD	: Ministry of Fisheries & Aquatic Resources Development
CFHC	: Ceylon Fishery Harbours Corporation
CFC	: Ceylon Fisheries Corporation
NIFT	: National Institute of Fisheries Training
TFH	: Tangalle Fishery Harbor
TFTC	: Tangalle Fisheries Training Center
KFH	: Kudawella Fishery Harbour
FEO	: Fisheries Extension Office
ADB	: Asian Development Bank
GTZ	: German Technical Cooperation
SIDA	: Sweden International Cooperation Agency

GL	: Ground Level
FL	: Floor Level
HWL	: High Water Level
MSL	: Mean Sea Level
LWL	: Low Water Level
FRP	: Fiberglass Reinforced Plastic
AEP	: Acrylic Emulsion Paint
OP	: Oil Paint
OS	: Oil Strain

Contents

Chapter 1 Background of the Project

The Democratic Socialist Republic of Sri Lanka is located in the southeastern ocean area of the Indian continent, lying over the Palk Bay and it is an island country with the national land area of 66.5 thousand km2, and its climate is noted for subtropical Monsoon. The population is approximately 18.55 million (1996). Under the background as the agricultural country with the plantation of tea, rubber, and coconuts started during the colonial period, the climate and the international market easily affect the industrial structure. The fishery industry is also prosperous and the value of the export of shrimp, tuna, etc. contributed to 2 % of the total value of exports. The GNP per person is 772 US$ (1996), the revenues and expenditures of the trade are approximately 1.2 billions US$ in red (1997), the foreign debts are 400 million US $ (1996), and the rate of inflation is 9.6 % (1997). The literacy ratio of the whole nation is approximately 90% and ranks higher among the developing countries.

In the field of the fishery, it is estimated that the number of fishery households is 100,000, its population is 700,000, and the number of fishermen is 150,000 and the number of other related employees is 115,000. Tangalle as the target area of the Project belongs to the southern area of the country, and it is estimated that the number of the fishery households is 40,000 and the number of fishermen is 50,000 there. The fishery industry of Sri Lanka becomes significant as the sources for the supply of animal protein to the nation, the gainings of foreign currencies by export, opportunities of employment, etc.

The coastal fishery is the main fishery. The various kinds of canoes as the traditional fishing boats (non-motorized fishing boats) and motorized fishing boats equipped with radios and engines (inboard ones and outboard ones) are utilized for fishing boats. After 1980s, there is not a major change in terms of the number of fishing boats. And those had remained as approximately 2,500-3,300 of inboard engine fishing boats, approximately 8,000-12,000 of outboard engine fishing boats and approximately 12,000-15,000 of non-motorized fishing boats, but recently the number of inboard engine fishing boats had increased and it became approximately 3,800 fishing boats in 1998. Among those fishing boats, approximately, 1,100 of inboard engine fishing boats, 1,900 outboard engine fishing boats and 2,400 of non-motorized fishing boats are operated in the southern area.

The annual yields of fishery production remarkably increased to 175,000 tons from 90,000 tons in 1970s when the modernization of fishing boats had progressed, but its increase became moderate and even slower after 1980s, and the yields in 1998 was approximately 167,000 tons. As for the status of the production by the methods of the fishery, while the offshore fishery production increases, the coastal fishery production is stagnant. As the causes, the resources at coastal areas are slightly exhausted and the fishing operation is shifting to the southern areas from the northern areas where the coastal fishery used to be the heart of the fishery industry. On the other hand, the fishery production grows well in the southern areas, and the total yields of the fishery production in Tangalle, Galle, Matara and Kalutara as 4 major districts representing the

southern areas, was approximately 30,000 tons in the early 1980s, which accounted for 20 % of the total yields of the whole country. However, in 1998, they increased to approximately 65,000 tons, which accounted for 40 % of the total yields. The major species of fish landed are skipjack as a head of all, and tuna (mainly yellow fin tuna), spanish mackerel, trevally and shark.

There are 12 of fishery harbours and 51 of fishery anchorages, and 2 of fishery harbours are under construction. The construction of breakwaters, wharves were carried out at these harbours, and Ceylon Fishery Harbours Cooperation (CFHC), under the Ministry of Fisheries & Aquatic Resources Development (MFARD), is in charge of the management and the operation of these facilities. Most of fishery anchorages form natural shore styles, and fish landing is concentrated by fishing boats. The maintenance dredging and construction of facilities for supplies of water, power and toilets are carried out there by CFHC and MFARD. Recently, especially in the southern and the eastern areas, the improvement of the fishery harbours and fish anchorages are progressed. In the southern area, five fishery harbours such as Galle, Tangalle, Mirissa, etc are located and two fishery harbours in Kudawella and Hikkaduwa are under construction. As the other fishery infrastructures, there are approximately 40 ice plants, 17 in the southern area and 24 in the western area centering Colombo and Negombo. The capacity of ice production in the whole country is approximately 1,000 tons per day.

On the other hand, as the educational opportunities for fishery related people after primary education are very limited in Sri Lanka, secondary and advanced education is provided only through the professional training programs at the fisheries training centers. At those centers, as a curriculum for the fisheries training, general education such as English necessary for fishery activities, etc. is provided, applicable to fishery related students over age of 17, and those centers function as the important role of the society. Also, the recent fishing boats are operated with technical equipment such as electronic devices, various driving machines, etc. and the knowledge of technology and the appropriate technical training are required for fishermen. Fisheries training centers are operated by National Institute of Fisheries Training (NIFT) of which headquarter is sited in MFARD, and Sri Lanka Institute of Fisheries Training in Colombo and 4 local fisheries training centers (Negombo, Tangalle, Batticaloa and Tricomalle) are on operation. On the other hand, Jaffna Fisheries Training Center has been closed since 1983 due to the affect of the domestic dispute. The target students of the training are fishermen, the succeeding fishermen, females of fishery households, etc., and candidates are invited through the advertisement in newspapers, and the selection is carried out by the marking system, based on educational standards, ages, relation to the fishery industry, etc. There are many candidates and only 20-25 % of all candidates, every year, succeed in entering the fisheries training centers.

Tangalle as the target area of the Project is geographically the center of the southern area and the fishery harbour and the fisheries training center has been sited earlier than 20 years ago.

Tangalle Fishery Harbour (TFH) was established in 1976, which is one of the oldest fishery harbours in Sri Lanka, and has been evaluated as a good harbour that takes full of advantage of natural conditions. The contents of the establishment at TFH were the construction of breakwater, groin and basin, relevant to harbour civil work, and the construction of ice plants, refrigerating facilities, water and fuel supplies facilities and boat repair facilities, relevant to land facilities, but any outstanding improvement has not been executed afterwards. And the capacity of each facility is not sufficient, compared with the present number of fishing boats. In addition, TFH is utilized by the seasonal fishing boats from the eastern area, where the fishing activities are hardened during the northeast Monsoon period. At present, it is utilized by 210 of registered fishing boats, 146 of seasonal fishing boats and 2,000 of fishermen, and the annual landed fish accounts for approximately 10,000 tons.

Under these circumstances, the Government of Sri Lanka was planned to finance domestic budget for the extension of the ice storage facility, the water supply facility and the wharf, which is strongly requested by the users, in order to establish the substantial services of infrastructures for the users of TFH. On the other hand, the construction of the fish marketing hall, net mending shed, canteen, boat repair facility, accommodation for fishermen, service center for fishermen and other facilities are planned be implemented by Japan's grant aid assistance, because the improvement of those facilities were confirmed essential through the examination on the development study (Master Plan Study for the Southern Area Development) in 1997 in collaboration with the Government of Japan.

Tangalle Fisheries Training Center (TFTC) was founded in 1972 and it has provided the advanced education as the professional training to the people related to fishery not only in Tangalle but also in the whole southern area. The area covered by TFTC comprises Aluthgama City, Galle in the southwest to Yala City, Hambantota in the southwest and spreads over 200 km in distance to the east and west. Since its opening, approximately 800 students had completed the training programs up to 1998. There were only two courses, a fishing technician course and a fishing boat electric course when it was opened, but there are 11 courses at present because of the backgrounds such as the changes of the specifications of fishing boats and the development of the technology related to fishery, in addition to the request from students. Recently approximately 100 students have taken the courses annually. In addition, a marine bio resource technology courses, etc are implemented for instructors and students of the adjoining junior high and high schools (annually approximately 600 people), and the training in fishing villages for fishermen who live in the fishing villages are implemented by the utilization of training vehicles.

As there are problems such as the shortage of numbers and capacities of classrooms and practice rooms, the decrepitude of training equipment and the inefficiency of the accommodation for students under the current situation, the planned programs are not implemented. The opportunities of training in fishing villages are provided temporarily when the courses cannot be implemented during scheduled periods because of the shortage of classrooms and practice rooms. The inefficiency of the accommodation

obliges students, who have succeeded in entering, to leave school because they cannot afford to pay for expenses of lodging. The current facilities were built for residence and inappropriate for training. For those reasons aforementioned, the removal of TFTC was planned and the Government of Sri Lanka has secured the new site. Then, the construction of TFTC and the procurement of decrepit training equipment are planned to be implemented by the Japan's grant aid assistance because the necessity of its improvement was confirmed through the examination on the aforementioned development study.

Under these circumstances, MFARD of Sri Lanka placed the improvement of fishery harbour facilities and fisheries training center at Tangalle as a top priority among the 6-year-Fisheries Development Programme (1999-2004). Relevant to the Programme, the Government of Sri Lanka has requested the Government of Japan for the grant aid assistance to construct the facilities and procure the related equipment, because it is considered urgent to execute the improvement of facilities and equipment at TFH and the improvement of facilities and training equipment at TFTC, from aspect of the promoting the coastal fishery in the southern area.

Chapter 2 Contents of the Project

2-1 Objectives of the Project

2-1-1 Problems on the fishery activities in Tangalle

The southern area in Sri Lanka is apt to be the heart of the fishery industry. The following backgrounds cause this tendency: ①Because of a long-standing dispute, the fishery activities have been moved from the northeast area to southwest area. Accordingly fishermen and fishing boats also have moved. ② It is more accessible from the southern area to the skipjack and tuna fishing grounds where are potential resources to be developed, compared with the resources along the coast. ③It is more accessible to the large markets such as Colombo or Badulla and Muwara-Eliya, districts of tea production that consume much fishery products. For example, in 1981, the yields of coastal fishery products in the southern area account for 17% of the total yields in this country and the rate increased to 28% in 1991 and to 39% in 1998. The annual operation in the southern area presently accounts for approximately 50% of large inboard engine fishing boats for the multi-day fishing operation, as the main fishing among coastal fishery, and approximately 15% of small inboard engine fishing boats for the one-day fishing operation. Apart from these local fishing boats that owe registered fishery harbours and fishery anchorages, many inboard engine fishing boats based in fishery anchorages in the northeast, seasonally, especially the northwest Monsoon season between October and March, utilize the fishery harbours in the southern area in order to seek the gentle circumstances for fish landing. The majority of these seasonal fishing boats from the northeast area are small inboard engine fishing boats, but the number of boats is sometimes equal to the number of harbour registered boats. Along the east coast in the south of the middle part, the landed fish is transported by small tender boats to the fishery anchorages at seashore. There is no problem during the gentle southeast Monsoon period, but during the northeast Monsoon period, fish landings should be sifted to the fishery harbours with breakwater in the southern area. Thus, the prosperous coastal fishery in the southern area is proved remarkably by the concentration of fishery harbours, that is, 5 of 14 fishery harbours in total over Sri Lanka, located along 60 km between Galle and Tangalle, the south brink in the southern area**.**

Tangalle, the target area for this Project, belongs to Hambantota district and the distance from Hambantota city, the district center, is approximately 30 km. Because Tangalle is geographically located in almost the center of the southern area, it functions as a pivot of area in terms of trades for people and goods. In Tangalle, Tangalle Fishery Harbour (TFH), one of five fishery harbours constructed in the concentration at the edge of the southern area, is situated, and also Tangalle Fisheries Training Center (TFTC), which is in charge of the whole fishery training for people relevant to fishery industry all over the southern area, is situated. Furthermore, as Fisheries Extension Office (FEO) under the Ministry of Fisheries & Aquatic Resources Development (MFARD), and the branch office of Ceylon Fisheries Corporation (CFC) in charge of fish marketing are situated. Thus, Tangalle is the center of fishery activities and the administration of this area.

TFH is the fishery harbour of which development was planned in 1972 and its construction was completed in 1976, and it is one of the oldest fishery harbours in Sri Lanka. Ceylon Fishery Harbours Corporation (CFHC), in charge of the operation and the management of TFH, was founded in 1972, and, in other words, CFHC and TFH have progressed together. TFH is evaluated as a good harbour that takes full of advantage of the natural conditions. However, it is inclined to be an old-fashioned harbour nowadays since it was constructed 23 years ago. At that time, it was designed to target the size and the number of fishing boats which are much smaller than the present fishing boats, and the facilities and the equipment have become decrepit because of the utilization for many years. The contents of facilities were breakwater, groin, wharf and basin, as the civil engineering in the harbour, and ice plants, refrigerated facilities, fuel and water supply facilities and facilities for fishing boats repair, as land facilities. As a result, the following problems have been caused recently.

1) The length of the wharf at TFH is deficient, compared with the present number of fishing boats, and upon fish landing, 6-7 fishing boats stand in a line and wait for their turns for fish landing.

2) The fish marketing hall is not established at TFH while the fish marketing halls at the adjoining fishery harbours have been improved. As approximately 10,000 tons of fish are annually landed there, it is put directly on the wharf for fish marketing in the burning sun. Therefore, the quality of landed fish remarkably deteriorates and the current situation is unfavorable from the aspect of sanitation.

3) Because the fishing boats, that utilize TFH, handle a great amount of fishing net, net mending is essential after returning to TFH. However the net mending shed is not established while the net mending sheds at the adjoining harbours have been improved. Consequently net mending is performed at the wharf or other places between fish landings and the performance is inefficient, which cause congestion at the wharf. Net mending work also becomes harder in the burning sun.

4) Tangalle harbour office of CFHC shares the same office with Tangalle office of CFC. Presently 15 of office staff are at work in the room with approximately 48 m2, and since there is no space for partition for managers and cashier, the management work is obstructed.

5) 200 – 300 fishermen are on board in the fishing boats, which stay at TFH to prepare for departure, etc., and some of them need to have meals at TFH. On the contrary, the present canteen is temporary and there are only 3-4 tables, which does not meet the demand. Also, this temporary canteen is supposed to be demolished in order to construct the extension of the wharf being planned by CFHC.

6) There is no problem in regard with the supplies of block ice for the fishery at TFH but there are some problems of flake ice for the fish marketing. Under the present situation, as there is no facilities for flake ice around Tangalle, the crushes of block ice is utilized for the fish marketing. However, the buyers such as inboard engine fishing boats, who

trade in a great amount, are prioritized upon selling block ice, while those who trade in a small amount such as vendors for fish markets and outboard engine fishing boats are apt to miss the opportunities. At present, approximately 30 retailers and 8 shop owners of fish markets in Tangalle City visit TFH to buy fish products everyday. As a result of the interview survey on this matter, the most of answers have indicated that it is difficult to secure a small amount of ice.

7) There are presently two fuel tanks with a capacity of 6,600 liters at TFH, and a fuel truck with a capacity of 6,600 liters refuels these tanks. However, as the capacity of the fuel tanks is the same as that of the fuel truck, these tanks cannot be refueled until they become empty, and refueling procedure is inefficient. Also the existing tanks are for diesel fuel storage to refuel inboard engine fishing boats, and one of them is planned to be diverted to kerosine fuel tank in order to refuel outboard engine fishing boats that require kerosine. Therefore, as a result, the capacity of refueling diesel fuel is to be inadequate.

8) Among 200-300 fishermen who stay at TFH as aforementioned, some need to use toilets and showers inside of TFH. However, there are only one toilet and two temporary showers, so that their everyday lives are obstructed.

9) Inboard engine fishing boats, which utilize many devices, require their maintenance and repair on an everyday basis, so that it is essential that their maintenance and repair should be performed at their registered harbours. However, under the current situation, there is only one manual crane at TFH to lift up fishing boats of which sizes should be under 33 ft. and it only allows to repair around 70 of approximately 200 registered fishing boats at TFH. Also the decrepitude of the manual crane and the equipment for repair is outstanding since they have been utilized over 20 years as well as the deficiency of the required equipment, so that only simple repairs for propeller shafts, etc can be performed.

10) Because Japanese used cars are easily utilized in Sri Lanka, the utilization of insulated trucks has been progressed. At TFH, approximately 45 insulated trucks are utilized by the owners of the fishing boats registered in TFH and arrive at the harbour by turns to meet the returns of boats. In addition, motorcycles and tricycles, which are engaged in fish marketing around the adjoining areas, visit the harbours, so that the harbour is extremely crowed without any particular parking space.

11) Because navigation lights are not equipped at TFH, the safety navigation is not secured upon arrivals and departures during night.

12) According to the interview survey of 97 fishermen as users of TFH carried out during the field study, in regard with the contents of what they requested to improve, ice plant facility, extension of the wharf and boat repair facility are ranked high, and temporary accommodation for fishermen, net mending shed, facility of fuel and water supplies, navigation lights, fish marketing hall and canteen followed these.

Under these circumstances, the Government of Sri Lanka has initiated the improvement of TFH, through CFHC in charge of the operation and the management of fishery harbours in this country. First of all, in 1998, the supply system of ice and fresh water was reinforced by the implementation to extend ice storage and water supply facilities, and in 1999, the extension of the wharf, where the improvement was requested by most of the users, has begun. By the August of 2000, the length of the wharf is planned to be doubled. Based on the current situation, among the contents of improvement strongly requested by users, the Government of Sri Lanka determined to improve the storage system of ice, the supply system of fresh water and the extension of the wharf by the domestic budget in order to fulfill the services of infrastructures to the users. However, the Government of Sri Lanka has requested for Japan's grant aid assistance for the improvement of the fish marketing hall, net mending shed, the canteen, the boat repair facility, etc, because the improvement of the preceding contents were confirmed necessary through the examination of the development study (Master Plan Study for the Southern Area Development) implemented in 1997 in collaboration with the Government of Japan.

TFTC was also founded in 1972 and has provided professional training for fishery related people not only in Tangalle but also all over the southern area for a long time. National Institute of Fisheries Training (NIFT) under MFARD operate 5 local fisheries training centers. These 5 centers cover fisheries training all over the country. The territory of each center is consequently vast. The territory of TFTC is all over the southern area that comprises Aluthgama City, Galle in the southwest to Yala City, Hambantota in the southwest and spreads over 200 km in distance to the east and west. Advanced education is not available for the people engaged in fisheries and their families after the completion of primary education. Under this situation, fisheries training centers provide not only fisheries training but also the general education, such as English necessary for fishery activities, applicable to people over 17 years old and, practically, function as the organization to provide advanced education to people related to the fisheries. In addition, the recent fishing boats are operated with technical equipment such as electronic devices like GPS, various driving machines, electrical wiring which becomes more complicated etc. and the knowledge of technology and the technical training are required of fishermen, even those who are engaged in fisheries for all their lives.

Because of these backgrounds, the number of candidates for fisheries training centers is large. At TFTC, every year, 2 – 6 times more of candidates than the capacities apply for the entry. The activities of fisheries training at TFTC are prosperous as well as one in Negombo. That is because TFTC is geographically located in the center of the southern area where fishery activities are prosperous and the number of candidates for training is large. There were two courses, a fishing technician course and a fishing boat electric course, available when it was opened, various courses have been established so far and 11 courses are available at present, based on the backgrounds such as the changes of the specifications of fishing boats, development of the technology related to fishery, etc. Recently 100 students have taken courses annually. Furthermore, a marine bio resource technology course for instructors and students of adjoining junior high and high schools (annually 600 people) and the training in fishing villages for fishermen who live in the

fishing villages are implemented as well. However, because of the shortage of numbers and capacity of classrooms and practice rooms, decrepitude of training equipment, and deficiency of accommodation for students, the following problems have been raised.

1) The shortage of the number and the capacity of classrooms and practice rooms hinders from implementing the training activities as planned. In 1999, the courses that implemented as planned were only a fishing technician course (9 months course, 1 course/year), assistant fishing technician courses (2 months course, 3 courses/year) and marine bio resource technology courses (1 or 2 days course, 15 courses/year). Diving training courses (1month course, 5 courses/year) were required to decrease to 2 courses and fishing boat electric courses (1month course, 5 courses/year) were required to decrease to 3 courses through the year. In regard with ornamental fish culture courses (2 months course, 5 courses/year), marine electronic equipment courses (1 week course, 2 courses/year), marine engine training courses (3 months course, 3 courses/year), FRP fishing boat repair courses (1 week course, 7 courses/year) and fish handling courses (1 week course, 5 courses/year), as the allocation of classrooms and practice rooms was not feasible, the training required classrooms and practice rooms was unable to be implemented, so that the only 2 or 3 days practices were implemented by using the opportunity of training in fishing villages.

2) Since TFTC covers all over the southern area, a half of students are selected from those who live far away and they need to stay in Tangalle. Under the present situation, several private houses, which accommodate only 15 students in total, are provided as accommodation, and most of the students support themselves to stay. Consequently, the situation causes them to leave TFTC even though they are accepted, because they become unable to cover the all expenses on their own. In 1998, 30 % of students at a fishing technician course, that is, 60 % of those who live far away left TFTC before completing the course.

3) There are no library and self-study rooms allocated in the existing facilities, so that students are not able to prepare and review courses.

4) Most of the training equipment has been utilized over 20 years and outstandingly decrepit. There is some equipment usable such as training boats, training vehicles, fishing gear, etc. but, in general, frequent breakdown obstructs smooth training activities. Also, some equipment is lacking even though it is necessary for training.

5) The existing building utilized for classrooms and practice rooms is the western style building for residence and it is inappropriate for training in term of the specifications and the allocation of the rooms.

Under these circumstances, the Government of Sri Lanka planned to remove THTC through NIFT in order to attempt to improve THTC. As the existing facilities are planned to be used as the office of FEO, the extension of the facilities has begun since 1999. However, the facilities are supposed to be used for training, including the extended parts, until the removal is completed. Because a new site for its removal has been secured, the

Government of Sri Lanka has requested Japan's grant aid assistance to implement the construction of the new training center and the renewal and the procurement of decrepit training equipment, as the improvement of them are required through the examination on the development study aforementioned.

2-1-2 Objective of the Project

In order to attempt to solve the preceding problems on the fishery activities in Tangalle, in regard with TFH, this Project is planned to reinforce the measures to improve TFH by the construction of land facilities such as fish marketing hall, net mending shed, a canteen, etc. and boat repair facility, and also, in regard with TFTC, it is planned to assist the fisheries training activities in Tangalle implemented by the Government of Sri Lanka with the arrangement of classrooms, practice rooms and accommodation accompanied with removal, and the renewal of decrepit training equipment. Through the improvement of land facilities of TFH and the construction of TFTC in Tangalle, this Project intends to maintain and promote the fisheries development in the southern area where is considered significant for the coastal fisheries in Sri Lanka. As the Project Design Matrix (PDM) is shown in Table 2-1, upon the promotion of the coastal fishery in the southern area, it is clarified that the contents, which are not implemented by Sri Lanka despite of the requirement, are the improvement as aforementioned.

Table 2-1 Project Design Matrix (PDM) Related to the Project

Narrative Summary	Objectively Verifiable Indications	Means of Verificators	Important Assumptions
Overall Goal 1. Improvement and maintenance of the nutrition of the people 2. Promotion of living standards of the people related to the fishery industry.	1. The increase in the contribution of fish as the resources of animal protein 2. The increase of fishermen's income and improvement of the standard of education.	1. Statistics of consumption by the resources such as fish, etc. 2. Statistics of housekeeping of families related to the fishery by inquiring them	No extreme progress on the development of livestock industry
Project Purpose The development of the coastal fishery in the southern area	The increase of the contribution in the southern area to the numbers of fishing boats and fishermen, the yields of fishery products and prices.	Statistics of fishery by area, related to the numbers of fishing boats and fishermen, yields of fishery products and prices.	No extreme changes of the social environment in the northern area.
Outputs 1. The establishment and the reinforcement of the base for the fishery operation 2. The improvement of the fish marketing system 3. The maintenance of the current fishery activities by the maintenance and the improvement of the technical standard of the fishermen, and training the potential fishermen and securing the sources of fishery activities in the future 4. The establishment and reinforcement of the fishery administrative system for the promotion of the fishery industry	1-1. The comparative increase of the number of fishery harbours in the southern area. 1-2. The fulfillment of the contents of facilities of fish landing and preparation for departure at fishery harbours. 2-1. The comparative increase of fishery products from the southern area. 2-2. The fulfillment of the contents of facilities related to fish marketing at fishery harbours. 3. The increase of students related to fisheries training center. 4. The vigorousness of the activities of FEO.	1-1. Statistics of the number of fishery harbours and its scale by the area. 1-2. Comparison with the related contents of facilities among fishery harbours. 2-1. Statistics of fish marketing by the area. 2-2. Comparison with the related contents of facilities among fishery harbours. 3. The numbers of trainings by the courses and the fisheries training centers. 4. Annual reports from TFEO.	No extreme changes of the environments for the construction of domestic fishing boats and the procurement of fishing gear to support the smooth additional investment into the methods of fishing operation.
Activities 1-1. The construction of the new fishery harbour in the southern area. 1-2. The fulfillment of facilities related to fishermen such as the wharf , fuel tank and dispenser and water tank, net mending shed, boat repair, canteen, toilets, etc. of the existing fishery harbours. 2-1. The fulfillment of the fish marketing hall and facilities related to ice plants for fish marketing at the existing fishery harbours. 2-2. The improvement of the quality of the fish landing products by the introduction of the insulated boxes. 2-3. The stabilization of measurement during trades of fishery products. 3-1. The construction of necessary scale and numbers of classrooms, practice rooms and accommodation at TFTC. 3-2. The renewal of the decrepit and tedious training equipment. 4. The extension and the construction of FEO	Inputs Japan 1. The reinforcement and the construction of land facilities, etc at TFH. (Fish marketing hall, net mending shed, canteen, administration office, boat repair facility, ice plants for fish marketing, etc) 2. The improvement of fish marketing system in TFH. (the introduction of ice plants, insulated boxes and platform scales) 3. The construction of TFTC at new site. (Classrooms, practice rooms, accommodation, canteen, library, etc.) 4. The procurement and the installation of training equipment. 5. Related consulting services	Sri Lanka 1. The construction of new fishery harbours such as Kudawella Fishery harbour. 2. The extension of the wharf at TFH. 3. The construction of facilities at fishery harbours except TFH. 4. The management of TFH. (The number of current personnel: 31, the number of additional personnel: 37) 5. The management of TFTC. (Current system) 6. The ground leveling of the construction site, the construction of exterior wall and gate, measures of tax exemption, etc. 7. The extension of FEO	No extreme social and economic changes to prevent the smooth implementation of Japan's grant aid scheme. Pre-Conditions No objection from fishermen and vendors for fish marketing against the project.

2-2 Basic Concept of the Project

2-2-1 Examination on the Request

The following components are targeted for the examination of this Project, which is confirmed by discussion with Sri Lanka side:

(1) Improvement of TFH

a. Fish marketing hall with fish marketing hall equipment
b. Net mending shed
c. Administration office
d. Canteen
e. Ice plant
f. Facilities for fuel tank and dispensers
g. Public toilets and showers
h. Boat repair facility (slipway, workshop, workshop equipment, crane)
i. Parking space
j. Navigation light
k. Water tank
l. Surface repair of wharf
m. Waste water disposal
n. Yard lighting

(2) Improvement of TFTC

1) Fishery training facilities consisted of classrooms, practice rooms, a library, an administration office, a principal office, an instructors room, student accommodation, etc.
2) Training equipment

The followings will show the reasons for the examination on the above-mentioned target components of the Project by the basic design study team.

1) Improvement of TFH

① Fish Marketing Hall

As landed fish is often loaded directly onto insulated trucks on the wharf, it is not considered practical to restrict immediately all fish dealing within the fish marketing hall. However, the quality of landed fish is deteriorated much under the burning sun and with placing directly on the wharf. It is necessary to improve such a situation for handling fish hygienically. At least, the facilities are required for the small scale distribution to suburbs of Tangalle, and the trades through sales

agents at TFH. Therefore, the construction of an open fish marketing hall with a handling capacity of 10-20% of the landed fish, and the introduction of insulated boxes and platform scales as the equipment for a fish marketing hall are examined in order to maintain the quality of the landed fish.

② Net Mending Shed

At present, since there is not any specific facility for net mending, net mending is performed on the wharf, which causes the extreme congestion on the wharf. Consequently, the open space of net mending shed should be established and the improvement of the net repair process should be attempted. Because the fishery in Sri Lanka utilize a great amount of fishing nets, the scale of the facility will be enormous if the scale is determined simply based on the amount of fishing nets to be used. Therefore, the facility should be examined in reference to the scale of the similar existing facilities at fishery harbours nearby in the southern area. Then, based on the determined scale, the procedures of repairing nets is reviewed.

③ Administration Office

The administration office should be secured in order to execute the appropriate management of TFH. Therefore, it is examined that the administration office of CFHC at TFH is newly established. Also, because it is preferable that office for the harbour management should be located where enables to overview the harbour, the facilities are examined to be sited on the second floor of the fish marketing hall building. Moreover, a meeting room is examined for the regular conferences of TFH operation.

④ Canteen

It is important to provide facilities for fishermen staying in the fishery harbour in order to live a daily life such as meals, etc. in the harbour without any inconvenience. Therefore, the establishment of new canteen mainly for fishermen is examined. A one-storied building, as the style of facility, is examined in order to make it accessible, because it is expected that many fishermen utilize the facility.

⑤ Ice Plant

In order to maintain the quality of the landed fish after fish landing, it is necessary to assure ice supply for fish marketing. In this connection, in other fishery harbours in the southern are such as Galle, Mirissa, etc., flake ice plants have been equipped recently for the fish marketing. Therefore, the flake ice plant is examined to be installed in the fish landing hall building, applicable to marketing agents within and out of the harbour and the fishermen of the outboard engine fishing boats who need a small amount of ice.

⑥ Fuel Tank and Dispenser

In order to realize effective refueling to the fuel tanks and to assure kerosine supply to outboard engine fishing boats, installation of one set of fuel tank and dispenser for diesel oil, the capacity of which will improve the timing of refueling with fuel supply trucks, is examined.

⑦ Public Toilets and Showers

It is essential to provide facilities that allow fishermen who stay at TFH to live their everyday lives, that is, excretion, bathe, etc. inside of TFH without any problem. Therefore, the public sanitation facilities, of which contents are toilets and showers mainly for fishermen are examined.

⑧ Boat Repair Facility

In order to increase the operation ratio of fishing boats, it is important that boat repair at their registered harbours is ensured. Therefore, it is examined for the construction and improvement of lift-up facilities (slipway and crane), winch house, workshop and repair equipment for regular repair work, applicable exclusively to the present fishing boats registered in TFH.

⑨ Parking Space

Since there is no particular parking space and congestion at TFH is extreme at present, the improvement of the situation should be intended. Accordingly, the allocation of parking space, which brings appropriate traffic lines, is examined.

⑩ Navigation light

It is significant that the safe navigation of fishing boats is ensured, so the allocation of navigation lights at the mouth of the harbour is examined.

2) Improvement of TFTC

① Classrooms

The arrangement of classrooms, required for the appropriate implementation of 11 courses required and planned at TFHC, is examined. As it should be taken into consideration that the numbers of students and the terms of courses are varied depending on courses, the allocation to utilize classrooms with different capacities for each course is examined.

② Practice Room

Accompanied with the current situation that allocates 3 different practice rooms according to the contents of practice, the arrangement of 3 practice rooms is examined. The scale and the specifications of each room is examined by considering the allocation of training equipment installed in the rooms.

③ Accommodation

For the fishing technician course and the marine engine training course that contain a larger number of the students and take longer terms among 11 courses, the half of students are selected from those who live too far to come to school from their home and they are required to stay at TFTC. Then, the accommodation necessary for these students to stay at TFTC is examined. In addition, the accommodation for instructors who participate from the distant areas is examined.

④ Canteen

The canteen is necessary for students and instructors for taking lunch during the limited lunch time and for the students staying at TFTC for daily use. Then, the canteen is examined based on the utilization by students and instructors for lunch and students stayed at TFTC for daily use.

⑤ Training Equipment

Based on the range of devices and technical standards that are presently utilized for the fishery by fishing boats around Tangalle area, the introduction of insufficient portion of equipment for audio visual equipment, navigation training equipment, fisheries training equipment, security training equipment, engine and engineering training equipment, electrical training equipment, diving training equipment, and equipment of classrooms, is examined. The existing training equipment, which still can be utilized, is excluded from the examination.

Also, the following items are included in the request application for the Project by Sri Lanka side, apart from the items above, but these are excluded from targets for examination by this Project for the reasons mentioned:

1) Items related to TFH

① Accommodation for fishermen

It was requested as the facility to accommodate fishermen of seasonal fishing boats during the preparation period for departure at TFH. However, compared with the other items of the request, its users are limited, and also, it seems appropriate to follow the current ways such as staying in the boats, because the length of their stay is not so long, so that it was excluded from the targets of examination.

② Fishermen Community Service Center

It was requested as the facility that consists of several retail counters of fishing materials to fishermen. However, because the planned site for its construction is away from TFH, the facility is less related to TFH, its smooth management may be difficult, it users are limited and it is categorized as facilities mainly for commercial activities, it was excluded from the targets for examination.

③Block Ice Plant

It was requested as the ice plant facility for the fishing operation. However, because the existing block ice plant is on operation in TFH, the large block ice plant with a daily capacity of 75 tons is under construction nearby, and there are less problems of the ice supply for the fishery for the time being, it was excluded from the targets for examination. However, the flake ice plant as the facility of the ice supply for fish marketing is targeted for examination.

④ Generator

It was requested as a backup power supply for the facilities greatly affected by the obstruction of operation upon power failures. However, power failures are not frequent and they do not last long and there is no serious hindrance to the operation of the existing facilities by power failures, so that it was excluded from the targets for examination.

⑤ Refrigerated Truck

It was requested as a vehicle for a long-distance transportation of landed fish. However, in Sri Lanka, the utilization of the insulated trucks for distribution is advanced, a great number of them are already utilized, new ones appear to be obtainable and, not a refrigerated truck but a insulated truck is sufficient enough for the transportation when the distance is approximately 200km, so that it was excluded from the targets for examination.

⑥ Office Equipment

Office supplies such as desks and chairs, book shelves, copy machines, etc. were requested. However, according to Japan's grant aid scheme, the procurement of these supplies is basically conducted by the recipient government, so that these were excluded from the targets for examination. The scheme applies to the administration office of TFTC as well, but desks and chairs equipped in classrooms are examined.

2) Items related to TFTC

① Auditorium

It was requested as the facility to hold ceremonies such as graduation, etc., including the audio system. However, the utilization will not be frequent, and it will be considered sufficient to utilize large rooms or outside facilities in order to hold ceremonies such as graduation, etc., so that it was excluded from the targets for examination.

② Bus

It was requested as the transportation for instructors and students to commute and for outside students to attend the marine bio resource technology course. Because the existing bus can still be utilized, it was excluded from the targets for examination.

③ Training boat

It was requested to be used onboard training through fisheries trainings. However, the existing training boat can still be used, so that it was excluded from the targets for examination.

2-2-2 Basic Concept of the Project

(1) Improvement of TFH

1) The points of the basic concept related to TFH

① The improvement should be executed, focused on the present conditions of fishing boats that utilize TFH.

② The expansion of facilities and equipment, that is unable to cope with the usage because of decrepitude and increase of demand, will be executed. (Ice plants, fuel tank and dispenser, canteen, administration office, parking space, boat repair facility, etc.)

③ The construction of the new fishery harbour facilities, which were improved at fishery harbors nearby, will be executed. (Fish marketing hall, net mending shed, navigation lights, etc.)

Based on the points aforementioned, the required scale, style, specifications, etc., of each facility and equipment, which are mentioned in the Clause 3-2-1, are examined as follows.

2) Examination on the Utilization by Fishing Boat

In terms of the examination on the utilization of TFH by fishing boats, it is necessary to consider the relation with KFH. The construction of Kudawella Fishery Harbour (KFH), which is under construction by the loans from ADB, is scheduled to be complete by the end of 2000. After its completion, the scale of these two harbours will be almost the same, and sited in 10 km away from each other, so that competition for the utilization of them will be expected. At present, among 204 inboard engine fishing boats registered in TFH, the owners of 68 boats live close by Kudawella. The utilization plan of KFH by ADB estimates that 30 boats at maximum are to transfer to KFH from TFH upon its opening and the figure is equal to approximately 40% of 68 fishing boats aforementioned. On the other hand, according to the interviews during the survey of 20 owners who live by Kudawella, about 60 % of all answered not to move to Kudawella upon its opening and the result assures the preceding estimate.

Consequently, 30 fishing boats, which are estimated in the utilization plan of KFH, are estimated to be transferred from TFH, when the utilization starts upon TFH opening after the implementation of the Project. On the other hand, the other fishing boats that utilize TFH will continue the utilization after the implementation of the Project, because they have utilized it for a long time and a certain custom to purchase landed fish is established. By considering the points aforementioned, the numbers of fishing boats that utilize TFH after the implementation of the Project, divided by scale and season, are shown in Table 2-2.

Table 2-2 Numbers of fishing boats utilize TFH by size (unit: numbers of boats)

	Present total of registered fishing boat at TFH	Estimated transfers from TFH to KFH	Total of registered fishing boat at TFH	Seasonal fishing boats	Total of fishing boats in TFH Utilization (Oct.-Mar.)	Total of fishing boats in TFH Utilization (Apr.-Sep.)
Inboard engines	204	30	174	146	320	174
28-29 ft	16	1	15	11	26	15
30-34 ft	136	22	114	97	211	114
35-39 ft	47	6	41	34	75	41
Over 39ft	5	1	4	4	8	4
Outboard engines	6	0	6	0	6	6
Total	210	30	180	146	326	180

Note:

1) The breakdown by size of fishing boats estimated to transfer to Kudawella is calculated by the ratio by size of fishing boats registered in TFH of which owners live around Kuwadella.
2) The number of the seasonal fishing boats between October and March is the total number of registered fishing boats at TFH and seasonal fishing boats

In addition, the daily number of fishing boats that visit TFH are shown in Table 2-3 and Table 2-4. Between October and March when the registered fishing boats and seasonal boats utilize TFH, 11 (6.7 + 4.9) fishing boats with the size of 28-29 ft., 16 (8.9 +7.5) with 30-34ft., 3(1.8 + 1.5) with 35-39ft., and 3 of outboard engine fishing boats, 33 in total, will visit TFH daily, and one fishing boat over 40ft, will visit TFH every 5 days. Also between September and April when only the registered fishing boats utilize TFH, as shown in Table 2-3, 7 fishing boats with the size of 28-29 ft., 9 with 30-34ft., 2 with 35-39ft, and 3 of outboard engine fishing boats, 21 in total, will visit TFH daily, and a fishing boat over 40ft, will visit TFH every 10 days.

Table 2-3 The number of the fishing boats visit TFH per day

	Number of fishing boats for fish landings (boats)	Annual cycles of fish landings per boat (cycle/year)	The number of visits per day (boats)
Inboard engines	174		
28-29 ft	15	160	6.7
30-34 ft	114	28	8.9
35-39 ft	41	16	1.8
Over 39ft	4	8	0.1
Outboard engines	6	160	2.7

Note: The figures are calculated by multiplying the number of fishing boats for fish landings by the annual cycles and divided by 360 days.

Table 2-4 The number of seasonal fishing boats visit THF per day

	Number of fishing boats for fish landings (boats)	Annual cycles of fish landings per boat (cycles/year)	The number of visits per day (boats)
Inboard engines	146		
28-29 ft	11	80	4.9
30-34 ft	97	14	7.5
35-39 ft	34	8	1.5
Over 39ft	4	4	0.1

Note: The figures are calculated by multiplying the number of fishing boats for fish landings by the annual cycles and divided by 180 days.

3) Estimated Amount of Fish Landings

With taking it into consideration that 30 fishing boats are estimated to transfer from TFH to KFH, the figures are resulted as shown in Table 2-5 and Table 2-6, by calculating the amount of fish landings. Accordingly, the amount of fish landings by seasonal fishing boats is estimated to be annually 2,678 tons, and the amount by fishing boats registered in TFH is estimated to be 6,518 tons, and 9,196 tons of fish landings in total is annually expected. On daily basis, the average amount of fish landings between October and March is 33 (18.1 +14.9) tons per day, and between April and September is 18.1 tons per day.

Table 2-5 The amount of fish landings by the fishing boats registered in TFH

	Number of boats for fish landings (No. of boats)	Annual total of the operation days (days)	Average days per operation (days)	Annual cycles of fish landings per boat (cycle/ year)	Average amount of fish landings per operation (Kg)	Annual amount of fish landings (Ton)
Inboard engines	174					
28-29 ft	15	160	1	160	500	1,200
30-34 ft	114	220	8	28	1,200	3,830
35-39 ft	41	220	14	16	2,000	1,312
Over 39ft	4	220	27	8	4,000	128
Outboard engines	6	160	1	160	50	48
Total	180					6,518

Note: The average amount per day is 18.1 tons (6,518 tons / 360 days), and 360 days are considered as 1 year.

Table 2-6 The amount of fish landings by the seasonal boats

	Number of boats for fish landings (No. of boats)	Annual total of the operation days (days)	Average days per operation (days)	Annual cycles of fish landings per boat (frequency/year)	Average amount of fish landings per operation (Kg)	Annual amount of fish landings (Ton)
Inboard engines	146					
28-29 ft	11	80	1	80	500	440
30-34 ft	97	110	8	14	1,200	1,630
35-39 ft	34	110	14	8	2,000	544
Over 39ft	4	110	27	4	4,000	64
Outboard engines	0	80	1	80	50	0
Total	146					2,678

Note: The average amount per day is 14.9 tons (2,678 tons / 180 days), and 180 days are considered as a half year.

Presently in Sri Lanka, upon the renewal and the construction of a decrepit fishing boat, the boat is replaced by the larger size of boat, so that the size of fishing boats that utilize TFH is expected to be enlarged in the future. The larger size of fishing boats bring the larger amount of fish landings, but it will not be so easy to secure the sufficient budget, and the abrupt increase of consumption will not be so easy to be expected because the increase of fish consumption depends on the increase of the people's income. By considering those points, the increase of fish landings is not simply expected. Consequently, the amount of fish landings related to the Project is considered as the level over 9,000 tons. Regarding the marketing and the distribution of landed fish are expected to continue the current status that accounts for 5% for Tangalle area, 10% for Colombo markets, and 85 % for inland markets.

4) Fish Marketing Hall Building

i) Fish Marketing hall

The dealing of landed fish in Sri Lanka is basically traded in direct negotiation**.** In the fish marketing halls in fishery harbours in the southern area, as shown in Fig. 2-1, the agents put 1-2 m3 capacity of the wooden fish boxes side by side around the back area of a marking hall, and purchase from fishermen and sell to retailers. In general, in the morning, fishermen place landed fish on floor in front of fish boxes, that is where is closer to the fish marketing hall, that stretches side by side, and prepare for sales to agents. Around noon, retailers compare products in those boxes, and thus business is carried out. This style of trade has created the custom to place landed fish directly on the wharf to deal with the sales where a fish marketing hall is not established like TFH. It is considered that this custom of trade will not be changed immediately, so that the style of the fish marketing hall to be constructed by the Project applies correspondingly to this custom.

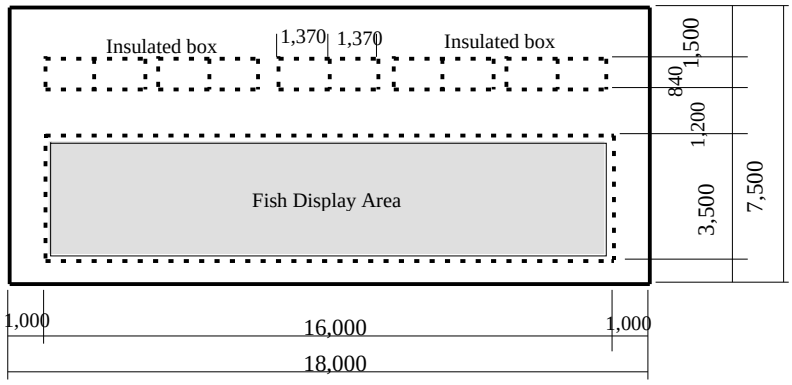
Regarding the examination on the required scale of the fish marketing hall, currently 5-10 agents are in dealing, but because the utilization of the fish marketing hall requires fees, so that the number of the users is estimated at minimum, that is five, and the length of the facility is determined by the calculation of the space for each agent to put the insulated boxes. Also, in terms of its depth, the space for the insulated boxes towards the backside is secured and the space for fishermen to put landed fish is added.

Regarding the insulated boxes, the capacity of the current boxes is too big and it is insanitary, because the blood and water are not wiped properly, that causes to lower the quality of fish. Therefore, the Project intends to improve the circumstances of the fish marketing by introduction FRP insulated boxes, which have high performance of preservation and are easily cleansed. The capacity of the insulated boxes, is to be approximately 500 ltr by considering the efficiency of cleaning.

Because the insulated boxes with a capacity of 500 ltr. accommodates only 250 kg of fish, two boxes per each agent are equipped, that enables to separate generic fish from high-priced fish, and the improvement of the additional value to landed fish with the high quality and high price will be promoted. By taking those aforementioned into consideration, the number, size and scale of boxes are estimated as follows:

Insulated boxes: Number: 10 (5 agents x 2 boxes)
Specifications: FRP insulated box, capacity of 500l
Size: 1,370mm (L) x 840mm (W) x 700 (H)
Size of fish marketing hall: 18m(W) x 7.5m (D) (by: Fish marketing hall division plan)

Fig. 2-1 Fish marketing hall division plan



Note: calculation of the area for fish display area.
Between April and September, 18.1 tons of landed fish per day on an average, and, between October and March, 33 tons of landed fish landing per day on an average are shown in Table 2-5 and Table 2-6, but it is not practical to consider that all of them are brought in the fish marketing hall. That is because plenty of fish are loaded directly into the insulated truck at the wharf.

By considering the situation of the fish marketing and the distribution at TFH, it is appropriate that 10 to 20 % of landed fish are estimated to be brought in the fish marketing hall. Therefore, the amount is estimated 3-4 tons, between April and September, and 3-6 tons, between October and March. The cycles of usage increase at the fish marketing hall where landed fish are plenty, and approximately 1 hour is required for one cycle of trading and accordingly 2-4 cycles per day are considered practical. By the examination on the conditions aforementioned, approximately 1ton of fish per day as on an average is put directly on the fish display area. The main species is mostly skipjack, and the average size of them at TFH is 20cm wide, 70cm long and 2.5kg. Accordingly the area is calculated as follows:

The converted numbers of skipjack: 400(1000kg/2.5kg)
The area occupied by one skipjack: 0.14m2 (0.2m x 0.7m)
Fish display area: 56 m2 (400 x 0.14**)**
Incidentally, 3.5 m, the size of the depth at the direct space for fish landed, is to be similar to 4-5 m, the size of the depth of the place where fishermen put fish directly on the wharf, so that the specification will be appropriate in regard to the efficiency of usage. Also, the utilization of the fish marketing hall is concentrated in the morning, and in the afternoon there could be space available. In this case, it is effective that the direct space for landed fish is utilized as net mending shed.

ii) Ice Plant

The Project will establish the system to enable those who want to buy a small amount of ice, such as retailers, including retailers in the fish market in the city, small scale distributors such as agents in TFH and fishermen of outboard engine fishing boats to purchase a small amount of ice. As the specifications of the ice plant, it is most effective to install the flake ice plant because flake ice allows to sell a small amount of ice and is appropriate for fish marketing.

By examination of the required amount of ice at TFH, the amount is estimated as follows:

The required amount of flake ice per day: 4,590kg
(Breakdown)

The required amount for retailers around TFH (bicycle, motorcycle)	: 30 persons x 50kg =1,500kg
The required amount for agents in TFH (in fish marketing hall)	: 5 persons x 500kg = 2,500kg
The required amount for retailers of fish market in Tangalle City	: 8 persons x 100kg = 800kg
The required amount for outboard engine fishing boat	: 3 boats x 50kg =150kg
	Total 4,950kg

(Basis on the calculation of the required amount of flake ice)
Retailers and agents: The number of those who worked at TFH when the field survey was executed are adopted.
The rate of usage between fish and ice: 1:1
The amount of purchase by bicycle and motor cycle: approx. 50kg in the capacity of 110 ltr. (40cm x 40cm x 70cm) fish box.
Agents in TFH:250kg in the capacity of 500 ltr. Insulated box each. Sales of 500 kg in total of two boxes

per person
Retailers of fish markets in Tangalle city: sales of approx. 100kg of fish per person per day
Outboard engine fishing boat: 3 visits per day, the average amount of fish captures 50kg

By the figures above, the required ice plant and the scale of ice storage are calculated as follows:

Capacity of daily production of ice plant: 5 tons
Ice storage capacity: 10 tons (for 2 days)

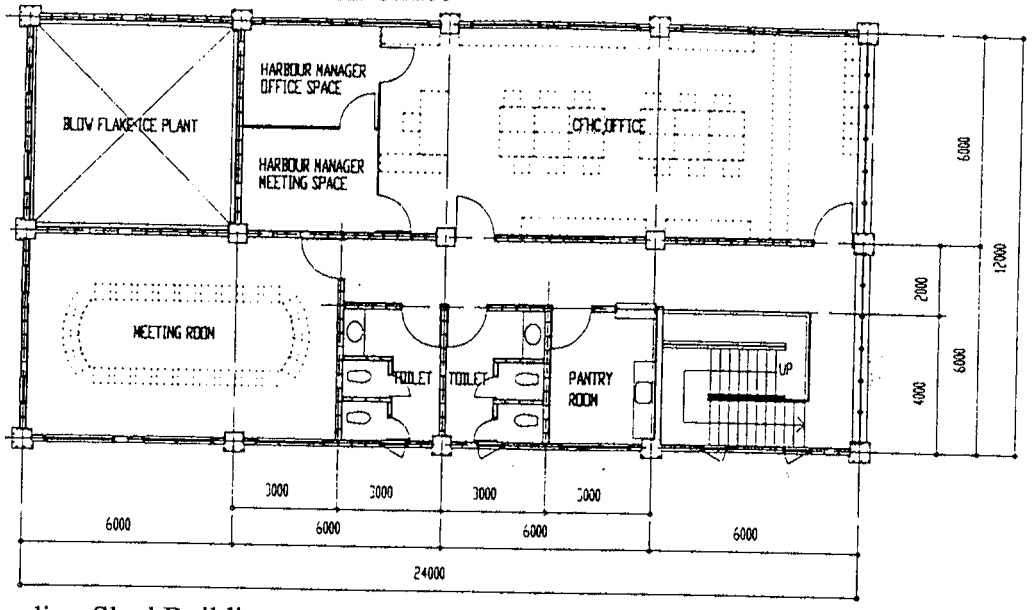
iii) An administration office

The administration office constructed by the Project is to be utilized by CFHC. The administration office should be sited on the 2nd floor of the fish market hall building in order to overview the inside of the harbour for the management reasons. According to functions, it is divided into rooms for the harbour manager, accountants, and other staff and a waiting room for workers. As for field works, the fuel supplies office, the field office in the workshop at the boat repair facility and parted space in a machine room at the flake ice plant should be sited around the field. Also the required area of each room and the basis of its calculation are shown in Table 2-22 subsequently. However, the unit area per person in each room is based on the followings:

① Administration Office
By referring to 5m2 – 15m2 per person as the standard unit area for a main room in Japan (Architectural Standard Specifications by the Architectural Institute of Japan), the unit area per person is determined as below. The floor plan of administration office is shown in Fig. 2-2
1) Room for harbour manager: 10m2/person
2) Rooms for accountant, officers, etc.: 6m2/person
3) Tentative rooms such as waiting room for workers, etc.: 3m2/person

② Meeting room
By referring to 2m2 – 3m2 per person as the above mentioned standard unit area in Japan, the are of the meeting room is determined by the unit area below 2.5m2 per person.

Fig. 2-2 Floor Plan of Administration Office



5) Net Mending Shed Building

Because each fishing boat loads the great amount of net for its operation, the scale of net mending shed would be too large if the scale was determined by the amount of net on board. Therefore, it is practical to determine the scale of the facility referred to the scale of similar facilities at fishery harbors in the southern area. Incidentally, the scale of the wharf, the number of registered fishing boats and the scale of the net mending shed building are shown in Table 2-7.

Table 2-7 The scale of the wharf, the number of registered fishing boats and the scale of net mending shed building of each fishery harbour in the southern area

	Beruwala	Galle	Mirissa	Kirinda	Puranawella	Tangalle
The number of registered fishing boats	359	323	76	133	299	210
The length of the wharf (m)	220	335	250	170	155	220
Area of the net mending shed (m2), (floor plan)	288 8m X 36m	250 10m x 25m	126 7m x 18m	0	108 6m x 18m	0

Note: The length of the wharf at TFH is the length after the completion of wharf extension. (source: CFHC)

By the comparison and examination on the conditions above, it is appropriate to determine the scale of the net mending shed in reference with the scale in Mirssa and Puranawella Fishery Harbours since the scale of the harbours, the number of registered fishing boats, etc are similar. However, as a result of the interview survey on the utilization efficiency of the current facility at Mirissa and Paranawella Fishery Harbours, it is confirmed that the area is not big enough to store a unit of net, and especially the width is inadequate. Therefore, the scale of the net mending shed by the Project is determined as below so as to get a little bit more space rather than these two fisheries harbours.

Net mending shed building: Area 180m2, Floor plan 10m (W) x 18m (L)

Incidentally, the operation of a multi-day fishing boat, as the main operation, utilizes 20 to 60 panels of net, of which size is 10m deep and 200m long. It is necessary to secure 10m in width in the floor plan when the depth of net is considered. On the other hand, net required its repair is around 10% of net utilized by each operation. Therefore, 2-6 panels per boat will require repairs and, in case of 20 visits, 100 panels of net in total will require repairs. However, the scale of the facility aforementioned will be able to repair about only 20 panels per day, so that it is preferable to operate the facility by attempting to select the users by means such as collecting utilization fees from users. Also it is effective to utilize unoccupied space of the fish marketing hall in the afternoon and night. On the contrary, as the net mending shed would happen to create unoccupied space in the morning while the fish marketing hall is crowded, in this case, it is effective to utilize the net mending shed as a supplementary fish marketing hall.

6) Canteen Building

The main users of the canteen are fishermen. The number of fishermen visit TFH per day, which is calculated by the number of fishing boats and the number of its crew, is shown in Table 2-8, but the number of target users of canteen is calculated by multiplying this number by 10 days as the average length of their stay.

Table 2-8 The number of fishermen visit TFH per day

	The number of fishermen per boat (persons)	The numbers of visits of boats and total fishermen per day bet. Oct and Mar.		The numbers of visits of boats and total fishermen per day bet. Apr. and Sep.	
Inboard engines		boats	persons	boats	persons
28-29 ft	4	11	44	7	28
30-34 ft	5	16	80	9	45
35-39 ft	6	3	18	2	12
Over 39ft	8	0.2	2	0.1	1
Outboard engines	1	3	3	3	3
Total			147		89

The number of users of the canteen per day is calculated by adding related personnel and agents into fishermen as below. However, 20 % is set up as the utilization rate because it is considered that only a part of the target users utilize the canteen.

① Fishermen:
April to September:
89 persons x 10 days (staying days) x 0.2 (utilization rate) = 178 persons
October to March:
147 persons x 10 days (staying days) x 0.2 (utilization rate) = 294 persons

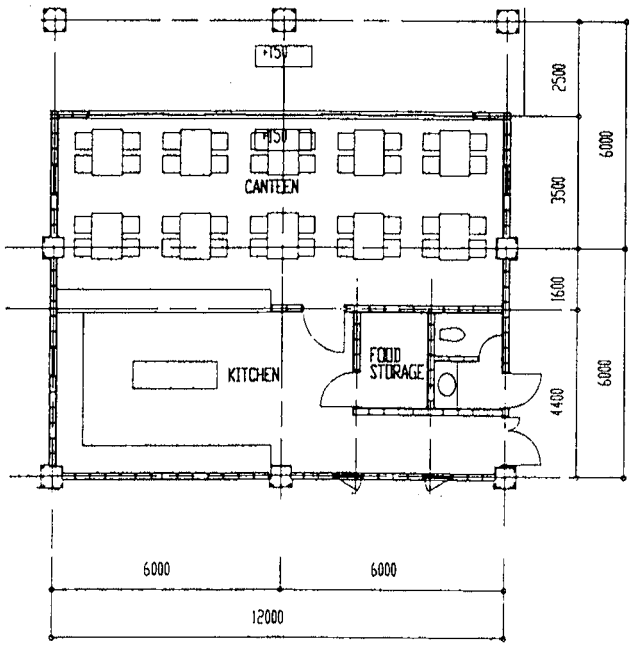
② Personnel related to the fishery harbour:
CFHC personnel 68 persons x 0.2 (utilization rate) = 13 persons.

③ Agents, etc.: 10 persons x 0.2 (utilization rate) = 2 persons.

The totals of the target numbers above are as follows:
Between April and September: 178 persons + 13 persons + 2 persons = 193 persons
Between October and March: 294 persons + 13 persons + 2 persons = 309 persons

When more than 10 cycles of utilization per day is assumed, the number of required seats is 20 – 31 seats on average, but more seats are required during lunch time. On the other hand, by considering the present situations of Beruwala Fishery Harbour (approx. 40 seats), Galle Fishery Harbour (approx. 50 seats) and Mirissa Fishery Harbour (approx. 60 seats), the number of the seats inside of the facility by the Project is determined 40, and the style that allows to add about 10 seats in the outside of the facility is examined. The floor plan of canteen building is shown in Fig. 2-3.

Fig. 2-3 Floor Plan of Canteen Building



7) Public Toilets and Showers

The main target users are fishermen and agents. By referring to the basis on calculation of number of target users in the clause of 6) Canteen Building aforementioned, the numbers of target users are as follows:

Between April and September: 178 persons + 2 persons = 180 persons
Between October and March: 294 persons + 2 persons = 296 persons

By referring to the instance of field office of which facilities are utilized several times per person, in the statistical chart of the utilization of sanitary fixture in Japan, 2 of stools, 2 of urinals and 2 of washhand basins are required for the numbers above. By considering the existing public restroom (with one stool), the number of new sanitary fixture is 1 of stool, 2 of urinals and 2 of washhand basins. Because urinals are not accustomed to the utilization of public restrooms in Sri Lanka, the Project will install 3 of stools and 2 of washhand basins.

On the other hand, because the target users of showers are mainly fishermen, the number of target users per day is 178 – 294. However, the facility will require fees for its utilization, so that not all everybody prefers using the facility. Therefore, as the number of the actual users is assumed to be a half of the number of the potential users, it is determined 118 of which number is half of 236 as the average number of potential target users. By estimating 10 minutes for the length of its usage per person and 8 hours for the period for utilization, later than afternoon, the number of showers is calculated as follows: 118 x 10mins. /480mins. =2.4. Therefore the Project installs 2 shower booths.

8) Boat Repair Facility

i) Lift-up Equipment

Because fishing boats are required lift-up for repair, either slipway or crane, or both of them are required to be equipped. The selection of lift-up equipment and the calculation of its scale are processed as follows:

① The calculation of the cycles of annual lift-ups and the occupation period of lift-ups by the size of fishing boat

② The examination and selection on the method of lift-ups

③ The examination on the scales of required equipment

① The calculation of the cycles of annual lift-ups and the days of lift-ups by the size of fishing boat

In terms of lift-ups of fishing boats for repair and maintenance at the fishery harbours around Tangalle, the fishing boats below 33 ft are lifted up twice or 3 times a year on average, and the fishing boats over 33ft are lifted up once or twice a year on average for cleansing the bottom of boat, etc., stuck with seaweed and inspection and maintenance of propeller shaft bearings. Incidentally, according to the records of lift-ups between January and August (214 days) in 1999 at TFH, applicable to 72 registered boats below 33 ft. 105 lift-ups in total (including 36 hang-ups) were executed, and the annual frequency of lift-ups per boat is approximately 2.5.

105 hang-ups and half hang-ups ÷ 72 boats x (365 days ÷ 214 days)
= 2.48 lift-ups/year • boat

Therefore, 2.5 lift-ups per boats are annually estimated, in regard with fishing boats below 33 ft. In addition, the operation period per lift-up is estimated to be 2 days, according to the current situation as 2-3 days for lift-up and 1 day for hang-up. On the other hand, in regard with fishing boats over 33ft., the frequency of lift-ups is annually 1.5 lift-ups, based on the average frequency of lift-ups at the adjoining fishery harbours, and the occupation period per lift-up is 3days/boat, because a hull is larger and its repair requires more time than small boats.

As estimated above, the total days of the occupation period for lift-ups per year at the lift-up equipment that is utilized by the registered fishing boats at TFH after the implementation of the Project, are 818 days, as shown in Table 2-9.

Table 2-9 The calculation of the cycles of lift-ups and total days of occupation period by the size of fishing boat.

Size	Registered boat numbers	Annual lift -ups	Days of the occupation period per lift-up	Total days of the occupation period for lift-ups
28 – below 32ft.	69	2.5	2	345
34 ft.	60	1.5	3	270
Over 34ft.	45	1.5	3	203
Total	174			818

Note: The total days for lift-ups are multiplied the annual lift-ups by the days per lift-up.

② The examination and selection on the method of lift-ups

As the method of lift-up, slipway is general, but in Sri Lanka a crane truck is also utilized to lift up fishing boats that is one of effective methods for smaller scale fishing boats. However, in regard with fishing boats over 34 ft., because of their hull structures and strength, it is difficult and dangerous to hang up them by a crane, so that slipway is required. . Therefore, the Project will adopt a slipway for the fishing boats over 34 ft. and hang-ups by a crane truck for other fishing boats.

③ The examination on the scales of required equipment

For 818 days, the required days of occupation period for lift-ups as shown in Table 2-9, slipway for one boat is assigned for lift-ups of fishing boats over 34 ft., a crane truck is assigned for lift-ups of the other fishing boats, and moreover the reserve of lift-up of slipway is assigned for lift-ups of 34 ft. type fishing boats. In that case, the allocation of each method appropriately meets the demand for lift-ups of registered fishing boats as shown in Table 2-10. Therefore, the Project will introduce slipway for lift-up of one fishing boat and a crane truck for hang-up of fishing boats.

Table 2-10 The utilization plan by the methods of lift-ups by the size of fishing boats related to the Project

		Plan of lift-up allocation	
		①Capability of Slipway	② Capability of new crane truck
Total days of maximum capability		300	600
Size	Total days of occupation period for lift-ups		
28- below 32ft.	345		345
34ft.	270	97	173
Over 34 ft.	203	203	
Total days of occupation period for lift-ups	818	300	518

Note: A crane truck is capable of lifting up 2 boats at maximum per day.

The examination on the scale and the ability of the required facility and equipment is as follows:

a) Slipway

The required scale of slipway is examined, based on the size and weight of fishing boat with 40ft., which is the largest scale in size among the utilized fishing boats and determined as the standard fishing boat. The standard specifications of this fishing boat are 12.2m long, 4.2m wide, 1.5m draft, 11 tons in the light load and 20 tons in the maximum load. The slipway is composed of a setting place and a ramp, its standard incline of a ramp for fishing boats is 1/6 – 1/10, and a setting place, where repair is performed, is generally horizontal. However, since the area of the site is limited, the Project will adopt the style with the equal incline at both a setting place and a ramp and will attempt to minimize the length of the slipway. However, 1/10 will be adopted for the inline of a ramp, because it is considered easy to perform repair at gentler slope if a setting place is inclined.

The site plan is shown in Fig. 2-4. Regarding a setting place, with the total length of a fishing boat with 40ft., approximately 1.5 m are added into both front and rear to secure the space for work, so that the total length is determined 15 m by the following formula:

The total length of the setting place = 12.2 + (1.5 + 1.5) = 15.2m

Regarding the width of the fishing boat with 40ft., approximately 1 m will be added into both right and let sides to secure the space for purposes of carrying tools, etc., and 6 meters are determined by the following formula:

The width of the setting place = width of the standard boat 4.2m + (1m + 1m) = 6.2m

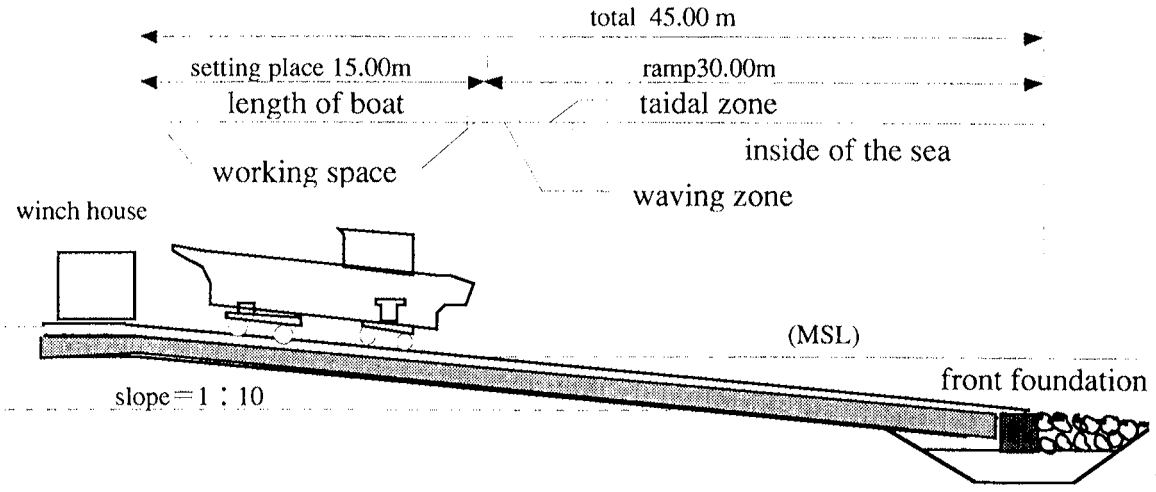
Regarding a ramp, the level of upper top of front foundation at the edge need to be determined –2.8 m, which is under MSL, by the following formula:

Difference between MSL and LWL 0.25m +
maximum draft 1.5 m + the height of cradle approximately 1.05 m = 2.8 m

Because the incline of the ramp is 1/10, the length below MSL is approximately 28 m, but 2 m are secured for waving zone, so that the total length of a ramp is 30 m. As the total length of a setting place is approximately 15 m, the total length of the site is 45 m.

Regarding a winch, 5 tons (speed 10m/min.) of the traction capacity is required to pull the weight for lift-up of fishing boat with 40 ft. and cradle at the incline of 1/10.

Fig. 2-4 The site plan of slipway.



b) Crane truck

The maximum fishing boat for hang-up targeted by the Project is a fishing boat with 34ft. (weight: 6.5 tons). In this case, in order to select the crane, which is capable of hanging up the weight of 6.5 tons in the radius of the circulation (9m) and in the state of 30 degrees of boom, a crane truck with a normal capacity of 20 tons of hang-up is selected.

ii) Workshop

Regarding workshop, rooms are divided basically according to the present conditions of repair work and the required space is obtained by the installation plan of the required repair equipment. Under the present conditions, because the workspace in the workshop is occupied mainly for mechanical work, there is not enough space available for FRP repair, painting, repair of the structures on a deck, etc., and these repair works are performed outside. These repairs are preferred to be performed inside, so that mechanical repair room and workspace for FRP repair, painting, carpentry are allocated in workshop. In addition, a storage room for materials and parts, office, toilets, a kettle room and a night-duty room for a short sleep are allocated. The scale of the facility is determined by the installation plan shown in Fig. 2-5.

Regarding repair equipment for workshop, the existing equipment (lathe, welding machine, grinder, drilling machine, etc.) has been utilized more than 20 years, its breakdown happens frequently and the function is extremely decreased, so that the equipment is required to be renewed. Regarding the defect of the basic equipment required for repair, it will be introduced when it is required by the contents of repair. The required equipment and its usage are shown in Table 2-11.

9) Fuel Tank and Dispenser

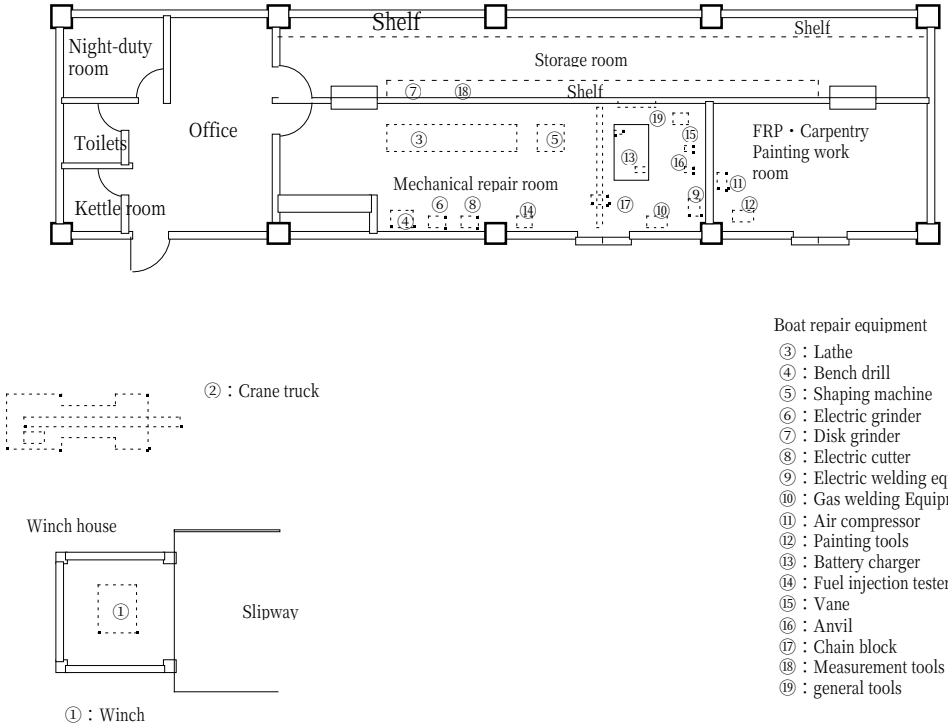
The Project will construct an additional fuel tank for diesel oil. The capacity of the new tank is 13,200 ltr., which is one rank higher than the existing capacity of 6,600 ltr., in order to smoothen refueling. Therefore, the Project will construct a set of fuel tank with a capacity of 13,200 ltr. and its dispenser, and a fuel supply office.

Table 2-11 The required equipment and its usage

Name of Equipment	Main usage						
	Main Engine	Propeller shaft	Steering	Deck	Hull	Present status	Required number
lathe	○	○	○			Not functional	1
Drill machine	○	○	○		○	Not functional	1
Shaping Machine	○	○	○			None	1
Electric grinder	○	○	○		○	Decrepit	1
Disk grinder		○	○	○	○	None	1
Electric Cutter		○	○	○	○	None	1
Electric welding equipment		○	○		○	Not functional	1
Gas welding equipment		○		○	○	Decrepit	1
Air compressor	○	○	○	○	○	None	1
Painting tools				○	○	None	1
Battery charger	○					None	1
Fuel injection tester	○					None	1
Vise, anvil	○	○	○		○	Decrepit	2
Chain block	○			○	○	None	5 tons x 1
Measurement tools	○	○	○		○	None	1
General tools	○	○	○	○	○	None	1

Fig.2-5

The installation plan of equipment in boat repair workshop



10) Parking Space and Exterior facilities

The basic targets of vehicles are insulated trucks, tricycle and cars of guests and staff, and the number utilization of vehicles are calculated, as follows:

① The number of insulated trucks owed by the owners of fishing boats registered in TFH is 45. The frequency of these trucks is assumed to be almost equal to the frequency of the visits by inboard engine fishing boats. According to Table 2-3, approximately 10 % of inboard engine fishing boats registered in TFH visit TFH per day (18 boats out of 174 boats). Therefore, the target number of insulated trucks is determined 5 per day, by the following calculation.
The number of insulated trucks visit TFH: 45 trucks x 0.1 = 4.5 trucks

②Regarding tricycles, based on such a situation as 2-3 tricycle are continuously coming in and out, parking space for 3 tricycles as much as space for 2 cars, is planned.

③Regarding cars, parking space for one for guest and two for staff is planned.

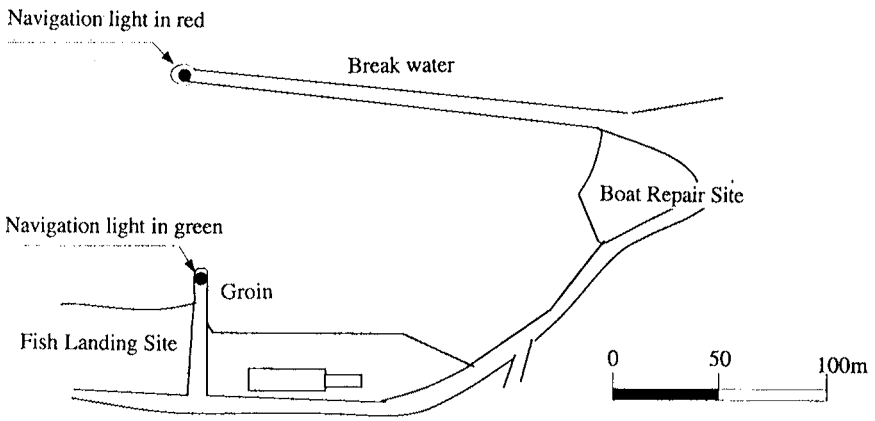
Therefore, it is planned to secure the parking space for 5 insulated trucks and for 5 cars.

In addition, for the exterior facilities, in-site road at the entrance of the site, pavements, armor stone revetment for the protection of the connection part at the existing groin and wharf, a retaining wall for the protection of shore side and drain gutters for rainwater drainage will be constructed and the surface repair of the existing wharf within construction area by Japanese side is performed. On the other hand, for the exterior equipment, an elevated water tank for the reserve and the supply of water, a septic tank, power supply equipment, yard lighting and a lighting rod will be constructed.

11) Navigation lights

To secure the safe navigation upon arrivals of fishing boats during the nighttime, navigation lights will be installed at the each edge of the existing breakwater and groin as shown in Fig. 2-6.

Fig. 2-6 The location plan of navigation lights



(2) Improvement of TFTC

1) The points of the basic concept related to TFT

① The improvement should be executed focused on the contents of the fisheries training that are currently required and planned at TFTC.

② The construction of classrooms, practice rooms, a library, an administration office, etc, which are required for current 11 courses related to the contents above, will be executed.

③ The construction of accommodation for students from distant parts in the territory of TFTC and part-time instructors, a canteen, self-study rooms, etc will be executed.

④ The existing training equipment, which is not to be utilized in the future because of decrepitude and breakdown, will be renewed and the training equipment, which is insufficient despite of the necessity for the current training program, will be arranged.

Based on the points aforementioned, the required scale, style, specifications, etc., of each facility and equipment, which are mentioned in the Clause3-2-1, are examined as follows.

2) Facilities

Classrooms, practice rooms, accommodation, a canteen, and other common facilities are considered for the facilities and the necessity of each room and its scale are examined as follows:

By referring to 5 m2 – 15 m2 per person as the standard unit area (Architectural Standard Specifications by the Architectural Institute of Japan) for a main room and 1.2 ~ 1.0 m2 per person as the same standard unit area for classrooms of a high school or a professional school in Japan, the unit area per person is determined as below. The detailed calculation of the required area of each room is subsequently shown in Table-2-23 (Area plan).

1) Room for principal: 10 m2/person
2) Rooms for office and instructors, etc.: 6 m2/person
3) Classrooms with monolithic desks and chairs: 1.2 m2/person
4) Classrooms with separated desks and chairs: 1.3 m2/person
5) Library, self-study room with common tables for 4 ~ 5 persons: 2.0 m2/person
6) Canteen: 1.5 m2/person

①Classrooms

The future fisheries training plans (capacity of students for each course) are shown in Table 2-12, and the number of students will slightly decrease by 2002, depending on the courses. Therefore, the number and the scale of classrooms are examined with referring to the plan in 2002, when the number of student will be stabilized. Because the numbers of students are varied according to courses, each of 4 different rooms for 50, 30, 20 and 10 students is established, and the months of utilization by the course and the room allocation in the same year are shown in Table 2-13, and the annual allocation for the utilization of classrooms is shown in Table 2-14. By these figures, it is determined appropriate that each of 4 different classrooms to accommodate 50, 30, 20 and 10 students is allocated.

Table 2-12 The future training plans

Course	Period of each course	2000 (annually trained students)	2001 (annually trained students)	2002 (annually trained students)	2003 (annually trained students)	2004 (annually trained students)	2005 (annually trained students)
Fishing Technician course	9 months	50	50	50	50	50	50
Assistant fishery technician course (female)	2 months	60	60	60	60	60	60
Diving training course	1 month	50	25	25	25	25	25
Fishing boat electric course	1 month	50	50	50	50	50	50
Ornamental fish culture course	2 months	75	25	25	25	25	25
Marine electronic equipment course	1 week	60	60	30	30	30	30
Marine bio resource technology course for students	1 day	500	500	500	500	500	500
Marine bio resource technology course for instructors	2 days	100	100	100	100	100	100
Marine engine training course	3 months	30	30	30	30	30	30
FRP Fishing boat repair course	1 week	35	50	50	50	50	50
Fish handling course	1 week	50	50	50	50	50	50

(source: MFARD)

Table 2-13 The months of utilization by the course and the room allocation for the training plans in 2002

Course	Period of each course	Number of courses per year	Number of students (per course)	Annually trained students	Total months of utilization	Classroom to be unitized
Fishing Technician course	9 months	1	50	50	9 months	Classroom (1)
Assistant fishery technician course (female)	2 months	3	20	60	6 months	Classroom (3)
Diving training course	1 month	3	10/10/5	25	3 months	Classroom (4)
Fishing boat electric course	1 month	3	20/20/10	50	3 months	Classroom (3)
Ornamental fish culture course	2 months	1	25	25	2 months	Classroom (2)
Marine electronic equipment course	1 week	1	30	30	0.25 months	Classroom (2)
Marine bio resource technology course for students	1 day	10	50	500	0.33 months	Classroom (1)
Marine bio resource technology course for instructors	2 days	4	25	100	0.26 months	Classroom (2)
Marine engine training course	3 months	1	30	30	3 months	Classroom (2)
FRP Fishing boat repair course	1 week	5	10	50	1.25 months	Classroom (4)
Fish handling course	1 week	5	10	50	1.25 months	Classroom (4)

Note: A capacity of Classroom (1) is 50 students, (2) is 30, (3) is 20 and (4) is 10. (source: MFARD)

Table 2-14 The allocation for the utilization of classrooms

Course	Period of course	Annual no of course	No, of students (per course)	Annual trained student	Class room	1	2	3	4	5	6	7	8	9	10	11	12
Fishing Technician course	9 months	1	50	50	(1)												
Marine bio resource technology course for students	1 day	10	50	500	(1)												
Ornamental fish culture course	2 months	1	25	25	(2)												
Marine engine training course	3 months	1	30	30	(2)												
Marine electronic equipment course	1 week	1	30	30	(2)												
Marine bio resource technology course for instructors	2 days	4	25	100	(2)												
Assistant fishery technician course (female)	2 months	3	20	60	(3)												
Fishing boat electric course	1 month	3	20/20/10	50	(3)												
Diving training course	1 month	3	10/10/5	25	(4)												
FRP Fishing boat repair course	1 week	5	10	50	(4)												
Fish handling course	1 week	5	10	50	(4)												

② Practice Rooms

The courses such as fishing technician course, assistant fishery technician course, fishing boat electric course, marine electric equipment course, etc, include lectures held at practice rooms. From the contents of present courses, the practice rooms are required for fishing gear and fishing training, boat steering, navigation and fishing equipment training, diving training, engines and engineering training and electrical training. For the training aforementioned, since it is appropriate to allocate practice rooms by the mutuality of the technical contents of training, 3 practice rooms are allocated at present. From the same aspect, the allocation of practice rooms are examined in the Project, and 3 different practice rooms, which are a practice room for fishing gear and fishing training, and diving training, a practice room for boat steering, navigation and fishing equipment training and a practice room for engines and engineering training and electrical training, are constructed. The area of each practice room is calculated by the installation plan of training equipment as shown in Fig. 2-7.

③ Accommodation

For the fishing technician course (50 students)and the marine engine training course as the long-term training applicable to males, the half of students are selected from those who live too far to come to school from their home and they are required to stay at TFTC. Apart from those, in the courses for a small number of students, some are also required to stay, but the accommodation for 40 students, equal to the half of 80, which is in total of those two courses, will be constructed by the Project. In addition, the instructors for diving training course, FRP fishing boat repair course, etc. are 4 persons of part-time instructors from the outside, so that accommodation for them is also required. Accommodation for 4 people is allocated as the accommodation for part-time instructors. The scale and specifications of the room are referred to the accommodation that is planned to be constructed at Negombo Fisheries Training Center by the Government of Sri Lanka. One room for students accommodates four persons and a desk is shared by two persons. One room for instructors accommodates two persons.

④ Canteen

A canteen is utilized for breakfast and dinner by lodgers (40 students) and for lunch by a part of students, etc. By referring to Table 2-14, the number of students reaches to its maximum in June and approximately 110 students receive trainings at the same time. Then, approximate 120 persons adding some instructors with these students will use the canteen for lunch. Therefore, the Project will provide seats for 40 people as same as the number of lodgers and the maximum number of people at lunchtime will utilize the canteen by three turns. The utilities such as kitchen, etc are also allocated.

⑤ Administration office

The administration office that consists of a principal room, an instructors' room, office space and toilets is allocated, and each of rooms should be divided, according to its function. The capacity of people is based on the present number of personnel.

⑥Other common rooms

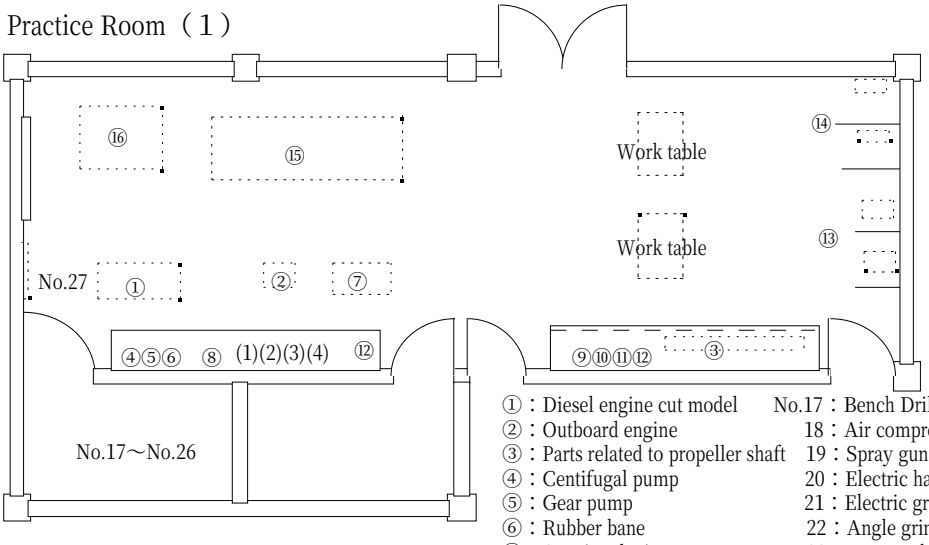
Apart form the facilities above, a library to store books, a self-study room for a part of lodgers, because a desk in their room should be shared, a storage room for training equipment, and toilets and shower rooms are allocated.

⑦ Exterior facilities, etc.

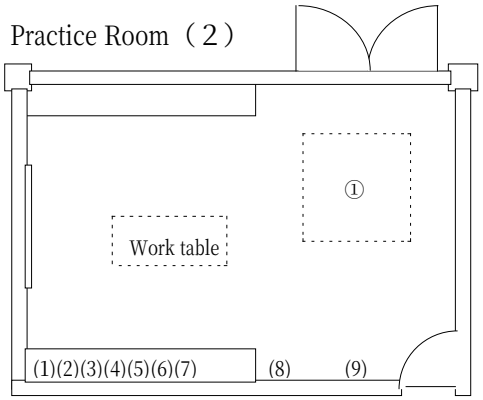
For the exterior facilities, in-site road, pavements, parking space and drain gutters for rainwater drainage will be constructed. Also, for the exterior equipment, an elevated water tank for the reserve and the supply of water, a septic tank, power supply equipment, yard lighting and a lighting rod will be constructed.

Fig. 2-7

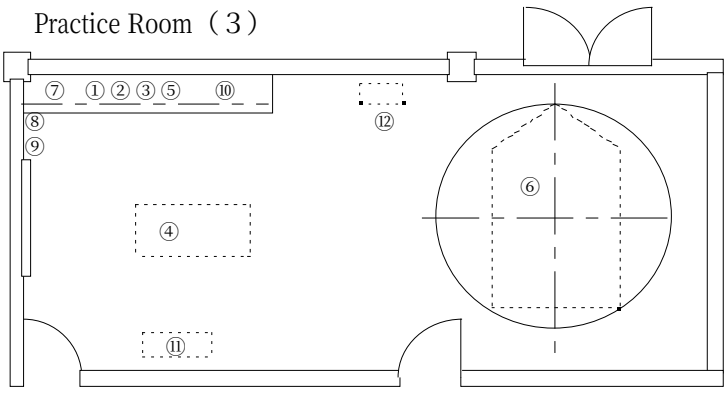
The Installation Plan of Training Equipment in Practice Room



①：Diesel engine cut model
②：Outboard engine
③：Parts related to propeller shaft
④：Centifugal pump
⑤：Gear pump
⑥：Rubber bane
⑦：Steering devices
⑧：Refrigeration device training equipment
⑨：Pressure gauges
⑩：Thermometer
⑪：Flow meter
⑫：Fuel injection nozzle tester
⑬：Gas welding equipment
⑭：Electric welding equipment
⑮：Lathe
⑯：Milling machine
No.17：Bench Drill
18：Air compresser
19：Spray gun
20：Electric hand drill
21：Electric grinder
22：Angle grinder
23：Battery charger
24：Standard calipers
25：Micrometer
26：Carpenter's square
27：General tools
(1)：Electrical wiring training device
(2)：Insulation tester
(3)：Tester
(4)：Oscilloscope



①：Hydraulic fishing devices
(1)：Snorkel
(2)：Diving mask
(3)：Fin
(4)：Weight belt
(5)：Buoyancy control jacket
(6)：Air presssure adjuster
(7)：Depth gauge, pressure gauge
(8)：Air cylinder
(9)：Air compressor for refilling



①：GPS
②：Radar
③：MF/HF wireless radio
④：VHF wireless radio
⑤：Direction finder
⑥：Navigation training device
⑦：Wind vane, anemometer
⑧：Barometer
⑨：Level gauge
⑩：Small echo sounder
⑪：Life boat
⑫：Portable water pump

3) Training Equipment

The training equipment is utilized for fisheries trainings at TFTC and is divided into audio-visual equipment, navigation training equipment, fisheries training equipment, security training equipment, engine and engineering training equipment, electrical training equipment, diving training equipment, and equipment for classrooms. Compared with the contents of the request, the necessity of each equipment is examined as below. The examination reviews importance to such the points that the equipment is required for each course and has the appropriate standard as the training equipment for fishery industry and fishermen in Sri Lanka.

① Audio-visual Equipment

The audio-visual equipment is utilized for lectures to a great number of students such as the lectures of marine bio resource technology courses, which receive the outside students (50 students / course), and training at fishing villages with a visitation of training vehicle. A 16-mm film projector, a slide projector and loud speakers and amplifier set, which are deficient because of breakdown, etc, even though teaching material are sufficient, will be provided, but a TV, a video, a camera, etc. is excluded from the targets of the Project, because the teaching materials are insufficient.

② Navigation Training Equipment

It is essential to train fishermen. However, the contents of request partly include equipment such as large-sized radars, radar simulators, steering simulator, etc, which is not necessary for traninings of the target students. Such equipment is excluded from the targets of the Project, but necessary equipment such as a direction finder, a small echo sounder, etc, as the basic equipment are not included in the request. By deleting and adding equipment, the equipment is arranges as shown in Table 2-15. The equipment is selected in accordance with the contents and the standards of equipment, which is actually installed in the fishing boats in Sri Lanka.

③Fisheries Training Equipment

Hydraulic fishing devices (training devices for operation of line hauler, net hauler, and side roller) as deck equipment training are requested, and those are necessary to learn the structure of machinery and the knowledge of maintenance and repair, by considering these devices are installed in many fishing boats.

④ Security Training Equipment

This equipment is targeted on trainings of the emergency refugee in the sea and fire-fighting in care of a fire, and is basic equipment. The adequate amounts of life jackets, life buoy are already quipped in TFTC but life boats and portable water pump are deficient,even though they are necessary for the trainings aforementioned. This equipment will be arranged by the Project, but the other requested equipment

such as an alarm system and firemen's outfits is excluded from the targets of the Project, because they are not normally equipped in fishing boats .

⑤ Engine and Engineering Training Equipment

In the fishing technician course at TFTC, the engine and engineering training is compulsory. Especially most of the normal maintenance and repair are related to engines and propeller shafts, and the training equipment to acquire the technique required for practical work will be arranged. However, in the contents of the request, the far-advanced equipment such as cut models of steam turbine and gas turbine, controllable pitch propeller, side thruster, etc. are included, but these are excluded from the targets of the Project. On the other hand, the cut models of engines with the same scale as the ones actually installed in present fishing boats and actual parts of propeller shafts are arranged by the Project. However, the equipment, of which can be diverted by the existing one, is also excluded from the targets, and the contents of the equipment is arranged as shown in Table 2-15.

⑥ Electrical Training Equipment

The electrical wiring becomes more complicated, accompanied with the enlargement and modernization of fishing boats, and the number of electrical measurements also increases, and accordingly the trainings related to electricity becomes more significant. Even though the fishermen who had once fishery training need to take additional trainings in order to acquire the basic knowledge related to electricity for actual operation and maintenance of fishing boats. The equipment that consists of basic measurement tools and wiring devices required for gaining the basic knowledge will be arranged by the Project.

⑦ Diving Training Equipment

The diving training course aims to train divers who will be engaged in inspecting the bottom of fishing, etc., and the diving equipment is essential for those trainings. At present, the lectures and practice are performed by 2 instructors and 10 students per course, the amount of the equipment is deficient. The Project supplements the deficient diving equipment and arranges air compressor to fill air.

⑧ Equipment for Classrooms and Others

There are 110 desks and chairs required for 4 classrooms, but two classrooms for 30 and 20 students are utilized mostly for courses related to mechanical techniques such as electricity and engines of fishing boats and those courses utilize many references, so that separated desks and chairs are installed in those two class rooms and monolithic desks and chairs are installed in the classrooms for 50 and 10 students. In addition, blackboards are equipped in both classrooms and practice rooms to improve the efficiency of classes. However, the requested office supplies such as desks and chairs, typewriters, computers, etc. are excluded from the targets of the Project.

The results of examination on the required number and the scale by the category of training equipment are shown in Table 2-15.

Table 2-15 Training equipment

①Audio-visual Equipment

No.	Name of equipment	Contents of Training	Numbers required	Numbers existed	Numbers to be procured
(1)	16mm film projector	Learning the outline of fishery	1	1(out of order)	1
(2)	Slide projector	Learning the outline of fishery	1	1(out of order)	1
(3)	Loud speakers and amplifier set	For the lectures to a great number of students	1	None	1

② Navigation Training Equipment

No.	Name of equipment	Contents of Training	Numbers required	Numbers existed	Numbers to be procured
(1)	GPS	Navigation	1	2 (old fashioned)	1
(2)	Radar	Navigation	1	1 (out of order)	1
(3)	MF/FM wireless radio	Watch on board, emergent refugee	1	None	1
(4)	Portable VHF wireless radio	Watch on board, emergent refugee	1	None	1
(5)	Direction finder	Navigation, engineering	1	None	1
(6)	Navigation training device	Navigation, steering	1	None	1
(7)	Wind vane, anemometer	Weather, marine weather	1	None	1
(8)	Barometer	Weather, marine weather	1	None	1
(9)	Level gauge	Steering, marine weather	1	None	1

③ Fisheries Training Equipment

No.	Name of equipment	Contents of Training	Numbers required	Numbers existed	Numbers to be procured
(1)	Hydraulic fishing devices	Operation of fishing devices, structure and maintenance	1	None	1
(2)	Echo sounder	Fishing methods, fishing grounds searching	1	1 (out of order)	1
(3)	Microscope	Observation of plankton	1	None	1

④ Security Training Equipment

No.	Name of equipment	Contents of Training	Numbers required	Numbers existed	Numbers to be procured
(1)	Life boat	Emergent measures, life saving training	1	None	1
(2)	Portable water pump equipment	Emergent measures, fire-fighting training	1	None	1

⑤ Engine and Engineering Training Equipment

No.	Name of equipment	Contents of Training	Numbers required	Numbers existed	Numbers to be procured
(1)	Diesel engine cut model	Structure and function of engine and maintenance	1	None	1
(2)	Outboard engine	Operation and structure of engine and maintenance	1	2 (out of order)	1
(3)	Parts related to propeller shaft	Mechanism for transmitting outputs, structure and maintenance	1	None	1
(4)	Supplementary pumps (centrifugal pump, gear pump, rubber bane pump)	Structure and maintenance	1 each.	None	1 each.
(5)	Steering devices	Structure, relay theory, maintenance	1	None	1
(6)	Refrigeration devices training equipment	Refrigeration devices, structure and theory	1	None	1
(7)	Various pressure gauges, thermometer, flow meter	Structure, mechanism	1 each	None	1 each
(8)	Fuel injection Nozzle tester	Nozzle adjustment training	1	None	1
(9)	Gas welding equipment	Gas welding and cutting training	2	None	2
(10)	Electric welding equipment	Welding theory, welding training	2	None	2
(11)	Lathe	Lathe process training	1	1 (out of order)	1
(12)	Milling machine	Cutting process training	1	1 (out of order)	1
(13)	Bench drill	Process training	1	1 (decrepit)	1
(14)	Air compressor	Painting training	1	1 (decrepit)	1
(15)	Painting tools	Painting training	1	None	1
(16)	Electric hand drill	Various engineering training	1	None	1
(17)	Electric grinder	Various engineering training	1	None	1
(18)	Angle grinder	Various engineering training	1	None	1
(19)	Battery charger	Engine repair training	1	1 (decrepit)	1
(20)	Measurement tools	Various engineering training	1 each	None	1 each
(21)	general tools	Various engineering training	1	None	1

⑥ Electrical Training Equipment

No.	Name of equipment	Contents of Training	Numbers required	Numbers existed	Numbers to be procured
(1)	Electrical wiring training devices	Electrical wiring theory, inspection training	5	None	5
(2)	Insulation tester	Insulation resistance inspection training	3	None	3
(3)	Tester	Metering of voltage, electric current, resistance value	5	None	5
(4)	Oscilloscope	Basic alternating theory, circuit training	1	None	1

⑦ Diving Training Equipment

No.	Name of equipment	Contents of Training	Numbers required	Numbers existed	Numbers to be procured
(1)	Snorkel	Diving training	12	8	4
(2)	Diving mask	Diving training	12	8	4
(3)	fins	Diving training	12	8	4
(4)	Weight belt	Diving training	12	2	10
(5)	Buoyancy jacket	Diving training	12	6	6
(6)	Air pressure adjuster	Diving training	12	6	6
(7)	Depth gauge, pressure gauge	Diving training	12	2	10
(8)	Air cylinder (*)	Diving training	24	6	18
(9)	Air compressor for refilling	Preparation for diving training	1	None	1

(*) Two cylinders are utilized for one diving training (two dives)

⑧ Equipment for Classrooms and Others

No.	Name of equipment	Contents of Training	Numbers required	Numbers existed	Numbers to be procured
(1)	Blackboard (large)	Classroom (1,4)	2	None	2
(2)	Blackboard (small)	Classroom (2,3), Practice room (1,2,3)	5	None	5
(3)	Desk and chair (monolithic)	Classroom (1,2)	60	Diverted to practice room	60
(4)	Desk and chair (separated)	Classroom (3,4)	50	None	50
(5)	Work table (for heavy duty)	Practice room (1)	2	None	2
(6)	Work table (normal)	Practice room (2,3)	2	None	2
(7)	Table for 4 students	Library, canteen, kettle room, pantry	16	None	16
(8)	Chairs for item (7)	ditto	64	None	64
(9)	Table for 6 students	Self-study room	4	None	4
(10)	Chairs for item ((9)	ditto	24	None	24
(11)	Book shelf	Library	3	decrepit	3

(3) The outline of the Project facilities and equipment

1) Items related to TFH

① Facilities

Name of facility	Scale and Contents of facility
Fish marketing hall building	1st floor: fish marketing hall, ice plant and storage room, machine room, etc. 2nd floor: administration office, meeting room, etc. the area of the construction 288 m2, the total area 540 m2
Net mending shed building	Net mending shed: the total area 180 m2
Canteen building	Canteen and kitchen: the total area 144 m2
Public toilets and showers	Public toilets and showers: the total area 28 m2
Boat repair building	Boat repair building (office, workshop, storage room): the total area 256 m2 Slipway: 48.5 m L x 6 m W, winch style, Concrete revetment: 37.5 m L
Office for fuel tank	Office for fuel tank: the total area 16 m2
Winch house	Place for winch: the total area 16 m2
Exterior facilities	Revetment: armor stone revetment, 20.5 L, in-site road: 35 m L, pavements: the total area 4, 315 m2, parking space: for 9 vehicles, retaining wall: 1.2 m H, 232 m L, drain gutter: 311 m L
Exterior equipment	Elevated water tank: 16.6 m H, reservoir: 24 m3, septic tank: one each for 187 persons and 20 persons, fuel tank (13,200 liters) • dispenser 1 set, power supply equipment, 9 yard lightings, 1 unit of lightening rod.

② Equipment

Name of equipment	Contents and numbers
Equipment for fish marketing hall	10 insulated boxes, 3 sets of scales, 1 unit of ice plant(5 tons/day, 10 tons of ice storage)
Equipment for canteen	10 tables for 4 persons, 40 chairs
Equipment for lift-ups of fishing boats	1 units of cradle, 1 winch, 1 crane of 20 tons
Equipment for boat repair	1 lathe, 1 bench drill, 1 shaping machine, etc.
Navigation light	1 unit (2 sets) of pole type navigation lamps

1) Items related to TFTC

① Facilities

Name of facility	Scale and Contents of facility
Fisheries training center	1st floor: classrooms, practice rooms, administration office, principal room, canteen, library, storage room for training equipment, 2nd floor: accommodation for students and instructors, self-study room, toilets and showers, linen room, etc. the area of the construction 882 m2, the total area 1,372 m2
Exterior facilities	In-site road: 141 m L, pavements: the total area 120 m2, parking space: for 3 vehicles, retaining wall: 1.5 m H, 165 m L, drain gutter: 168 m L
Exterior equipment	Elevated water tank: 16 m H, reservoir: 16 m3, septic tank: tank for 127 person, 9 yard lightings, 1 unit of lightening rod.

② Equipment

Name of equipment	Contents and numbers
Audio-visual equipment	1 set of 16-film projector, 1 set of slide projector, 1 set of loud speaker and amplifier
Navigation training equipment	1 set of GPS, 1 set of radar, 1 unit of navigation training device, etc.
Fisheries training equipment	1 set of hydraulic fishing device, 1 set of echo sounder, etc.
Security training equipment	1 unit of life boat, 1 set of portable water pump equipment
Engine and engineering equipment	1 set of diesel engine cut model, 1 set of refrigeration training equipment, 1 unit of lathe, 1 unit of milling machine, etc.
Electrical training equipment	5 sets of electrical wiring training devices, 3 sets of testers, 1 set of oscilloscope, etc.
Diving training equipment	1 set of air pressure adjuster, 18 pcs. of air cylinders, 10 sets of depth gauges • pressure gauges, etc.
Equipment for classrooms	Desks and chairs (monolithic: 60, separated: 50), blackboard, etc.

2-3 Basic Design

2-3-1 Design Concept

(1) Basic Policy

Based on the current situation in Sri Lanka and the background of the Project and also in order to achieve the most appropriate contents of facilities within the range of Japan's grant aid scheme, the basic design should be executed with considering the following points:

1) To base the design on the styles and specifications of facilities that users and operators are accustomed.

2) To design the facilities with the consideration of natural conditions at the Project site.

3) To design the facilities with the consideration of the architectural standards in Sri Lanka, and the related standards in Japan, in case that the related standards do not exist in Sri Lanka.

4) To design the facilities, based upon the appropriate structures and specifications of facilities and simple design of machinery in order to minimize the maintenance cost.

(2) Design Policy

1) The policy for natural conditions

① It is typical Monsoon climate, but the velocity of the wind does not exceed 15m/sec. The climate is generally gentle, and the Project site is not affected hardly by Monsoon wind. Therefore, the roof of facilities and its eaves shall be designed by referring to the ideas of wind pressure and considering the maximum velocity of the wind in the near areas.
② It is significant to focus on the drainage system to minimize seawater pollution by drainage and soil water. As for the value of Biochemical Oxygen Demand (BOD), it should be designed according to the related standards in Sri Lanka.
③ At TFH, either the breakwater basically blocks southeast or northwest wave direction, the basin of TFH remains calm. Therefore, the standard value of the wave height, etc. under the gentle climate should be adopted.
④ It should be designed to pay attention to corrosion caused by salt, etc. at seaside areas.
⑤ The conditions of erosion and sediments at beachside should be considered, in regard with the construction of related facilities to TFH.

2) The policy for the utilization of local constructors and local materials and equipment

① It is possible to procure various kinds of construction materials locally, so that the local materials should be utilized.
② Regarding deformed steel bar, aluminum sash, etc, the stable supplies are not expected because the local productions of those materials are not active. Therefore, it is considered to procure them from Japan or another country.
③ Regarding the equipment, only equipment that meets the requirement of the design specifications should be procured in Sri Lanka, and it is considered to import the other equipment from Japan.
④ There are public corporation and services related to construction under many ministries of Sri Lanka, and their technique of design and execution is high, but the technical levels of private constructors become higher in these days. Then, it is positively considered to utilize them.

3) The policy for the period and the procedures of the Project construction

At TFH, the existing facilities are sited, and in order to implement the construction with a minimum hindrance to the fishery activities, the construction procedures should be examined by noting traffic lines for construction vehicles, allocation of temporary yard during construction, etc. Also, at the corner of the groin and the existing wharf, where splash and inflow of seawater caused by waves is expected, the appropriate procedure of execution such as preceding the construction of revetment work, etc. should be examined. Moreover, TFHC is planning to extend the new wharf between the existing wharf and the boat repair facility, and the construction work is scheduled to be complete by August, 2000. Therefore, the period for the construction of facilities at TFH by the Project should avoid the extension work period of the wharf. And the period should be flexible, in case of slight delay of the execution of its extension work.

As the construction work at TFTC is to be executed on the inclined site, the temporary yard and the construction method should be carefully planned, and the execution should be planned by considering the relation of the existing strong ground and the bearing ground. Upon the execution, the safety of workers and people around the sites should be secured, and also the utilization of local labor, construction equipment and materials and constructional machinery should be attempted in order to contribute to the revitalization of local economy.

(3) Examination on design conditions

1) Design conditions related to the natural conditions.

The design conditions related to the natural condition for the basic design of the Project are shown in Table 2-16, based on the result of the survey on the natural conditions.

Table 2-16 Design conditions related to the natural conditions

1. Natural conditions				
	Condition	Design values	Reference	
	Velocity of the wind Maximum Monthly maximum Wind direction: annual average April to December January to March	 50m/sec. 15m/sec. Southeast Southeast Northeast	Value upon Batticaloa cyclone in 1978. Recorded in May and June in 1998. Regular Monsoon throughout a year.	
	Seismic coefficient	Seismic coefficient =0.1	Less body-felt seismic earthquake. The standards of earthquake resistant design are not available locally.	
	Water level: H.W. L. M. S. L. L. W. L	+ 0.25 m +- 0.00 m - 0.25 m	Resulted in the survey on the natural conditions.	
	Design water height	H = 0.3 m or less	Inside of a fishery harbour	
	Amount of rainfall Annual maximum Monthly maximum Monthly minimum	 3,784 mm 283 mm 0 mm	 The annual maximum between 1980 and 1998. Recorded in Nov., 1980 Recorded in Feb. and Mar., 1998	
	Temperature Monthly average (maximum) Monthly average (minimum)	 28.7 ºC 26.1 ºC	 Extracted from the data of the climate.	
	Humidity Maximum Minimum	 93.0 % 66.0 %	 Extracted from the data of the climate.	
2. Soil conditions				
	Site		Surface	Bearing ground
	Harbour • fish landing site	Level of layer N-value	MSL+1.0~-1.6m 13~16	MSL+1.0~-1.6m 13~16
	Harbour • boat repair facility site	Level of layer N-value	MSL+0.7~-0.3m 23	MSL+0.7~-0.3m 23
	TFTC site	Level of layer N-value	MSL+22~+23m 9~18	MSL+20~+21m 50 or more

Note: The data is extracted from Hambantota Observatory under the Meteorological Department.
The soil condition is extracted from the boring survey and the examination on soil in the field survey.

2) Regulations and standards for architectural design

In Sri Lanka, in general, the standards of a donor country usually apply the aid projects, but British Standards (BS), Ceylon Standards (CS) and Sri Lanka Standards (SLS), which refer to BS, are applied to domestic public work. The Project is planned based on the standards and specifications of Japan, with reference to the following standards and regulation of Sri Lanka.

Specifications for Building Works – Sri Lanka (Volume 1) 1985

Specifications for Electrical & Mechanical Works Associated with Building and Civil Engineering – Sri Lanka 1987

Urban Development Authority Planning and Building Regulations (Urban Development Agency)

Fire Regulations of the Ministry of Housing, Construction and Public Utilities

International Electrical Commission (IEC)

Standards of Institute of Electrical Engineers (IEE)

General Specifications for Building Construction Works: Public Buildings Association

General Specifications for Electrical Construction Works: Public Buildings Association

The Society of Heating, Air-conditioning and Sanitary Engineering of Japan HASS010: the Society of Heating, Air-conditioning and Sanitary Engineering Institute of Japan.

Japan Architectural Standard Specifications: Architectural Institute of Japan

Anti Seismic Mechanical Electrical Design and Execution Guidelines: Architectural Center

Standard Designing Methods of Fishery Harbour Structure: Association of Fishery Harbours of Japan

Standard Specifications of Concrete Works: Institute of Civil Engineering of Japan

Japan Industrial Standard (JIS): Japan Standard Institute

Method of Soil Testing: The Geological Society of Japan

General Specifications for Road Pavement Works: Association of Road Pavement of Japan

3) Examination on standards for structure

① Examination of standards for design

The standards for structure are shown in Table 2-17. The structural standards are determined by considering such conditions that TFH site is reclaimed land, the gap between tide levels is 50 cm, which is comparatively small, etc. In regard with TFTC, the structural standards are determined by considering such conditions that the site is inclined with the gap of 6 m between the highest level and the lowest level and solidification by the slope forms the strong ground.

Table 2-17 Structural standards

Conditions		Design Value		Reference
		TFH site	TFTC site	
Soil bearing capacity		5t/m2: beach side part 10t/m2: the other sites	10 t/m2 :	Utilizing N-value from boring survey results, calculated by the guideline of Design for Foundation Construction works by Architectural Institute of Japan Corp.
Wind force		160kg/cm2	160 kg/cm2	q= V2/16, V=50m/sec
Live load		300kg/cm2	300 kg/cm2	According to Japan Architectural Standard Specifications by Architectural Institute of Japan Corp.
Concrete	Slump	Footing • footing beam 15 cm or less Column • beam 18 cm or less		According to Japan Architectural Standard Specifications by Architectural Institute of Japan Corp.
	Concrete strength	Land buildings: Levelling concrete 180 kg/m2 Dirt floor concrete 180 kg/m2 Building frame concrete 210 kg/m2 Slipway: Plain concrete 210 kg/m2 Reinforced concrete 240 kg/m2		According to Japan Architectural Standard Specifications by Architectural Institute of Japan Corp. According to Standard Designing Methods of Fishery Harbour Structure.
	Salt content rate	Target value: 0.004%wt or less		Nacl conversion
	Cement	Normal Portland cement		According to Japan Architectural Standard Specifications by Architectural Institute of Japan Corp.
	Thickness of cover concrete	Footing: 8.5 cm, underground part: 6.5 cm Column: 5.5 cm, beam: 5.5 cm Walls except for bearing wall: 4.5 cm, Slipway: parts affected by seawater 7 cm, other parts 5 cm		Because it is sited at seaside, 2.5 cm is added to each value from Japan Architectural standard Specifications
Stone materials		Weight per unit volume: Armor stone 2.6 ton.m3, Rubble stone 1.8 ton/m3		According to Japan Architectural Standard Specifications by Architectural Institute of Japan Corp.
Wood materials		Compressive strength = 90 kg/cm2 or more Insecticide • corrosion-proofing applied		According to Japan Architectural Standard Specifications by Architectural Institute of Japan Corp.
Reinforcement bar Steel frame		Reinforcement bar: SD295A(over D9 below D17), SD345, (D19 or more) Steel frame: SS400		According to Japan Architectural Standard Specifications by Architectural Institute of Japan Corp.

Note: Soil bearing capacity utilizes the calculation method for the ground support allowable capacity of the guideline of Design for Foundation Construction works by Architectural Institute of Japan Corp.

② Examination on the ground conditions

According to the results of soil survey, at the fish landing site of TFH, N-value at the surface layer indicated 13-16, so that it is planned in the basis of this layer as the bearing ground. At the boat repair site, N-value of the surface layer also indicated 23, it is planned in the basis of this layer as the bearing ground for the spread foundation. At TFTC, at the layer approximately –3 m from the surface layer, the strong layer with N-value 50 were ensured along geographical features, so that it is planned in a basis of this layer as the bearing ground.

2-3-2 Basic Design

(1) Overall Plan

The Project facilities are planned at two sites, "TFH site", where is the northeast of Tangalle City, and "TFTC site", where is 500 m from the southwest of TFH. The location of each site is shown in Fig. 2-8. Either site is located around the center of Tangalle City. From Colombo, the suburbs of Tangalle City is accessible by Route No. A2 that runs along the southwest coast, and, from the suburbs, TFH site is accessible by two roads that run towards the coastline from Route No. A2. At TFH site, the site plan of facilities are planned with being divided to Fish Landing Site, where is extended next to the center part of the wharf, and Boat Repair Site where is located in the southeast edge within TFH.

1) The site plan of TFH site

① Fish Landing Site

The center part of TFH site lies between the coastline and Muhudu Mawatha Street as the access road that is 6m in width and runs along coast to south and north. It is thin site with the dimensions of approximately 20m x 90m that spreads to south and north. The current site of TFH is shown in Fig. 2-9. The Fish Landing Site is located next to the north side of this center part and is rectangular site with the dimensions of approximately 65m x 45m. The Fish Landing Site is across over the existing groin at the north edge of the center part that spreads to east and west, and both the center part of site and the Fish Landing Site are continuous at the same height of ground level. At the east side of the Fish Landing Site, the sandy beach continues, and it is a boat landing place for outboard engine fishing boats. Also, at the west side, Muhudu Mawatha Street runs and there are gaps of 1.2m – 1.5 m between the street and ground level of the site, and the slope connects to the site. At the north side of the site, houses also are located. The north border of the Fish Landing Site is set at the branch road of 3m in width that is located 63m from the north edge of exterior walls at the existing fishery harbour. The border to the beach side is set at the houses where located 25 m from the shoreline or at the point from 40m from Muhudu Mawatha Street at west side. The Project facilities should basically be sited to continue the traffic lines of the existing facilities, and the Project facilities and the existing facilities should be placed almost in a line towards south and north. Fish marketing hall building should be sited as close to the wharf as possible and the office of CFHC should be sited on 2nd floor to overview the whole harbour. A canteen building should be sited next to the north side of the fish marketing hall building. A paved road, as wide as one in the existing harbour, is sited in front of these facilities, and net mending shed and public toilets and showers are sited at the other side of the road.

② Boat Repair Site

The Boat Repair Site is the area located approximately 120m from the Fish Landing Site in the direction of southeast and faces the water area within the harbour. The ground level of Muhudu Mawatha Street in front of this site is 0.5 m higher than the ground level in front of Fish Landing Site, and the gap between this site and the ground level is approximately 2.0 m, which is comparatively high. The approach to the inside of the site is the slope of 9 %. Because there is a gap of approximately 1m between the site and the breakwater, which spreads towards south and north at the back of the east side of the site, the Project plans the construction of exteriors including slope protection. Slipway is sited parallel to the breakwater and, at its west side, the boat repair facility building is planned to be sited. The east side of the site is examined to be utilized as the temporary yard for construction.

2) The site plan of TFTC site

The planned site is located at hillside of the City that takes 5 minutes walk from Tangalle City Hall and the bus terminal. At present, the partially collapsed western building of the colonial period remains. Route No. A2 with 9m in width runs at the east side of the site, the unoccupied wooded land surrounds the east side, and there is a church at the south side. The area of the site is 3,120 m2, of which the east side is inclined. The gap between the highest ground level of site and the entrance of the front road is 6m, and the distance between the front road and the west end of the site is 75 m. The degree of incline at east side is approximately 8%. The site plan of the facilities by the Project utilizes this gap of levels. The existing path in the site is located almost in the center and the western building was constructed by centering this path, so that the site plan of the facilities by the Project also utilizes this path. The current site of TFTC is shown in Fig. 2-10

Fig. 2-8 The location of the Project sites

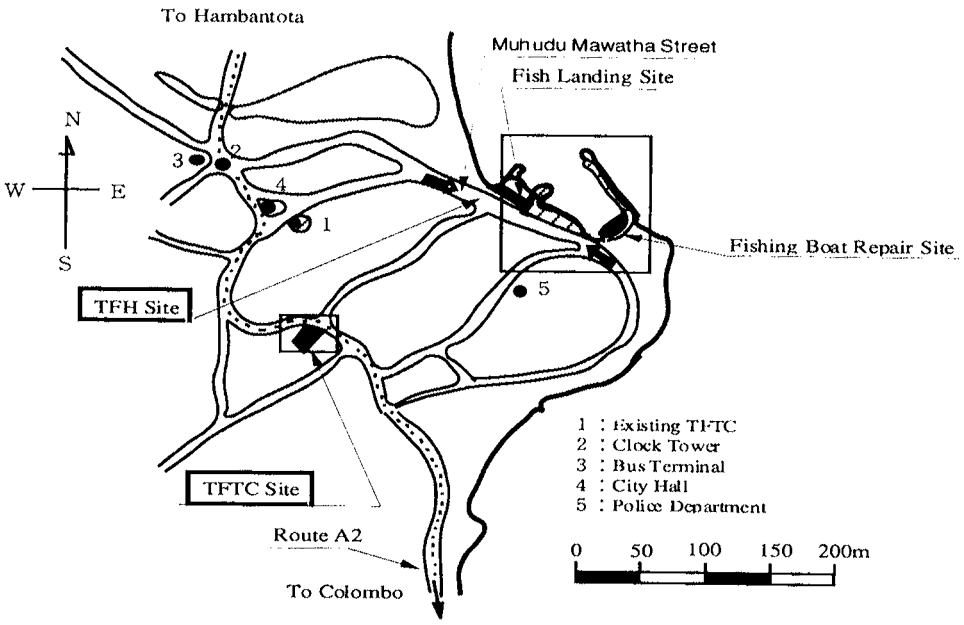


Fig 2-9 The site condition of TFH

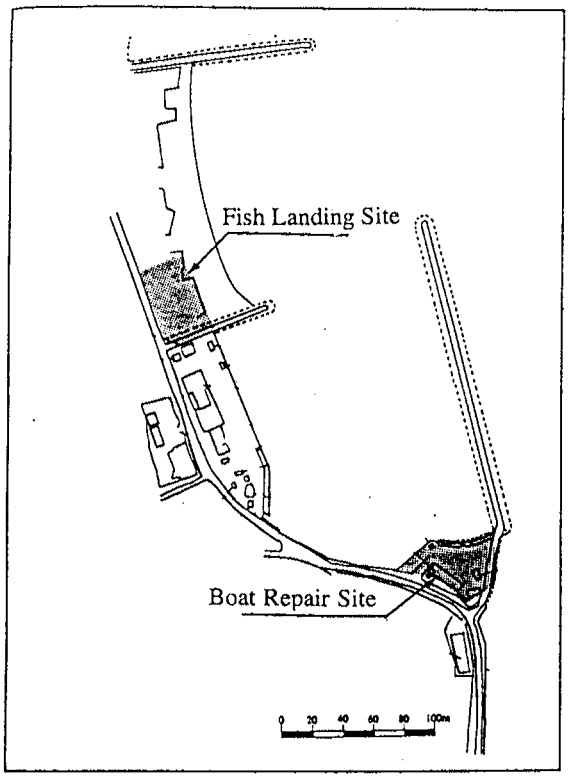
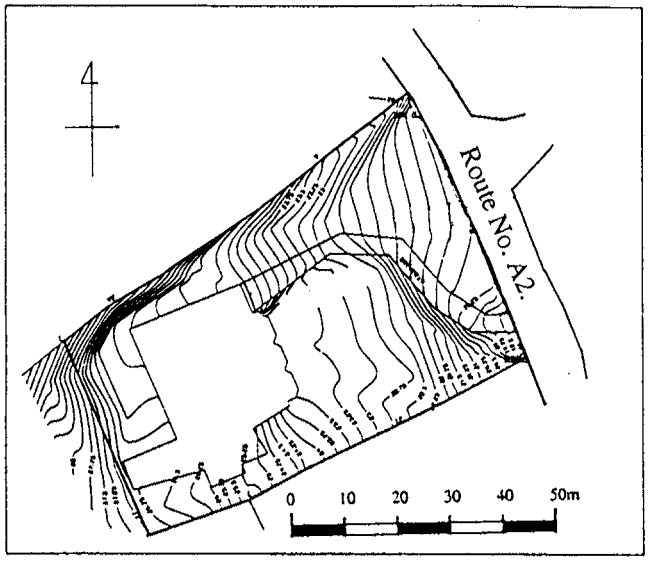


Fig. 2-10 The site condition of TFTC



(2) Construction Plan of Facilities

1) Construction Plan of Facilities

i) Facilities related to TFH

① Fish Marketing Hall Building

The facility, where functions as the heart of management and operation of the whole facilities, consists of the fish marketing hall, flake ice plant and ice storage facilities, the administration office of CFHC, a meeting room and a machine. The flake ice plant and ice storage facilities, which are high storey, are included, so that the building is to be two stories by considering the most effective utilization of the site. As the flake ice plant and ice storage facilities, etc. require high storey, these are sited on the 1st floor, and the ceiling is open at the top. The fish marketing hall is sited to the wharf side and on the 1st floor, for easy access. The administration office of CFHC is sited on the 2nd floor to overview the whole facilities for the management of the wharf and fishing boats and supervision of fishermen's activities.

② Net Mending Shed Building

The specifications of net mending shed adopted for those of fishery harbours by CFHC under ADB's projects are applied. The floor is planned 10m x 18m. The retaining wall of 1,200mm in height is planned to surround the building.

③ Canteen Building

Cafeteria style, which is applied to the styles adopted for the canteen of fishery harbours by CFHC under ADB's projects, is applied. The users will utilize the canteen under self-service condition. The shelves for the display of trays and the counters divide a kitchen and a canteen. Regarding the kitchen, the facilities is planned to utilize propane gas as the heat resource.

④ Public Toilets and Showers

The toilets and showers building is for fishermen and the styles of toilets and showers are planned, based on the utilization by considering the local custom.

⑤ Boat Repair Building (Workshop)

It is sited close to the slipway. The facility consists of workshop (2 divisions), an field office and a storage room for tolls, parts, and materials. The storage room is sited next to the field office and at the backside of workshop. The workshop consists of a mechanical repair room for engines and propeller shafts and a carpentry room including FRP repair and painting works, and each room is connected with the outside by a wide opening. Also it is planned to be overviewed from the field office.

⑥ Related Facilities

As the other related facilities, an elevated water tank, a fuel tank and dispenser, a water reservoir, a septic tank, parking area, etc. are planned.

ii) Facilities related to TFTC

By considering the slope from the west side to the east side, 3 different levels of floors are connected by skip floor adjusted to the gradient. On the floor plan, it is divided by the function into 4 zones, “Lecture Zone”, “Practice Zone”, “Accommodation Zone” and “Administration Zone”. In the practice zone, a practice room related to engine will be noisy, so that it is located at the corner of the building. Also, the accommodation zone is sited on 2nd floor and separated from the other zones. For the other related facilities, an elevated tank, a water reservoir, a septic tank and parking area are planned.

2) Section Plan of Construction

① Design GL/FL

The design GL (Ground Level) of the facilities related to TFH is basically planned to be the same GL of the existing facilities. The level should be adjusted by considering that the drainage slopes faces the sea at the existing GL. The FL (Floor Level) of each facility is planned to be 150 mm higher than the Design GL in order to prevent rainwater from flowing in. However, the FL of the platform of the ice storage room is planned to be FL+900, by considering the efficient conveyance of ice. The design GL of TFTC is structured with 3 levels to adjust to the gradient of the site, and each floor is connected with skip floor. The gap of each level is around 1m and the gap between the front road and the edge of the site is absorbed and the space with the minimum depth of excavation is created.

② Elevation Plan

By considering blows of rain and sunshine, the eaves are deepened upon the elevation plan. The roof pitch is adjusted to the specifications of Spanish roof tile, which is habitually utilized in the local areas.

3) Finish Plan

The selection of finish materials is planned, according to the General Specifications for Building Construction Works of Japan, by considering the durability and the endurance of the construction, simple maintenance and easy procurement of local materials. The finish plan of exteriors and interiors are shown in Table 2-18, Table 2-19, Table 2-20 and Table 2-21.

Table 2-18 Finish plan of exteriors of facilities at TFH

Finish plan of exteriors of facilities at TFH	
Building	Finish
Fish marketing hall building Canteen building	Roof: truss wood frame, plywood 12t., glass wool 50t., plywood 12t., asphalt felt, clay tile roofing Exterior wall: concrete block, mortar, AEP Column • Beam: concrete, AEP Window: wood frame, aluminium window Exterior fittings: galvanized steel door, anti chloridisation paint Painting: Anti chloridisation for steel parts Exterior floor: concrete trowel finishing coated by hardener
Net mending shed building Public toilets and showers	Roof: truss wood frame, colored non-asbestos cement board 6.3t. Column • Beam: concrete, AEP Retaining wall: concrete block, mortar, AEP Painting: Anti chloridisation for steel parts Exterior floor: concrete trowel finishing coated by hardener
Boat repair building Office of fuel tank and dispenser Winch house	Roof: truss wood frame, colored non-asbestos cement board 6.3t. Exterior wall: concrete block, mortar, AEP Column • Beam: concrete, AEP Fittings: galvanized steel door, anti chloridisation paint Painting: Anti chloridisation for steel parts Exterior floor: concrete trowel finishing coated by hardener
Elevated water tank Water reservoir	Tower: galvanized steel, anti chloridisation paint Foundation: concrete Reservoir: thermal insulating material sandwich panel FRP reservoir
Exterior floors	Front of the wharf • access road • surroundings of boat repair building: concrete paving Others: back filling soil rolling, crushed stone paving

Note: plywood 12t., glass wool 50t. and colored non-asbestos cement board 6.3t. are based on the standards of the General Specifications for Building Construction Works of Japan

Table 2-19 Finish plan of exteriors of facilities at TFTC

Finish plan of exteriors of facilities at TFTC	
TFTC building	Roof: truss wood frame, plywood 12t., glass wool 50t., plywood 12t., asphalt felt, clay tile roofing Exterior wall: concrete block, mortar, AEP Column • Beam: concrete, AEP Window: wood frame, aluminium window Exterior fittings: galvanized steel door, anti chloridisation paint Coating: marine paints for all steel parts Exterior floor: concrete trowel finishing coated by hardener Nosing of steps: non-slip tile
Elevated water tank Water reservoir	Tower: galvanized Steel, anti chloridisation paint Foundation: concrete Reservoir: thermal insulating material sandwich panel FRP reservoir
Parking Space / Exterior floors	Main entrance • exterior stairs: 300 mm rectangular tile Parking Space: concrete paving Service entrance: crushed stone paving

Table 2-20 Finish plan of interiors of facilities at TFH

Finish plan of interiors of facilities at TFH				
		Finish		
		Floor	Wall	Ceiling
Fish Marketing Hall				
	Office Entrance Hall	F1 Type	Column: W1 Type Wall: W2 Type	C1 Type
	Entrance / Stairs	F1 Type nosing of steps: non-slip tile	Railing: steel, OP, Wood top rail: OP	Backside of stairs: concrete, OP
	Toilets • Showers	F3 Type	W3 Type	C1 Type
	Worker room	F2 Type	W2 Type Column • beam: W1 Type	C1 Type
	Fish marketing hall Storage	F3 Type Scale base: F3 Type	Column • beam: W1 Type Wall: W2 Type	C2 Type
	Ice storage room	F2 Type Scale base: F3 Type	W2 Type Column • beam: W1 Type	C2 Type
	Machine room Storage	Entrance area: F3 Type Other areas: F4 Type	W2 Type Column • beam: W1 Type	C2 Type
	CFHC Office	F3 Type	W2 Type Column • beam: W1 Type	C3 Type
	Harbour manager room (office space) (meeting space)	F3 Type	Block, strip limber board, OS. Interior wall: wood frame, strip limber board, OS, partition with glass Column • beam: W1 Type	C3 Type
	Accountant room	F3 Type	W2 Type Column • beam: W1 Type	C3 Type
	Meeting room	F3 Type	Block, strip limber board,OS Column • beam: W1 Type	C3 Type
	Kettle room	F3 Type	W3 Type	C1 Type
	Document storage	F3 Type	W2 Type	C2 Type Wood frame: OP
	Corridors / Stair halls	F3 Type	W2 Type	C1 Type
	Ice Plant		W2 Type	C2 Type Wood frame: OP
Net mending building				
	Net mending room	F3 Type	Retaining wall: W2 Type Column • beam: W1 Type	Wood frame: OP no coating
Canteen Building				
	Canteen	F3 Type	W2 Type Column • beam: W1 Type	Wood frame: OP, plywood, OS
	Kitchen Food storage	F4 Type	W3 Type Column • beam: W1 Type	Wood frame: OP, cement board, OS

Boat repair building				
	Exteriors	F1 Type nosing of steps: non-slip tile	W2 Type Column • beam: W1 Type	Wood frame: OP, plywood, AEP
	Workshop (1) (2)	F2 Type	W2 Type Column • beam: W1 Type	Wood frame: OP, plywood, OS
	Storage room for tools and materials	F2 Type	W2 Type Column • beam: W1 Type	Wood frame: OP, plywood, OS
	Office	F2 Type	W2 Type Column • beam: W1 Type	Wood frame: OP, plywood, OS
	Night-duty room	F2 Type	W2 Type Column • beam: W1 Type	Wood frame: OP, plywood, OS
	Toilets • Showers	F3 type with tile	W3 Type	C1 Type
	Kettle room	F2 Type	W2 Type	C1 Type
	Winch house	F2 Type	W2 Type	Only exterior fishing
	Office for fuel tank	F2 Type	W2 Type	C1 Type

Note:
The finish plan of interiors of facilities at TFH and TFTC are mainly divided into the following categories:

Floor
F1 Type: 300mm rectangular tile
F2 Type: concrete trowel finishing coated by hardener
F3 Type: concrete trowel finishing coated by urethane coating
F4 Type: concrete trowel finishing
F5 Type: flooring boarding

Wall
W1 Type: concrete, AEP (Acrylic Emulsion Paint)
W2 Type: block, mortar, AEP
W3 Type: block, 100 mm rectangular tile

Ceiling
C1 Type: cement board, AEP
C2 Type: concrete, AEP
C3 Type: plywood, OS (Oil Strain)

Table 2-21 Finish plan of interiors of facilities at TFTC

Finish plan of interiors of facilities at TFTC				
Floor		Finish		
		Floor	Wall	Ceiling
1st Floor	Entrance hall	F1 Type	W2 Type Column • beam: W1 Type	Slab side: strip limber board Beam side: C2 Type
	Entrance / Stairs	F1 Type nosing of steps: non-slip tile	Railing: Steel OP Wood top rail: OP	Backside of stairs: C2 Type
	Corridors	F2 Type Partially F1 Type	W2 Type Column • beam: W1 Type	Slab side: strip limber board Beam side: C2 Type

	Office Instructors' room (1) (2) (3) Principal room	F3 Type	Exterior wall: W2 Type Interior partition wall: wood frame partition, (Retaining wall: strip limber board higher parts of retailing wall: glass)	Slab side: strip flooring Beam side: C2 Type
	Kettle room	F3 Type	W3 Type	C1 Type
	Classroom (1) (2) (3) (4)	F3 Type	W2 Type	Slab side: strip limber board Beam side: C2 Type
	Practice room (1)	F2 Type	W2 Type	Wood frame: OP, plywood, OS
	Practice room (2) (3)	F3 Type	W2 Type	Wood frame: OP, plywood, OS
	Training equipment storage	F4 Type	W2 Type	Wire mesh
	Canteen	F3 Type	W2 Type	Slab side: strip limber board Beam side: C2 Type
	Kitchen	F4 Type	W3 Type	C1 Type
	Machine room	F4 Type	W2 Type	C2 Type
	Toilets • Showers	Terrazzo tile	W3 Type	C1 Type
2nd floor	Accommodation (1) – (10) for students	F5 Type	Block, strip limber board Column • beam: W1 Type	C3 Type
	Accommodation for instructors	F5 Type	Block, strip limber board Column • beam: W1 Type	C3 Type
	Self-study room	F5 Type	Block, strip limber board Column • beam: W1 Type	C3 Type Wood frame: OP
	Toilets • Showers	Terrazzo tile	W3 Type	C1 Type
	Kettle room • linen room	F3 Type	W3 Type	C1 Type
	Corridors	F2 Type	Walls of accommodation side: W2 Type Column • beam: W1 Type Railing: steel, OP, Wood top rail: OP	C3 Type Wood frame: OP
	Interior stairs	F1 Type nosing of steps: non-slip tile	Railing: steel, OP, Wood top rail: OP	C2 Type
	Exterior stairs	F2 Type A part of stairs/corridors: F1 Type	Railing: steel, OP	

4) Area plan of facilities

① Area plane of each room

The basis of calculation for the area of each room is shown in Table 2-22 and Table 2-23, and the area of the target facilities by the Project is summarized in Table 2-24 and Table 2-25.

Table 2-22 Area plan of facilities related to TFH

Bldg	Room	Area (m2)	Area calculation
Fish marketing hall building			
	Office Entrance Hall	23.4	Entrance hall: 6 m x 3 m = 18.0 m2 Corridor: 1.8 m x 3 m = 5.4 m2
	Toilets • Showers	Male: 12.0 Female: 12.0	Male: toilets stool 1, urinal 2, washhand basin 2 Female: toilets stool 2, washhand basin 2 Closet for cleaning tools: 1.62m2 (in men's room)
	Worker room	13.2	Driver 1, janitor 3: 3.0 m2 x 4 persons = 12.0 m2 Path, etc. 1.2 m2
	Fish marketing hall	135	Place for insulated boxes: 13.44 m2 Place for fish display: 56.00 m2 Work space • path: 65.56 m2
	Ice storage room	46.8	Ice storage room: 4.0m x 4.0m = 16 m2 Retail space, etc: 2m x 6m = 12.0 m2 Maintenance space: 8.8 m2
	Machine room and storage	27.0	Refrigerating machine for ice plant: 1 Electric control board: 1 Path for maintenance work: 7.2 m2 Engineer for ice plant 1: 3 m2 x 1 person = 3 m2 Storage: 13.5 m2
	CFHC Office	90.0	Personnel on service 13: 6 m2 x 13 persons = 78 m2 Reception counter: 12 m2
	Harbour manager room	24.0	Office space: 12 m2 Meeting space: 12 m2
	Accountant room	9.0	Personnel on service 2: 4.5 m2 x 2 persons = 9.0 m2
	Meeting room	54.0	Meeting for 25 persons: 2.2 m2 x 25 = 55 m2
	Kettle room	12.0	Sink: 1,800 x 900, cupboard: 1,600 x 450
	Storage for fish marketing	27.0	Spare parts for fish marketing hall
	Corridors / Stair halls	24.0	Width of corridor: 2.0m
	Ice Plant		At the open ceiling of the ice storage room, Required height for installing the machine: 5.5 m
Net mending shed building			
	Net mending room	180.0	18m x 10m = 180 m2
Canteen building			
	Canteen	60.0	40 seats x 1.5 m2/person = 60 m2
	Kitchen	47.6	Kitchen: 42.4 m2 (includes 7.2 m2 for path) Food storage: 5.2 m2
	Toilets	5.2	

Boat repair building			
	Office	64.0	Personnel 5 on service: 6 m2 x 5 persons =30 m2 Night-duty room: 3 x 5 =15 m2 (includes 7.2 m2 for toilets and path) Toilet: 2.5 x 2.5 = 6.25 m2 Kettle room: 2.5 x 2.5 = 6.25 m2
	Workshop (1) (2)	192.0	According to Fig. 2-3
	Winch house	16.0	Winch foundation: 2.2 m2 Path for work, etc.: 13.8 m2
Office for fuel tank			
	Office for fuel tank	16.0	Personnel 2 on service: 6 m2 x 2 persons = 12 m2 Reception • path: 4.0 m2

Table 2-23 Area plan of facilities related to TFTC

Floor	Room	Area (m2)	Area calculation
1st Floor	Entrance hall	49.0	Entrance hall
	Entrance / Stairs	15.0	3 m x 5 m = 15m2
	Corridors	195.3	The width of corridor: 2.2m
	Library	24.5	Shelf: 0.3 m x 14 m x 1.2 m (=h):4.2 Self-study desk: 900 x 600 x 2
	Classroom (1)	73.5	Classroom for 50 students: 1.2 m2/person x 50 persons = 60 m2 Space for platform for instructors, path, etc.: 13.5 m2
	Classroom (2)	22.1	Classroom for 10 students: 1.2 m2/person x 10 persons = 12 m2 Space for platform for instructors, path, etc.: 10.1 m2
	Classroom (3)	34.3	Classroom for 20 students: 1.3 m2/person x 20 persons = 26 m2 Space for platform for instructors, path, etc.: 8.3 m2
	Classroom (4)	51.5	Classroom for 50 students: 1.3 m2/person x 30 persons = 39 m2 Space for platform for instructors, path, etc.: 12.5 m2
	Practice room (1)	82.6	Storage room for training equipment: 2.2m x 7m =15.4 m2 According to Fig. 1-4
	Practice room (2)	33.6	According to Fig. 1-4
	Practice room (3)	50.4	According to Fig. 1-4
	Office	44.55	Personnel 6 on service: 6 m2 x 6 persons = 36 m2 Corridor: 8.55 m2
	Principal room	24.5	Principal on service: 10 m2 x 1 person = 10.0 m2 Meeting space: 8.75 m2
	Instructors' room	26.3	3 rooms with 6 booths for instructors: 2.5m x 3.5m x 3 rooms = 26.25 m2 Desk: 900 x 650 x 2 Shelf: 1,800 x 300
	Kettle room • Toilets	17.15	Sink: 1,500 x 600 Toilets for instructors: 5.25 m2
	Training equipment storage	16.8	Storage of miscellaneous supplies/teaching materials/tool, spare parts, etc.
	Canteen	60.0	40 seats x 1.5 m2/person
	Kitchen	28.5	(canteen area) x 0.5

	Machine room	3.0	Electric control board: 1 Lifting pump: 2
	Toilets • Showers	33.6	For male and female: toilet stool 2 each., Washhand basin 1 each Closet for cleaning tools
2nd floor	Accommodation (1) – (10) for students	168.0	Room for 4 persons: 16.8 m2/room x 10 rooms Referring to Negombo Fisheries Training Center
	Accommodation for instructors (1) (2)	73.5	Room for 2 persons x 2 rooms: 12.25 m2/room x 2 = 24.5 m2 Common space: 36.75 m2 Toilets and Showers: 12.25 m2
	Self-study room	49.0	24 seats x 2.0 m2/person = 48.0 m2
	Toilets • Showers	33.6	Shower(male): 4 booths locker room Toilet(male): stool 3 booths, Washhand basin 5
	Linen room	49.0	Linen room for students: 24.5 m2 Linen room for instructors: 24.5 m2
	Corridors / hall	88.2	Corridor: 2.2 m x 42 m
	Interior stairs	15.0	3 m x 5 m = 15 m2

② Overall area

Table 2-24 The areas of the facilities related to TFH

Building	Construction area	Floor area
Fish marketing hall building	288 m2	1st floor 288 m2 2nd floor 252 m2 Sub Total 540 m2
Net mending shed building	180 m2	180 m2
Canteen building	144 m2	144 m2
Public toilets and showers	28 m2	28 m2
Boat repair building Winch house	256 m2 16 m2	256 m2 16 m2
Office of fuel tank and dispenser	16 m2	16 m2
Sub Total	928 m2	1,180 m2

The areas of the facilities related to TFTC

Building	Construction area	Floor area
Fisheries Training Center Building	882m2	1st floor 882 m2 2nd floor 490 m2 Sub Total 1,372 m2
Sub Total	882m2	1,372 m2

5) Structural Planing

The terrace roof is not common in Sri Lanka except for Colombo City. Probably because the terrace roof comparatively requires high technique of water-proofing and the comparatively longer branches at eaves of the sloping roof is appropriate to avoid rain caused by the Monsoon climate, the sloping roof is the traditional style of roof in Sri Lanka. Therefore, the Project plans the structural style that forms sloping roof. The main structure follows the general methods of construction work in Sri Lanka with consideration of easy maintenance afterwards, columns and beams should be the

reinforced concrete and rigid framing structure, and the roof should be the mixed structure covered by the roof with truss wood frame. The foundation style of the construction is planned to be the spread foundation of concrete, because the bearing ground at each site secures the bearing capacity indicated in the structural conditions.

6) Facility arrangement

i) Air conditioning and ventilation arrangement plan

Natural ventilation and natural air draft are a principle, but separate-type air conditioners and ceiling fans are installed in rooms partially. In this case, the equipment, of which operation and maintenance are easy and is manageable in Sri Lanka, is selected. An outline of air conditioning and ventilation arrangement for each room is shown in Table 2-26

Table 2-26 Air conditioning and ventilation arrangement for each room

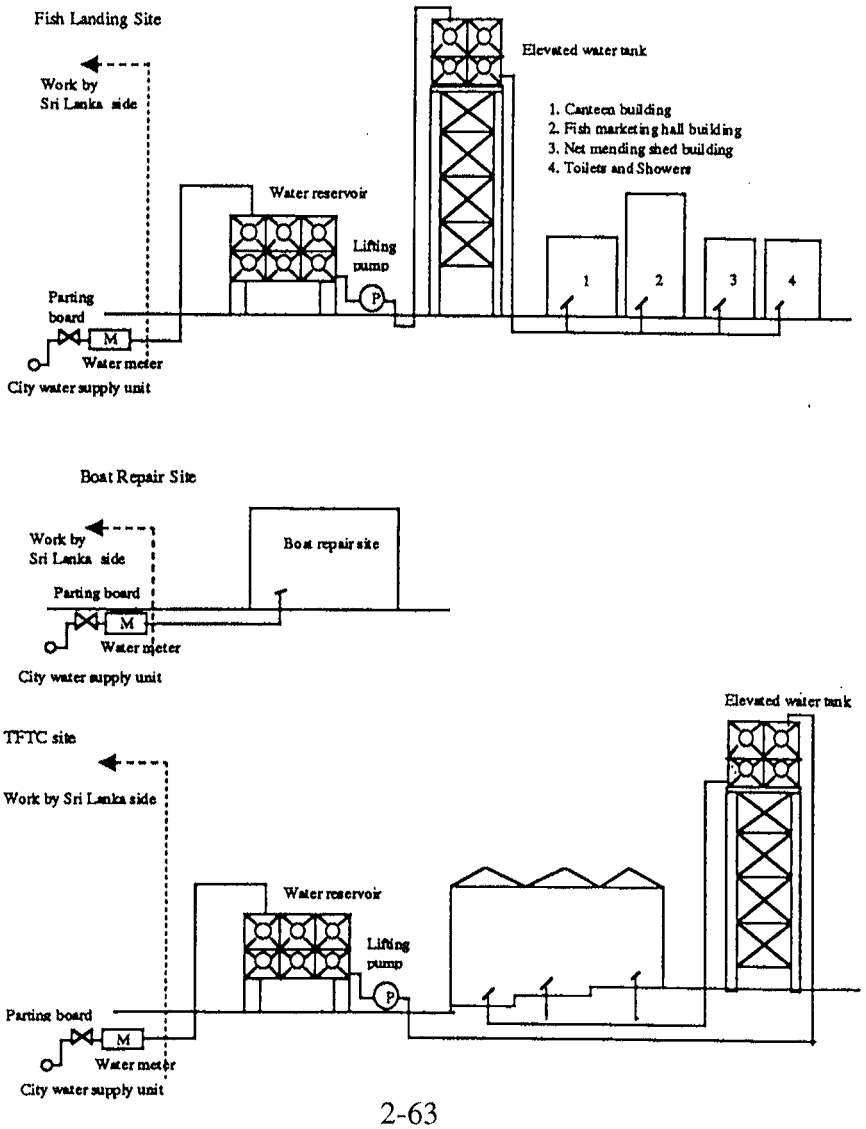
Building	Room	Separate-type air conditioner	Ceiling fan	Ventilating fan	Reference
Fish marketing hall building	CFHC office	---	❍	---	Ceiling propeller fan
	Harbour manager room	❍	---	❍	2HP 5kw air conditioning for cooling
	Meeting room	---	❍	---	Ceiling propeller fan
	Toilets	---	---	❍	
	Accountant room	---	❍	---	Ceiling propeller fan
	Kettle room	---	---	❍	
	Machine room	---	---	❍	
Canteen building	Canteen	---	❍	---	Ceiling propeller fan
	Kitchen	---	---	❍	
Boat repair building	Office	---	❍	---	Ceiling propeller fan
	Workshop	---	---	---	
	Toilets • kettle room	---	---	❍	
TFTC building	Classroom (1) (2) (3) (4)	---	❍	---	Ceiling propeller fan
	Practice room (1) (2) (3)	---	❍	---	Ceiling propeller fan
	Principal room	❍	---	❍	2HP 5kw air conditioning for cooling
	Instructors' room	---	❍	---	Ceiling propeller fan
	Library	---	❍	---	Ceiling propeller fan
	Canteen	---	❍	---	Ceiling propeller fan
	Kitchen	---	---	❍	
	Accommodation	---	---	---	
	Self-study room	---	❍	---	Ceiling propeller fan
	Toilets	---	---	❍	
	Showers	---	---	❍	
	Kettle room	---	---	❍	

ii) Water supply system plan

① Water supply system

In both of the TFH site and the TFTC site, 3 inches diameter PVC main pipes are laid at the public roads in front of the sites. Between these main pipes and the sites, the installation of branching pipes is required. In terms of this installation, the installation of the pipe of over 2.4 inch is required to be implemented by Sri Lanka side for getting the necessary amount of water at planned sites. Sri Lanka side is responsible for up to the installation of the inspection meter, and the piping work after the inspection meter at the sites is implemented by Japanese side. In regard with water pressure, based on the conditions of water pressure in the adjoining areas, it is judged around1kgf/cm2. In addition, because the water supply is deficient at present, the water supply system; main pipes→reservoir→elevated water tank→each required place, is planned. In case of a suspension of water, it is planned that the capacity of the reservoir is equal to the necessary amount for one day. The water supply system is shown in Fig 2-11.

Fig. 2-11 Water Supply System



② Scale of water supply facilities

Table 2-27 shows the basis of calculation for necessary amount of water at each site and the scales and the specifications of a reservoir, an elevated tank, etc.

Table 2-27 Calculation and specifications for water supply facilities

TFH site

Item	Outline
Necessary amount of water	Ice plant: 7.0 m3/day Toilets • Shower: 68 persons/day x 40L/day +296 persons/day x 20L/day = 8.64 m3/day (target numbers of plan: assumed users 296 fishermen and CFHC related personnel 68 persons) Fish marketing hall: washing water for floor 40L/min. x 20min/cycle x 2 cycles/day = 1.60 m2 Washing water for insulated boxes 60L x 10 boxes x 1cycle/day = 0.6 m2 Canteen: 309 persons x 15L/day = 4.64 m3 Hot water supply, etc.: 1.0 m3/day Total: 23.48 m3/day By the calculation above, the planned amount of water is 23 m3/day.
Water Reservoir	• Water storage required for one day: 4m x4m x 2m (23m3 effect) • Thermal insulating material sandwich panel FRP tank
Elevated water tank	• Assumed to store 10 % of water required for one day: 23 m3 x 1/10 = 2.3 m3 1m x 2m x 2m (3 m3 effect) • Thermal insulating material sandwich panel FRP tank
Lifting pump	• Lifting water 200 litre/min. • Lifting head**:** 17m Aq (167kPa) • Lifting pump: automatic parallel drive type, single suction centrifugal pump, 50 ,1.5kW x 2
Piping materials	Installing pipe: PVC Secondary water supply pipe: PVC coating steel pipe laid pipe,underground

TFTC site

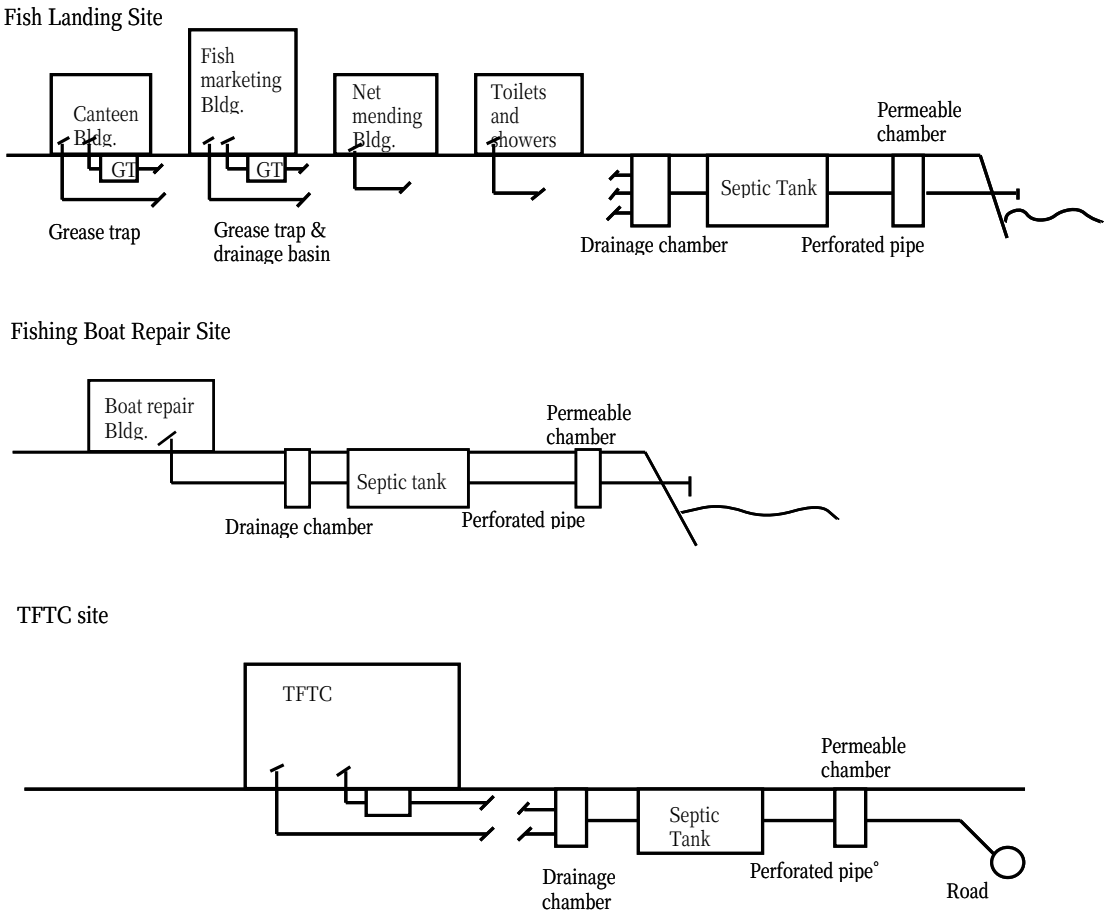
item	Outline
Necessary amount of water	Target number of users: lodgers: 44 person Students + personnel: 110 + 17 = 127 persons Unit amount: dormitory 120 litre/person school 80 litre/persons Amount of utilized water: 120 x 44 persons + 80 x 127 persons = 154,400 litre The planned amount of water is 16m3/day.
Water Reservoir	• Water storage required for one day: 3m x3m x 2m • Thermal insulating material sandwich panel FRP tank
Elevated water tank	• Assumed to store 10 % of water required for one day: 16 m3 x 1/10 = 1.6 m3 1m x 2m x 1m • Thermal insulating material sandwich panel FRP tank
Lifting pump	• Lifting water 110 litre/min. • Lifting head**:** 25m Aq (245kPa) • Lifting pump: automatic parallel drive type single suction centrifugal pump, 32 ,1.5kW x 2
Piping materials	Installing pipe: PVC Secondary water supply pipe: PVC coating steel pipe,underground

iii) Drainage and sanitary arrangement

① Drainage system

The waste water treatment is to be under BOD value 100ppm at TFH and BOD value 30 ppm at TFTC. In terms of interior drainage, the aeration type septic tank is equipped in the site, and after the treatment, the drainage runs through perforated PVC pipe and the overflown water is discharged. The grease trap system is adopted for general kitchen drainage, and the drainage of fish marketing hall runs through drainage basin equipped in the site and the bucket type grease trap, and it is treated by the septic tank. The separate flow system is set for exterior drainage, and rainwater is directly discharged to the wharf side after flowing into the drain gutter in the site. The flow of drainage at each site is shown in Fig. 2-12.

Fig. 2-12 Flow of drainage system



② Scale of drainage system

The specifications of main drainage and sanitary equipment are as follows:

Septic tank	: Aeration type septic tank Concrete Hume pipes
Permeable piping • chamber	:Permeable chamber 1,000 , 2,000mm in height :Permeable crushed stone:30mm, 1,000mm in depth
Drainage pipe:	: PVC 100 , 200 Parts cross road are protected by concrete
Showers;	Fish marketing hall building/ Training center; shower metal fittings Public toilets and showers; flush tub
Sanitary equipment	: Fish marketing hall/training center; western style toilets, low tank style, with flush tub : Public toilets and showers; local style (squating pan style) high tank style with, flush tab

iv) Garbage arrangement

Garbage is collected by the garbage collection system of Tangalle City. The collection is performed twice or three time a week. Huts with dirt floor concrete for garbage at the side of the canteen building at fish landing site, the side of the office at the boat repair facility site, and the side of the kitchen at TFTC site are placed. In addition, water pipes and drainage basins are planned to be sited in order to wash garbage bins and water the huts.

v) Gas supply system

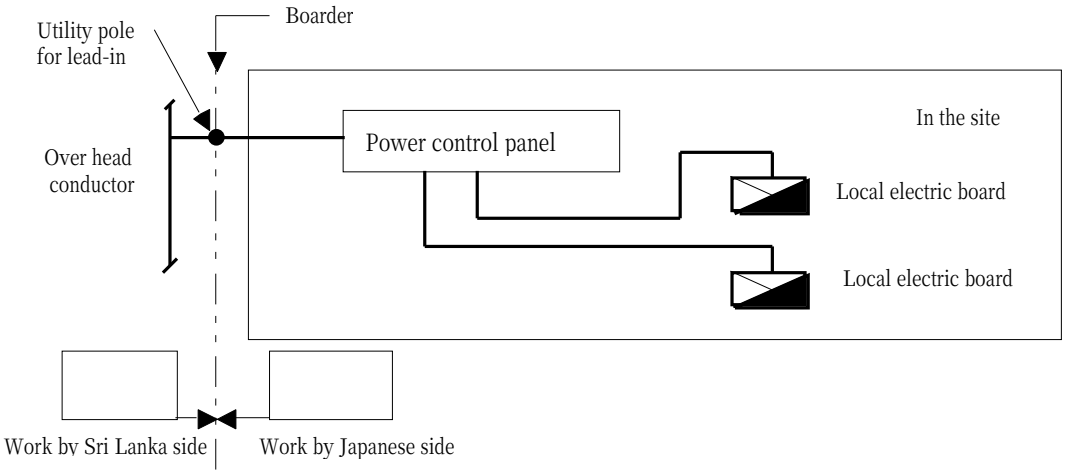
LPG is expected as the heat resource for kitchen. The piping system is the direct piping to the kitchen range, and Sri Lanka side is responsible for this work.

vi) Electric arrangement plan

At the TFH site, by the work of Sri Lanka side, the power is dropped to 3 –phase, 4-wire, 50Hz, 400V-230V from 3300v at the transformer situated along the front road, and the primary power source is led into the power control panel in the site. Also at the TFTC site, by the work of Sri Lanka side, 150KVA transformer is installed along the front road, and through this transformer, the primary power source is led into the

power control panel. From the utility pole for lead-in in the site, the power is lined by underground utility. The system of power supply is shown in Fig 3-13.

Fig. 3-13 Power supply system



Truck line system:

At the TFH site, the power control panel is installed in the machine room of the fish marketing hall building and the field office of the boat repair building, and piping and wiring to electric lamps and power panels in each building are planned. At the TFTC, the power control panel is installed in the machine room on the 1st floor, and piping and wiring to electric lamps and power panels on 1st floor and 2nd floor are planned. The standards of piping and wiring in the sites are applied to IEC (International Electrical Commission). The system of power supply are 3 , 3wire, 400v-230v, and single phase, 2 wire, 230 V.

Power equipment:

Piping and wiring from the power control panel to each equipment are planned.

Electric outlet socket:

Wiring and piping from each panel to general outlet socket, lighting switches, each lighting equipment, ventilating fan and air conditioners are planned.

Materials:

Underground piping:	FEP pipe, the depth: deeper than GL-900mm (cable conduit)
Wiring materials:	cable (BS standards)
Outlet socket:	BS standard, 15A, 3 electrodes (1 electrode for earthing)
Piping:	galvanized metal pipe

Lighting equipment:

The specifications of lighting equipment are resistant corrosion caused by salt. Light equipment is, in principle, fluorescent lamp fixture and mercury vapor lamp for yard lighting.

vii) Other arrangement

① Lightening rod

At each of TFH and TFTC, the lightening rod is installed in the top of the elevated water tank. The structures and the specifications of top parts of rods, the lead of lightening rod, and electrodes for earthing will be applied to JIS and the total resistance of earth is planned to be 10 Ω or less.

② Fuel tank and dispenser

At TFH site, the following fuel tank and dispenser equipment is constructed.

Capacity: 13,200 ltr. x 1unit (diesel oil)
Ground installation system, horizontal cylinder type.
Steel made: rustproof painted surface

Dispenser x1 set, Stand type, generating system. (price and flow amount are indicated)

(3) Civil work plan

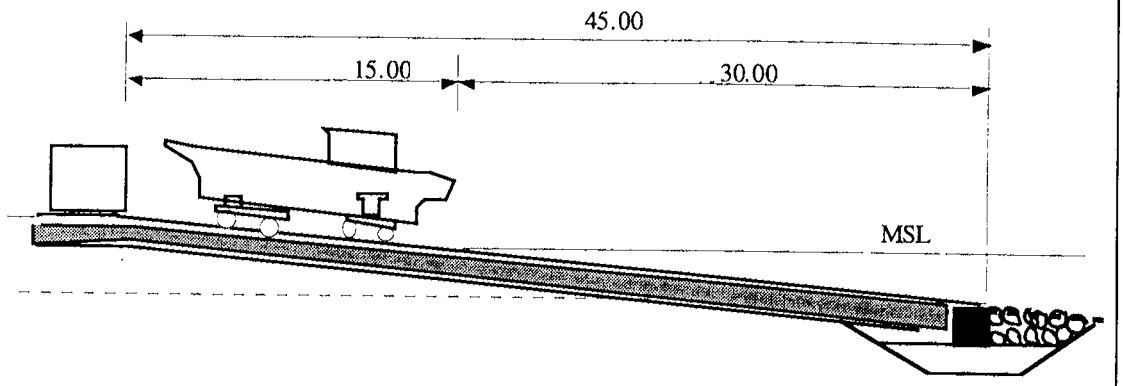
The following civil work of facilities are planned at TFH site:

1) Slipway

As the structure of slipway, based on the comparison of the structures as shown in Table 2-28, the precast concrete style is adopted. In terms of execution, the precast concrete is laid on the top of it to finish the shallow slope and rail and cradle are installed. By this methods, because the exiting ground is sandy soil, subsidence is expected least and the terms of construction is comparatively shorten.

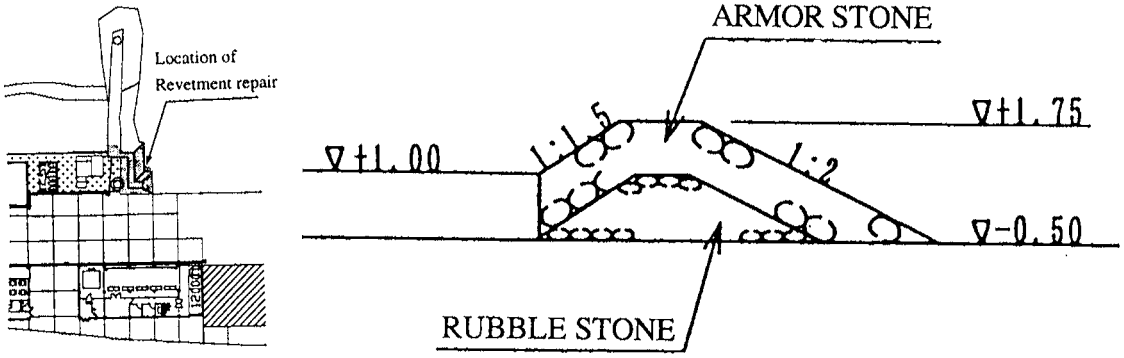
The edge in the water requires reinforcement by cast-in-place concrete and ground excavation and, accompanied with its construction, seawater pollution may be expected, so that, upon the construction, the procedures are carefully considered by setting protection filter to resist the diffusion of polluted water. The edge on land, a winch is stalled and its winch house is prepared to shelter from wind and rain.

Table 2-28 Comparison of the structures of slipway

	cast-in-place concrete	Precast concrete
		
General features	The control of water pollution is rather difficult because the are of cast-in-place concrete is large.	The quality control is easy because of the land work.
Implementation aspect	The term of construction is long because of the great amount of the field work.	The construction of laying PC is major, and the term of the construction is shortened.
Management and maintenance	Not particularly necessary.	Not particularly necessary
Economical aspect	The costs are high because of the long-term construction.	By shortening the terms of the construction, it is possible to decrease the costs.
result	Δ	○

2) Revetment

At the east edge of the existing wharf at TFH, 5 m between the edge of the wharf and the existing boundary wall is the temporary revetment, because scour could be expected if this situation remains, so as to secure safety for the new facilities, the repair of revetment is executed. As for the repair of revetment, the structure is stone bond as shown below, the revetment of 5m horizontally and 10m vertically toward the extended line of the existing wharf is constructed and the height of the finish upper surface is MSL +1.75m, which is the almost same height of the existing groin.



(4) Exterior facilities

1) TFH site

In order to resolve the gap between the level of front road and surrounding areas such as beach side area and the planned level, the construction work of the reinforced concrete retaining wall (1.2 m H, 232 m L) is executed. For the part of the road where stone bond retaining wall is sited, the preserve stone bond is performed at the inside of the site.

Both of the Fish Landing Site and the Boat Repair Site are paved (4,315 m2) with concrete from the front road to the inside of the sites and the areas of the entrances are slopes, because of the gap of 1.5 m ~ 2.0 m between the levels of the front road and sites. The strength of the pavement at the inside of the site is planned on the conditions of 15 tons of the maximum load for running of fuel supply trucks at the Fish Landing Site and 20 tons of the maximum load for hung-ups by the mobile crane at the Boat Repair Site.

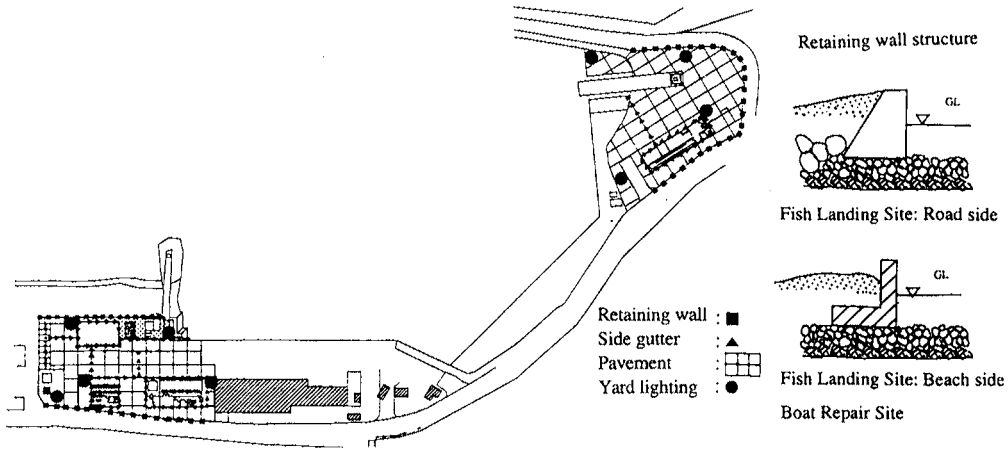
A U-shaped side gutter (311 m L)is constructed in order to drain water on the floor of the paved parts. Rainwater on the roof of each facility is drained by a chamber, and discharged through the U-shaped side gutter into the sea.

Totally 9 yard lightings are installed in the TFH site.

For the navigation lights, each one of solar battery-type beacon lamps is installed at the edge of the existing breakwater and at the edge of the groin. The both edges of the existing breakwater and the groin are filled with the random rubbles of armor stones, and to install beacon lamps, the repair of armor stone and concrete foundation is executed. The beacon lamps are installed at the position of

2 m high from the upper surface of the ground and then the partitions surround around the lamps to protect from damages.

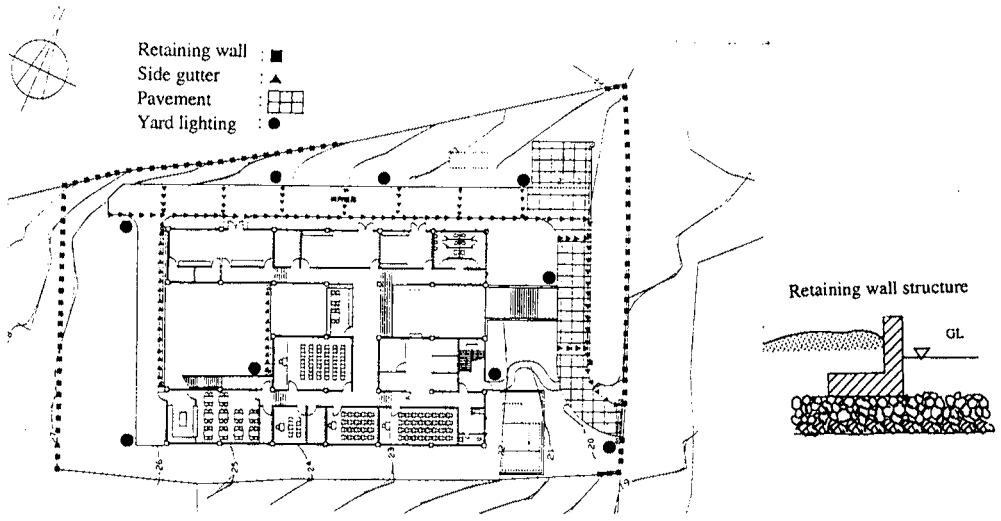
Fig. 3-14 Layout of exterior facilities at TFH site.



2) TFTC site

In order to resolve the gap between the level of front road and surrounding areas and the level of the inside of the site, the construction work of the reinforced concrete retaining wall (1.5 m H, 165 m L) is executed.
The approach from the entrance at the front road and to parking space inside and the entrance of the facility is paved with concrete (120 m2). The strength of the parking space and the road inside of the site is planned on the conditions of 10 tons of the maximum load for running of buses.
At the side of the road inside of the site and the building side of the courtyard, a U-shaped side gutter (168 m L) is constructed in order to drain rainwater from the hillside, etc. and the rainwater is discharged into the public side ditch at the front road.
Totally 9 yard lightings are installed in the TFTC site.

Fig. 3-15 Layout of exterior facilities at TFTC site.



(5) Equipment plan

1) Equipment for facilities at TFH

i) Equipment for Fish Marketing Hall Building

a. Ice plant : 1 unit
capacity: 5 tons/day, compressor motor 30kw,
capacity of refrigeration, 140,000 kcal/Hr
Air cooling condenser
Ice type: flake ice
Ice storage: 10 tons (4, 000mmW x 4,000mmL x 2,464mmH)
Panel assembling style

b. Insulated boxes : 10 pcs.
FRP made: dimension: 1,370mmW x 840mmL x 700mmD
capacity: approx. 550 litre, weight 85kg

c. Scale for fish : 2 sets
Analogue platform scale**:** capacity 25 ~ 150kg x1, capacity 10 ~ 100kg x1, minimum scale 500g

d. Scale for ice : 1 set
Analogue platform scale**:** capacity 10 ~ 100kg, minimum scale 500g

ii) Equipment for Canteen Building

a. Table (for four persons) : 10 pcs..
dimension: 1,200mm W x 900mm D x 750mm H

b. Chairs for the Table above (for four persons) : 40 pcs.
dimension: 450mmW x400mm/500mmD x440mm/800mmH

iii) Equipment for fishing boat lift-up

a. Winch equipment : 1 unit
lift-up capacity: approx. 5 tons, rolling speed approx. 10 m/min.
motor output approx. 15 kw
wire diameter 22 mm x 100 m L (break load: approx. 20 tons)

b. Cradle : 1 set
rail wheel type, 10 m ~15 m L, 3.5 m ~ 4.5 m W

iv) Equipment for Boat Repair Building

a. Crane : 1 unit
model: truck crane, hang-up load: approx. 20 tons
height of lift: approx. 30.0/31.7m, length of boom: approx. 31.0m

b. Lathe : 1 unit
dimension: approx. 4,800mm L x 1,100mm W x1,350mm H
electric output: 7.5kw
capacity: maximum distance between both centers 3,000~3,600mm,
diameter of bar materials process: 76mm,
swing on head: 600mm, swing on side slide base: 380mm

c. Bench drill : 1 set
model: upright type drilling machine,
output: approx. 1.5kw with lubricator for cutting
holing capacity: steel 40~55mm, cast iron 50~60mm

d. Shaping machine : 1 set
dimension: approx. 1,400mm L x 1,000mm W x1,500mm H,
Weight 1,000kg
dimension of stroke: approx. 500mm, processing width: 500mm,
electric output: 1.5kw

e. Bench grinder : 1 set
dimension of grindstone:
(outer length) 250mm x (thickness) 25 mm x (hole diameter) 20 mm
electric output: 1,050 w

f. Disk grinder : 1 set
size of grindstone: 150mm, electric output: 1,050w

g. Electric cutter : 1 set
size of grindstone: 405mm, electric output: 2.2kw

cutting capacity (round bar: approx. 70mm, pipe: approx. 120mm)

h. Electric welding Equipment : 1 set
rating output current: 300A, rating input 24.5KVA,
adjustable range of output current (70~300A)
compulsory air cooling system,
diameter of applicable welding bar 2.6~6mm
parts: cap tire cable, bar holder, earth clip, cable joint
face protection for welding

i. Gas welding equipment : 1 set
oxygen cylinder, acetylene cylinder 1 each.,
pressure adjuster 1 each. hoses 1 set
welder for acetylene gas (with 5 fire spouts),
and cutting welder (with 3 fire spouts)

j. Air compressor : 1 set
Single stage compressor, electric output: 2.2kw,
capacity of air tank: approx. 80litre (pressure 8~10kg/cm2)

k. Painting tools : 1 set
spray gun, cup container, hoses

l. Battery charger :1 set
voltage: 6~12V(high speed 2~50AH, normal speed 24~120AH),
power input 1.1KVA,with power code, direct current output code

m. Fuel injection tester : 1 set
pressure meter: 0~500kg/cm2 (minimum scale 10kg/cm2)

n. Vise, anvil : 2 pcs. each
rectangular type vise: 200mm W x 200mm (open height) x1,
100mm W x 120mm(open height) x1,
anvil: cast iron type, approx. 50kg x1, approx. 30kg x1,

o. Chain block : 1 set
manual type; rating load 5 tons, height of lifting 3.0m
body (load chain, hand chain, manual gear with trolley)

p. Measurement tools : 1 set

standard calipers: range of measurement 300mm x1
micrometer: range of measurement
(anvil conversion style 0~150mm) x1
carpenter's square: 500mm x 250mm x 1

q. General tools : 1 set

Engineering kit

Socket hexagon	5, 5.5, 7, 8, 10, 12, (6.35mm rec.), 10,12,13, 14, 17, 19, 21,22, 24, 27, 30, 32
Spanner	5.5x7, 8x10, 10x12, 11x13, 12x14, 14x17, 19x21, 22x24
Long spectacles wrench 45 º	10x12, 11x13, 12x14,14x17, 19x21, 22x24
Single spanner	10x10, 12x12, 14x14, 17x17, 19x19, 21x 21
Screwdriver	(-)75, (-)100, (-)150, round soft grip, +No.1, No.2, No.3 round soft grip
Ratchet handle (371) x1, Driver type handle115 (6.35mm rec.) x1, Extension bar 321 (150mm) x1, Ball joint x 1, Monkey wrench (200 mm, 300 mm) x 1, Combination plier 200 mm x 1, Safety plier 250 mm x1, Snap ring plier 200 mm x 1, Pincer 175 mm x 1, Radio pincer 150 mm x 1, Nipper 150 mm x 1, Pipe wrench 300 mm x 1, Grip plier 250 mm x 1, Mini cutter 200 mm x 1, Hammer 1 pound x 1, Shock absorption hammer 1 pound x 1, Ball point x 1	
L-shaped wrench set	1,5, 2, 2.5, 3, 4, 5, 6, 8, 10

v) Navigation Light Red (1 unit), Green (1 unit)

Type: beacon lamp type
Lamps: luminous diode • 1 flush/4 sec.
Light distance: 5 miles
Height: 2 m

(Because Sri Lanka is recognized as Class A district by the international agreement, a red lamp on the left hand side and a green lamp on the right hand side, faced from the sea side are allocated.)

2) Training Equipment for TFTC

a. Audio-visual Equipment

[1] 16-film projector : 1 set

Lens: F1.8, Xenon lamp, case with speakers

[2] Slide projector : 1 set

Lens: F2.8, 85mm, projector lamp: 24V-150W halogen lamp

[3] Loud speaker and amplifier : 1 set

portable type (microphone, speakers, amplifiers):

power source (alternating current 220V-240V, direct current 12V battery)
output approx. 20~25W

b. Navigation Training Equipment

[1] GPS : 1set
GPS: 6.5 inches LCD, power source: 10.5~30V,
power consumption: approx. 50W
8 channels parallel for following 8 satellites

[2] Radar : 1set
10 inches kinescope display, power source: 10.5~34V,
power consumption: approx. 50W
range of distance: 48 miles, transmission output: approx. 4kW

[3] MF/HF wireless radio : 1 set
output 150W, power source voltage DC 10.8~40V
dimension: approx. 300mmW x 260mm D x 150mm H
sound: J34, H3E

[4] VHF wireless radio : 1 set (2 pcs.)
potable type: frequency 156.3~156.875Mhz, 8~14 channels (maximum)
power source: battery type, 7.2 VDC
Channel: CH16, CH6, CH12, CH13, CH15, CH17, CH17

[5] Direction finder : 1 set
range of transmission frequency: 200~5,000khz

[6] Navigation training device : 1 unit
Navigation stand: diameter approx. 1.8 x 3.5m/electric hydraulic drive
(operation stand, steering device, magnetic compass, gyro compass, hand compass 2pcs.)

[7] Wind vane, anemometer : 1 set
fixed vane type wind vane anemometer: hanging display type,
power source: AC 220V
velocity: 2~60m/s
direction: (180 degree each)

[8] Barometer : 1 set
marine aneroid barometer: diameter 150mm

[9] Level gauge : 1 set
dialing type: diameter 200m, (angle: 50 degree for left and right)

c. Fisheries Training Equipment

[1] Hydraulic fishing device : 1 set
electric hydraulic drive: hydraulic drive motor 3.7kw
line hauler: rolling up capacity: approx. 100kg,
net hauler: capacity approx. 130kgf-m

[2] Echo sounder :1 set
6 inches color display, frequency 200/50kHz,
output 300w, power source voltage DC11~40V, depth range 0~160m

[3] Microscope :1 set
Total magnification 100x ~ 600x,
glass cylinder type/length of glass cylinder: ocellus incline/120 ~ 160 mm
Revolver/variegation: 3/turntable type

d. Security Training Equipment

[1] Life boat : 1 unit
Expansion type, for 6 people
Fittings: 1sets for coastal usage

[2] Portable water pump equipment : 1 set
engine output approx. 10PS, capacity of water discharge 0.27m3/min,
discharge pressure: 7.0kg/cm3 with hose, nozzle

e. Engine and Engineering Training Equipment

[1] Diesel engine cut model : 1 set
output approx. 50HP, with supercharger, 4 cycles, 4 cylinders,
with manual reduction gear, manual start type

[2] Outboard engine : 1 set
outboard engine: output 25HP

[3] Parts related to propeller shaft : 1 set each.
propeller shaft (approx. 2,500mmx35mm), intermediate shaft,
intermediate coupling, sterntube, propeller, propeller nut,
lingunmvitae, cutless bearing

[4] Supplementary pumps : 1 set each
centrifugal pump, gear pump, rubber bane pump

[5] Steering device : 1 set
manual hydroelectric type: steering gear, with stand, torque approx. 20kgf-m
direct cylinder type

[6] Refrigeration training equipment : 1 set
dimension: approx. 1,200 mm L x 550mm W x 1,700mm H
compressor output 0.4kw, refrigerant R-22

[7] Pressure gauges, thermometer, flow meter : 1 pcs. each
for water pressure, hydraulic pressure, air pressure, refrigerant

[8] Fuel injection Tester : 1 set
pressure meter: 0~500kg/cm2 (minimum scale 10kg/cm2), with stand

[9] Gas welding equipment : 2 sets
pressure adjuster 1 each, hoses 1set,
welding for acetylene gas (with 5 fire spouts),
cutting welder (with 3 fire spouts)

[10] Electric welding equipment : 2 sets
rating output current: 150A, rating input 15.0KVA,
adjustable range of output current (below 150A)
compulsory air cooling system, diameter of welding bar 2.6~6mm
parts: cap tire cable, bar holder, earth clip, cable joint,
face protection for welding

[11] Lathe : 1 unit
dimension: approx. 3,000mm L x 1,030mm W x1,230mm H
electric output: 3.7kw
capacity: maximum distance between both centers 1,500mm,
diameter of bar materials process: 52mm,
swing on head: 460mm, swing on side slide base: 250mm

[12] Milling Machine : 1 unit
dimension of table: approx. 210mm L x 950mm W x1,500mm H
electric output: 1.5kw, conversion of revolution of main axis: 3 x 6 shifts
capacity: maximum movement of left and right: 600mm
maximum movement of front and back: 200mm
maximum movement of up and down: 400mm

[13] Bench drill : 1 set
bench type, base size 240 mm x 240 mm, height 1,280mm, output: 400W
process capacity 23mm

[14] Air compressor : 1 set
Single stage compressor**,** electric output: 2.2kw,
capacity of air tank: approx. 80litre (pressure 8~10kg/cm2)

[15] Painting tools : 1 set
spray gun, cup container, hoses

[16] Electric hand Drill : 1 set
output: 700W, process capacity (steel 13mm, wood 30mm)

[17] Electric grinder : 1 set
dimension of grindstone:
approx. 250 mm (outer length) x 25 mm (thickness) x 20mm (hole diameter)
electric output: 1,050w

[18] Angle grinder : 1 set
dimension of grindstone: approx. 150mm, electric output: 1,050w

[19] Battery charger : 1 set

voltage: 18~24V/10A, power source 400VA,
with power cables, direct current code

[20] Measurement tools : 1 set

standard calipers: 150mm x1
micrometer: 0~150mm x1
carpenter's square: (500mm x 250mm) x 1

[21] General tools : 1 set

Socket hexagon	5, 5.5, 7, 8, 10, 12, (6.35mm rec.), 10,12,13, 14, 17, 19, 21,22, 24, 27, 30, 32
Spanner	5.5x7, 8x10, 10x12, 11x13, 12x14, 14x17, 19x21, 22x24
Long spectacles wrench 45 º	10x12, 11x13, 12x14,14x17, 19x21, 22x24
Single spanner	10x10, 12x12, 14x14, 17x17, 19x19, 21x 21
Screwdriver	(-)75, (-)100, (-)150, round soft grip, +No.1, No.2, No.3 round soft grip
Ratchet handle (371) x1, Driver type handle115 (6.35mm rec.) x1, Extension bar 321 (150mm) x1, Ball joint x 1, Monkey wrench (200 mm, 300 mm) x 1, Combination plier 200 mm x 1, Safety plier 250 mm x1, Snap ring plier 200 mm x 1, Pincer 175 mm x 1, Radio pincer 150 mm x 1, Nipper 150 mm x 1, Pipe wrench 300 mm x 1, Grip plier 250 mm x 1, Mini cutter 200 mm x 1, Hammer 1 pound x 1, Shock absorption hammer 1 pound x 1, Ball point x 1	
L-shaped wrench set	1,5, 2, 2.5, 3, 4, 5, 6, 8, 10

f. Electrical Training Equipment

[1] Electrical wiring training device : 5 sets

basic wiring training device (voltage, current, resistance,
other basic wiring element/block), portable type

[2] Insulation tester : 3 sets

rating voltage 500V, rating resistance 100MΩ, effective scale 0.1~50MΩ

[3] Tester : 5 sets

range of measurement: direct current 2/4/20/40V, alternating current 250/250V
direct current 200mA/20A, alternating current,
resistance x 1/10/100x1K

[4] Oscilloscope : 1 set

kinescope: 20Mhz, portable type

g. Diving Training Equipment

[1] Snorkel : 4 pcs.
monolithic poly-urethane pipe, neck turned type

[2] Diving mask : 4 pcs.
material: silicon kind

[3] Fins : 4 pcs.
plastic type, adjustable size

[4] Weight belt : 10 pcs.
nylon belt with buckle: 50m/m W(with 10kg weight x3 pcs.)

[5] Buoyancy control jacket : 6 sets

[6] Air Pressure adjuster : 6 sets
balance diaphragm type: 1HP, 2LP with port

[7] Depth gauge, pressure gauge : 10 sets
double throw, analogue display,
depth range: 0~70m, pressure range: 0~300kg/cm2

[8] Air cylinder : 18 pcs.
12litre, 150kg/cm2, with valve

[9] Air compressor for refilling : 1 set
diesel engine drive: 3.5PS, maximum pressure 150~200kg/cm2 with wheels
capacity: approx. 30~100litre/min, approx. 90m3/24 hours
High pressure refilling hose (200kg/cm3 x 3m) x 1 pc.

h. Equipment for Classrooms and Others

[1] Blackboard(large) : 2 sets
dimension: approx. 2,700mm W x 1,200mm H

[2] Blackboard(small) : 5 sets

dimension: approx. 1,800mm W x 1,200mm H

[3] Desk and chair (monolithic) : 60 pcs.
dimension: approx. 380/490mm W x380/725mm D x 440/740mmH

[4] Desk and chair (separated) : 50 sets
desk dimension: 600mm W x 400mmD x6 70/730mmH
chair dimension: sitting height 360/440mm H

[5] Work table (for heavy duty) : 2 pcs.
dimension: approx. 1,500mm W x 900mm D x 740mm H

[6] Work table (normal) : 2 pcs.
dimension: approx. 1,700mm W x 900mm D x 740mm H

[7] Table for 4 students : 16 pcs
dimension: approx. 1,200mm W x 900mm D x 750mmH

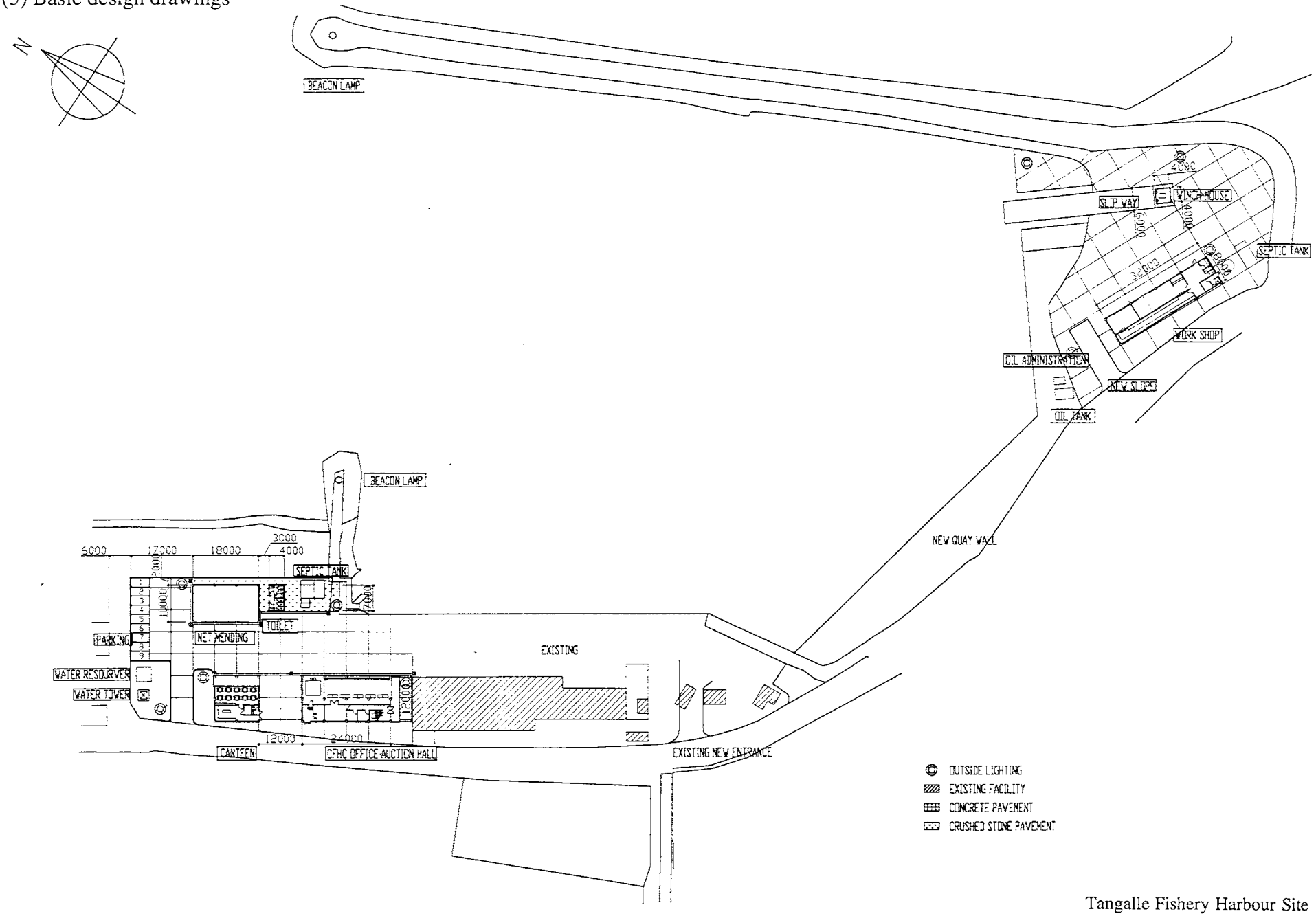
[8] Chairs for item [7] : 64 pcs.
dimension: approx. 450mm W x 400/500 mm D x 440/800mm H

[9] Table for 6 students : 4 pcs.
dimension: approx. 1,800mm W x 900mm D x 750mm H

[10] Chairs for item [9] : 24 pcs.
dimension: approx. 450mm W x 400/500mm D x 440/800mm H

[11] Book shelf : 3 pcs.
dimension: approx. 600mm W x 450mm D x 1,800mm H
wooden type

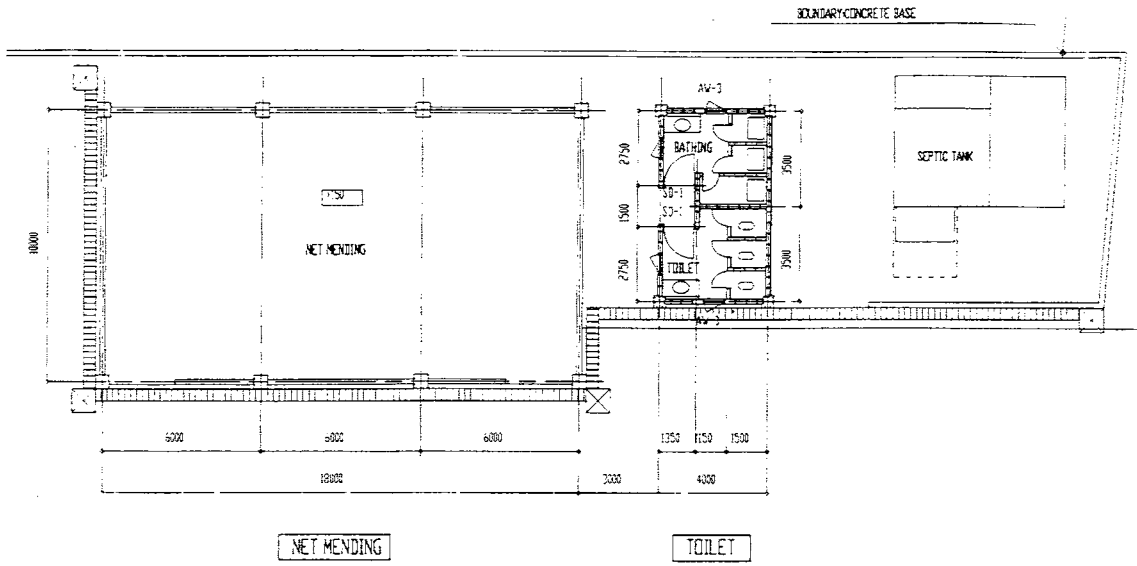
(5) Basic design drawings

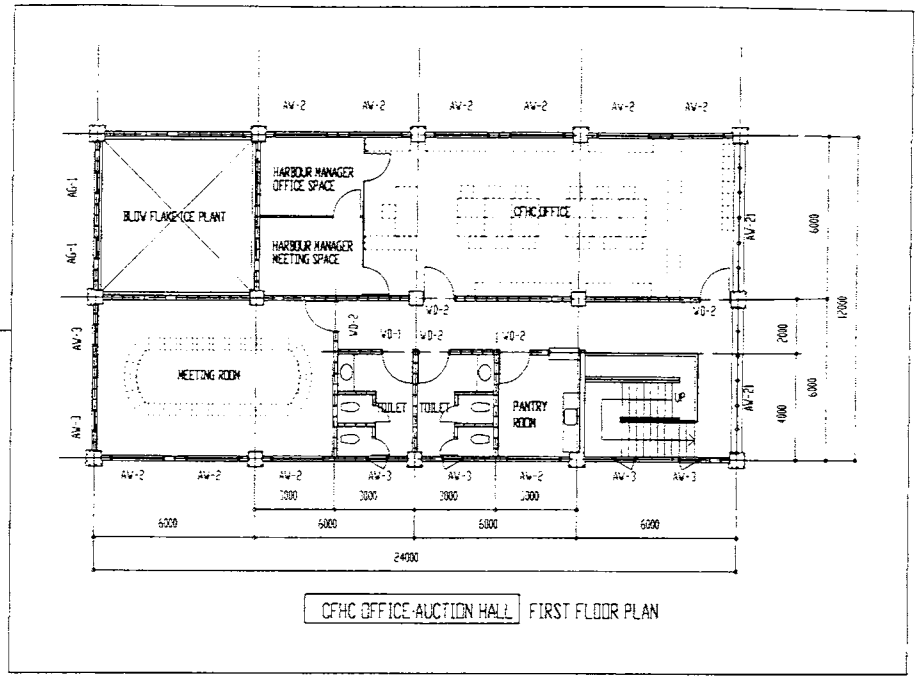


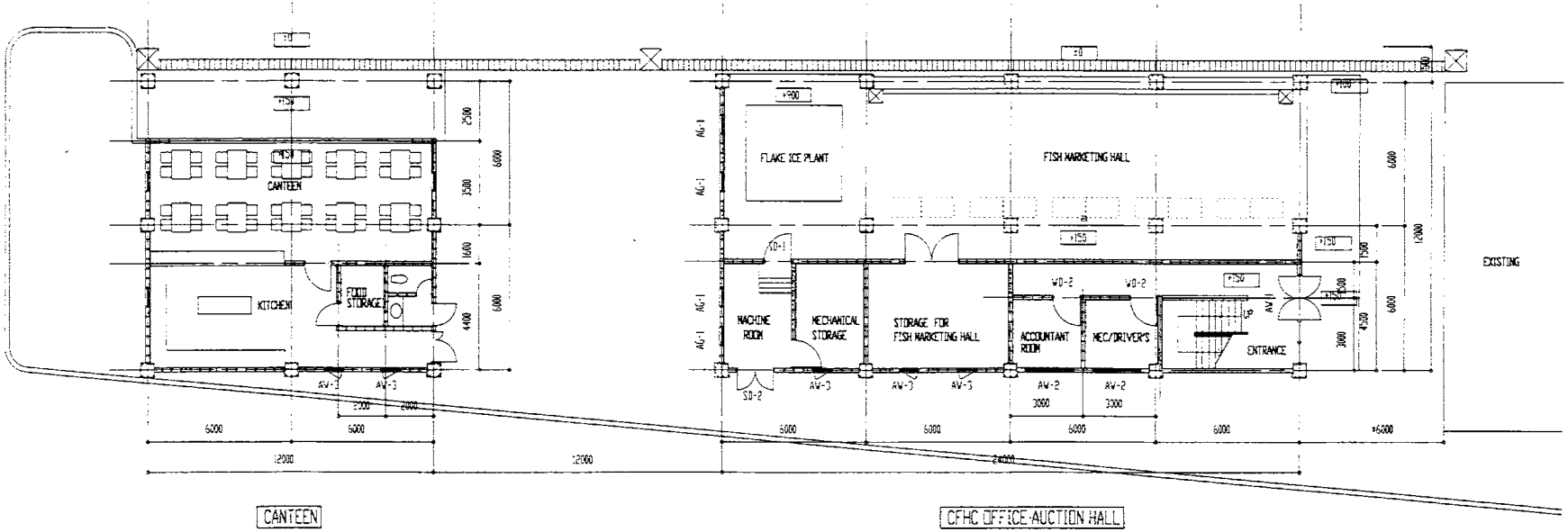
Tangalle Fishery Harbour Site

SITE PLAN

S=1:1000



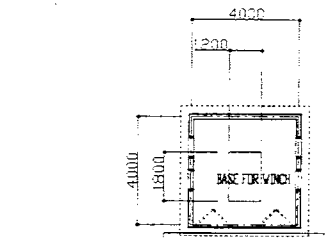




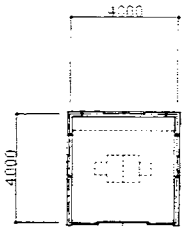
Tangalle Fishery Harbour Site

CFHC OFFICE-AUCTION HALL/CANTEEN/NET MENDING/TOILET GROUND FLOOR PLAN

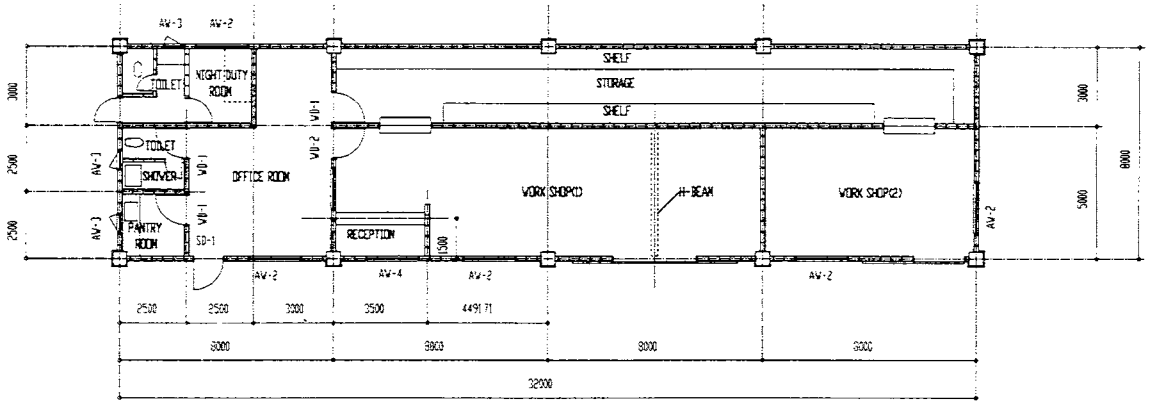
S=1:200



WINCH HOUSE



OIL ADMINISTRATION



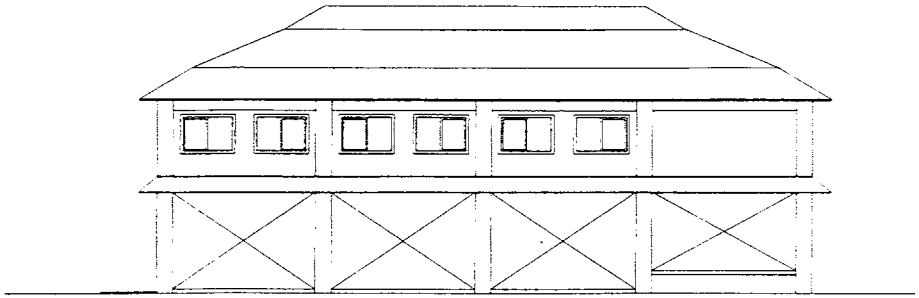
WORK SHOP

Tangalle Fishery Harbour Site

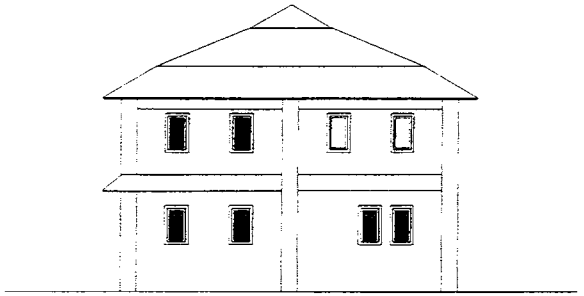
WORK SHOP/WINCH HOUSE/OIL ADMINISTRATION GROUND FLOOR PLAN

S=1:200

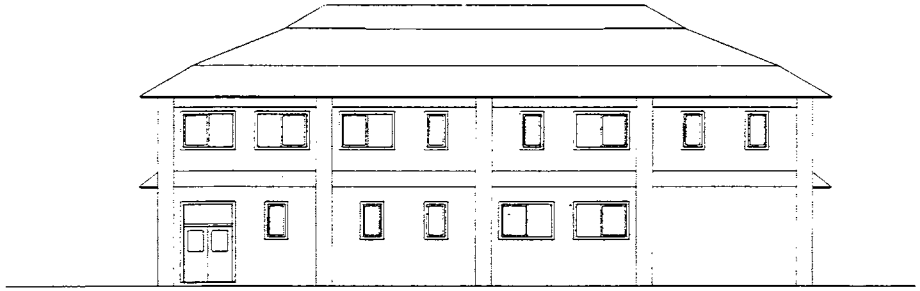
0 1 2 3 4 5m



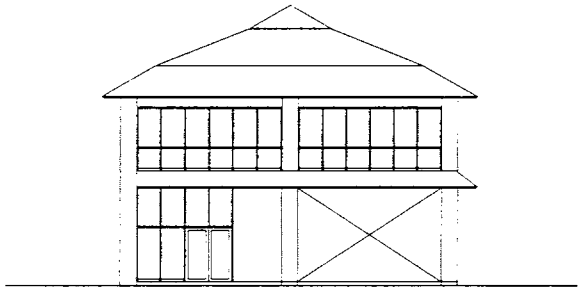
ELEVATION (E) 1/200



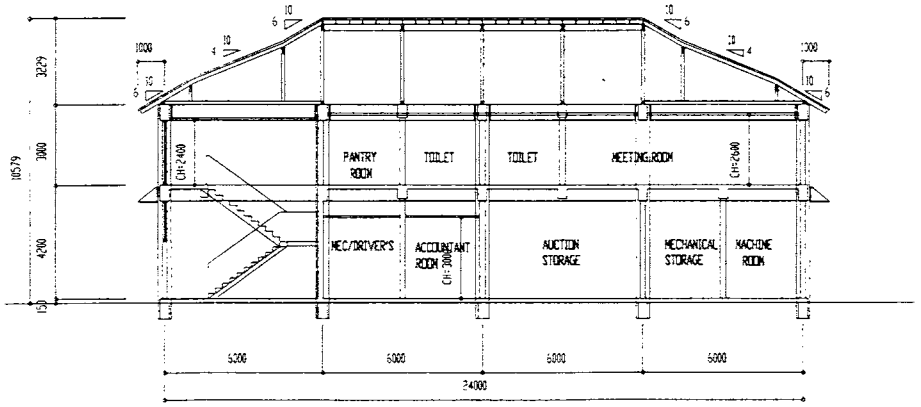
ELEVATION (N) 1/200



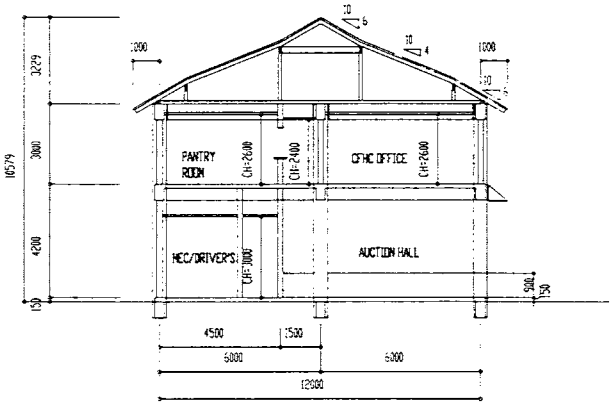
ELEVATION (W) 1/200



ELEVATION (S) 1/200



SECTION (1) 1/200



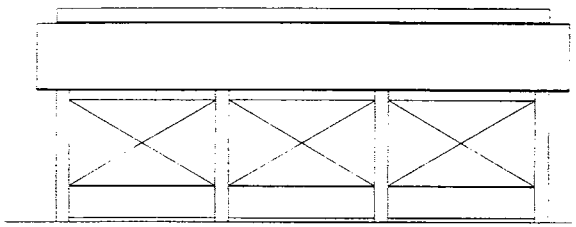
SECTION (2) 1/200

Tangalle Fishery Harbour Site

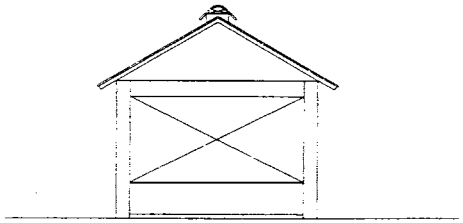
CFHC/AUCTION ELEVATION·SECTION

S=1:200

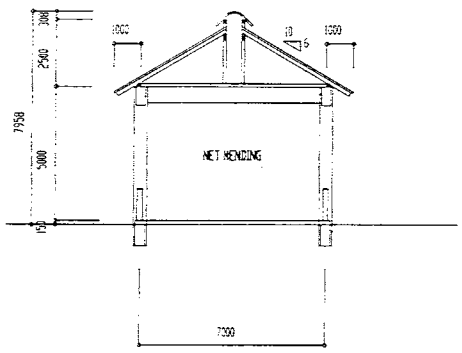
0 1 2 3 4 5m



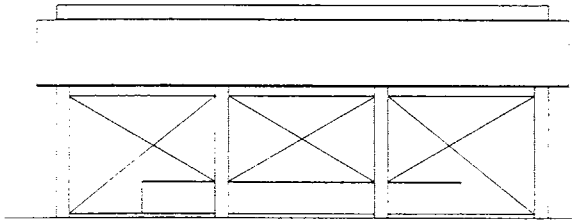
ELEVATION (E) 1/200



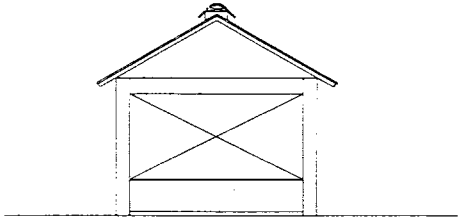
ELEVATION (N) 1/200



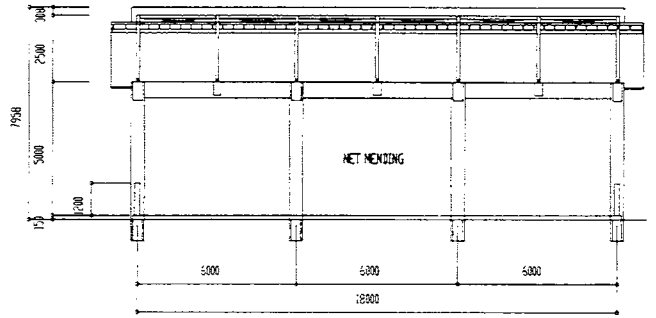
SECTION 1/200



ELEVATION (W) 1/200



ELEVATION (S) 1/200



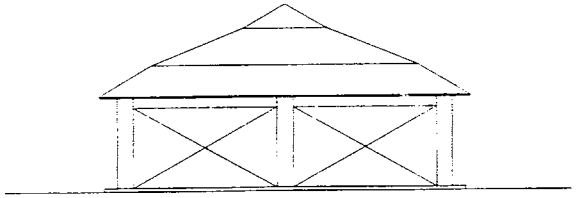
SECTION 1/200

Tangalle Fishery Harbour Site

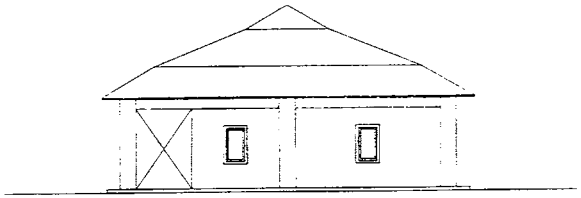
NET MENDING ELEVATION·SECTION

S=1:200

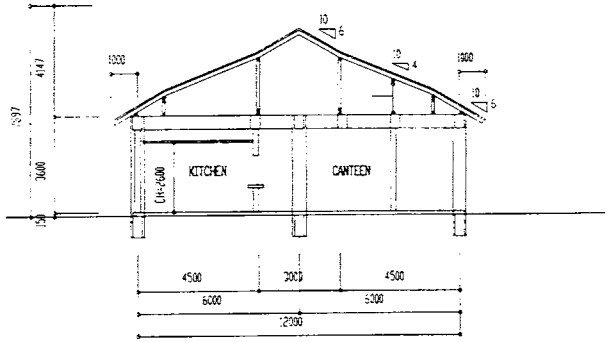
0 1 2 3 4 5m



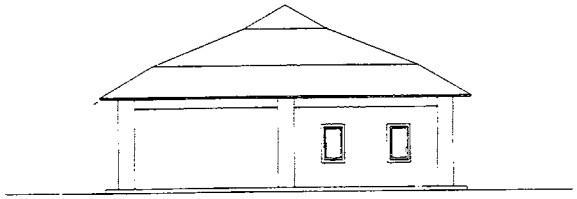
ELEVATION (E) 1/200



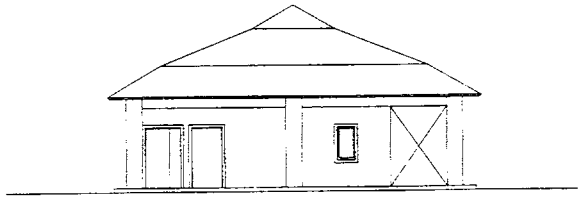
ELEVATION (N) 1/200



SECTION 1/200



ELEVATION (W) 1/200



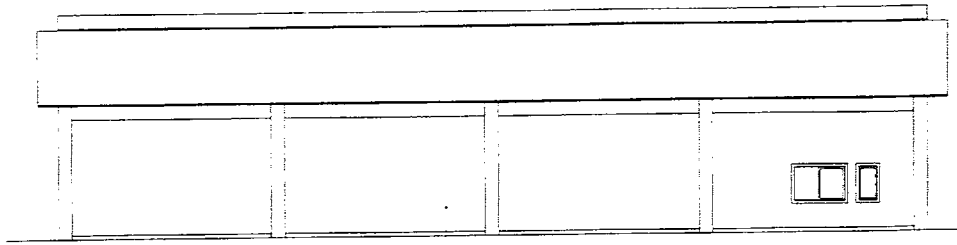
ELEVATION (S) 1/200

Tangalle Fishery Harbour Site

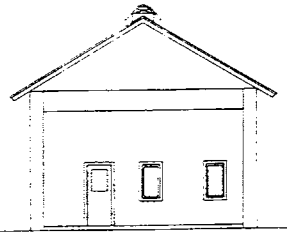
CANTEEN ELEVATION·SECTION

S=1:200

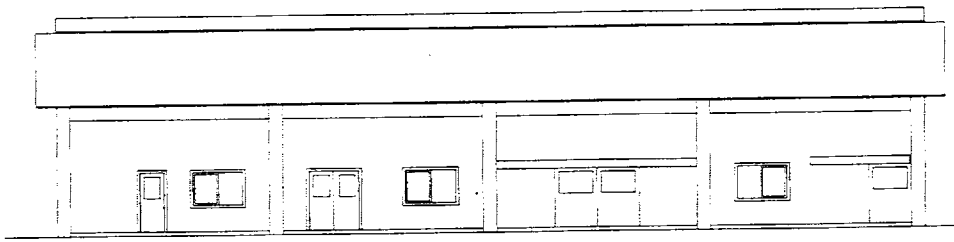
0 1 2 3 4 5m



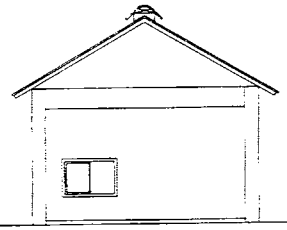
ELEVATION (S) 1/200



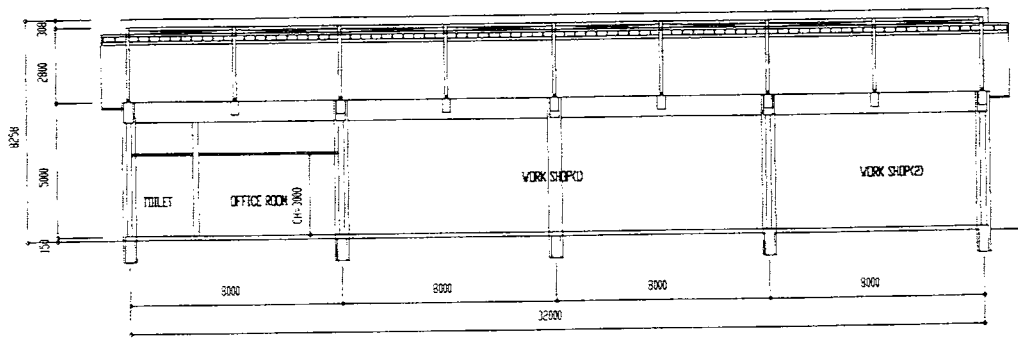
ELEVATION (E) 1/200



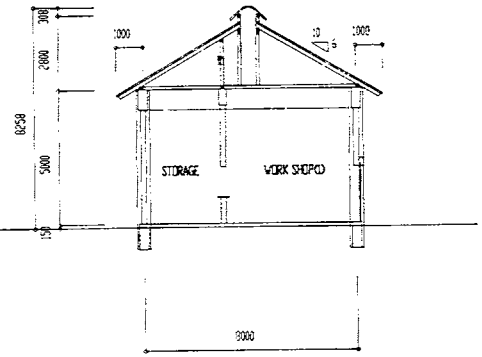
ELEVATION (N) 1/200



ELEVATION (W) 1/200



SECTION (1) 1/200



SECTION (2) 1/200

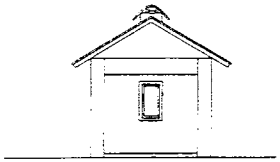
Tangalle Fishery Harbour Site

WORK SHOP ELEVATION SECTION

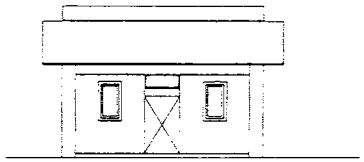
S=1:200

0 1 2 3 4 5m

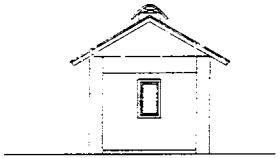
TOILET



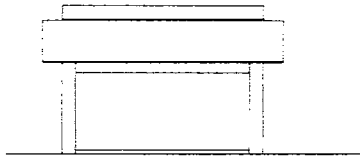
ELEVATION (E) 1/200



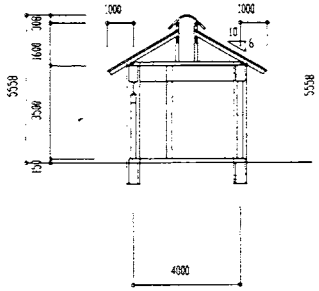
ELEVATION (N) 1/200



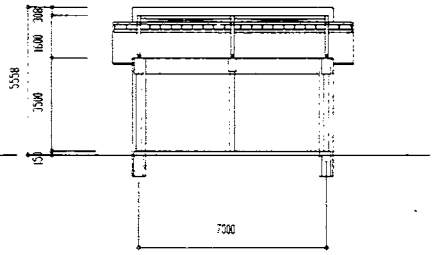
ELEVATION (W) 1/200



ELEVATION (S) 1/200

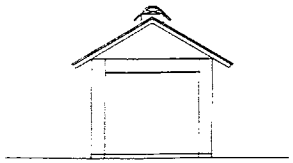


SECTION (1) 1/200

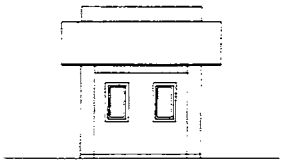


SECTION (2) 1/200

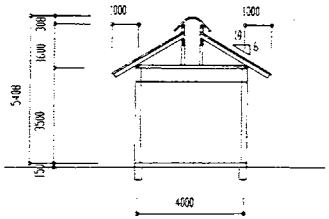
WINCH HOUSE



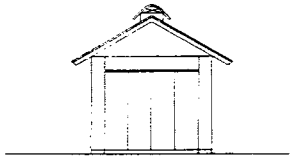
ELEVATION (S) 1/200



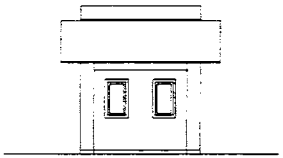
ELEVATION (W) 1/200



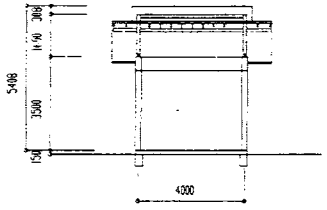
SECTION (1) 1/200



ELEVATION (N) 1/200

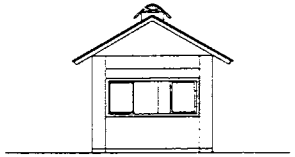


ELEVATION (E) 1/200

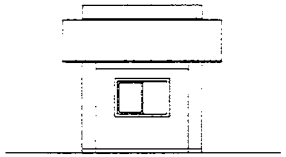


SECTION (2) 1/200

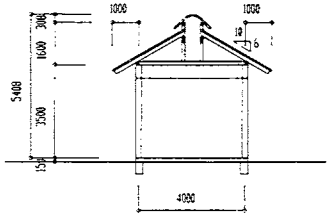
OIL ADMINISTRATION



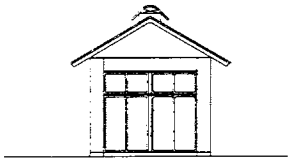
ELEVATION (S) 1/200



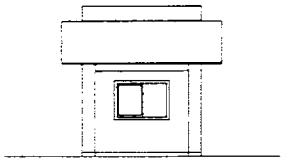
ELEVATION (W) 1/200



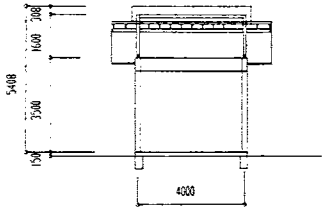
SECTION (1) 1/200



ELEVATION (N) 1/200



ELEVATION (E) 1/200



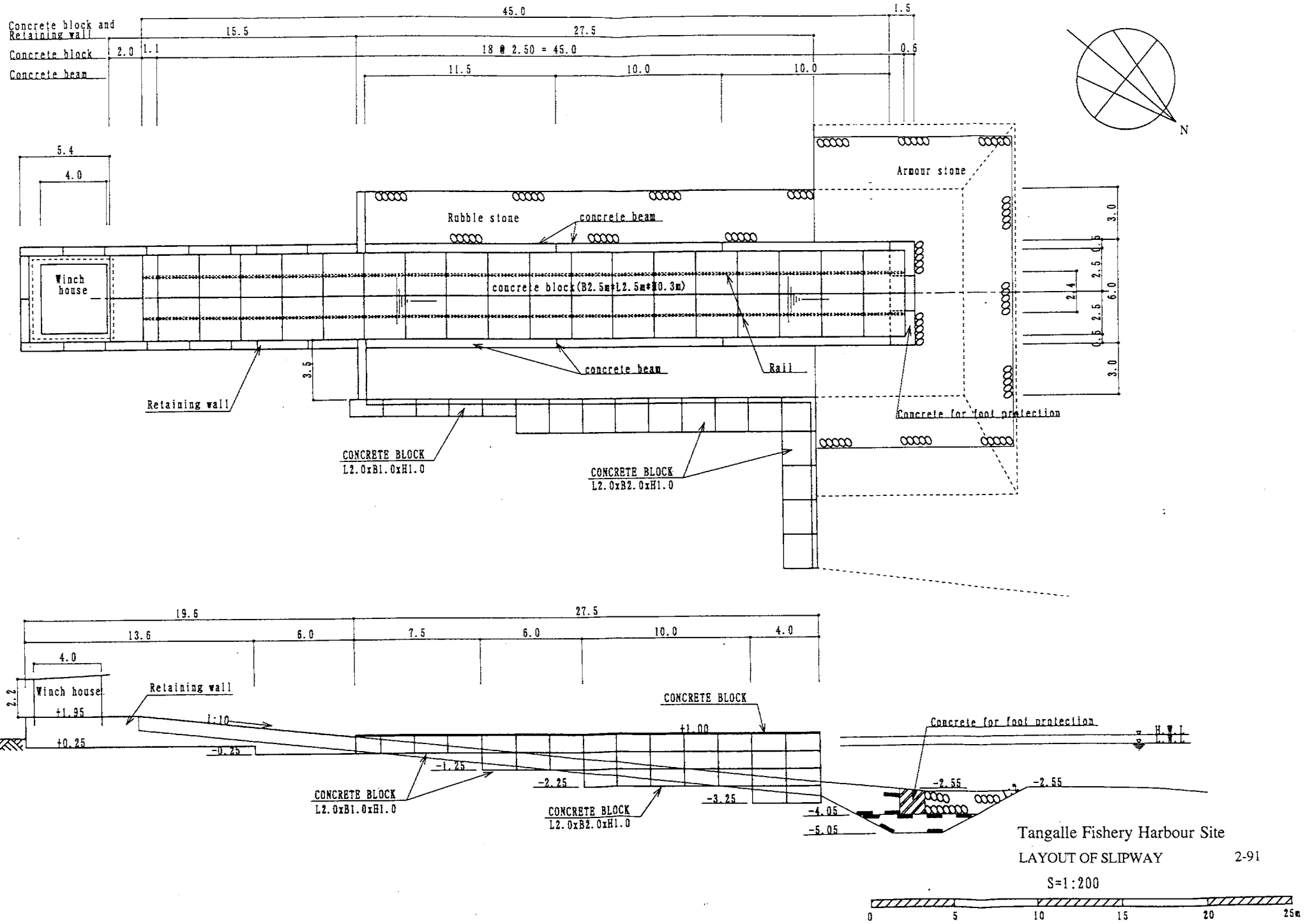
SECTION (2) 1/200

Tangalle Fishery Harbour Site

TOILET/WINCH HOUSE/OIL ADMINISTRATION ELEVATION·SECTION

S=1:200

0 1 2 3 4 5m

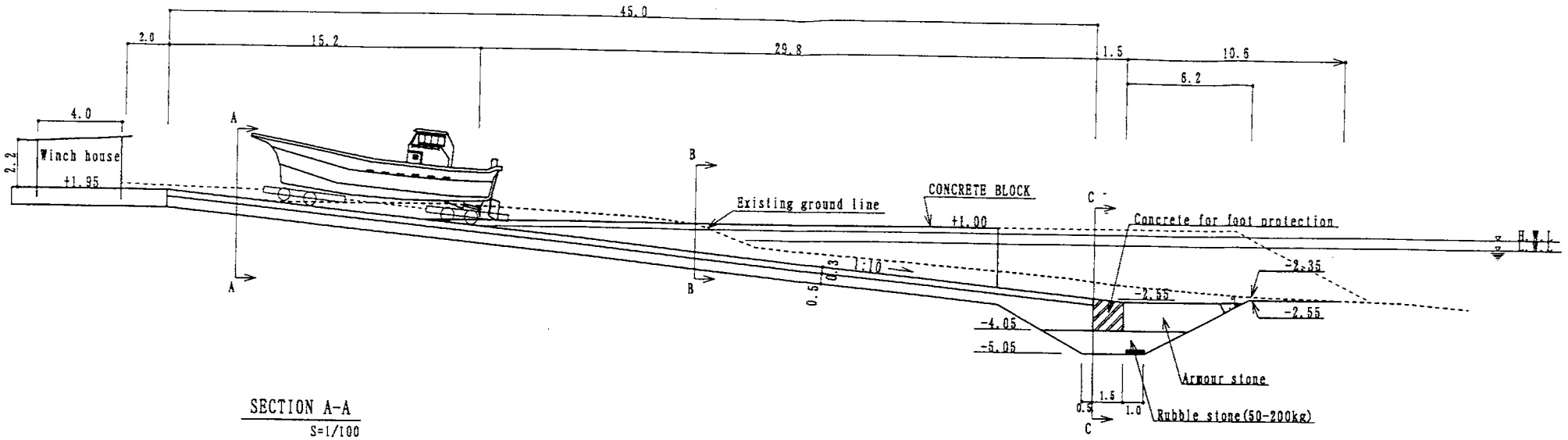


Tangalle Fishery Harbour Site

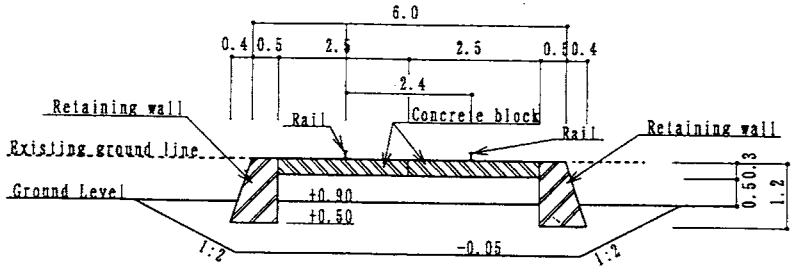
LAYOUT OF SLIPWAY 2-91

S=1:200

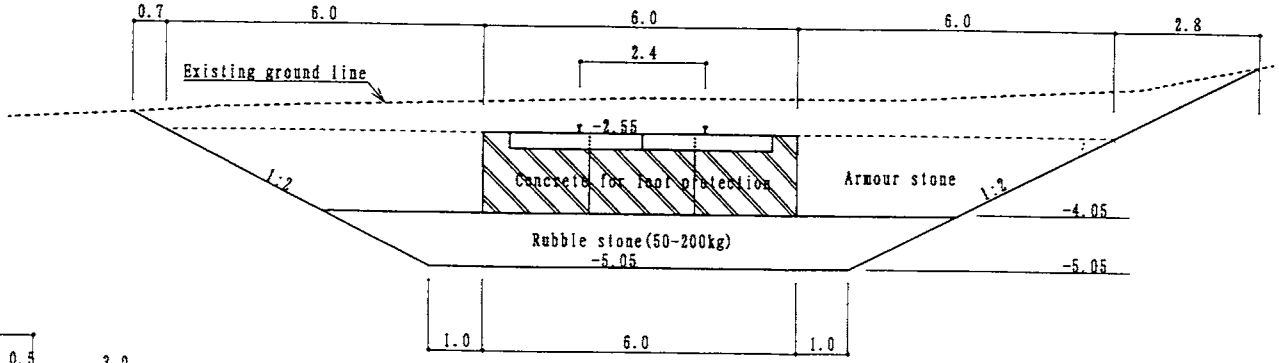
SECTION 1-1
S=1/200



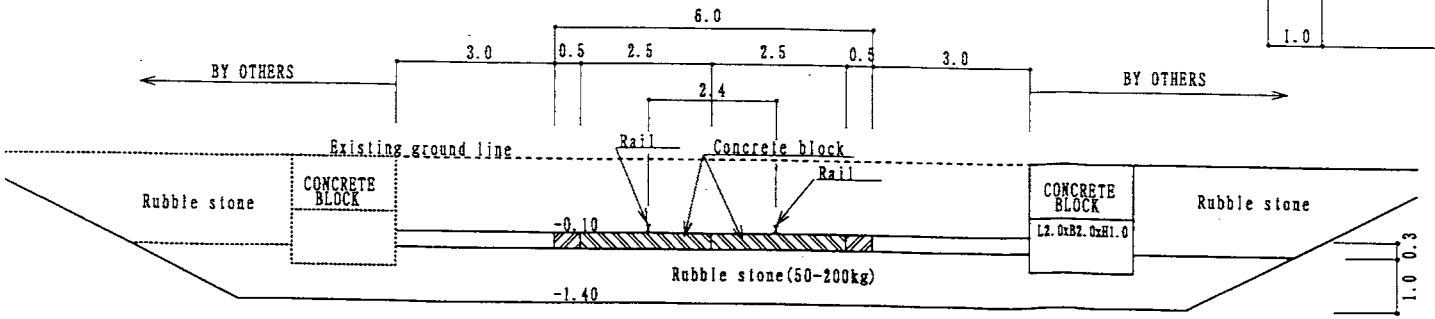
SECTION A-A
S=1/100



SECTION C-C
S=1/100



SECTION B-B
S=1/100

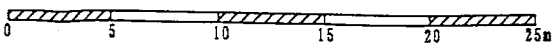


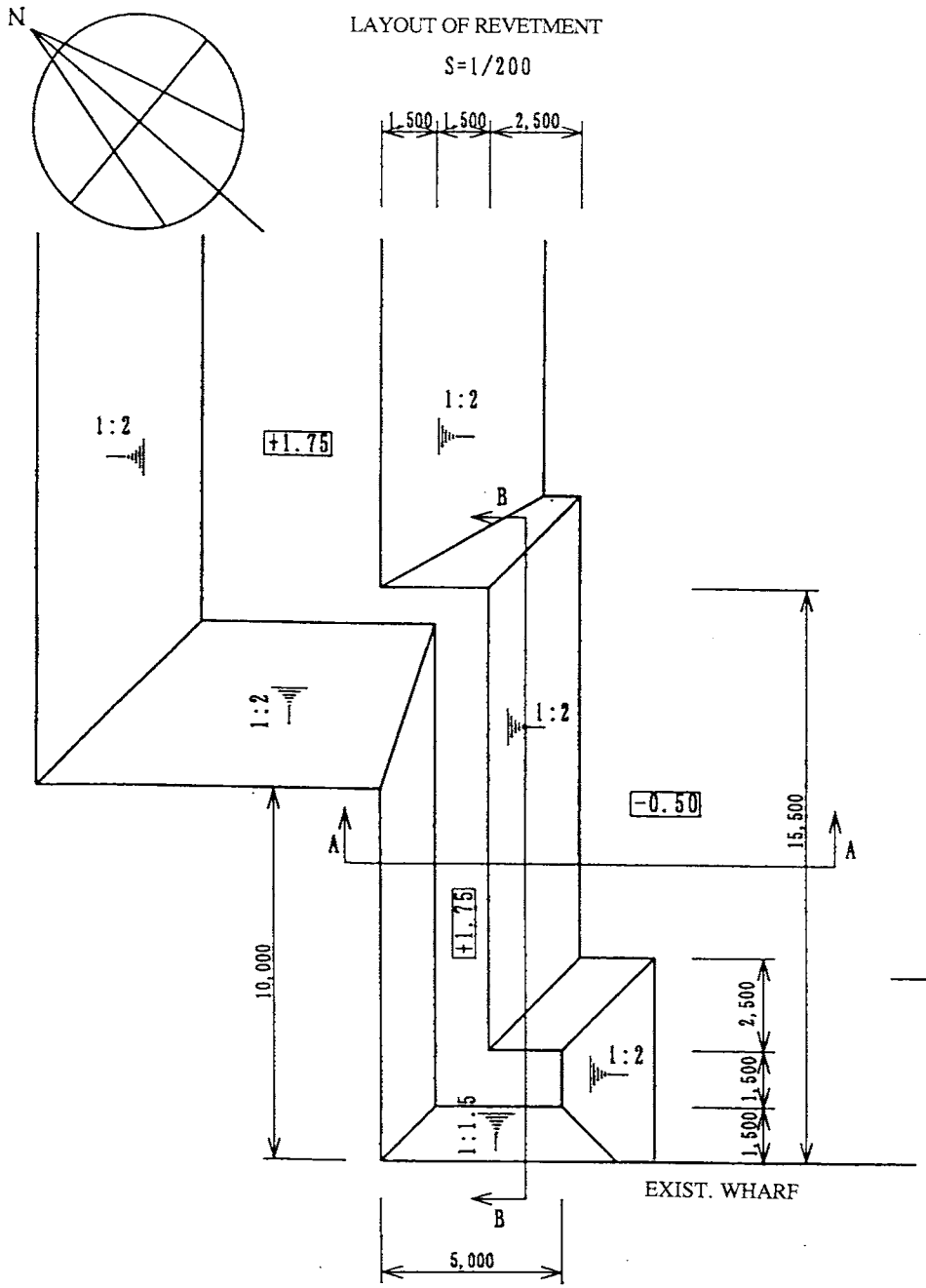
Tangalle Fishery Harbour Site

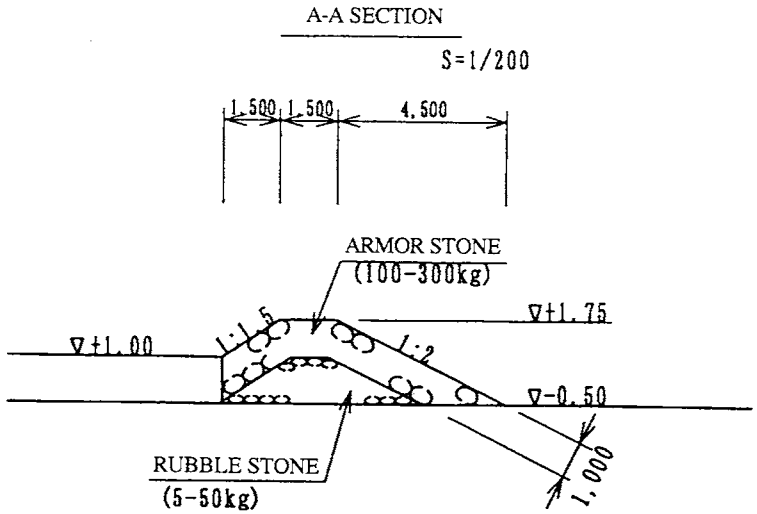
CROSS SECTION OF SLIPWAY

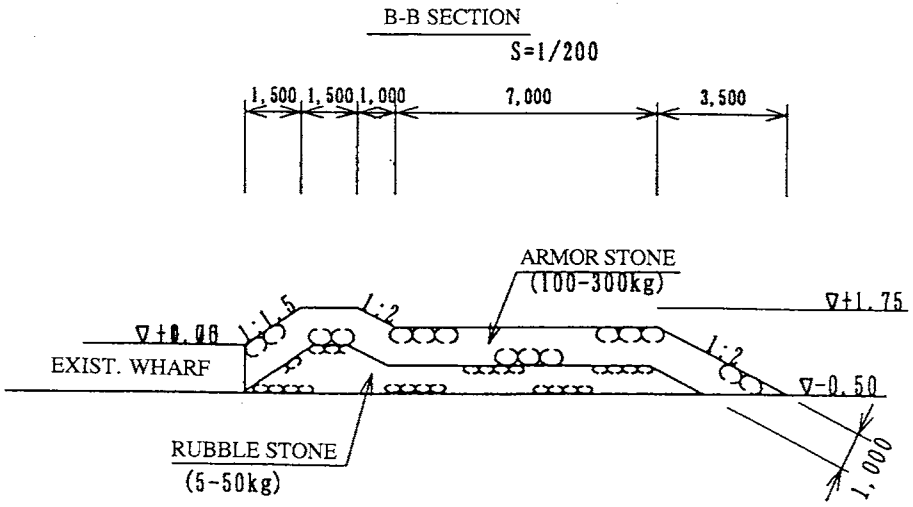
AS DRAWING

2-92





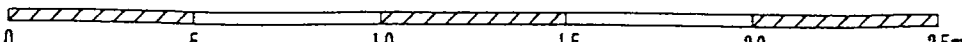


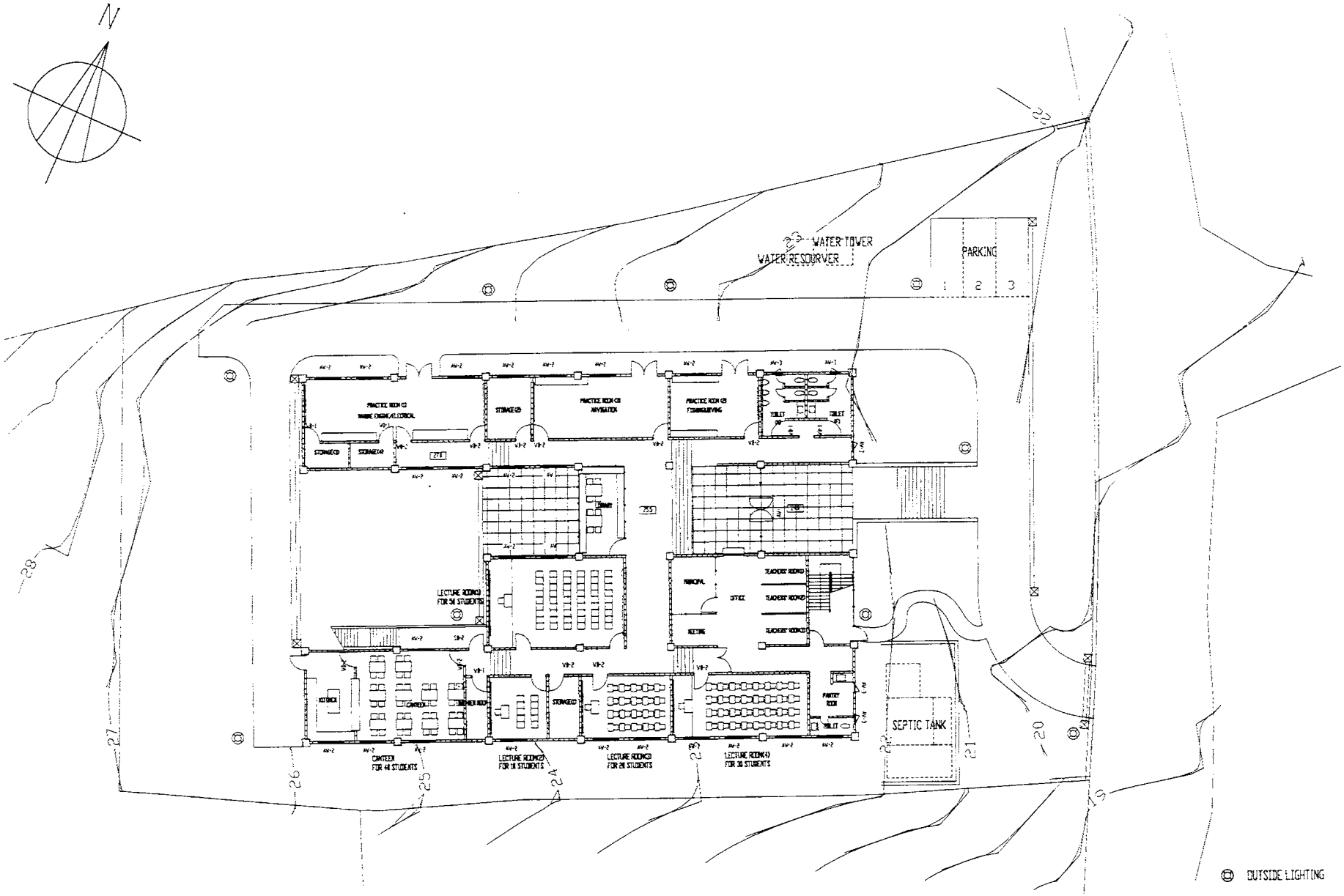


Tangalle Fishery Harbour Site

LAYOUT OF REVETMENT

S=1:200

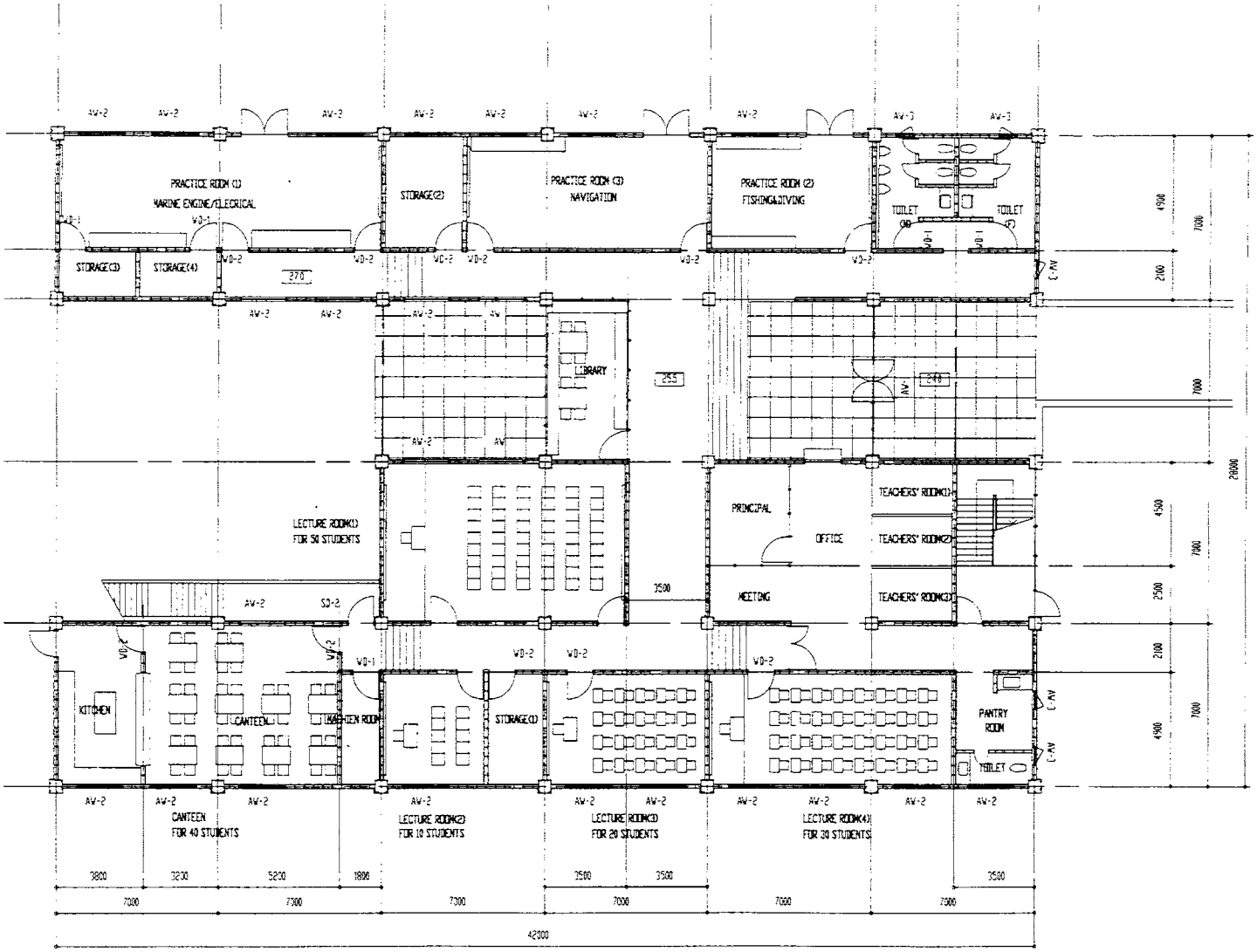




Tangalle Fisheries Training Center Site

TRAINING CENTER SITE PLAN

S=1:300

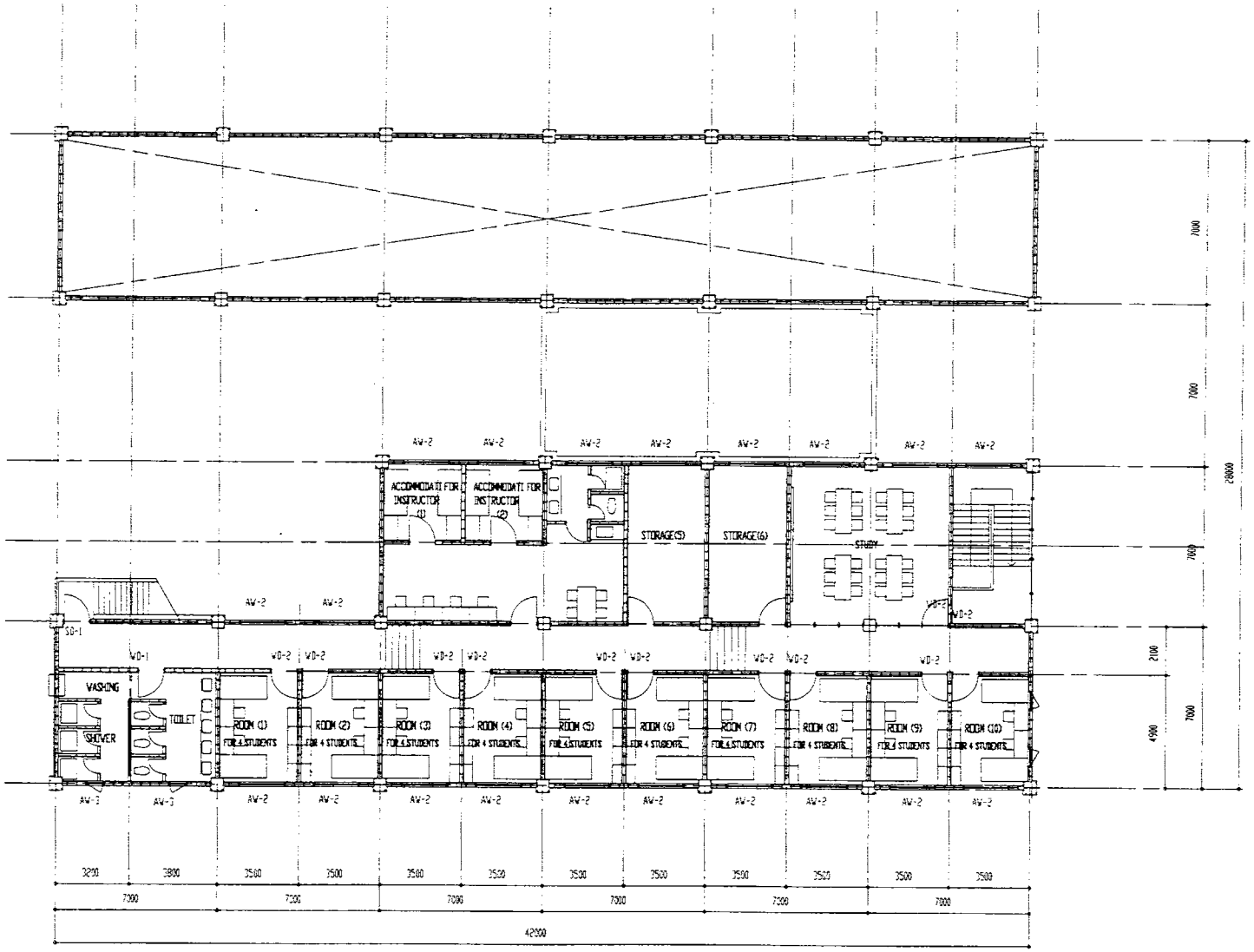


Tangalle Fisheries Training Center Site

TRAINING CENTER GROUND FLOOR PLAN

S=1:200

0 1 2 3 4 5m

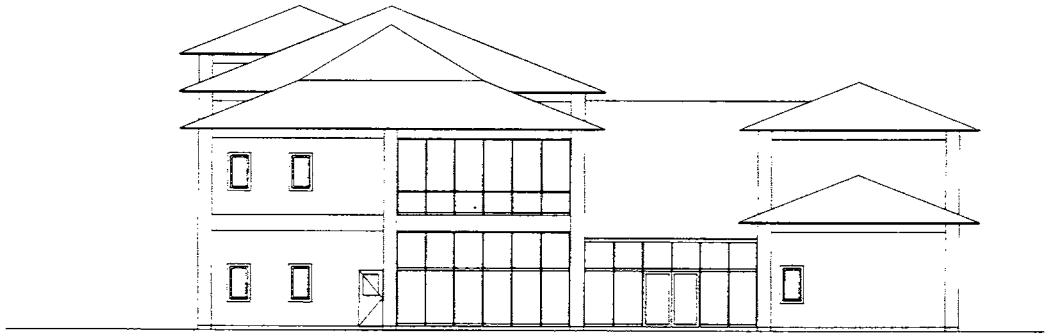


Tangalle Fisheries Training Center Site

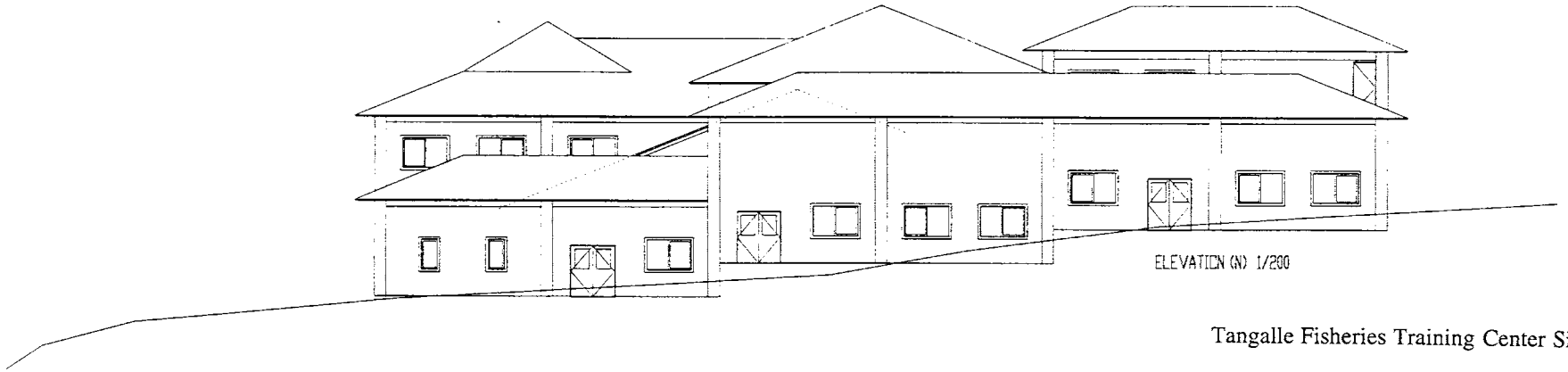
TRAINING CENTER FIRST FLOOR PLAN

S=1:200

ELEVATION (S) 1/200



ELEVATION (E) 1/200

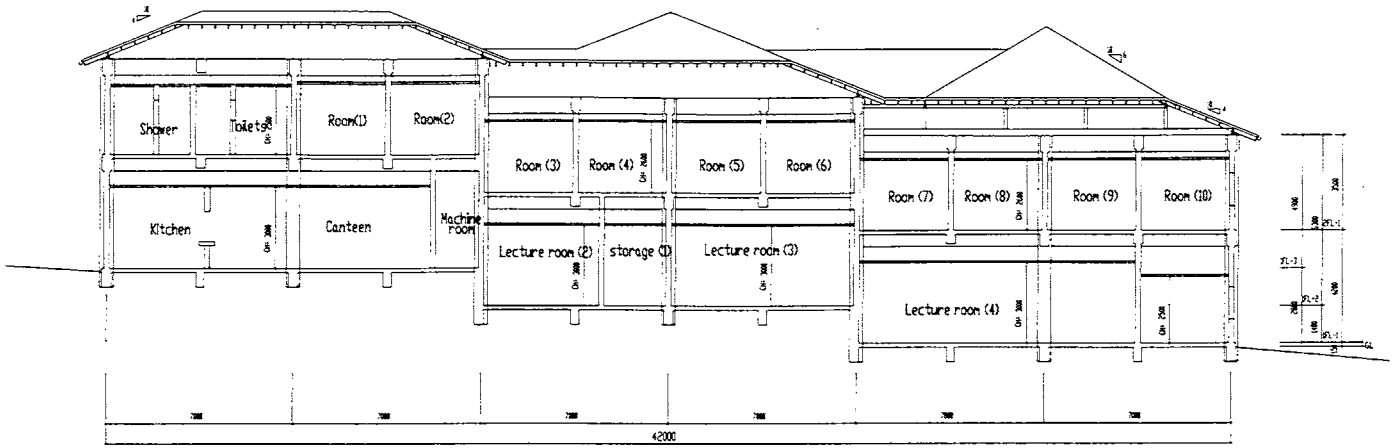


ELEVATION (N) 1/200

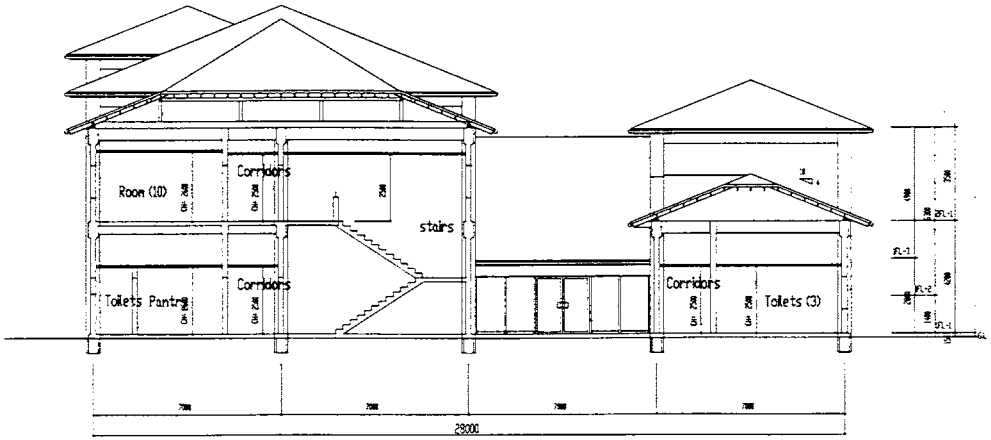
Tangalle Fisheries Training Center Site

TRAINING CENTER ELEVATION

S=1:200



SECTION (1) 1/200



SECTION (2) 1/200

Tangalle Fisheries Training Center Site

TRAINING CENTER SECTION

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Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

1) Basic policy

This Project is implemented by Japan's grant aid scheme. Therefore, with the consideration of the restrictions to complete the construction within the period of Exchange of Notes, the appropriate construction plan, procurement of equipment and materials and the procedure plan should be examined, and the construction should be implemented under the appropriate standards and supervision of construction.

The implementation of the construction is implemented based on the following basic policy:

① The Project contains two elements as the construction of related facilities to TFH and the construction of TFTC. The first one is the construction scheme at the site where is utilized at present, so that it should be considered that the present fishery activities least interrupted.

② Adjoining residential areas, adjoining facilities and environmental preservation should be carefully considered.

③ It should be noted to keep the close relationship with the recipient implementation body, intend to bring about a cordial understanding at every stage of the construction and to avoid discrepancy in the procedures.

④ Local construction materials and labor reach the certain level of standards. Those should be prudently examined and effectively utilized.

⑤ The equipment of which operation and maintenance are simple and spare parts are available locally should be selected.

⑥ The site of the Project is distant from Colombo, and its distance is 200km by land transportation. The conditions of local transportation should be considered upon the arrangement of technicians and skilled labor and the procurement of materials.

⑦ The custom, traditions and culture of the recipient country should be considered upon the implementation of the construction and supervision of labor.

2) Policy for utilization of subcontractors

Among constructors in Sri Lanka, the upper class constructors registered in the Government hold the efficient technicians and skilled labor to participate in the Project construction, and they are financially well formed and have sufficient ability to procure the constructional machinery. Because there are a great number of agents for transportation that are efficient enough to transport the construction equipment and materials from Colombo to the site, less problems are expected in terms of selection. It is the policy that the construction contractor should make the best use of these local agents as subcontractors in the proper fields.

On the other hand, the installation of the ice plant, the professional Japanese technician will be dispatched. That is because, as the other instances, the installation of the flake ice plant, which is introduced to the Project, has been done by professional technicians dispatched from supplier countries such as Singapore, etc. Also, for the procedure of laying work of PC floor board, the rail to pull fishing boats, and skilled operation of heavy machinery is required, so that the skilled technician will be dispatched from Japan.

3) The system for the implementation of Sri Lanka side

MFARD is the responsible ministry for promotion for the Exchange of Note and banking arrangement.

As this Project contains the improvement to TFH and the improvement of TFTC, in regard with the implementation, CFHC is responsible for the improvement to TFH and NIFT is responsible for the improvement of TFTC for consulting agreement, construction contact, procedure to related agencies and bureaus, and inspection and approval of the contents of the implementation plan. Also they are responsible for arrangement for receiving imported constructional materials and the Project equipment in order to smoothen the construction. CFHC and NIFT are also responsible agencies for the operation and management of facilities and the storage and management of the equipment provided by the Project.

3-1-2 Implementation Conditions

① Because the site of TFTC is located in the center of the city and many schools are also located around, the constructional equipment and materials should be delivered safely, especially during hours when students go to school and go home.

② As for TFTC, the implementation should be planned with the prudent consideration of the temporary facilities plan and construction method, because the construction will be executed in the inclined ground.

③ TFH continues its activities during the construction. The safety construction is the top priority and the measures should be taken to restrict irrelevant people from entering the site during the construction, etc. Furthermore, movement plan of construction vehicles, temporary facilities plan and construction method should be carefully considered in order to avoid influence against existing fisheries activities.

④ There are several buildings at the extended site of TFH, and the construction method should be selected with consideration of affects by scour because it is adjoining close to sea.

⑤ At TFH and TFTC, each site is tight and not enough space to place the construction equipment and materials and machinery, so that the implementation plan and the supervision of work progress should be performed to avoid interrupting traffic in the site and activities of local people.

3-1-3 Scope of works

When the Project is implemented by Japan's grant aid scheme, the followings are the scope of works for Japan and Sri Lanka sides, and the expenditure should be attributed as divided.

1) Responsibilities shared by Sri Lanka side

① To secure the sites planned for the construction by the Project, to evacuate the existing buildings and obstacles in the Project sites, and to remove a fuel tank and dispenser.

② To reinforce the breakwater at the backside of the Boat Repair Site.

③ To secure the sites for a temporary yard for construction and field office.

④ To implement the installation of the primary transformer and wiring.

⑤ To implement the piping work to lead to the site from the main water supply.

⑥ To construct the exterior fences, gates and guard's room is the Project sites.

⑦ To procure furniture necessary for the offices constructed by the Project.

2) Responsibilities shared by Japanese side

① To render related consulting services such as the design of details, assistance for tendering and construction work supervision.

② To supply all materials and labor for construction for the Project construction by Japanese side.

③ To execute overseas and inland transport of imported equipment required for the Project and procured by Japanese side.

④ To go through inspection of qualities required for the construction work and the equipment procured by Japanese side for the Project.

3-1-4 Consultant Supervision

Based on the contents of the design of the Project, the consultant engages in inspection of the contents and methods of construction, and construction work supervision. Upon the execution of work, the communication system among the related organizations of Sri Lanka, JICA office, a consultant and a construction contractor, and the planning for arrangement of equipment transportation and office, and the methods of procedures, terms and management relevant to the quality control, should be properly planned. Also, in regard with the personnel plan, the technical levels, arrangement, numbers and organization of its supervision should be carefully considered and properly planned.

3-1-5 Procurement Plan

1) Construction Materials

General construction materials, except for special painting materials, sanitary equipment and tools, are widely marketed. Also those materials are considered efficient enough for usage for the Project, so that, except for the specific materials, the utilization of materials marketed in Sri Lanka is planned. The specific materials are defined as the materials which are not easily obtained, but even succeeded in obtaining, the cost becomes higher because of import, and of which quality are not adequate enough. Therefore, the items in a table below are planned to be procured from the third country or Japan.

The items procured from Japan

Name of material	Reasons
Special shaped reinforcing bars	The local products are twisted and not applied to the standards.
Plywood for finishing work	Not procured locally. Imported one are too thick and of less quality.
Steel door	Not produced locally.
Aluminum sash	Some are available locally but low reliability. Local goods are of site knockdown products. Less flexibility in sizes.
Urethane coated flooring material	Rarely obtainable locally.
Floor hardener	Rarely obtainable locally
Anti chloridisation paint	Rarely obtainable locally
Lightening conductor equipment	Rarely obtainable locally
Pump	Some are available locally but low reliability.
Lighting equipment	No products available to meet the requirement for water resistance and salt resistance.
Air conditioner	Some are available locally but unstable procurement period.

2) Procurement of equipment

① Local procurement

The desks, chairs, tables and shelves, which is included in the Project, are manufactured and marketed in Sri Lanka usually, and they are advantageous upon repairs and supplements, so that they are planned to be procured locally after they are compared with Japanese products and proved to be efficient.

② Equipment excluded from local procurement

The procurement from Japan is planned for the following reasons:

• Many products are imported from mainly India and China. Some products from western countries, Japan and other eastern Asia countries are recognized, but the records of sales and delivery are not confirmed. In addition, services such as aftercare, etc. followed by the delivery are hardly verified.

• Only a few importers permanently keep the imported products on stock. The specifications, qualities and functions of those products, systems of supplies and conditions of warranties are not clarified.

• In regard with the availability of aftercare, supplements, expendables, any particular advantages of procurement from the third county are not recognized, compared with the procurement from Japan.

• CFHC and TFTC, which is responsible for the operation of the Project, are both accustomed to treating the equipment manufactured in Japan.

• The Government of Sri Lanka prefers the utilization of Japanese products of which quality, function and especially the durability are superior.

3-1-6 Implementation Schedule

The implementation of this Project is divided in two phases. The improvement to TFTC is implemented in the 1st phase and the improvement to TFH is implemented in the 2nd phase. The Project plans to require, as the 1st phase, 4 months for the detail design and the implementation to tendering, 9.5 months for the approval of the drawings after the constructor contract and construction terms for the construction and inspection, etc., 3 month for the approval of the drawings and the production of the equipment after tendering, 2 month for transportation, and 1.0 month for the inspection and delivery. As for the 2nd phase, the project requires 4 months for the detail design and the tendering, 10 months for the construction work, 4 months for the procurement of the equipment, 2 months for transportation, and 2 months for the installation, inspection and delivery.

Implementation Schedule

1st phase Improvement for Tangalle Fisheries Training Center

	Name of process	1	2	3	4	5	6	7	8	9	10	11	12
Detail Design	Detailed design survey												
	Tender preparation												
	Tendering												
Const-ruction	Preparation												
	Structure work												
	Finishing Work												
	Facility installation												
	Inspection												
Equipment Procure-ment	Manufacturing												
	Transportation												
	Installation												

2nd phase Improvement to Tangalle Fishery Harbour

	Name of process	1	2	3	4	5	6	7	8	9	10	11	12
Detail Design	Detailed design survey												
	Tender preparation												
	Tendering												
Const-ruction	Preparation												
	Revetment work												
	Structure work												
	Facility installation												
	Finishing work												
	Exterior work												
	Civil work												
	Inspection												
Equipment Procure-ment	Manufacturing												
	Transportation												
	Installation												

3-1-7 Obligations of Recipient Country

① To execute responsibilities shared by Sri Lanka side mentioned in the Clause 3-1-3.

② To take necessary measures to move fishermen who live in the Project sites.

③ To take necessary measures to keep out the irrelevant people in the Project sites during the related construction work.

④ To acquire admission and permissions required for the implementation of the Project and the related construction work.

⑤ To secure immediate tax exemption and customs clearances required for the implementation of Project and the related construction work.

⑥ To share the expenditures required for the implementation of Project but not shared by Japan's grant aid scheme.

⑦ To exempt Japanese nationals and juridical persons from custom duties, internal taxes and fiscal levies upon the supply of the products and the services and construction work in Sri Lanka

⑧ To ensure entry and stay in Sri Lanka of Japanese nationals who are required to implement the Project.

3-2 Operation and Maintenance Plan

(1) TFH

After the implementation of the Project, the estimation of revenues and expenditures upon the operation of TFH are shown in Table 3-1. The annual net income that exclude the expenditures upon its operation are estimated approximately 744,000 rupees in black. However, the annual revenues on account that excludes the depreciation that is preferred to be secured in relation with the ice plant and boat repair facilities are estimated approximately 505,000 rupees in red, and the acquisition of the budget for the renewals of related machinery in the future will require financial assistance from the Government of Sri Lanka.

Table 3-1 Estimate of Incomes and Expenditures upon the Operation of TFH

(currency: rupee)

Item	Basis of estimation	
Income		8,799,900
(current operation)		
Sales of Water supply	19,200 rupees/month x 12 months	230,400
Admission fees	52,600 rupees/month x 12 months	631,200
Registration fees	53,000 rupees/month x 12 months	636,000
others	400 rupees/month x 12 months	4,800
(operation of the Project facilities)		
Sales of ice	Table 3-2	1,971,000
Boat repair fees	Table 3-3	4,666,500
Profits by canteen operation	50,000 rupees/month x 12 months	600,000
Insulated box rental fees	500 rupees/month x 10 boxes x 12 months	60,000
Expenditures		8,055,713
(current operation)		
Labor	213,700 rupees/month x 12 months	2,564,400
Expenses	46,900 rupees/month x 12 months	562,800
(operation of the Project facilities)		
Expenses for ice plant	Table 3-2	1,328,983
Expenses for boat repair facility	Table 3-3	2,591,040
Other labor	42,500 rupees/month x 12 months	510,000
Other electricity	2 rupees/KWH x 213KWH/day x 365day/year	155,490
Other water	27.5 rupees/m3 x 16m3/day x 365days/year	160,600
Electricity basic fee	100 rupees/KVA x 150KVA x 12 months	180,000
Water basic fee	200 rupees/month x 12 months	2,400
Net income from operation		744,187
Depreciation of ice	Table 3-2	250,000

plant equipment		
Depreciation of boat repair facility	Table 3-3	1,000,000
Revenues on account		-505,813

(basis of calculation)

1) The incomes and expenditures from the current operation of the facilities are based on the average of the actual amount between January and May in 1999.
2) The profits from the operation of the canteen are referred to 100,00 rupees as the actual average amount of the profits recorded in the canteen at Galle fishery harbour.
3) In terms of other labor, the new personnel, except for the personnel related to ice plant and boat repair facility, is included. That is 1 supervisor for the net mending shed (5,000Rp/month), 2 supervisors for water supply (5,00Rp/month), 1 cashier for the canteen (5,000Rp/month), 2 cooks (6,000Rp/month), 1 tea maker for canteen (4,500Rp/month), 2 stewards (3,000Rp/month).

In addition, because the operation of the ice plant and the boat repair facility among all facilities related to the Project is noted, the incomes and expenditures of both facilities are examined separately.

1) Flake ice plant

Table 3 -2 Estimate of Incomes and Expenditures upon the Operation of Flake ice plant

(currency: rupee)

Item	Basis of estimation	
Income		1,971,000
Sales of ice	1.2 rupees/kg x 5,000kg/day x 365days/year x 0.9	1,971,000
Expenditures		1,328,983
Labor		528,000
(Refrigeration technician)	7,000 rupees/month x 12 month x 1person	(84,000)
(Refrigeration mechanic)	5,000 rupees/month x 12 month x 1person	(120,000)
(Labor)	4,500 rupees/month x 12 month x 1person	(324,000)
Expenses for electricity and water		700,983
(electricity)	2 rupees/KWH x 36KW/hour x 24 hours x 365days/year	(630,720)
(water)	27.5 rupees/m3 x 7m3/day x 365days/year	(70,263)
Maintenance cost		100,000
Net income from operation		642,017
Depreciation	Depreciate by approx. 400,000 yen in total in every year for 10 years in total.	250,000
Revenues on account		392,017

(basis of calculation)

1) the price of ice is referred to the instance that 50kg block ice is sold in approx. 60 rupees around Tangalle.
2) The rate of actual sale of ice is assumed 90% of the total production of ice.
3) The human cost are referred to the figures of personnel applied in CFHC.
4) Maintenance indicates the expenses for refrigerant, lubricator and replacing parts, etc.
5) Depreciation targets on the important structural machinery such as air compressor, motor, fan, etc, and the renewal is estimated in 10 years.

2) Boat repair facility

Table 3-3 Estimate of Incomes and Expenditures Upon the Operation of boat repair facility

(currency: rupee)

Item	
Income	4,666,500
Slipway lift-up fee	586,000
Crane lift-up fee	862,000
Machinery work fee	3,218,500
Expenditures	2,591,040
Labor	1,336,800
Electricity	83,520
Crane maintenance cost	526,720
Slipway maintenance cost	644,000
Incomes from operation	2,075,460
Depreciation	1,000,000
Revenues on account	1,075,460

Reference: basis of calculation of the revenues and the expenditures of boat repair facility

①Revenues

	Lift-up fee	Staying fee	Total
(1) Slipway lift-up fee	286,000	300,000	586,000
(2) Crane lift-up fee	546,000	316,000	862,000
Total	832,000	616,000	1,448,000

(4) Mechanical work fees

		Annual numbers of boat repair	Days for one process	By process
	Unit price	No. of boats	Day/boat	Total
1) propeller repair	3,500	246	1	861,000
2) welding process	1,500	246	1	369,000
3) engine repair	2,000	205	2	820,000
4) coating and carpentry	1,500	246	2	738,000
5) FRP repair	2,000	41	3	246,000
6) Fish hold repair	1,500	41	3	184,500
				3,218,500

②Expenditures

(1) Labor

			(currency: rupee)
			Year 2004
Occupation	Monthly salary	Number	Annual salary
Marine Engineer	1,200	1	144,000
Foreman	7,000	1	84,000
Charge hand	5,500	1	66,000
Mechinist	8,500	1	102,000
Lathe man	7,000	1	84,000
Welder	5,700	1	68,400
Electrician	5,700	1	68,400
Mechanics 1, 2, 3	6,000	1	216,000
Helper mechanics 1, 2, 3	4,500	1	162,000
Labor 1, 2, 3	4,000	1	144,000
Driver (crane)	6,000	1	72,000
Diver	6,000	1	72,000
Office clerk	4,500	1	54,000
Total		19	1,336,800

(2) Electricity

Main Equipment	57.00	KVA			
Light/etc.	1.00	KVA			
Total load	58.00	KVA			
Average load 30% x 8 hours	139.20	kWh	Unit Rs/kwh		Annual expenses
Annual consumption of electricity	41,760.00	Kwh	2.00	/kwh	83,520.00

(3) Maintenance expenses for vehicle

			Unit price			annual
Fuel 16 ltr/day	320	Ltr/month	33Rs	/Ltr		126,720
Maintenance expenses (oil, etc)						400,000
						526,720

(4) Maintenance expenses for slipway

Winch (grease)	5,000	/month				60,000
Wire, etc. (grease)	2,000	/month				24,000
Painting/cradle	5,000	/month				60,000
Consumables/parts	500,000	/year				500,000
						644,000

In reference to the depreciation of related equipment, it was calculated to deprecate 23,000,000 yen in total, the depreciation reserve for the renewal by the fixed price is estimated in 15 years.

(2) TFTC

The expenditure for the operation and the maintenance of TFTC is included in the budget measures by MFARD. For reference, the expenditures for the operation of TFTC in 2002 is estimated approximately 6,239,000 rupees as shown below. However, these expenditures are equivalent to approximately 3.5 % of the total budget of NIFT (180 million rupees), and to approximately 11 % of the NIFT's total operation budget (55 million rupees) which exclude the budget for facilities construction. As the NIFT's budget is allocated for 5 fisheries training centers, there is not any problem in operation budget of TFTC.

The expenditure for the operation of TFTC (currency: rupee)

	Allocation	amount
(1)	Labor cost	2,650,000
(2)	Electricity cost	72,000
(3)	Water cost	107,000
(4)	Scholarship fee	1,850,000
(5)	Maintenance cost for equipment	1,560,400
	Total	6,239,400

[basis of calculation]

1) Labor

The personnel will not increase, so that, based on 13.3% of the increase of labor cost between 1997 and 1998, approximately 2,650,000 rupees is assumed as 10 % of increase against the results of 1998.

(currency: rupee)

	Actual result			estimate
Year	1997	1998	Increase rate	2002
Labor cost	1,597,729	1,810,113	10%	2,650,186

2) Electricity

As the following calculation, approximately 72,000 rupees are estimated annually.

	Capacity	Demand rate	Hours	Days/year	Annual consumption
Lighting	30kw	0.4	4hours/day	260	12,480 kwh
Yard light	1kw	1.0	10hours/day	365	3,650 kwh
Others	70kw	0.4	2hours/day	260	14,560 kwh
Power	25kw	0.4	2hours/day	260	5,200 kwh
				Total consumption	35,890 kwh
				Total expenses (2rupees/kwh)	71,780 rupees

3) Water cost

As the following calculation, approximately 107,000 rupees are estimated annually.

	Usage/day	Days/year	Annual usage
Lodgers	120ltr x 44 persons	270 days	1,425 m3
Instructors • other students	80ltr. x 127 persons	260 days	2462 m3
		Total usage	3,887 m3
		Total expenses: 27.5 rupees/m3	106,893 rupees

4) Scholarship fee

Applicable to all students except visitors for marine bio resource technology course, 75 rupees/day are provided as scholarship. As shown below, it annually requires approximately 18,500,000 rupees.

Total number of students x total days of trainings x 75 rupees
= 24,670 persons•days x 75/day = 1,850,250

5) Maintenance cost for training equipment

Approximately 2 % of the estimated procurement cost (approx. 48.3 million yen) for the training equipment is counted for annual maintenance cost, which is estimated as approximately 1,560,400 rupees.

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

In the fishery sector of Sri Lanka, this Project is positioned as a part of all through the scheme for the improvement of the fishery industry in the southern area, where is apt to be the heart of the coastal fishery industry in the country. Especially Tangalle, the Project site, is positioned as if a pivot of the fishery activities in the southern area, and apart from the harbour, a fisheries training center, FEO, etc. are located. The Project targets on the construction of the related facilities to TFH and TFTC, and, through the fishery harbour as the core of the fishery activities and professional school to train the ability of people, the Project contributes to the development of the fishery industry in the southern area,

TFH, where takes full advantages of natural conditions, has been utilized for more than 20 years by not only the fishermen around Tangalle area, but also the fishermen from the southeast area who are required to move to the southern area during the northeast Monsoon period. On the other hand, as the aspect from the present stream of new development upon fishery harbours, TFH is an old fashioned fishery harbour, and that causes the deficiency of its scale and development of the facilities. However, TFH will remains in the future as the precious harbour for various people related to the fishery industry and its marketing, and local consumers, etc. Under these circumstances, the Project promotes the improvement of the utilization of TFH and related fishery activities, by reinforcing the schemes such as the extension of the wharf, etc to maintain the fishery harbours, which is implemented by Sri Lanka, through the implementation of the Project.

TFTC has also been the sole fishery related institute for more than 20 years to provide the advanced education to the people related to fishery industry in the southern area. The operation of fishing boats in the recent fishery industry is assisted by electric devices such as navigation equipment, etc. and precision machinery such as driving devices, so that it is compulsory that the fishermen learn the mechanical technique. Moreover, it is significant to learn the knowledge of natural resources, post-harvest techniques and environmental aspect. Accordingly, the Government of Sri Lanka has intended the measures such as securing the budget, focused on the reinforcement of fisheries trainings. However, at TFTC, the training programs for the great number of candidates are not implemented because of the deficiency of classrooms, practice rooms, accommodation, etc. Under these circumstances, the intention to normalize the fisheries training activities by the implementation of the Project establishes the foundation for maintenance and improvement of the fishery activities in the southern area.

The followings are the detail effects by the Project:

(1) Improvement of TFH

1) Activation of utilization of TFH

For fishermen, a fishery harbour is the first land from the field at sea where they have to work under hard conditions, and it is a place where not only the production is converted into money but also they can take a rest and prepare themselves for next departure. That is the base for fishery activities. At TFH, the basic facilities such as breakwater, wharf, etc are established to secure the safety mooring, but the land facilities to fulfill the utilization of the harbour are not efficient. Under these circumstances, the facilities, which are constructed by the Project, bring the following effects for approximately 2,000 fishermen there and people engaged in fish marketing, and as a result, activate its utilization.

① For people related to the fishery industry, a role of harbour is significant beyond thought as the place for social life and rest. Especially, the fishermen of fishing boats with cabins such as fishing boats for multi-day fishing and seasonal fishing boats that utilize TFH, live their lives in the boats even after return. A canteen, toilets and showers, which are constructed by the Project, will contribute to improvement of living conditions for the fishermen.

② The construction of TFH is not directly to connect to the increase of the fishery production, but, as a reserve of fishery resources is considered limited, it will be rather important that TFH acts as a place to promote the effective utilization of present captures. In the current situation of TFH, captures are traded in the burning sun and ice for buyers who trade in a small amount is restricted. A fish marketing hall, flake ice plant, which are constructed by the Project, will improve the dealing conditions in the burning sun, and intend to improve and maintain the qualities of the captures on fish landing and promote the effective utilization of the limited fishery resources.

③ It is a complicated work to prepare fishing boats for departure. After return, to start with, repair of nets damaged by fishing, and loading of fresh water, food and ice should be performed efficiently. In every country, the longer they stay in fishing grounds, the more they capture. On the other hand, fishermen desire as much rest as possible while they stay at a harbour. Therefore, fishermen greatly expect functions of preparation for departure in the fishing harbour. A net mending shed and a fuel tank and dispenser, which are constructed by the Project, extremely improve the functions of preparation for departure, increase the efficiency of preparation, and decrease their loads of work.

④ The maintenance of fishing boats are the most significant to continue the fishery by fishing boats. Breakdowns of machines on the sea cause not only to hinder the operation but also threaten fishermen's lives. Therefore, fishermen are required to maintain a hull and machinery regularly. A fishing boat repair facility, which is

constructed by the Project, will enable the maintenance of fishing boats within TFH for fishermen, and assists in increasing operation ratio of the fishing boats.

2) Development in the southeast area.

There is no use saying that the Project contributes to the improvement of living standards of those who are related to the fishery industry and its marketing around Tangalle. Moreover, the Project greatly increases convenience to fishermen who utilize TFH as the seasonal fishermen from the southeast area and the related people. As the southeast area is not beneficial as fish landing area, fishermen have to depend on fishery harbours in the southern area such as TFH, especially during the northeast Monsoon season. The Project will provide those fishermen the convenience produced by the construction of the base for the fishery activities, and indirectly contributes to the development of the southeast area.

(2) Improvement of TFTC

Fishery is not always comfortable with sweaty, dirty clothes and heavy job. In every country, it appears that people related to fishery are not positioned highly in the society. Also, the children of fishermen often have any other choices to be engaged in fishery. Sri Lanka is basically under the similar situation. Therefore, training of successors, improvement of technical skills of fishermen on service and training of women to support them are essential not only because of maintaining the current fishery activities but also intending the progress in the future. Based on these points, the facilities, which are improved by the Project, will bring the following effects, and not only the effects from the aspect of educational training, but also the convenience from the aspect of social welfare for approximately 1,000 students and participants annually who get opportunities of professional training only in TFTC.

① There is no use saying that the capacity of training students and number of courses for each curriculum are satisfied and the fisheries training based on the present training plan will be conducted by the construction of classrooms and practice rooms.

② As the fisheries training center targets on the large area, a half of its students need to stay there. It is a serious problem that the burden of expenses for accommodation forces some students to cease trainings, even though succeeded in entering after hard competition. Accommodation for students and instructors, which is constructed by the Project, will improve the situation, and realize its role as the fisheries training center for all over the southern area.

③ The fisheries training at TFTC will bring up the successors for fishery and children of fishermen and promote employment opportunities for them, and as a result, contribute to the maintenance of the coastal fishing activities.

④By conducting fish handling training course and marine bio resource technology course for local students and instructors, the knowledge of preservation and management of fishery resources are developed and the consciousness is improved, and that accordingly will bring the convenience from the aspect of marine environment.

Therefore, it is considered appropriate to implement this Project by Japan's grant aid scheme.

4-2 Recommendation

By the implementation of the Project, the effects, as aforementioned, are expected, but the following points should be considered to materialize those effects and further promotion.

1) Cooperation and consistency between the related organization

CFHC and NIFT are responsible for the implementation of the Project. Both of them are under the control of MFARD, but they are two different organizations. Also as the Project is implemented under the control of Hambantota district, its district bureaus and agencies, Tangalle city hall, etc will be related to the approval of the plan, admission, adjustment of the implementation. For smooth implementation of the Project, it is recommended that the system of sufficient communication, cooperation and consistency should be established with placing MFARD, a responsibility agency for the Project, as its core.

2) Utilization of facilities and equipment at TFTC

The courses targeted by the Project include such courses as ornamental fish culture course, fishing boat electric course, etc that have been implemented for shorter period than scheduled because of the deficiency of classrooms, etc. For these courses, students will be newly invited and, in that case, it is expected that the increase of instructors for new fields is required, depending on situation. It is necessary to prepare well for the invitation and selection of students and the acquisition of instructors in order to utilize the related facilities constructed by the Project. As the equipment, which is presently required, will be arranged by the Project, the acquisition of technicians for appropriate operation and maintenance, organization of practice programmes are required for the utilization of the equipment.

3) Orientation to the fishermen for the effective utilization of landed fish.

By reflecting on the present situation of the coastal fishery resources, it is considered significant to improve the value added of landed fish, rather than the increase of its quantity in the future. For this reason, the Project arranges the flake ice plant and the fish marketing hall. Flake ice is superior in the capability of immediate cooling and it is also

effective to keep the quality of fish when it is used for fish marketing. On the other hand, the fish marketing hall enables more hygienic fish dealing. However, as the utilization of these facilities is comparatively new in Sri Lanka, it is considered that some users are not accustomed to it. The appropriate guidance for the methods of the utilization of flake ice and fish marketing with utilization of fish boxes will be required for users.

4) Proper utilization of boat repair facility

Under such background that the operation of the boat repair facility at TFH is converted from private consignment to direct operation of CFHC, the Project determines to improve the related facilities. As the background of the conversion, there is a reason why fishing boats are not always prioritized for repair by the operation of private consignment. In order to assure the repairing fishing boats, without converting to private consignment again, the effective boat repair should be realized by the appropriate acquisition of related technicians and the operation and management of the boat repair facility.

5) Proper maintenance plan

The most of the facilities constructed by the Project will not require a great amount of maintenance, but several facilities such as the ice plant, the boat repair facility including workshop equipment and fisheries training equipment, require maintenance such as regular inspection, supplies of spare parts, etc. It is important to secure proper budget and adequate technicians for proper maintenance for those facilities and equipment. In this connection, in regard with TFH, where collects the utilization fees for the services, it is recommended that the system for a long-term plan of maintenance, and the system to secure a source of budget should be established, by forming the daily incomes as the a source of budget. On the other hand, in regard with TFTC, which depends on the budget by the Government of Sri Lanka, it is recommended to establish a long-term plan of maintenance and secure the budget.

6) Acquisition of expenditures for depreciation

Among the facilities and equipment by the Project, the main machinery of the ice plant is required to be renewed after 10 years, and the boat repair equipment is required to be renewed after 15 years. As for depreciation, annually 250,000 rupees for the main machinery of the ice plant and annually 1,000,000 rupees for the boat repair equipment should be reserved, and it is recommended to prepare for the renewal in the future.

Appendix 1 Member List of the Survey Team

(1) On the basic design study

Mr. Toru SHIMODA	Leader	Fourth Project Management Division, Grant Aid Management Department, Japan International Cooperation Agency (JICA)
Mr. Hideki TOYAMA	Technical Adviser	Resources Development Department, Fishing Ground and Facilities Division, Fisheries Agency
Mr. Munehiro SHIMADA	Chief Consultant / Fishery Facility Planning	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Takeaki HOSHINO	Civil Structure Planning	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Tooru FUKUBAYASHI	Architecture Planning	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Junichiro MORI	Fishery Plant Planning	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Nobuo ITOI	Fishery Training Equipment Planning I	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Wataru IWASAKI	Construction Planning / Cost Estimation	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Masashi SATO	Fishery Training Equipment Planning II	Overseas Agro-Fisheries Consultants Co., Ltd.

(2) On the explanation of the draft basic design

Mr. Hiroshi KITANI	Leader	Development Specialist, Institute for International Co-operation, Japan International Cooperation Agency (JICA)
Mr. Yoshihisa KIGATA	Technical Adviser	International Affairs Division, Fisheries Agency
Mr. Munehiro SHIMADA	Chief Consultant / Fishery Facility Planning	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Tooru FUKUBAYASHI	Architecture Planning	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Nobuo ITOI	Fishery Training Equipment Planning I	Overseas Agro-Fisheries Consultants Co., Ltd.

Appendix 2 Survey Schedule

(1) On the basic design study

No. of Date	Date: (DD/MM/YY)		Schedule / Activity			
			Official		Consultants	
			Mr. SHIMODA	Mr. TOYAMA	Mr. Shimada Mr. Fukubayashi Mr. Itoi	Mr. Hoshino Mr. Mori Mr. Iwasaki
1	18.JUL.99	Sun.	London→Sri Lanka	Japan →Sri Lanka		
2	19.JUL.99	Mon.	Courtesy Call to Embassy of Japan and JICA Office Courtesy Call to the Ministry of Finance & Planning, MFARD and CFHC of the Government of Sri Lanka			
3	20.JUL.99	Tue.	Colombo→Tangalle Site Survey in Beruwalla, Galle, Mirissa, Puranawella Kudawella Fishery Harbours			
4	21.JUL.99	Wed.	Site Survey and discussions in TFH and TFTC, Site survey in Kirinda Fishery Harbour, Tangalle→Colombo			
5	22.JUL.99	Thu.	Discussion with CFHC, Site Survey in Colombo fish market Information collection from ADB			Natural conditions and Infrastructure survey
6	23.JUL.99	Fri.	Discussion with CFHC, Site survey in Negombo Fisheries Training Center Discussion on the Minutes of Discussions			Natural conditions and Construction situation Survey
7	24.JUL.99	Sat.	Internal meeting			Natural conditions survey
8	25.JUL.99	Sun.	Internal meeting			Internal meeting
9	26.JUL.99	Mon.	Signature on the Minute of Discussions Report to Embassy of Japan and JICA office			Climate survey Ice plant survey
10	27.JUL.99	Tue.	Sri Lanka →Japan		Colombo→Tangalle	Climate survey
11	28.JUL.99	Wed	Site survey in TFH, Completion of topographic surveys			
12	29.JUL.99	Thu.	Discussion with Tangalle office of CFHC, Interview survey of users at TFH			
13	30.JUL.99	Fri.	Discussion with TFTC, Interview survey of fishery related people at Tangalle			
14	31.JUL.99	Sat.	Survey on boat repair facility and its activities at TFH			
15	1.AUG.99	Sun.	Tangalle→Colombo			
16	2.AUG.99	Mon.	Discussion with NIFT, Construction conditions survey, Data collection of materials cost			
17	3.AUG.99	Tue.	Discussion with CFHC, Survey on construction laws and regulation			
18	4.AUG.99	Wed.	Discussion with CFHC, Collection of fisheries statistics Survey on local constructional materials & equipment and training equipment			
19	5.AUG.99	Thu.	Discussion with CFHC, Boat yard survey, GTZ and SIDA survey			
20	6.AUG.99	Fri.	Discussion with CFHC and NIFT on detail technical contents of the Project			
21	7.AUG.99	Sat.	Discussion with CFHC on Project implementation (Mr. Iwasaki leaves Colombo)			
22	8.AUG.99	Sun.	Discussion with CFHC on Project operation and maintenance			
23	9.AUG.99	Mon.	Final discussion with CFHC, Report to the Embassy of Japan and JICA office			
24	10.AUG.99	Tue.	Sri Lanka→Japan			

(2) On the explanation of the draft basic design

No. of Date	Date: (DD/MM/YY)		Schedule / Activity	
			Official	Consultants
			Mr. Kitani Mr. Kigata	Mr. Shimada Mr. Fukubayashi Mr. Itoi
1	18.OCT.99	Mon.	Japan →Sri Lanka	
2	19.OCT.99	Tue.	Courtesy Call to Embassy of Japan and JICA Office Courtesy Call to the Ministry of Finance & Planning, MFARD and CFHC of the Government of Sri Lanka	
3	20.OCT.99	Wed.	Explanation of the draft basic design and discussions with CFHC and NIFT	
4	21.OCT.99	Thu.	Explanation of the draft basic design and discussions with CFHC	
5	22.OCT.99	Fri.	Discussion on the Minutes of Discussions with MFARD	
6	23.OCT.99	Sat.	Additional survey on construction conditions	
7	24.OCT.99	Sun.	Internal meeting	
8	25.OCT.99	Mon.	Signature on the Minutes of Discussions Report to Embassy of Japan and JICA office	
9	26.OCT.99	Tue.	Sri Lanka →Japan	Colombo→Tangalle Explanation of the draft basic design and discussions with TFH office Additional site survey on harbour design
10	27.OCT.99	Wed.		Explanation of the draft basic design and discussions with TFTC office Additional site survey TFTC Tangalle →Colombo
11	28.OCT.99	Thu.		Discussion with CFHC and NIFT
12	29.OCT.99	Fri.		Sri Lanka→Japan

Appendix 3 List of Party Concerned in the Recipient Country

1. Ministry of Finance & Planning

Mr. J. H. J. JAYAMAHA	Director, Department of External Resources
Mr. A. RANASINGHE	Assistant Director

2. Ministry of Fisheries & Aquatic Resources Development (MFARD)

Mr. S. AMARASEKARA	Secretary
Mrs. N. MOHOTTALA	Acting Secretary
Mr. G. L. W. SAMARASINGHE	Additional Secretary
Mr. H. GUNAWARDENA	Technical Advisor
Mr. G. PIYASENA	Director, Planning & Monitoring
Mr. HETTIARACHCHI	Director, Export & Import
Mr. G. P. GUNAWARDENA	Project Director

3. Ceylon Fishery Harbours Corporation (CFHC)

Dr. L. P. CHANDRADASA	Chairman
Mr. U. W. L. CHANDRADASA	Managing Director
Mr. M. WIJESUNDERA	Executive Management Consultant
Mr. S. BANDAR	Civil Manager
Mr. H. L. JAYAWARDENA	Civil Engineer
Mr. F. W. PERERA	Mechanical Engineer Manager

4. Tangalle Office of CFHC

Mr. J. P. ANANDA	Deputy Manager
Mr. L. S. De SILVA	Senior Officer
Mr. U. DISANAYAKA	Area Coordinator

5. National Institute of Fisheries Training (NIFT)

Capt. S. K. S. JAYASINGHE	Director
Mr. P. P. WEERASINGHE	Deputy Director

6. Tangalle Fisheries Training Center (TFTC)

Mr. M. M. P. YARENA	Principal
Mr. P. EDIRIWICKRAMASURIYA	Engine Instructor
Mr. W. P. ARIYADASA	Mate
Mr. S. B. CHANDRA	Seaman

7. Sri Lanka office of Asian Development Bank (ADB)

Mr. T. KONDO	Resident Representative

8. Sri Lanka office of GTZ

Dr. R. BOLZ	Director

9. Ministry of Science and Technology

Mr. T. K. FRANANDO	Deputy Director, Meteorological Department

10. Embassy of Japan in Sri Lanka

Mr. K. SEIYAMA	Second Secretary

11. JICA office in Sri Lanka

Mr. S KAIHO	Resident Representative
Mr. Y. KARINO	Resident Representative (ex.)
Mr. Y. SUZUKI	Deputy Resident Representative
Mr. Y. ONOE	Assistant Resident Representative

On the basic design study

MINUTES OF DISCUSSIONS ON THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF TANGALLE MARINE FISHING COMPLEX IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

In response to a request from the Government of the Democratic Socialist of Sri Lanka, the Government of Japan decided to conduct a Basic Design Study on the Project for Development of Tangalle Marine Fishing Complex (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Sri Lanka the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Toru Shimoda, Staff, Grant Aid Management Department, JICA, and is scheduled to stay in the country from July 18, 1999 to August 10, 1999.

The Team held discussions with the officials concerned of the Government of Sri Lanka and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Colombo, July 26, 1999

Mr. Toru Shimoda
Leader
Basic Design Study Team
Japan International Cooperation Agency

Mrs. N. Mohottala
Acting Secretary
Ministry of Fisheries &
Aquatic Resources Development

Dr. L. P. Chandradasa
Chairman
Ceylon Fishery Harbours Corporation

Witnessed by:

Mr. J. H. J. Jayamaha
Director
Department of External Resources
Ministry of Finance & Planning

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve fishing and training activities at the Tangalle Fishery Harbour in order to solve the problems faced by the low income fishermen and to enhance their quality of life.

2. Project Site

The project sites are the Tangalle Fishery Harbour shown in ANNEX-1 and one block in Tangalle town reserved for the Fishery Training Center,.

3. Responsible and Implementing Agency

The Ministry of Fisheries & Aquatic Resources Development is the Responsible Agency of the Project, and Ceylon Fishery Harbours Corporation is the Implementing Agency of the Project.

4. Items to be considered in the Project

After discussions with the Team, the items described in ANNEX-2 are considered as components subject to the study by the Team.

5. Japan's Grant Aid System

1) The Sri Lanka side understands the Japan's Grant Aid Scheme explained by the Team, as described in ANNEX-3.

2) The Sri Lanka side will take the necessary measures, as described in ANNEX-4, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Further Schedule of the Study

1) The consultants will proceed to further studies in Sri Lanka until August 10, 1999.

2) JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around October, 1999.

3) In case that the contents of the report are accepted in principle by the Government of Sri Lanka, JICA will complete the final report and send it to the Government of Sri Lanka around February, 2000.

7. Other Relevant Issues

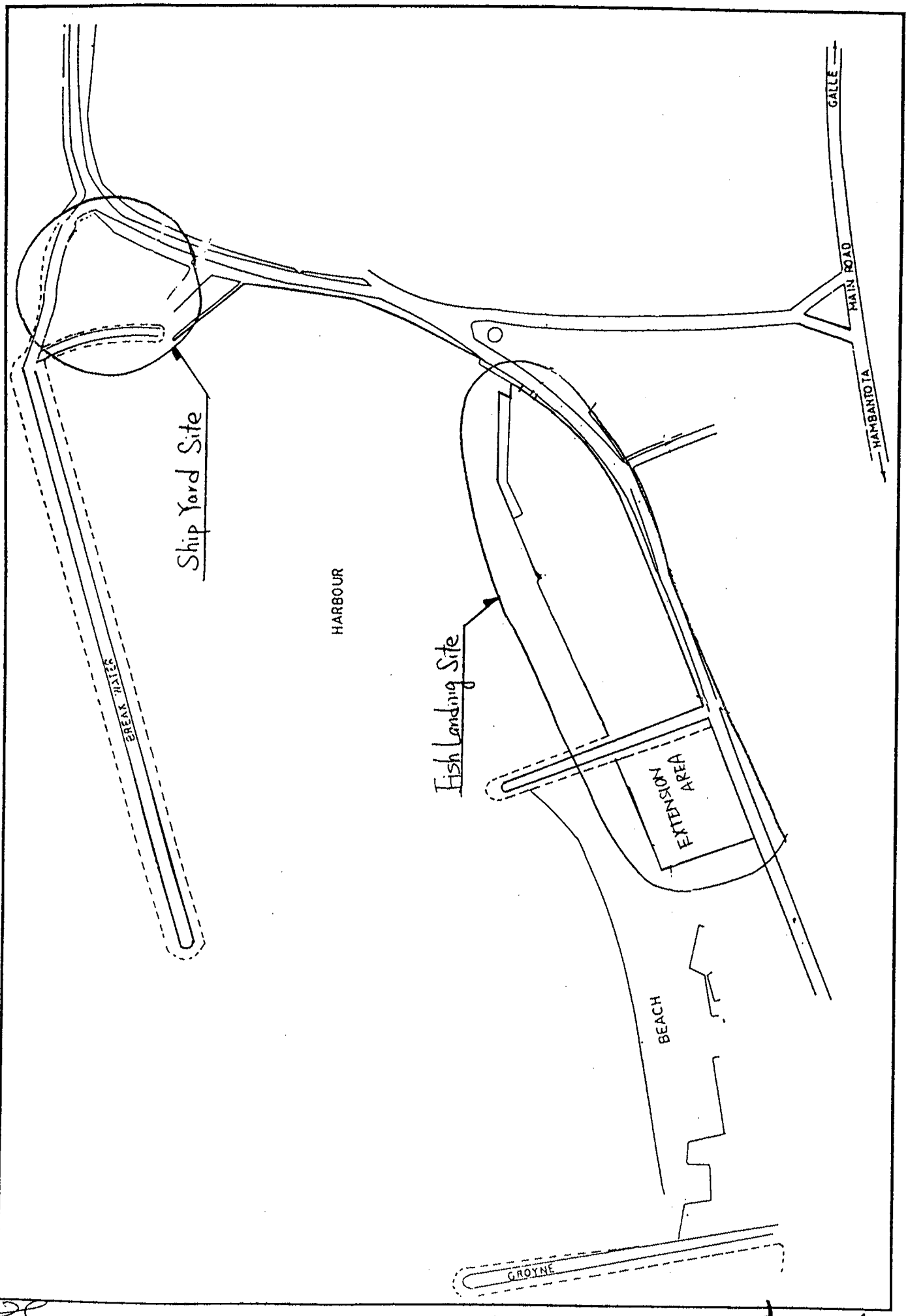
1) Ceylon Fishery Harbours Corporation will represent the Sri Lanka side as the Implementing Agency and it will be responsible for coordination of the Project with National Institute of Fishery Training.

2) Ceylon Fishery Harbours Corporation will submit to the Team documents to ensure the removal of houses and the acquisition of land necessary for the site extension by return of the consultant of the Team. However, any legal and other procedures shall be taken place after the Exchange of Note is signed.

3) Ceylon Fishery Harbours Corporation will carry out a coastal protection work against erosion affecting to the ship yard area.

4) Following conditions are required to include a total relocation of the Tangalle Training Center into the components to be considered in the Project:
   i) Explanation of curriculums to be taken in the new facilities including detail teaching subjects, numbers of students per course/year, duration of each course, admission times of each course in a year and organization of administration staff and instructors must be submitted to the Team by return of the consultant of the Team.
   ii) The activities records during at least past three years not only of the Tangalle Training Center but also of the four other training centers under National Institute of Fishery Training, showing at least budgets, courses, numbers of students per year, numbers of total graduates, organization of administration staff and instructors must be submitted to the Team by return of the consultant of the Team.
   iii) A letter, signed by the ~~Minister~~ Ministry of Fisheries & Aquatic Resources Development showing that a budget and staff will be provided sufficiently enough to run a new curriculum and to maintain the equipment and facilities of the new Tangalle Training Center and also showing the plan how the facilities currently used as the training center will be utilized after the relocation, must be submitted to the Team by return of the consultant of the Team.
   iv) Courses in the new Tangalle Training Center must primarily focus on the subjects necessary to local small scale fishermen and their families, and courses for teaching staff shall not be included in the design of facilities and equipment.
   v) Training equipment adequate only for the level of the current fishing activities at Tangalle Fishery Harbour will be considered.
   vi) Class rooms, a library, an administration office, a principal office, an instructors room, workshop, storage, sanitary, pantry and student accommodation will be considered in the facilities, ~~but an auditorium will not be included~~.
   vii) Buses and training boats will not be included.
   viii) Construction of the Training Center may be carried out with the Japanese 2000 year's budget if necessary (the Exchange of Note will be signed later than June 2000 separately from the other parts of the Project).

ANNEX-1 PROJECT SITE



ANNEX-2 ITEMS TO BE CONSIDERED IN THE PROJECT

1. Components in the Fish Landing Site
   1) Ground Leveling in the Extension Area
   2) Auction Hall
   3) Net Mending Shed
   4) Parking Space
   5) Administration Office with Canteen
   6) Ice Plant
   7) ~~Renewal of~~ Fuel Tank, Dispensary and Water Tank
   8) Surface Repair of Quay Wall
   9) Waste Water Disposal
   10) Public Toilets and Showers
   11) Auction Hall Equipment including Fish Storage, Handling and Landing

2. Components in the Ship Yard Site
   1) Slipway
   2) Workshop
   3) Workshop Equipment
   4) Crane

3. Components in the Training Center Site
   1) Facilities consisted of class rooms, a library, an administration office, a principal office, an instructors room, workshop, storage, sanitary, pantry and student accommodation
   2) Training Equipment

4. Components in other sites
   1) Beacons
   2) Yard Lighting

Details of the above components will be determined in the course of the analysis of the Project by the Team and provision of the items are still subject to change.

ANNEX-3 JAPAN'S GRANT AID SYSTEM

1. Grant Aid Procedures

1) Japan's Grant Aid System is executed through the following procedures.

Application (Request made by a recipient country)
Study (Basic Design Study conducted by JICA)
Appraisal & Approval (Appraisal by the Government of Japan and Approval by the Japanese Cabinet)
Determination of Implementation (The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, a request for the Grant Aid submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for the Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using a Japanese consulting firm.

Thirdly, the Government of Japan appraises the project so as to see whether or not it is suitable for the Grant Aid, basing on the Basic Design Study report prepared by JICA, and then it is submitted to the Cabinet for approval.

Fourthly, once the project is approved by the Cabinet, its implementation is officially determined by signing the Exchange of Notes between the Governments of Japan and of the recipient country.

Finally, in the course of implementation of the project, JICA will take charge of expediting the execution of the project by assisting the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study, conducted by JICA on the requested project, is to provide basic documents necessary for the appraisal of the project by the Government of Japan. The contents of the study are as follows:

a) to confirm the background, objectives and benefits of the project and also institutional capacity of the agencies concerned of the recipient country necessary for the project implementation;

b) to evaluate the appropriateness of the project from the technical, social and economic points of view;
c) to confirm items agreed on by both parties concerning the basic concept of the project;
d) to prepare a basic design of the project; and,
e) to estimate costs of the project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the project. Such measures must be guaranteed even though they may fall outside the jurisdiction of the organization in the recipient country actually implementing the project. Therefore, the implementation of the project is confirmed by all relevant organizations of the recipient country in the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the study, JICA selects a consultant among those who registered at JICA by evaluating competitive proposals submitted by those consultants. The selected consultant carries out the Basic Design Study and prepares a report based on the terms of reference made by JICA.

At the beginning of the implementation, after the Exchange of Notes, JICA recommends the same consultant who participates in the Basic Design Study to the recipient country for the services of Detailed Design and construction supervision of the project in order to maintain the technical consistency between the Basic Design and the Detailed Design.

3. Japan's Grant Aid Scheme

1) What is the Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and

regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) Period

The period of the Grant Aid means the one fiscal year which the Cabinet approves the project. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed. However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Purchase of Products and Services

Under the Grant Aid, in principle, Japanese products and services, including transport or those of the recipient country are to be purchased. When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely consulting, contracting or procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of Verification

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This verification is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

(i) to secure land necessary for the site of the project prior to commencement of the construction;

(ii) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;

(iii) to ensure tax exemption and to facilitate prompt execution for unloading, customs clearance at the ports of disembarkation and internal transportation of the products purchased under the Grant Aid;

(iv) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts;

(v) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their works.

7) Proper Use

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for this operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

8) Re-export

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in a Japanese bank (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments to the Bank in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of recipient country or its designated authority.

ANNEX-4 UNDERTAKINGS REQUIERED OF THE GOVERNMENT OF SRI LANKA

In addition to the undertakings mentioned in the section 3. 6) of ANNEX-3, following necessary measures shall be taken by the Government of Sri Lanka on condition that the Grant Aid by the Government of Japan is extended to the Project.

1. to remove all houses and structures in the area to be extended before implementation of the Project;

2. to demolish structures necessary for implementation of the Project;

3. to take necessary measures to maintain the supply of fuel and water to fishing boats and offices during the construction of such utilities;

4. to ensure fishing and marketing activities do not affect the construction during the Project;

5. to provide general furniture such as desks and tables necessary for the Project;

6. to construct necessary gates and fences in and around the site;

7. to secure a temporary construction yard during the construction of the Project;

8. to bear commissions to a Japanese bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and other payment commissions;

9. to provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary;

10. to ensure that the Government of Sri Lanka will make necessary arrangements to obtain Budgetary Provisions to utilize the Grant Aid; and,

11. to bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities.

MINUTES OF DISCUSSIONS ON THE BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF FISHERY HARBOUR FACILITIES AND FISHERIES TRAINING CENTER AT TANGALLE IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA (EXPLANATION ON DRAFT REPORT)

In July 1999, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Improvement of Fishery Harbour Facilities and Fisheries Training Center at Tangalle (hereinafter referred to as "the Project") to the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "Sri Lanka"), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult Sri Lanka on the components of the draft report, JICA sent to Sri Lanka the Draft Report Explanation Team (hereinafter referred to as "the Draft Team"), which is headed by Hiroshi Kitani, Development Specialist, JICA and is scheduled to stay in the country from October 18, 1999 to October 29, 1999.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Colombo, October 25 , 1999

Mr. Hiroshi Kitani
Leader
Draft Report Explanation Team
Japan International Cooperation Agency

Mr. S. Amarasekera,
Secretary,
Ministry of Fisheries &
Aquatic Resources Development

Dr. L. P. Chandradasa
Chairman
Ceylon Fishery Harbours Corporation

Capt. S. K. S. Jayasinghe
Director
National Institute of
Fisheries Training

Witnessed by:

Mr. J. H. J. Jayamaha
Director
Department of External Resources
Ministry of Finance & Planning

ATTACHMENT

1. Components of the Draft Report

The Government of Sri Lanka agrees and accepts in principle the components of the draft report explained by the Draft Team.

2. Japan's Grant Aid Scheme

The Sri Lanka side reaffirms its understanding of the Japan's Grant Aid Scheme which was explained by the Basic Design Study Team for the Project in July, 1999, and agrees to implement the measures to be taken by the Government of Sri Lanka as described in ANNEX-1.

3. Schedule of the Study

JICA will complete the Final Report after considering the items discussed with the Draft Team, and forward it to the Government of Sri Lanka in March 2000.

4. Responsible and Implementation Agencies

The Ministry of Fisheries & Aquatic Resources Development is the Responsible Agency of the Project.
National Institute of Fisheries Training is the Implementation Agency of the components of the Construction of Tangalle Fisheries Training Center and Ceylon Fishery Harbours Corporation is the Implementation Agency of the components of the Improvement of Tangalle Fishery Harbour of the Project.

5.Other Relevant Issues

The Sri Lanka side proposes to the Draft Team the following modification of the contents of the Project for further consideration.

1)For Tangalle Fishery Harbour Improvement Components
i) Alternation of the floor of the fish marketing hall from hardener coated concrete to urethane coated concrete.
ii) Alternation of the floor of the toilet & shower rooms from terrazzo tile to urethane coated concrete.
iii) Relocation of canteen, water tank and parking lot for getting space for future extension of fish marketing hall.
iv) Relocation of toilets from the ground floor to the first floor and storage and accountant room from the first floor to the ground floor in the fish marketing hall building.
v) Additional toilet for workshop.

2)For Tangalle Fisheries Training Center Construction components.
i) Additional provisions of ceiling fans for classrooms and practice rooms.
ii) Relocation of pantry and additional toilet and office storage in place of guard man room.
iii)Additional toilet for and alternation partitions of instructor accommodation rooms.
iv)Extension of crushed stone paving of in-site path.

ANNEX-1 UNDERTAKINGS REQUIERED OF THE GOVERNMENT OF SRI LANKA

Following necessary measures shall be taken by the Government of Sri Lanka on condition that the Grant Aid by the Government of Japan is extended to the Project.

1. to secure land necessary for the site of the Project prior to commencement of the construction;
2. to remove all houses and structures in the area to be extended before implementation of the Project;
3. to demolish structures necessary for implementation of the Project;
4. to take necessary measures to maintain the supply of fuel and water to fishing boats and offices during the construction of such utilities;
5. to ensure fishing and marketing activities do not affect the construction during the Project;
6. to provide general furniture such as desks and tables necessary for the Project;
7. to construct necessary gates and fences in and around the site;
8. to secure a temporary construction yard during the construction of the Project;
9. to ensure tax exemption and to facilitate prompt execution for unloading, customs clearance at the ports of disembarkation and to facilitate internal transportation of the products purchased under the Grant Aid;
10. to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts;
11. to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their works;
12. to bear the cost of GST, defense tax, custom duties and other necessary taxes which are charged for procurement against the Contracts with Japanese Construction and Consultant companies, and the equipment and construction materials which are imported for the Project implementation.
13. to bear commissions to a Japanese bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and other payment commissions;
14. to provide necessary permissions, licenses and other authorizations for Implementation the Project, if necessary;
15. to ensure that the Government of Sri Lanka will make necessary arrangements to obtain Budgetary Provisions to utilize the Grant Aid; and,
16. to bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities.

Appendix 5 Cost Estimation Borne by the Recipient Country

- To remove and evacuate the existing obstacles in the Project site
  Rs. 2,530,000
- To reinforce the breakwater at the backside of the Boat Repair Site
  Rs. 4,000,000
- To lead lines for electricity and pipes for water to the Project site
  Rs. 2,650,000
- To perform the construction work of exterior fences, gates, guard room, etc.
  Rs. 800,0000
- To procure office supplies and furniture for the administration offices
  Rs. 200,000