CHAPTER 4

PHASED IMPROVEMENT PLAN

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Principal policies of the Phased Improvement Plan are set up tin line with the development direction of the Master Plan.

4.1 Improvement Policies

Principal policies of formulating Phased Improvement Plan are set as follows;

1) To urgently relieve the port from serious damages or even collapse of the existing wharf and eventual inefficient operation or closure of the port
2) To recover a normal and efficient port operation free from a load limitation to the wharf
3) To provide appropriate facilities for successful launching of the planned port authority for efficient and smooth port management
4) To secure safety of ship maneuvering in the turning basin and cargo handling operation in the yard
5) To maintain the present participation of private sector in stevedoring service for efficient port operation.

It is clarified through examination to this point that the deteriorated existing wharf urgently needs to be replaced with a newly constructed wharf or to be reinforced /reconstructed for safe container handling operation.

4.2 Phased Improvement Plan

4.2.1 Required Port Facilities

The traffic demand of cargo and passenger is forecast for the Phased Improvement Plan and to meet the traffic demand, the required port facilities are determined in the light of development direction of Master Plan. In determining priority to each facility in the Phased Improvement Plan, following technical and economical considerations have been given as detailed below.

(1) Dredging of Channel and Turning Basin

According to the results of the bathymetric survey in the existing approach channel and turning and berthing areas, the minimum water depth is about 9 m. The present water depth is deep enough for safe maneuvering of ship.

Dredging works in the approach channel and turning basin are not planned in the Phased Improvement Plan.

(2) Breakwater

The new wharf is exposed to waves transmitting through the breakwater to the extent that a ship berthing alongside can not work more than 20 days a year. Extension of the breakwater shall be considered to secure the calmness in front of the wharf. However, the extension of the breakwater interferes with turning and navigation of large tankers and other ships along the channel. Therefore, the extension of the existing breakwater is not proposed in the phased improvement plan, and instead placing of crown concrete block on top of the rubble mound of the existing breakwater is planned to reduce transmitting waves.

(3) Existing Wharf

The existing wharf is recommended to be rehabilitated with adequate anti-corrosion measures to extend service life for ships handling conventional cargoes other than container vessels.

(4) New Wharf

A new wharf is necessary for safe and efficient container cargo handling operation and proposed to be constructed extending from the outer corner of the existing wharf to the existing breakwater. There exists a hard coral layer along the planned face line of the new wharf and alternative improvement plans are proposed for economical and technical comparison.

(5) Ferry Terminal Wharf

A dolphin supporting a gangway is damaged by an impact of a ship moored at cyclone time. To meet the requirement of a new ferryboat due at the end of 1998, the gangway shall be widened for passenger traffic.

The concrete slope of the wharf is abraded by movement of a ramp of a ferryboat. Minor repair works are required for these damages.

(6) Small Boat Jetty

A small boat jetty is included in the Master Plan.

(7) Mooring Buoy for Tanker

Tanker buoys owned by private sector do not seriously interfere with navigation of ships in the channel and their relocation is not planned in the Phased Improvement Plan.

(8) Pavement of Staging Area

The area at the back of a new wharf is planned to be concrete paved for providing a staging area as described in the previous chapter.

(9) CFS

Volume of container cargo is not large enough to justify a full-scale container freight station and is not planned in the Phased Improvement Plan.

(10) Maintenance Shop

Full maintenance and repair works to containers are not proposed to be done in Apia Port and a maintenance shop is not planned in the Phased Improvement Plan.

(11) Shed

Minor repair works to the existing sheds are necessary to their roofs, doors and walls to prevent rainwater leakage.

(12) Oil Tanks

The existing two tanks are located almost at the center of the container yard of a new wharf and seriously interfere with a heavy yard traffic. The tanks are planned to be demolished and newly constructed at the innermost part of a container yard in the Master Plan.

(13) Access Road

Improvement of the entrance gate and access road is planned in the Master Plan.

(14) Ferry Terminal Building

The existing facilities are enough for ferry passenger and cargo traffic and no facility is proposed in the Phased Improvement Plan.

(15) Administration Office

The new Samoa Ports Authority will hold about 30 staff working in a main office as detailed in Chapter 5 and for convenience and efficiency of their works a new office building is an absolute necessity. An area near the existing Ferry Terminal Building is proposed as a site for the new office. For a transition period, the existing MOT office can be temporarily used.

(16) Marine Office

The existing office is enough to house staff working in Marine Division and no additional office space is required. A minor repair work to the existing building to prevent rainwater leakage is required.

(17) Tug Boat

The specification of the existing two tugboats are as follows;

Name	Year built	Capacity
Tafola	1991	1600 HP
Pualele	1972	425 HP

Pualele has been serving for 26 years since her purchase in 1972 and has already finished an economic service life. A new tug boat with the same specification as Tafola replacing Pualele is urgently required.

(18) Navigation Aids

Any additional navigation aids are not necessary nor proposed.

(19) Marine Facilities

All the facilities related to a marina are proposed to be constructed in Master Plan and are not included in the improvement plan.

Through consideration on urgency and importance of improvement to all the above facilities, major facilities to be improved in the Phased Improvement Plan are selected to included 1) the existing wharf, 2) a new wharf, 3) a breakwater, 4) pavement of staging area, 5) SPA office building, 6) a tug boat and 7) miscellaneous works.

4.2.2 Alternative Plans of Berthing Facility

Improvement plan includes major components of wharf, breakwater, staging area, office building, tugboat and minor works. Three alternative plans to improve berthing capacity are proposed and compared. Such other facilities as office building, tugboat and minor works are commonly included in all the alternative plans. The alternative Phased Improvement Plans are summarized in Table 4.2.2-1. Figures 4.2.2-1～4.2.2-3 show layout of port facilities of each alternative plan.

The scope and layout of the Improvement plans are planned in line with the Master Plan.

Table 4.2.2-1 Alternative Phased Improvement Plans

Facility	Improvement Work	Plan 1 New Wharf Construction	Plan 2 Reconstruc-tion	Plan 3-1 New Piles + Reinforce-ment	Plan 3-2 Replacement of All piles
Existing and New Wharves Alternative					
Existing Wharf	Anti-corrosion & Reinforcement	○			
	Reconstructed in present place		○		
	Complete Rehabilitation			○	○
New Wharf	Extended from the existing wharf	○			
	Not constructed			○	○
Other Facilities					
Breakwater	Placing Crown Concrete Block	○	×	×	×
Staging Area	Pavement	○	×	×	×
Oil Tanks	Demolition/Reconstruction	×	×	×	×
SPA Office	New Construction	○	○	○	○
Tug Boat	New Boat, 1 No.	○	○	○	○
Others	Miscellaneous Repair Works	○	○	○	○

Figure 4.2.2-1 Alternative Improvement Plan 1

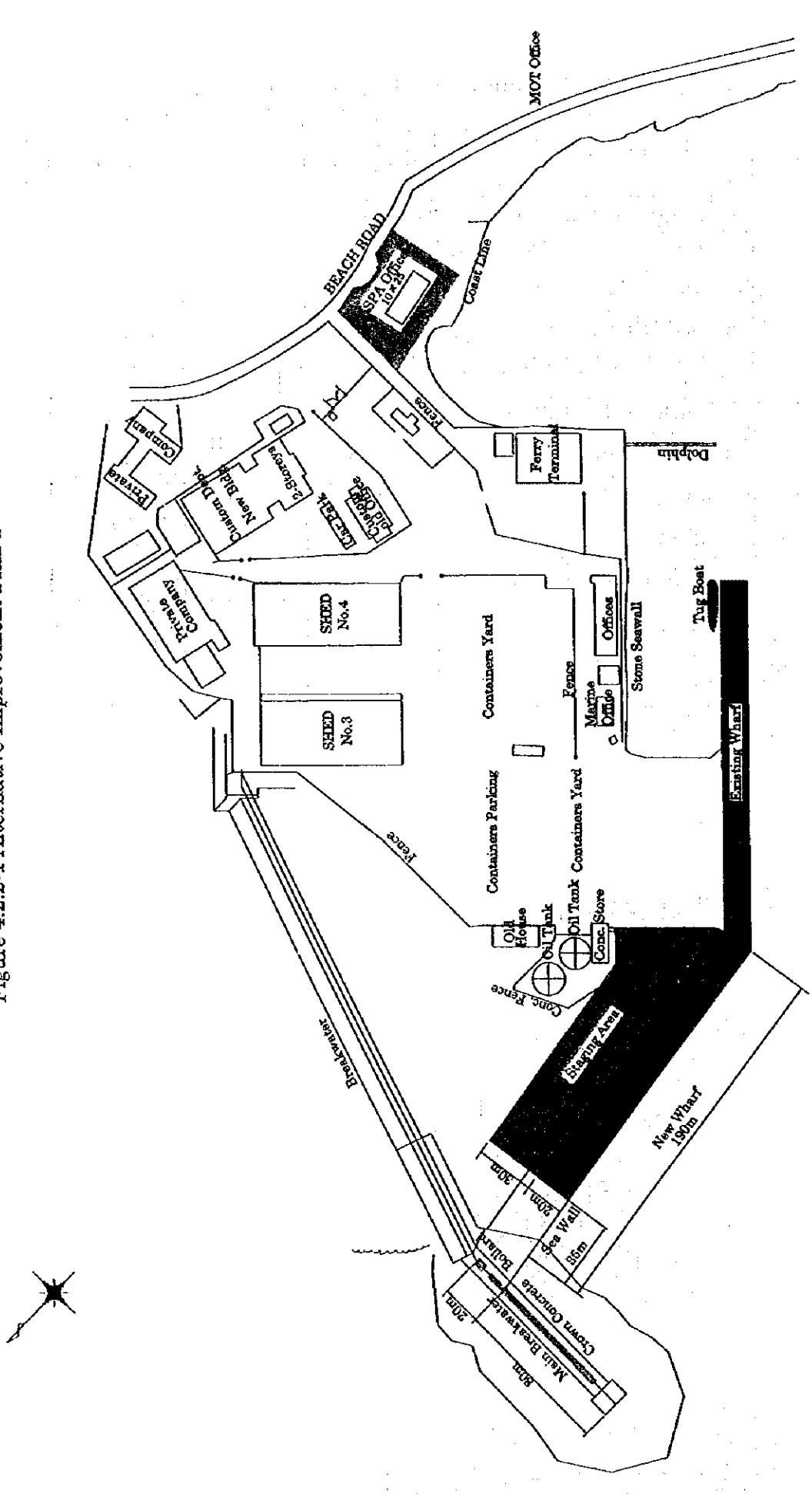


Figure 4.2.2-2 Alternative Improvement Plan 2

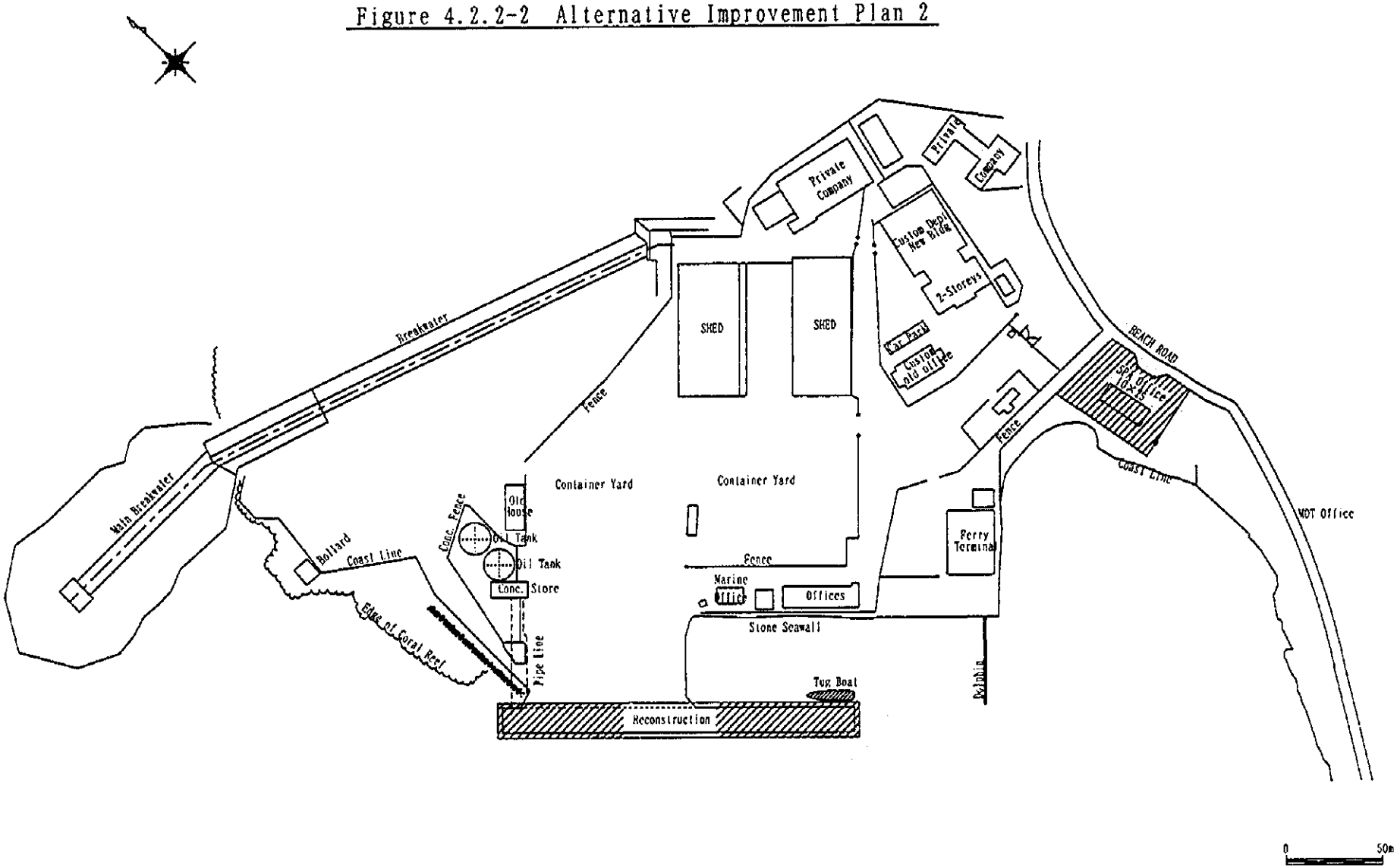
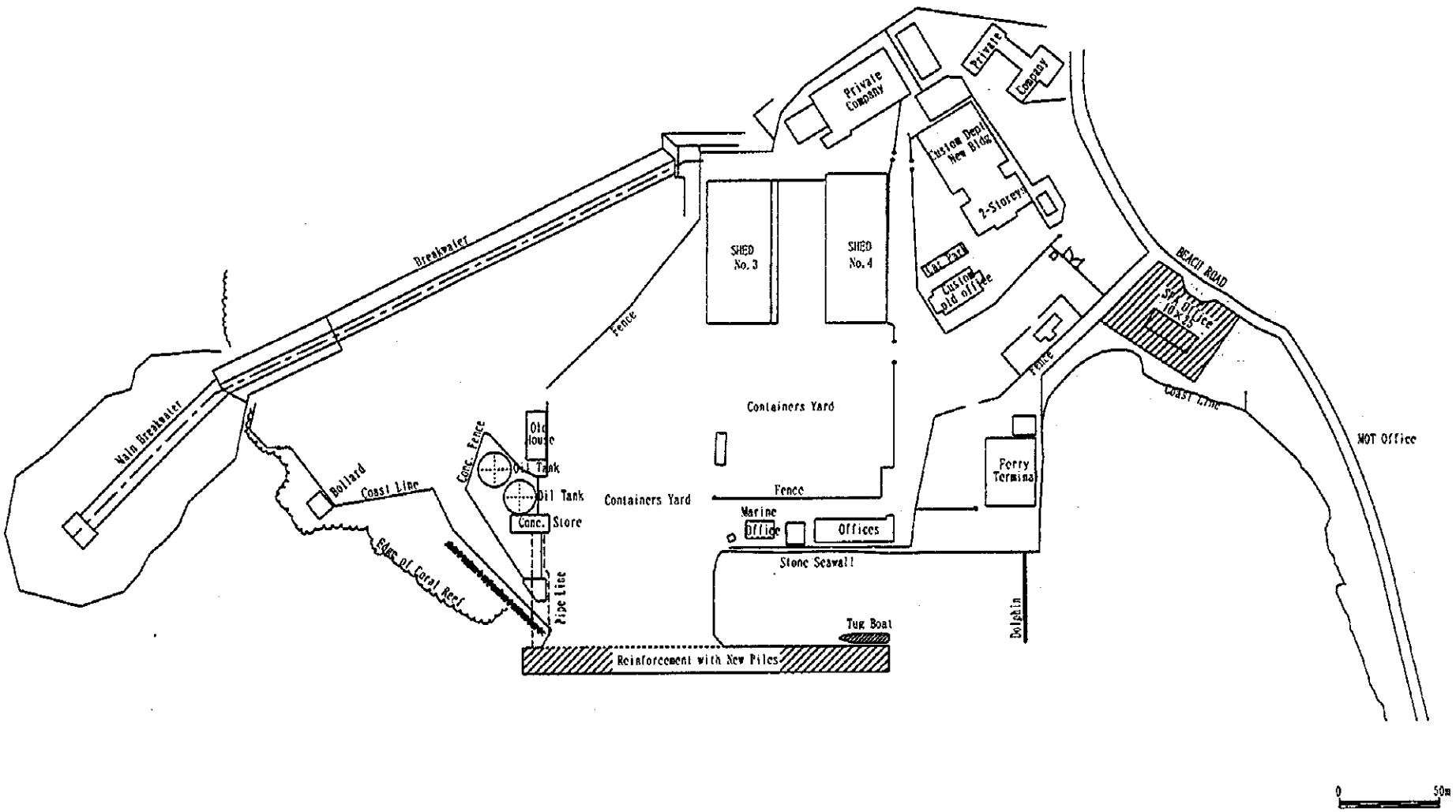


Figure 4.2.2-3 Alternative Improvement Plan 3



Three alternative plans are compared as below,

(1) Alternative Plan 1

This plan is to construct a 190m long new wharf (155m quay and 35m seawall) extending from the outer corner of the existing wharf to the landward end of the existing breakwater.

Water area in front of the new wharf is less sheltered from waves than the other plans. The existing breakwater is improved in order to reduce wave transmission rate by placing crown concrete blocks.

Apron of the new wharf is concrete paved for an area of 20m x 155m and the area at the back is also concrete paved 30m wide to provide a staging area.

The pipelines connecting tanks and the wharf are re-aligned in an underground concrete duct.

The existing wharf is repaired with adequate anti-corrosion work to extend its service life for handling non-container cargoes. The existing wharf can serve for such ships as cruise ship, copra ship, tanker, car carrier, fishing boat, ferry, etc. The existing wharf will greatly contribute to alleviate future congestion in Apia Port.

Interference of the construction work with port operation can be minimized by scheduling the repair work to the existing wharf after construction of the new wharf.

(2) Alternative Plan 2

This plan does not use any part of the existing wharf and is to enclose the existing wharf with a steel sheet pile wall. Inside of the wall is filled with soil and the surface is concrete paved after removing the existing concrete deck. Since this plan does not rely on any structural members of the existing wharf, structural reliability is high and construction method is simple.

This plan involves pile driving work all along the edge of the existing concrete deck with a large crane. The existing batter piles obstruct new piles and must be pulled out. To minimize interference of the construction work with port operation, a half of the wharf will be reconstructed and used for cargo handling before commencing the work to the other half of the wharf. Port operation considerably affect the construction work and vice versa.

Traffic between the wharf and the yard is smooth as at present and no work is required for the existing tanks.

The construction cost is the highest among the alternative plans.

(3) Alternative Plan 3

Deterioration of the existing wharf concentrates on the H shaped steel piles which are observed to have been heavily corroded on both above and under water sections. This plan is to use the existing concrete deck without any reinforcement and the existing piles supporting the deck with adequate reinforcement.

Alternative plan 3-1 consists of reinforcement of the existing piles and driving of additional piles, while alternative plan 3-2 is to replace all the existing piles with new piles. Since alternative plan 3-1 involves lot of works under the concrete deck and under water affected by berthing ship and tide, the construction cost is estimated higher than alternative plan 3-2. Deterioration of piles are very much complicated and the reinforcing work shall be carefully planned and implemented to achieve high structural reliability.

Interference of the construction work with port operation is significant but not serious as that of alternative plan 2.

The other aspects of this plan is similar as those of alternative plan 2.

Three alternative plans are compared as shown in Table 4.2.2-2.

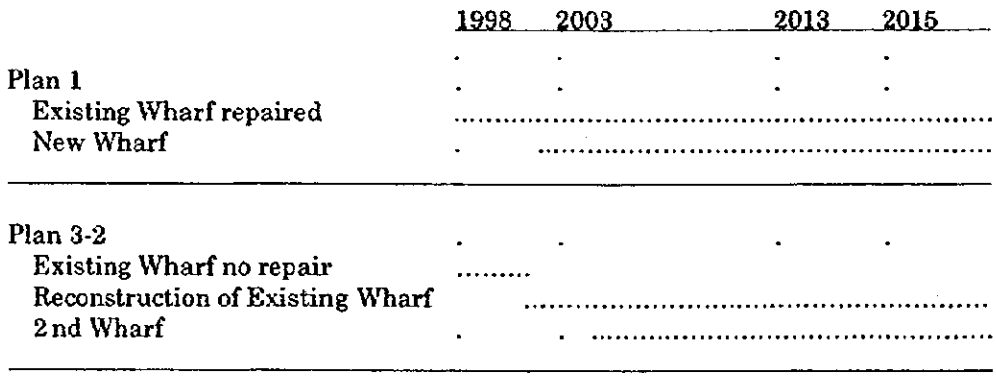
Table 4.2.2-2 Comparison of Alternative Plans

	Plan 1	Plan 2	Plan 3-1	Plan 3-2
Interference with Port Operation	Good	Fair	Bad	Fair
Ease of Construction	Medium	High*	Low*	Low*
Construction Cost	Excellent	Fair	Fair	Fair
Overall Evaluation	○	×	△	△

*denotes construction costs become higher than Plan 1 when 2nd berth is included

Construction schedule of phased improvement plan in the cases of adopting Alternative Plan 1 and Plan 3-2 is shown below,

Improvement Schedule of Berthing Facilities



-Plan 1

to construct a new container berth and rehabilitate the existing wharf for conventional cargoes serviceable beyond 2015,

-Plan 3-2

to reconstruct the existing wharf and construct the second container berth later, until then accepting port congestion to some extent.

Above two plans are evaluated by means of internal rate of return (EIRR) and plan 1 has been ranked as the best. Economic internal rate of return presented in detail in Chapter 7.

4.3 Design of Facilities

4.3.1 New Wharf

(1) Design Ship and Length and Depth of New Wharf

1) Design Ship

Container ships call Apia Port with arrival draft shallower than full load draft. The size of design ship is adopted to be 10,000 GRT through consideration of actual draft and the large ships with frequent call. The maximum size of container ships can be accommodated at the existing wharf at present.

2) Length and Depth of New Wharf

(a) Length

In Japan, typical wharf length for 10,000 GRT container ship is 170 m. Due to topographical condition at the proposed site, the length of the new wharf is determined to be 190 m (155 m quay and 35 m seawall).

(b) Depth

The typical wharf depth for 10,000 GRT container ship is 10 m below C.D.L. As swell causes disturbance in Apia Bay during November to February obstructing cargo handling operation, the depth of the new wharf is designed to be 11 m below C.D.L. adding a depth allowance of 1.0 m.

(c) Crown Height

The crown height of the new wharf is +3.00 m as the same as the existing wharf.

(2) Structural Design

Two structural types are examined for a new wharf.

Type A: Steel Sheet Pipe Pile Bulk Head Type
Type B: Open Type Piers with Vertical Piles

Based on the results of comparison of structure design, steel sheet pipe pile bulk head type (Type A) is adopted as shown in Figure 4.3.1-1.

(3) Sea Wall

The rubble mound type covered with 4ton concrete blocks which are used in the seawall toward mouth of the existing wharf. Cross section of the seawall is shown in Figure 4.3.1-2

4.3.2 Existing Wharf

The following three alternative plans are designed for different load conditions by cargo type and service life as shown in Table 4.3.2-1.

Table 4.3.2-1 Design Conditions of Alternative Plans

Design condition	Plan 1	Plan 2	Plan 3
Cargo Type	Conventional Cargo	Container Cargo	Container Cargo
Service life	More than 15 years	30 years	30 years

(1) Alternative Plan 1

The existing wharf is repaired with adequate anti-corrosion work to extend its service life for handling non-container cargos. The rehabilitation plan of the existing wharf is designed for conventional cargo handling operation with minor anti-corrosion works to the piles.

(2) Alternative Plan 2

The existing wharf is reconstructed by enclosing the existing wharf with a steel sheet pipe pile wall. Inside of the wall is filled with soil. The existing batter piles are pulled out as they obstruct new pile driving. The existing concrete deck is removed and the surface is concrete paved.

The plan and cross section of reconstruction of the existing wharf are shown in Figures 4.3.2-1 and 4.3.2-2, respectively.

(3) Alternative Plan 3-1

The service life of the existing wharf is extended to be 30 years by the reinforcement of existing piles and driving additional piles.

The plan and cross section of reconstruction of the existing wharf are shown in Figures 4.3.2-3 and 4.3.2-4 respectively.

(4) Alternative Plan 3-2

Alternative plan 3-2 is to replace all the existing piles with new piles. New piles are driven between the rows of existing piles.

The plan and cross section of improvement of the existing wharf are shown in Figures 4.3.2-5 and 4.3.2-6 respectively.

4.3.3 Other Facilities

(1) Breakwater

The placement of crown concrete block on top of the rubble mound of the existing breakwater is planned. The length of breakwater improvement is 70 m from concrete base of the light beacon to the face line of the new wharf.

As a result of breakwater improvement, the transmitting waves can be reduced through the existing breakwater. However, the breakwater improvement can not prevent to cause swell disturbance in Apia Bay by North-Eastern Trade Wind.

The cross section of improvement of the existing breakwater is shown in Figure 4.3.3-1.

(2) Administration Office

The layout of administration office for the new Samoa Ports Authority is shown in Figure 4.3.3-2.

(3) Tug Boat

The general arrangement of a new tug boat is shown in Figure 4.3.3-3.

(4) Ferry Terminal Wharf

The repair works of ferry terminal wharf are required as shown in Figures 4.3.3-4 and 4.3.3-5 respectively.

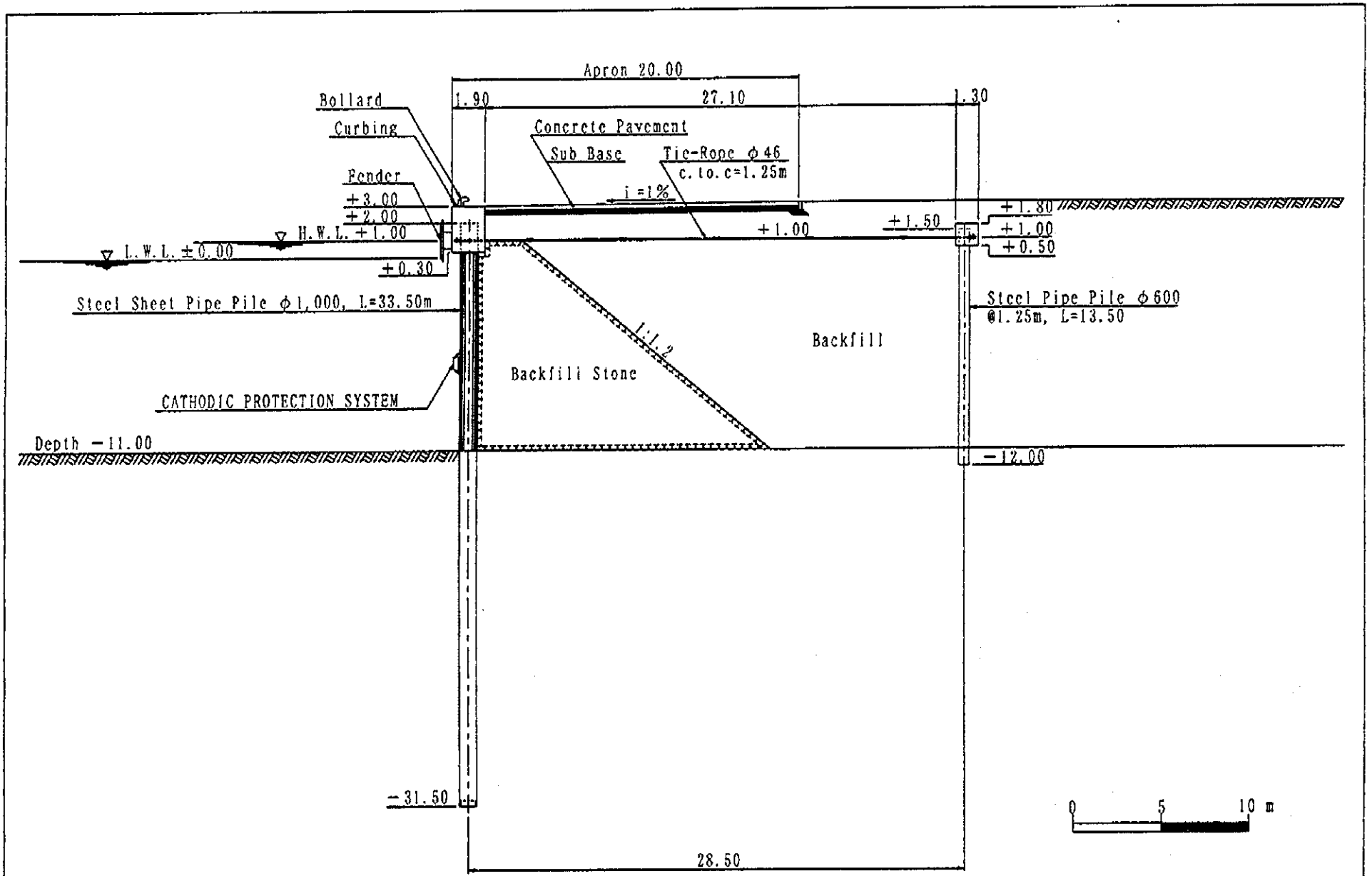


Figure 4.3.1-1 Cross Section of New Wharf(Type A)

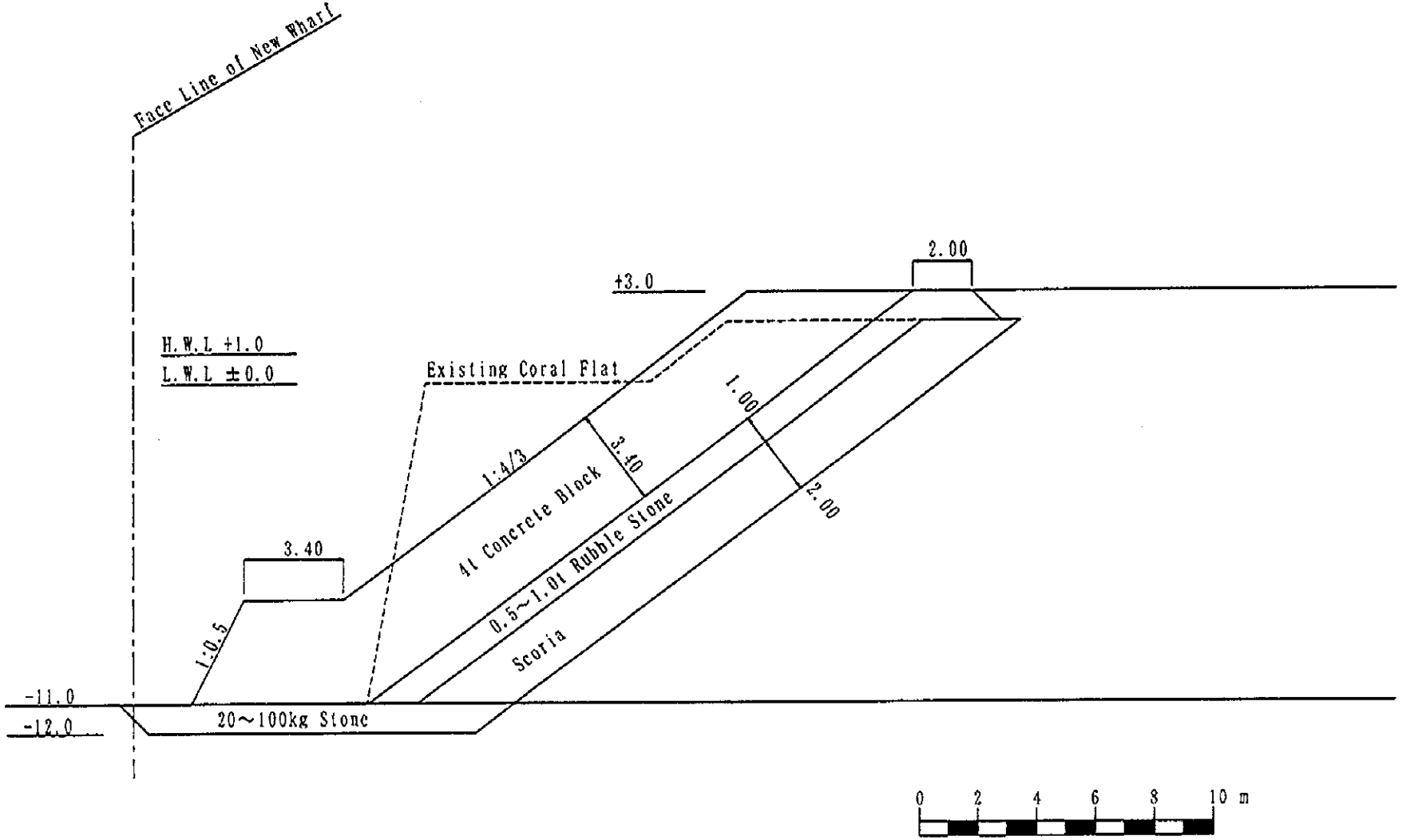


Figure 4.3.1-2 Cross Section of Sea Wall

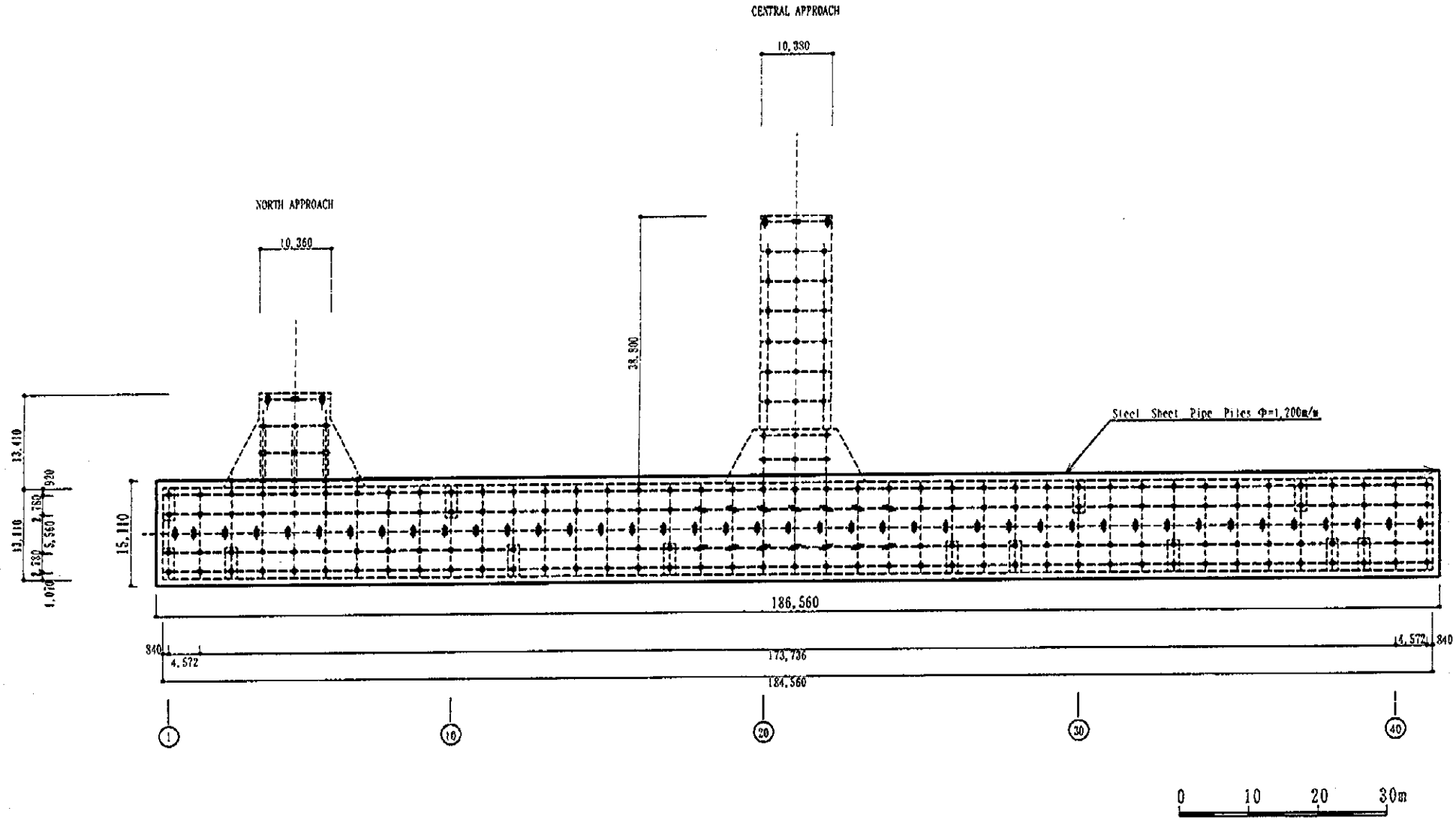


Figure 4.3.2-1 Plan of Reconstruction of Existing Wharf (Alternative Plan 2)

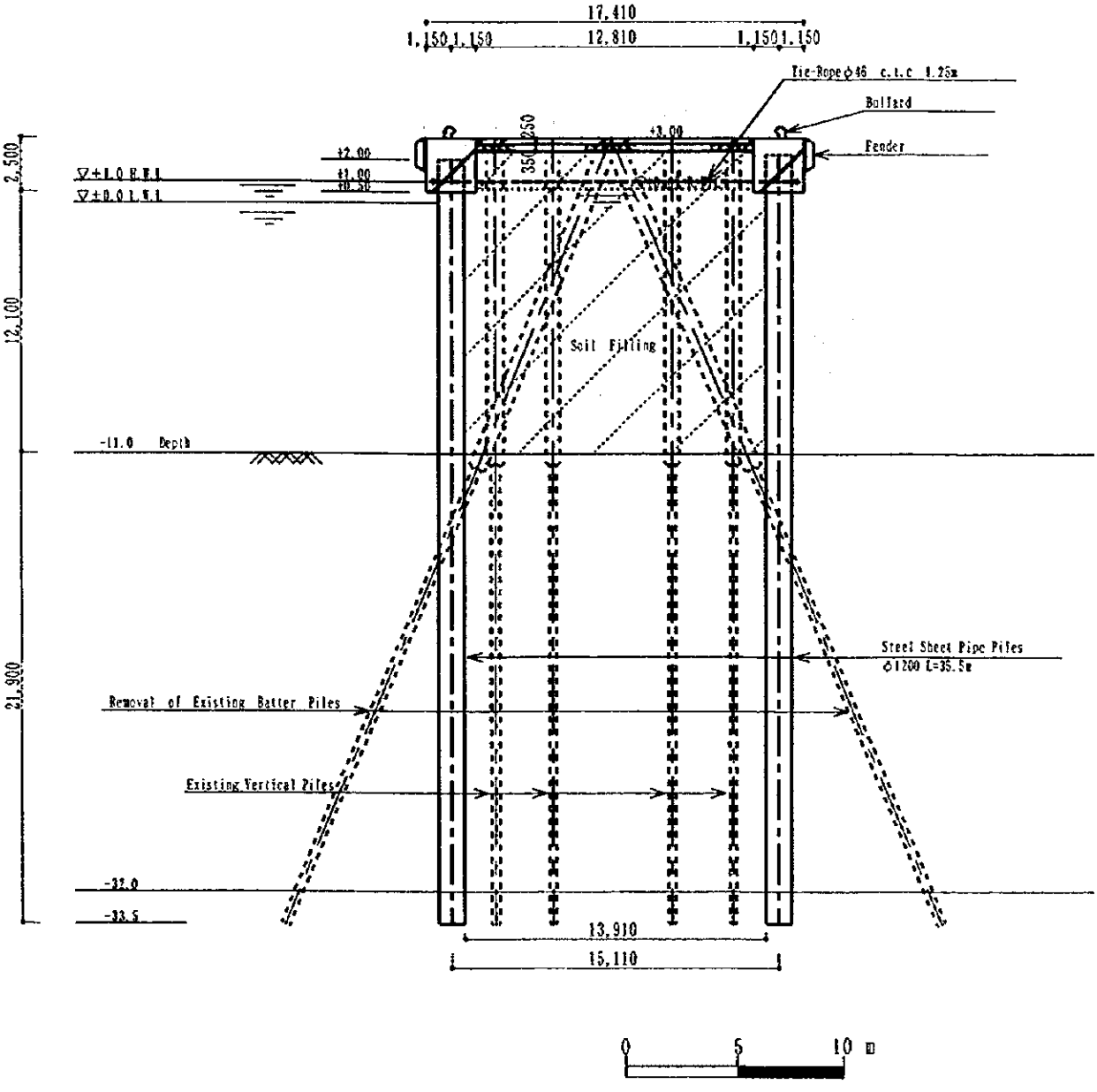


Figure-4.3.2-2 Cross Section of Reconstruction of Existing Wharf (Alternative Plan 2)

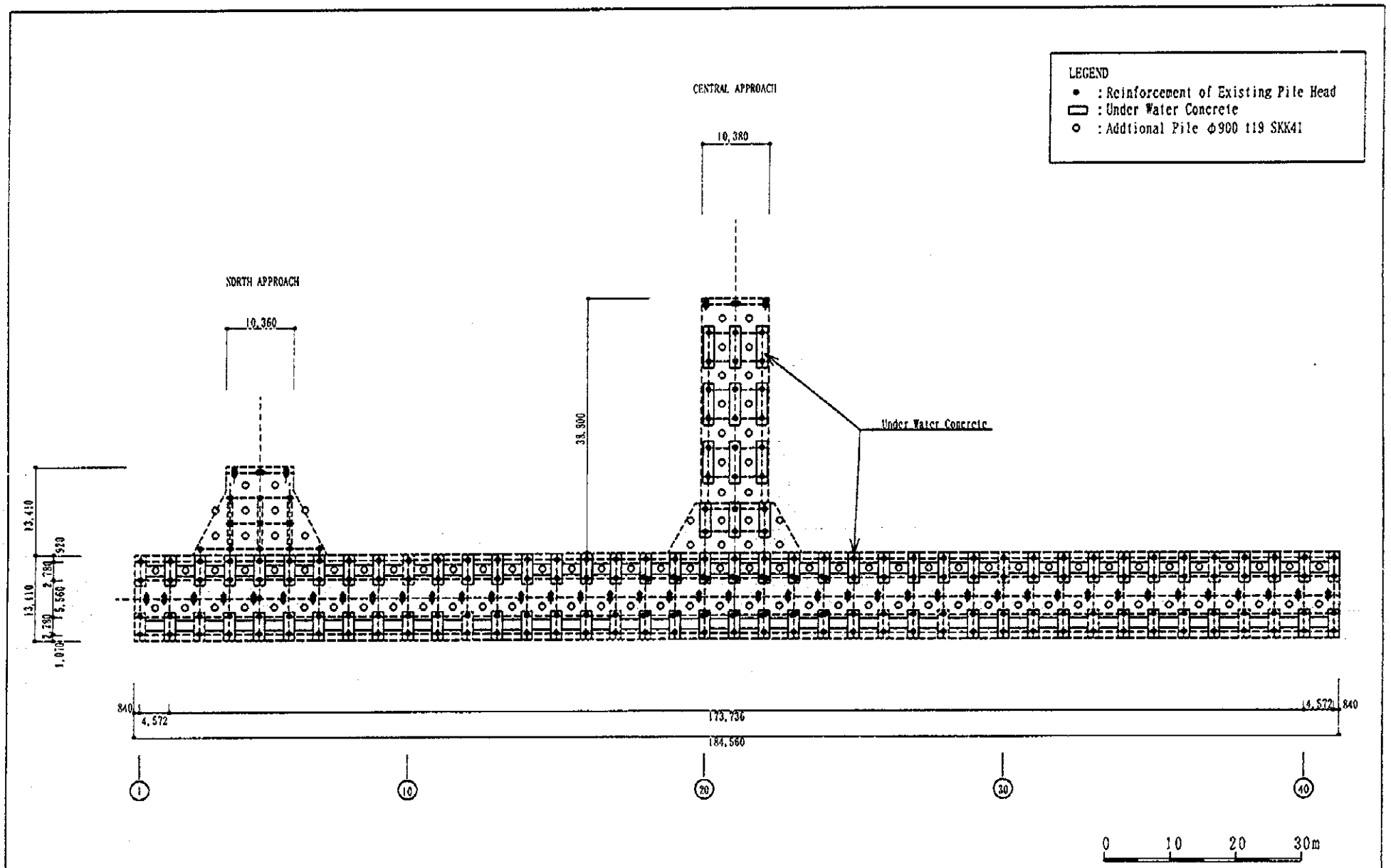


Figure-4.3.2-3 Plan of Reinforcement of Existing Wharf(Alternative Plan 3-1)

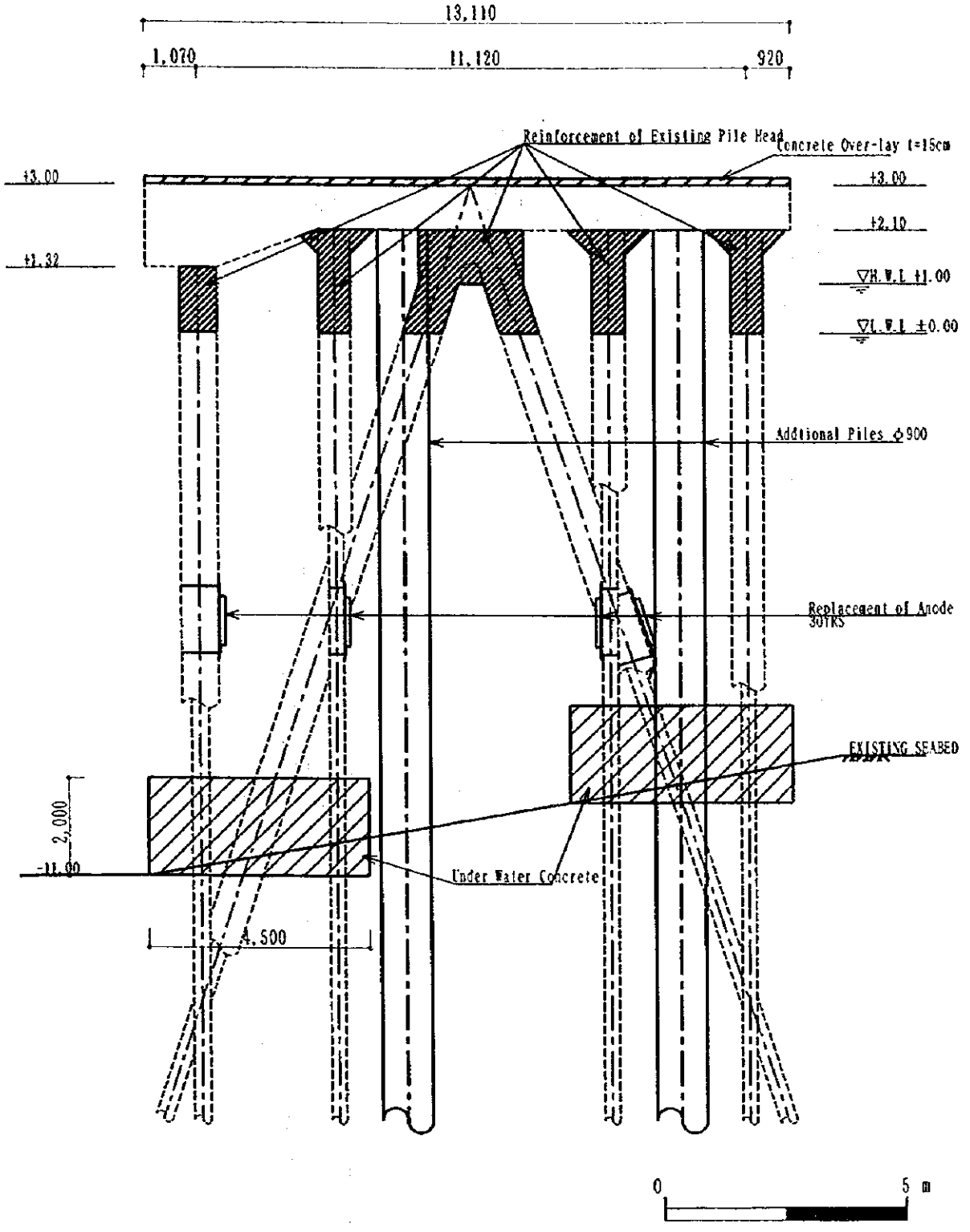


Figure 4.3.2-4 Cross Section of Reinforcement of Existing Wharf
(Alternative Plan 3-1)

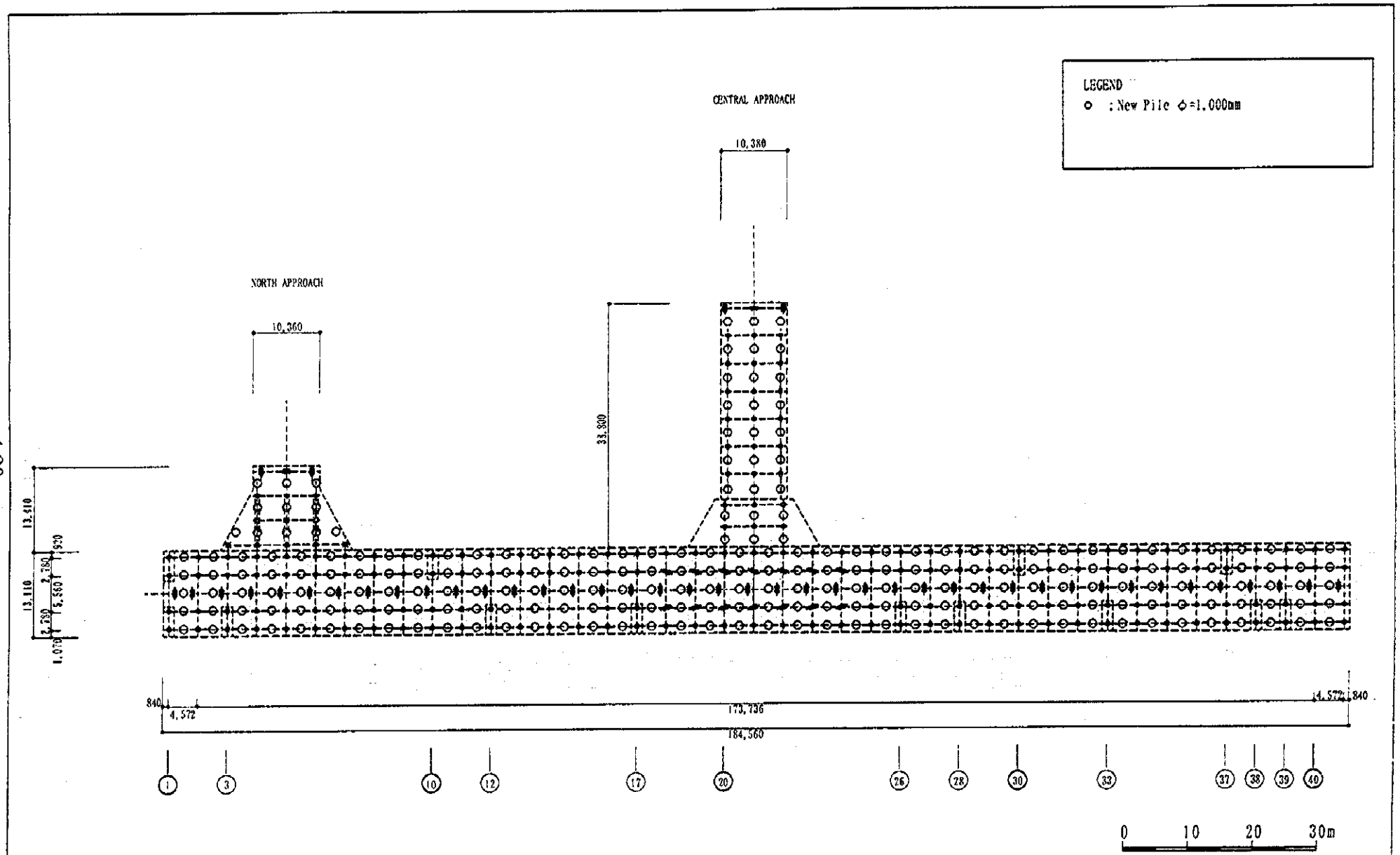


Figure-4.3.2-5 Plan of Reinforcement of Existing Wharf (Alternative Plan 3-2)

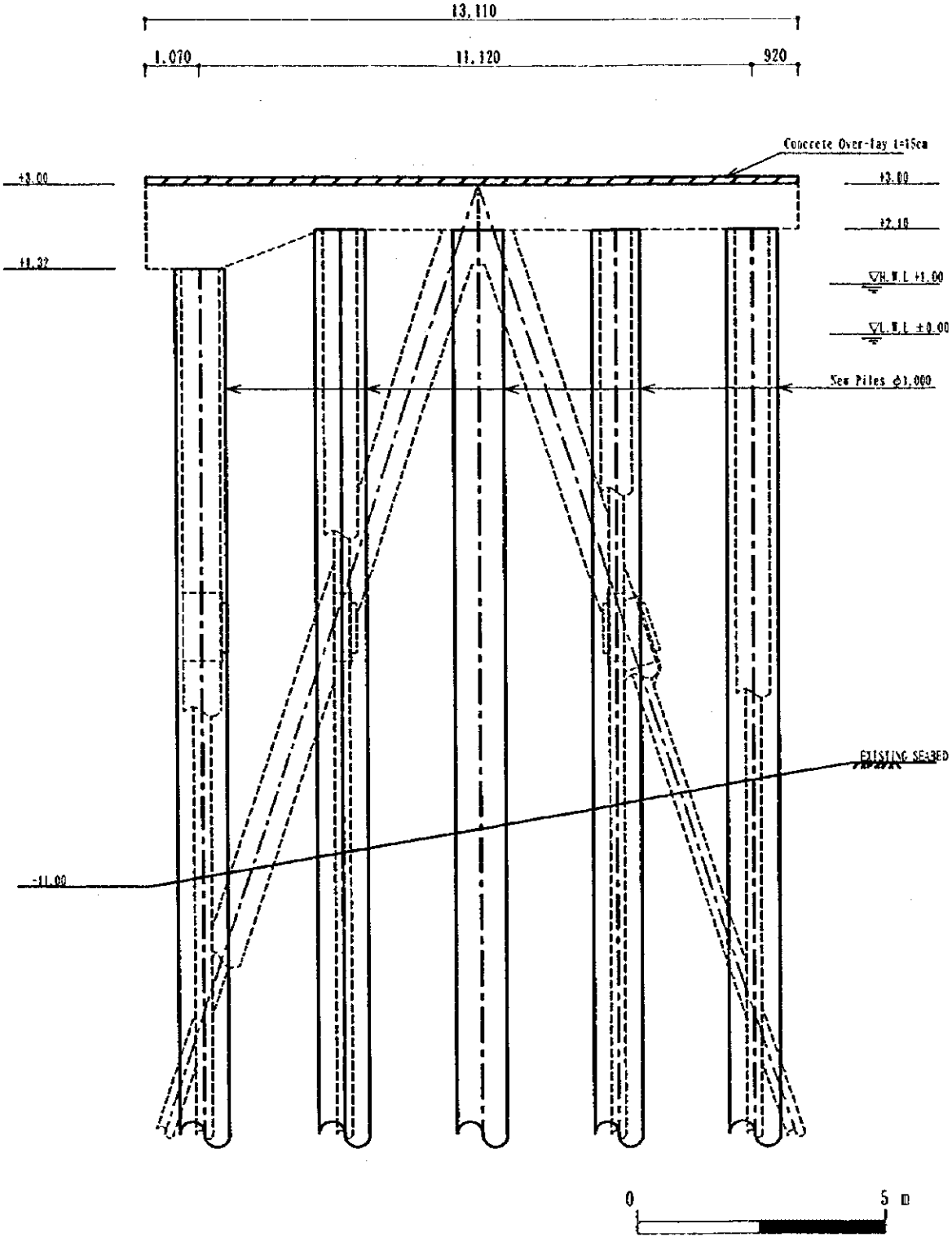


Figure-4.3.2-6 Cross Section of Reinforcement of Existing Wharf (Alternative Plan 3-2)

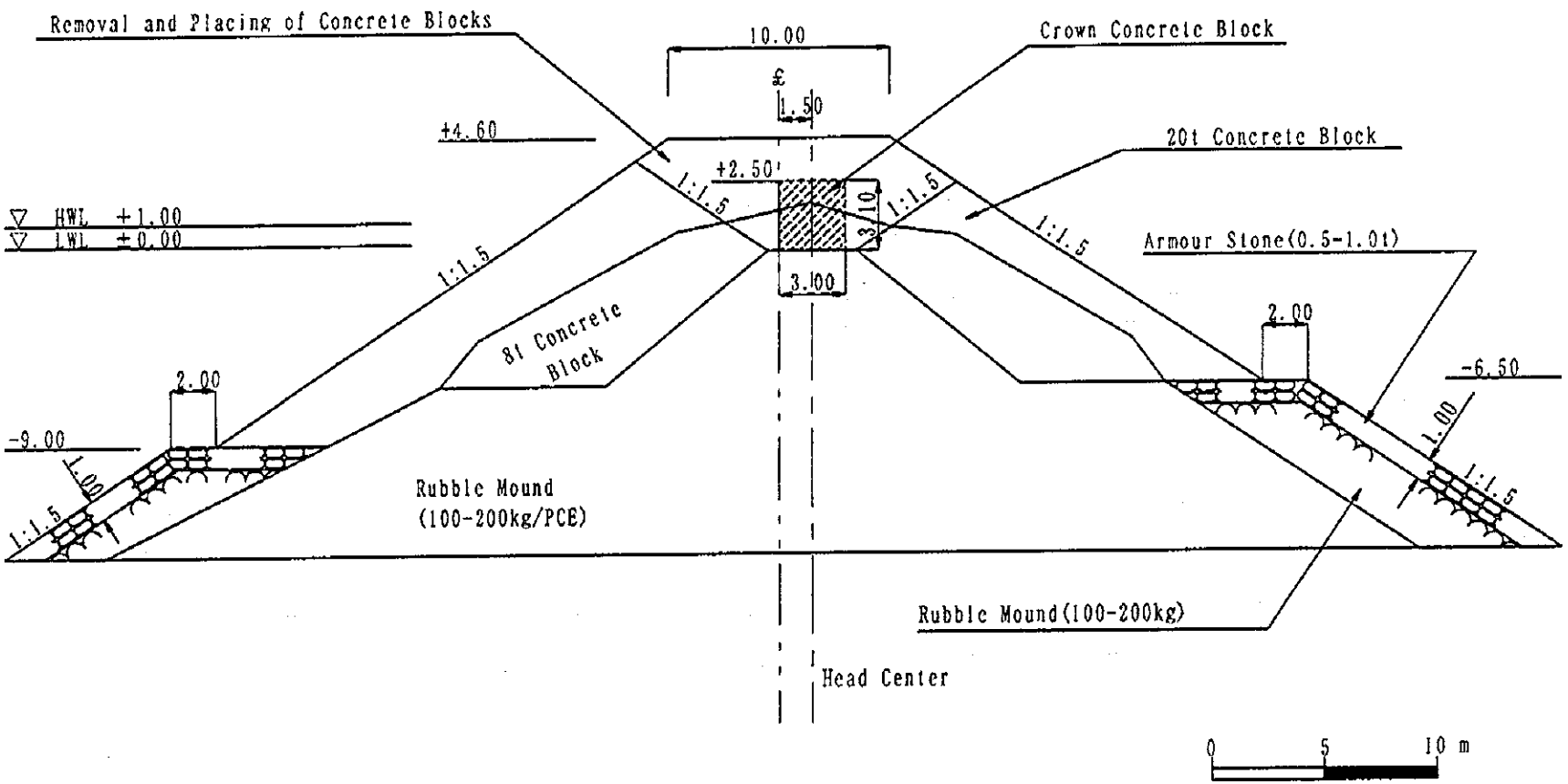


Figure 4.3.3-1 Cross Section of Improvement of Existing Breakwater

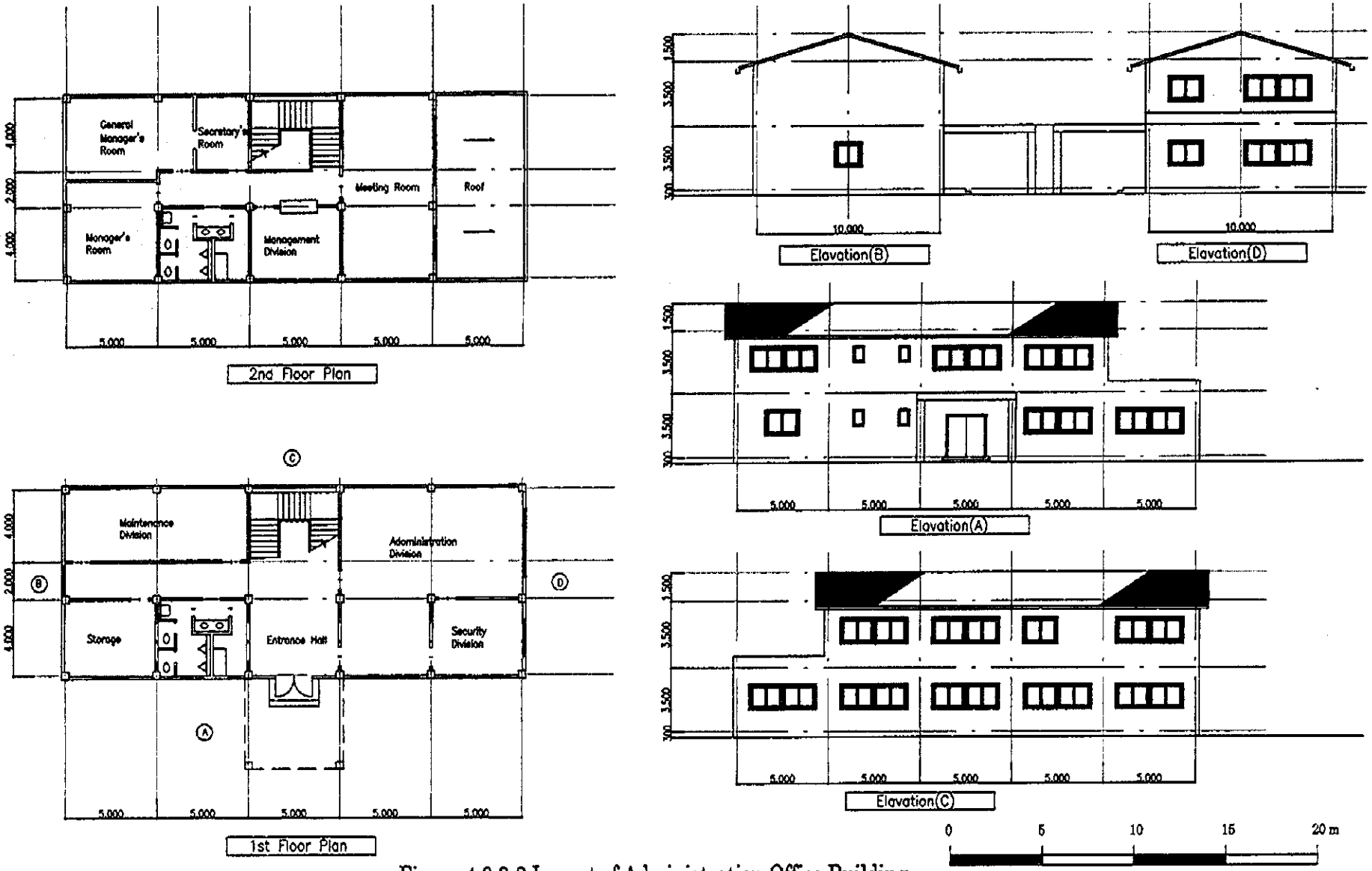
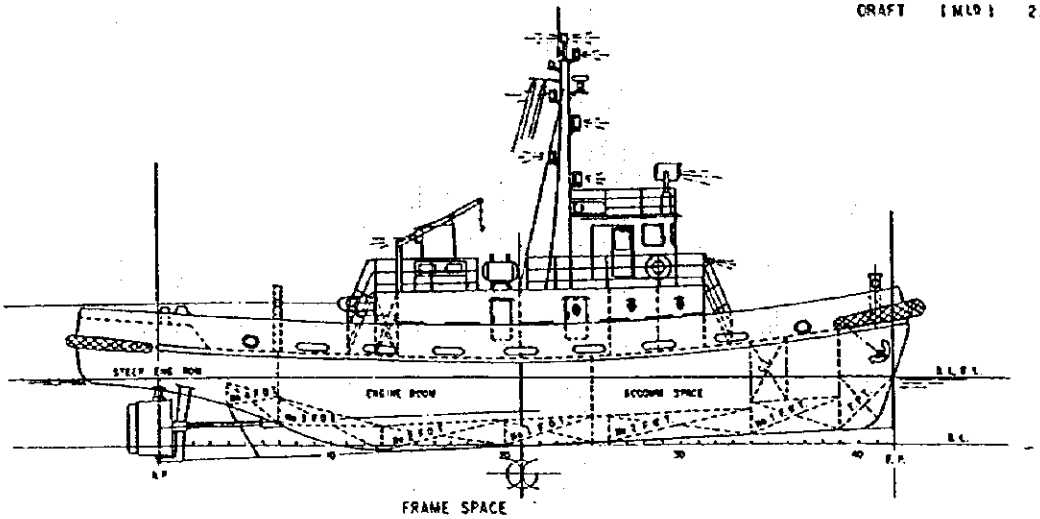
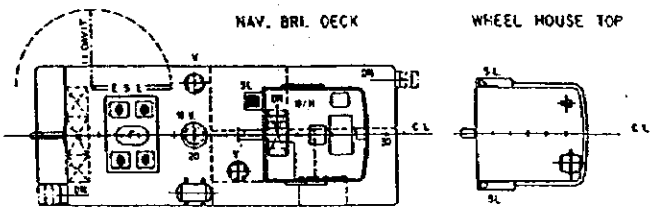


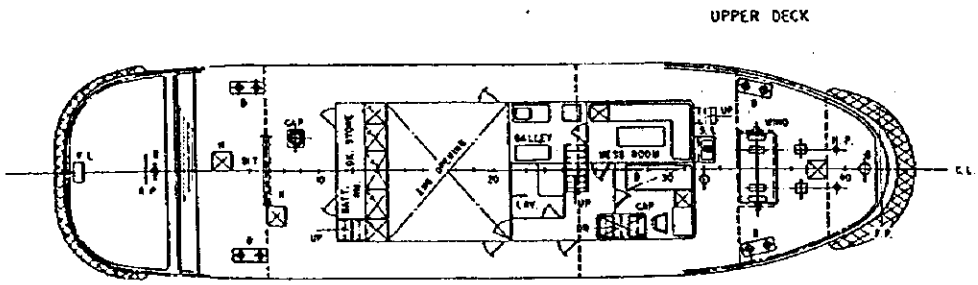
Figure 4.3.3-2 Layout of Administration Office Building

PRINCIPAL PARTICULARS

LENGTH	(O.A.)	26.00m
LENGTH	(P.P.)	23.10m
BREADTH	(MLD)	6.80m
DEPTH	(MLD)	2.80m
DRAFT	(MLD)	2.15m







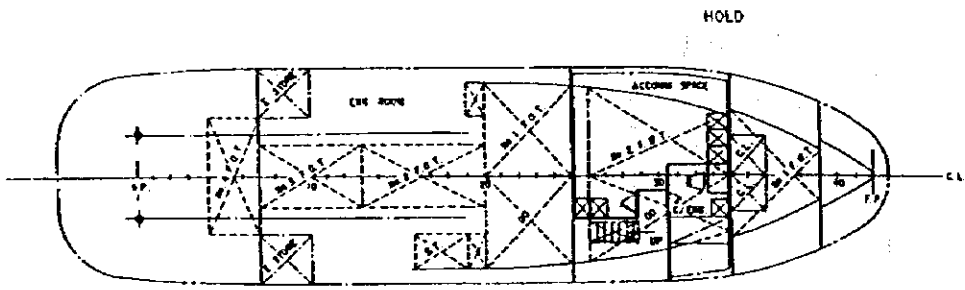
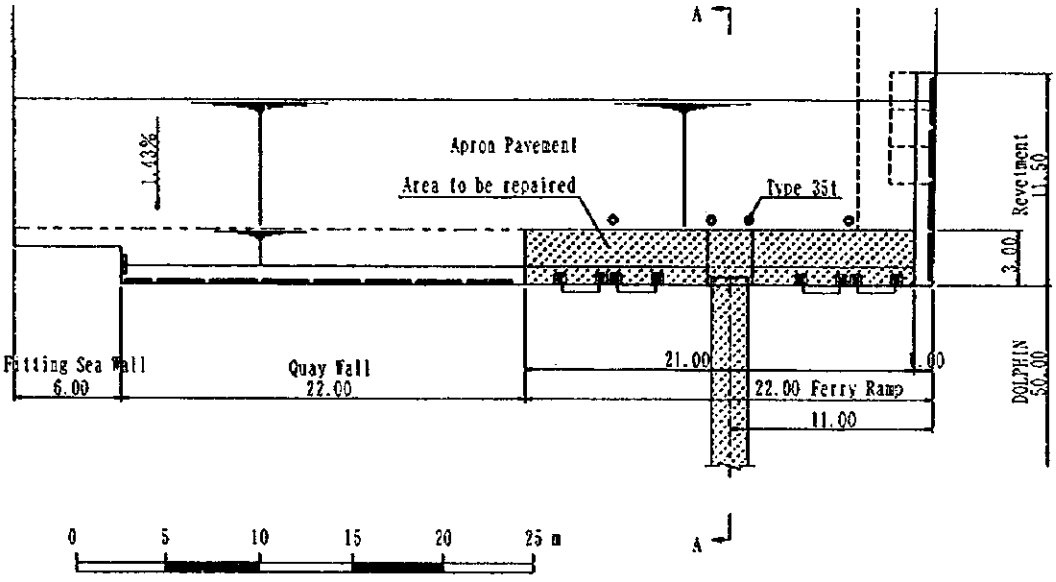


Figure 4.3.3-3 General Arrangement of Tug Boat

PLAN



SECTION A-A

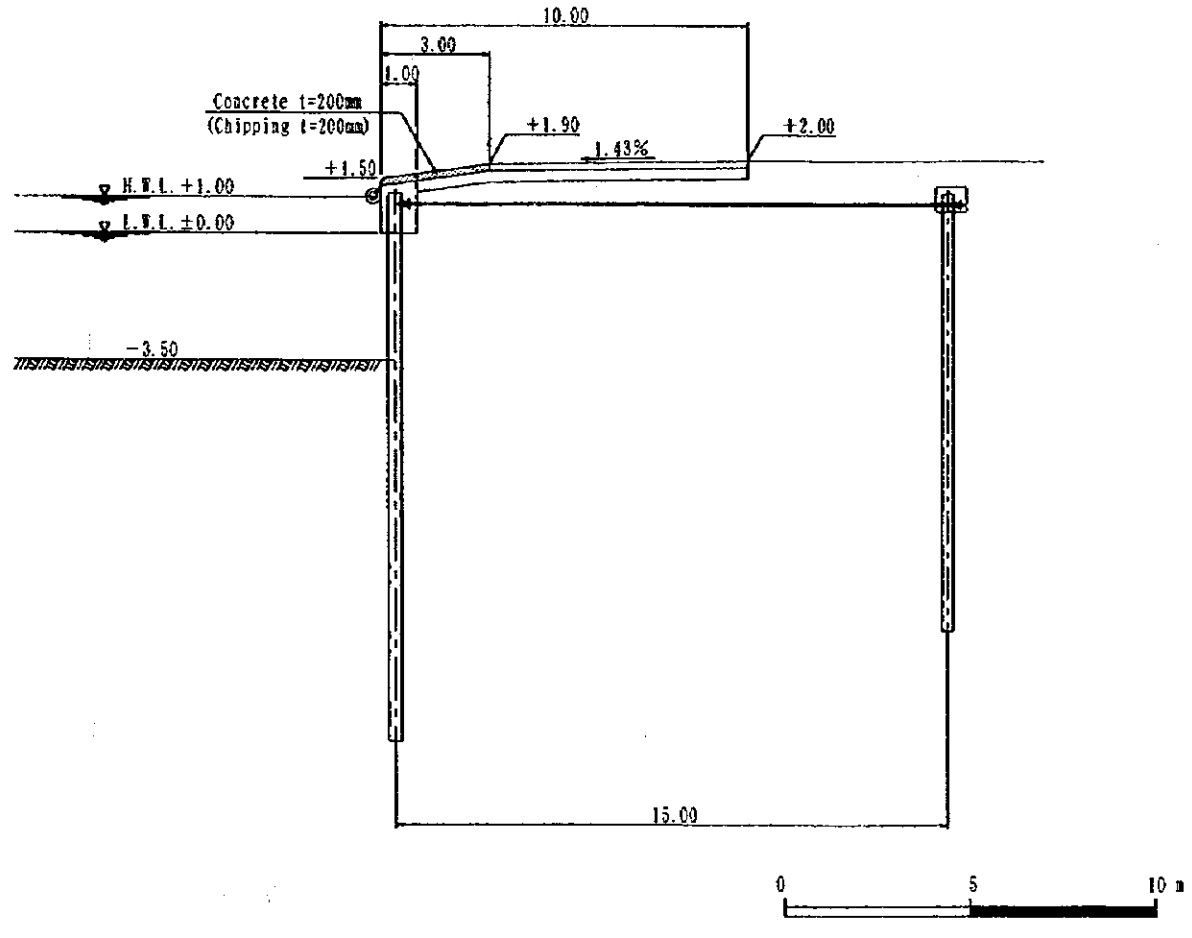


Figure 4.3.3-4 Repair of Ferry Terminal Wharf

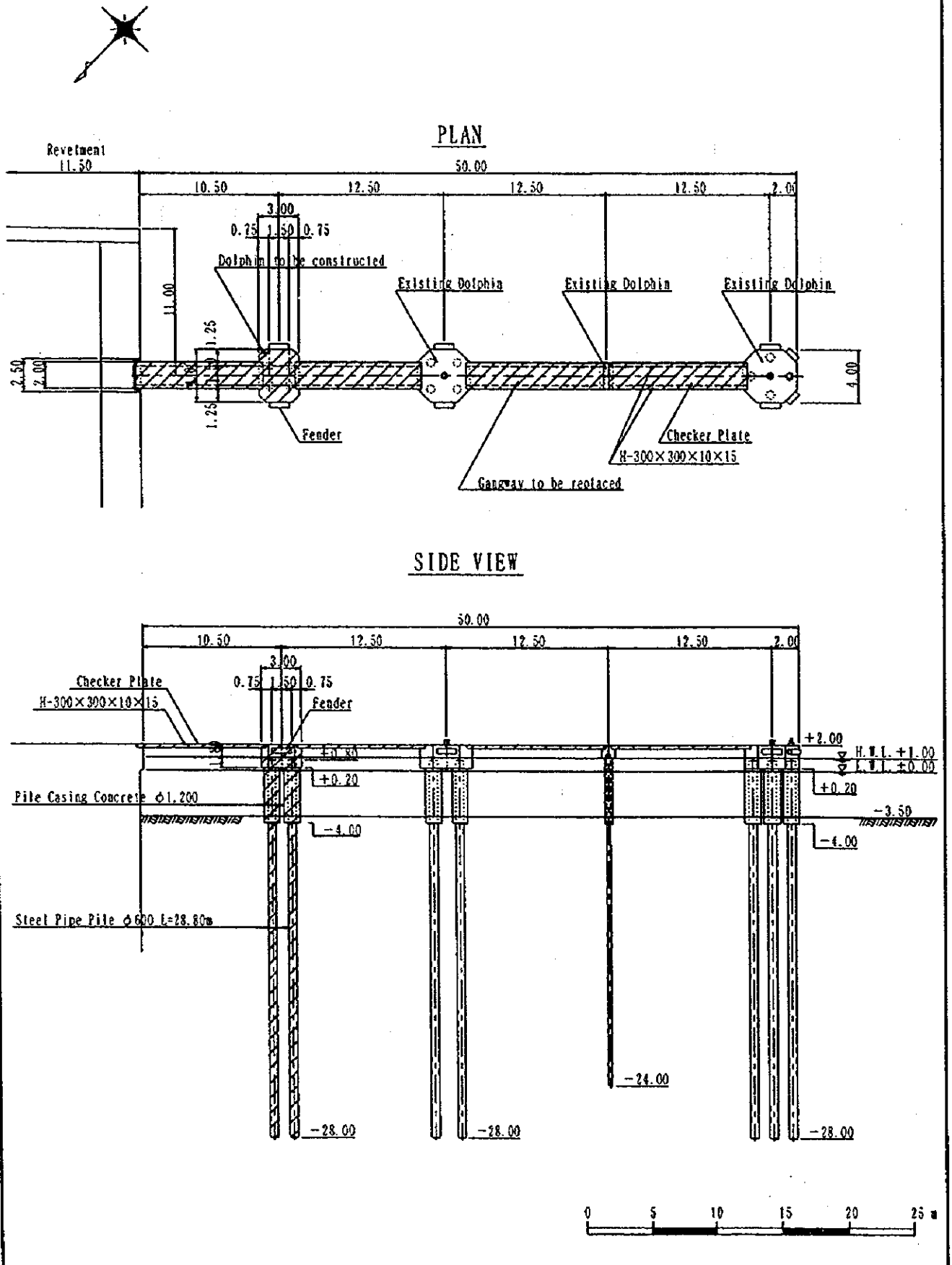


Figure 4.3.3-5 Repair of Ferry Dolphin

4.4 Construction Plan and Cost Estimation

This section presents the construction plan and the cost estimation for the Phased Improvement Plan.

4.4.1 Construction Plan

(1) Construction Quantities

The construction quantities of facilities on each alternative the Phased Improvement Plan are shown in Table 4.4.1-1 1)~4). Administration office, tug boat and minor repair works are commonly included in all the alternative plans.

Table 4.4.1-1 Facilities and Construction Quantities

1) Alternative Plan 1

Facility	Unit	Quantity	Remarks
1. Construction of New Wharf	M	155	150m quay (-11m) and 35m seawall
2. Improvement of Breakwater	M	70	Placing of concrete crown blocks
3. Pavement of Staging Area	m^2	4,500	Concrete pavement
4. Repair of Existing Wharf	M	185	Anti-corrosion works to existing 307 piles
5. Minor Repair Works	Ls	1	Ferry terminal wharf and dolphin
6. Administration Office	m^2	450	2 story office building
7. Tug Boat	No	1	1600 HP

2) Alternative Plan 2

Facility	Unit	Quantity	Remarks
1. Reconstruction of Existing Wharf	M	189	Enclosing existing wharf by steel sheet pipe pile wall and filling with soil
2. Minor Repair Works	Ls	1	Ferry terminal wharf and dolphin
3. Administration Office	m^2	450	2 story office building
4. Tug Boat	No	1	1600 HP

3) Alternative Plan 3-1

Facility	Unit	Quantity	Remarks
1. Reinforcement of Existing Wharf	M	185	Reinforcing of existing 307 piles Driving of 112 additional piles
2. Minor Repair Works	Ls	1	Ferry terminal wharf and dolphin
3. Administration Office	m^2	450	2 story office building
4. Tug Boat	No	1	1600 HP

4) Alternative Plan 3-2

Facility	Unit	Quantity	Remarks
1. Reinforcement of Existing Wharf	M	185	Replacing all the existing piles with new piles Driving of 248 new piles
2. Minor Repair Works	Ls	1	Ferry terminal wharf and dolphin
3. Administration Office	m^2	450	2 story office building
4. Tug Boat	No	1	1600 HP

(2) Construction Schedule

Construction Schedule of the alternative plans are presented in Table 4.4.1-2.

Table 4.4.1-2 Construction Schedule

(1)Alternative Plan1

Facility	Unit	Quantity	Construction Year	
			1st Year	2nd Year
1. Construction of New Wharf	m	190		
2. Improvement of Breakwater	m	70		
3. Pavement of Staging area	m^2	4,500		
4. Repair of Existing Wharf	m	185		
5. Minor Repair Works	Ls	1		
6. Administration Office	m^2	450		
7. Tugboat	No	1		

(2) Alternative Plan 2 and 3

Facility	Unit	Quantity	Construction Year	
			1st Year	2nd Year
1. Reconstruction of Reinforcement of existing Wharf	m	190		
2. Minor Repair Works	Ls	1		
3. Administration Office	m^2	450		
4. Tugboat	No	1		

4.4.2 Cost Estimation

The Construction cost of each alternative plan of the Phased Improvement Plan is estimated as follows:

(1) Estimate Conditions

1) Exchange Rate

The following exchange rate among Tala, US$ and Japanese Yen issued at the end of September, 1998 are applied:

1 Tala = 0.3280 US$ = 44.95 Japanese Yen

2) Physical Contingency

a) 0%: Imported a tug boat and construction costs of buildings
b) 10% : Construction costs of civil works

(2) Construction Cost

The construction costs of each alternative plan for the Phased Improvement Plan are presented in Table 4.4.2-1.

Table 4.4.2-1 Comparison of Construction Costs of Alternative Plans

Facility	Unit	Quantity	Construction Cost (Tala thousand)			
			Plan 1	Plan 2	Plan 3-1	Plan 3-2
1. Construction of New Wharf	m	190	30,822	0	0	0
2. Improvement of Breakwater	m	70	1,511	0	0	0
3. Pavement of Staging Area	m^2	4,500	1,307	0	0	0
4.Repair or Reinforcement of Existing Wharf	m	185	2,858	41,723	32,742	30,904
5. Administration Office	m^2	450	1,553	1,553	1,553	1,553
6. Tug Boat	No	1	7,063	7,063	7,063	7,063
7. Minor Repair Works	Ls	1	409	409	409	409
Sub-total (1 to 7)			45,523	50,748	41,767	39,929
8. Engineering Services	Ls	1	4,086	4,558	3,749	3,586
Sub-total (1 to 8)			49,609	55,306	45,516	43,515
9. Physical Contingency	Ls	1	3,707	4,230	3,332	3,148
Grand Total			53,316	59,536	48,848	46,663

1 Tala = 0.3280 US Dollar = 44.95 Japanese Yen

CHAPTER 5

MANAGEMENT AND OPERATION

CHAPTER 5 MANAGEMENT AND OPERATION

5.1 Present Organization and Management

5.1.1 Present Organization

Apia Port is operated and managed under Marine Department of Ministry of Transport. Organization of Ministry of Transport is shown in Figure 5.1.1-1.

Main functions and a number of staff of each section are summarized below,

	Number of staff
Minister	1
Secretary	1
Corporate Services Department	15
Administration, Accounting, Secretarial Services	
Marine Department	38
Wharf inspection, Pilotage, Tug service, Facility maintenance	
Civil Aviation Department	4
Licensing	
Road transport Department	4
Licensing	
Total	63

In addition to the above, 35 casual workers perform port-related duties.

5.1.2 Present Management

Following problems are pointed out in the present management.

1) Integrated administration system is required to control the port in the light of long term port planning and management and to oversee all the activities toward efficient port operation in good coordination with other related agencies.

2) All the port revenues are received into the general account of the state and the funds required for efficient administration and proper maintenance are not allocated.

3) Due the above situation, statistical data important for port management and planning are not kept and maintenance works to the port facilities are not properly done.

All the above problems will be swept out by a new organization, Samoa Ports Authority scheduled to be established in January 1999.

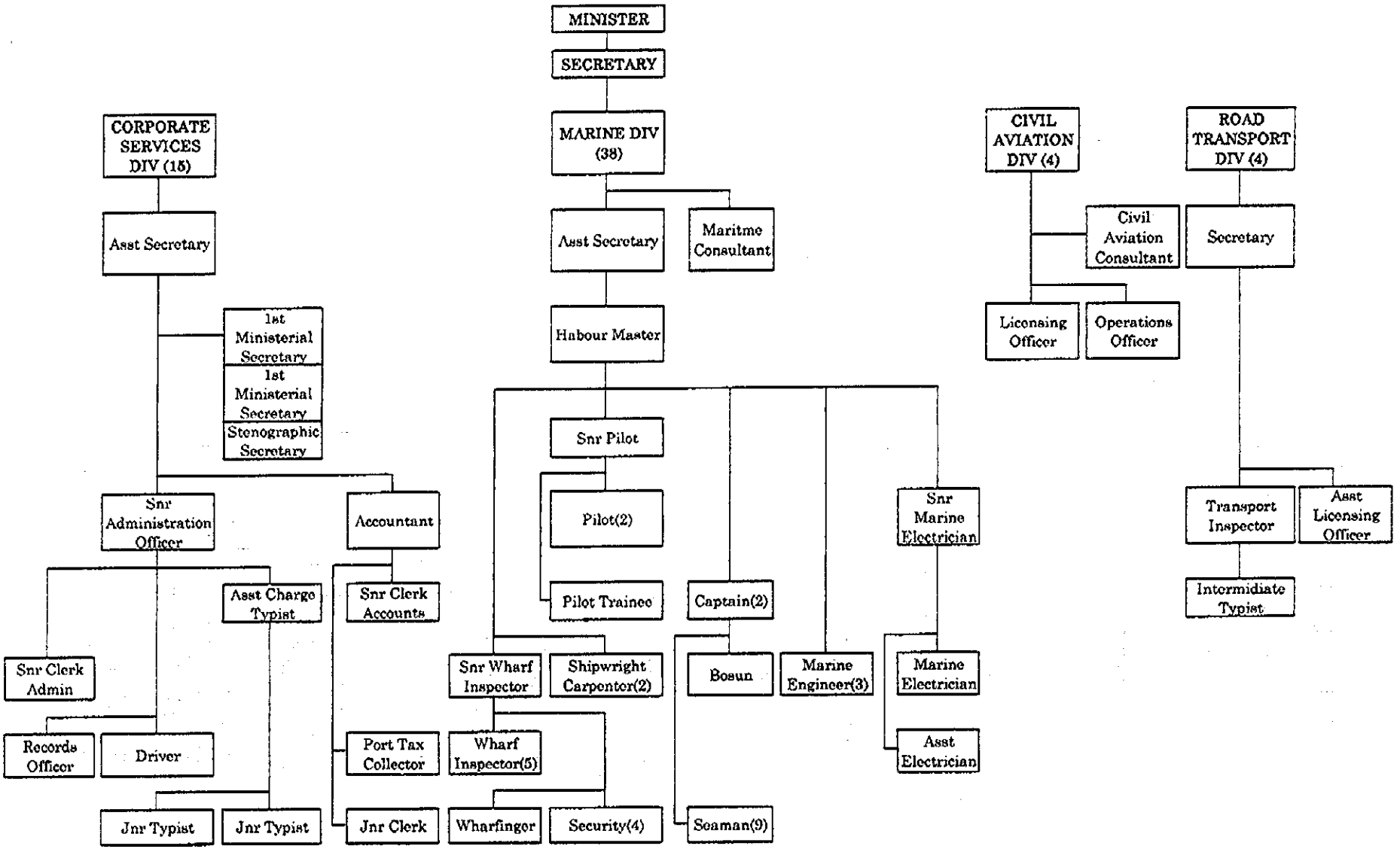


Figure 5.1.1-1 Organization Chart, Ministry of Transport

5.2 Establishment of New Ports Authority

5.2.1 Samoa Ports Authority Act 1998

Samoa Ports Authority Act has been approved by the parliament and signed by Head of State. The Act shall come into force upon the publication by the Minister of a notice in the Gazette by 1 January 1999 at the latest. The Bill is intended to establish a separate legal entity with autonomous functions and powers with financial viability. It spells out in fair detail its membership, functions and powers, finance, dues and rates, etc.

The Authority shall provide following major services;

a) berthing, unberthing, towing, mooring, unmooring, moving, or docking any vessel;
b) embarking, disembarking passengers to or from any vessel; including the provision of landing-places;
c) providing lighterage or to appoint, license and regulate lighterage operators;
d) piloting any vessel;
e) installing and maintaining navigation installations;
f) sorting, weighing, measuring, storing, warehousing or otherwise handling any goods;
g) supplying fuel, water, telephone and other services to vessels;
h) rendering assistance to any vessel;
i) recovering wrecks.

The original assets of the Authority shall consists of

a) All buildings, installations and improvements, located on or adjacent to or vicinity of the ports, which are in use by the Government at the date of this act comes into force for the maintenance and operation of ports; and
b) All vessels, vehicles, plant, machinery, equipment, stores, furniture and apparatus afloat or on shore which are in use by the Government,
c) The Government shall cause the land, real and other property, all debts and liabilities to be transferred to the Authority,
d) Persons employed by the Government and engaged in discharging any of the functions vested in the Authority shall be deemed to be transferred to the service of the Authority.

5.2.2 New Port Organization

Obviously, Samoa Ports Authority (SPA) can be established by taking over most of the existing staff of the Marine Division of Ministry of Transport. The organization of new port authority is proposed as shown in Figure 5.2.2-1 and Table 5.2.2-1. SPA shall be operated as a self-financing organization and shall

determine future management policies and work out improvement plans toward sound profitability. The present organization shall be reinforced for more business-oriented management. Basic statistical information of cargo and ship shall be compiled for profitable port management and planning. Every revenue and expenditure shall be examined for its appropriateness and necessity, and if found necessary be amended. Budget enough for adequate maintenance works shall be secured not only to save otherwise unnecessary renewal or major repair costs but to provide safe and efficient port services.

MOT is given assistance from PWD for engineering works at present. An engineering division shall be established in SPA to maintain all the port facilities as well as to plan improvement/development plans with its own staff.

5.2.3 Management and Finance

The residual value of fixed assets of existing major port facilities under control of Marine Division in 1998 is estimated as about 32.2 million Tala. This value will be transferred as the capital of Samoa Ports Authority from the Government. The annual depreciation cost for these fixed assets is estimated as about 1.6 million Tala, and the repair and maintenance cost of these fixed assets which is about 10% of depreciation cost is estimated as about 237.6 thousand Tala.

The total port revenue by port charge excluding road transport revenue accounts for 1,969,086 Tala in actual.

The Profit and Loss Statement of Marine Division in 1996/1997 is shown as below.

Total Port Revenue by Port Charge	1,969,086 Tala
Total Expenditure	1,235,802 Tala
Profit before Depreciation	733,284 Tala
Depreciation Cost	1,596,793 Tala
Profit after Depreciation	- 936,901 Tala

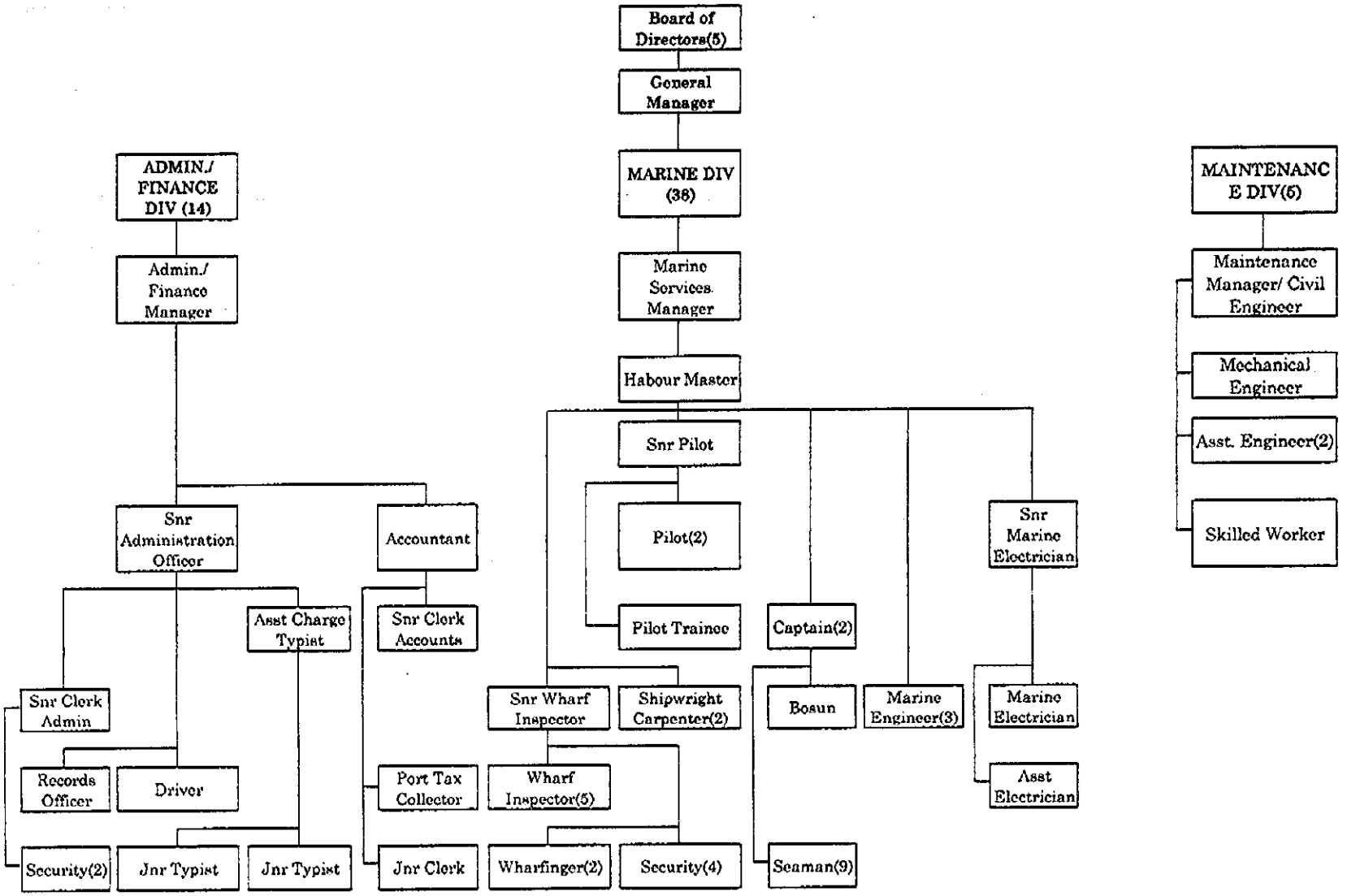


Figure 5.2.2-1 Organization Chart, Samoa Ports Authority

Table 5.2.2-1 (1) Organization of New Port Authority

Permanent Staff

Present MOT

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	General Manager	1	Recruit	1		
	Total	1	Total	1		

Corporate Services Division

	Present	
	Position	Number
1	Assistant Secretary	1
2	1st Ministerial Secretary	1
3	2nd Ministerial Secretary	1
4	Stenographic Secretary	1
5	Senior Administration Officer	1
6	Senior Clerk Administration	1
7	Records Officer	1
8	Driver	1
9	Assistant Charge Typist	1
10	Junior Typist	2
11	Accountant	1
12	Senior Clerk Accounts	1
13	Port Tax Collector	1
14	Junior Clerk Accounts	1
	Total	15

Admin./Finance Division

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	Admin Finance Manager	1	Shift	1		
2	Senior administration Office	1	Shift	1		
3	Senior Clerk Administration	1	Shift	1		
4	Records Officer	1	Shift	1		
5	Driver	1	Shift	1		
6	Assistant Charge Typist	1	Shift	1		
7	Junior Typist	2	Shift	2		
8	Accountant	1	Shift	1		
9	Senior Clerk Accounts	1	Shift	1		
10	Port Tax Collector	1	Shift	1		
11	Junior Clerk Accounts	1	Shift	1		
12	Security	2	Shift	2		
	Total	14	Total	14		

Marine Division

	Present	
	Position	Number
1	Assistant Secretary	1
2	Marine Consultant	1
3	Harbour Master	1
4	Senior Pilot	1
5	Marine Pilot	3
6	Senior Marine Electrician	1
7	Marine Electrician	1
8	Assistant Electrician	1
9	Marine Engineer	3
10	Captain	2
11	Bosun	1
12	Seaman	9
13	Shipwright Carpenter	2
14	Senior Wharf Inspector	1
15	Wharf Inspector	5
16	Wharfinger	2
17	Security	4
	Total	39

Marine Division

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	Assistant Secretary	1	Shift	1		
2	Harbour Master	1	Shift		1	
3	Senior Pilot	1	Shift		1	
4	Marine Pilot	3	Shift		3	
5	Senior Marine Electrician	1	Shift		1	
6	Marine Electrician	1	Shift		1	
7	Assistant Electrician	1	Shift		1	
8	Marine Engineer	3	Shift		3	
9	Captain	2	Shift		2	
10	Bosun	1	Shift		1	
11	Seaman	9	Shift		9	
12	Shipwright Carpenter	2	Shift		2	
13	Senior Wharf Inspector	1	Shift	1		
14	Wharf Inspector	5	Shift	1		4
15	Wharfinger	2	Shift	1		1
16	Security	4	Shift			4
	Total	38	Total	4	25	9

Maintenance Division

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	Maintenance Manager	1	Recruit	1		
2	Mechanical Engineer	1	Recruit	1		
3	Asst. Engineer	2	Recruit	2		
4	Skilled Worker	1	Recruit	1		
	Total	5	Total	5		
			G Total	24	25	9

Table 5.2.2-1 (2) Organization of New Port Authority

Casual Worker, Present MOT

Main Office

	Present	
	Position	Number
1	Minister's Driver	1
2	Nightwatchman	1
3	Tealady	1
4	Cleaner	1
5	Driver	1
	Total	5

Marine Division

Container Park

1	Security Guard (Apia)	7
2	Nightwatchman (Apia)	1
	Total	8

Navigation

1	Electrical Assistant	2
	Total	2

Malifanua

1	Security Guard (m)	10
	Total	10

Salelologa

	Security Guard (m)	10
	Total	10

Light Attendants

	Asau	
1	Nightwatchman	1
2	Security Guard (m)	1
	Aleipata	
1	Light Attendant	1
	Mount Vaea	
1	Light Attendant	1
	Apolima	
1	Light Attendant	1
	Total	5

Transport Control Board

1	Liaison Office	1
2	Cleaner	1
	Total	2

New Ports Authority

Main Office

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	Nightwatchman	1	Shift	1		
2	Tealady	1	Shift	1		
3	Cleaner	1	Shift	1		
4	Driver	1	Shift	1		
	Total	4	Total	4		

Marine Division

Container Park

1	Security Guard (Apia)	7	Shift	7		
2	Nightwatchman (Apia)	1	Shift	1		
	Total	8	Total	8		

Navigation

1	Electrical Assistant	2	Shift	2		
	Total	2	Total	2		

Malifanua

1	Security Guard (m)	10	Shift			10
	Total	10	Total			10

Salelologa

	Security Guard (m)	10	Shift			10
	Total	10	Total			10

Light Attendants

	Asau					
1	Nightwatchman	1	Shift			1
2	Security Guard (m)	1	Shift			1
	Aleipata					
1	Light Attendant	1	Shift			1
	Mount Vaea					
1	Light Attendant	1	Shift			1
	Apolima					
1	Light Attendant	1	Shift			1
	Total	5	Total			5
			G Total	14		25

CHAPTER 6

ENVIRONMENTAL EXAMINATION

CHAPTER 6 ENVIRONMENTAL EXAMINATION

6.1 Guideline for Environmental Consideration.

The Division of Environment and Conservation (DEC) was established in 1989, and combined with the former Department of Lands and Surveys to form the new Department of Lands, Surveys and Environment (DLSE). DLSE is responsible for environmental management of the Samoa since 1992.

The Government also established National Environment and Development Management Strategies (NEMS) in association with the United Nations Development Programme (UNDP) and the South Pacific Regional Environment Programme (SPREP) in February 1993.

6.2 Initial Environmental Examination (IEE)

6.2.1 Principal Policy

The background of IEE

According to Draft EIAR, the proponent should submit PEAR in accordance with guidelines provided by the Department and shall contain at a minimum the following particulars:

1) A brief description of the development;
2) A brief description of the area to be affected and the nature of the proposed change to the area (including a location map and site plan);
3) A brief justification for the development proposal;
4) Possible adverse impacts, including long-term and short-term, primary and secondary consequences;
5) Possible alternatives to mitigate any adverse impacts.

Draft EIAR still needs to take a time to be materialized. Therefore, IEE and EIA have to be carried out based on the guideline of other countries. IEE is conducted according to Guideline of JICA in this study.

6.2.2 Initial Environmental Examination (IEE)

(1) Subject of IEE

The major environmental issues expected from the project are listed below;

1) Environmental Issues in Relation to the Project

a) Effects on shoreline change with construction of port facilities
b) Effects on corals, shellfish and benthic organisms with dredging and diffusion of suspended silt

c) Selection of suitable locations for disposal of dredging and waste from demolished tanks
d) Effects from construction activities on marine environments specifically fish populations
e) Assessment of a quarry of sand and coral rocks

2) Social Issues in Relation to the Project

a) The effect on employment with port development
b) Enhancement of commercial activities
c) Effects of port development on cargo traffic and its associated effect on the population in Apia

Social benefits to be brought by this project are evaluated very high.

(2) Site Description

1) Outline of Natural Environment

(a) Inside of the Port

The water area of Apia Port extends about 400m from east to west and up to 600m from north to south. Apia Port facilities, including the main wharf, are located on the northeast side of Apia. There are two rivers flow into Apia bay, the Vaisigano River from southeast and the Mulivai River from southwest.

The bottom of water area of the port is covered with thick layer of creamy, sticky mud and its depth is about 10 to 13m at mostly around the entrance channel.

(b) Outside of the Port

The reef flat extends from east to west at outside of the breakwater of Apia Port, where the reef zone around High Water Level (HWL) is covered with coarse sand. But the most of reef flats dry up during Mean Low Water Spring (MLWS) except Palolo Deep which is located north to the port and is designated as National Marine Reserve in 1974 under the National Parks and Reserves Act.

2) Water Quality Contamination

Discharging of bilge oil and/or waste is prohibited from both land and sea around Apia Harbor. But there are no current informations for water quality of Apia bay.

3) Dredging and Reclamation Inside Apia Port

Muddy soil is accumulated about 1.5~3.0m thick in the port. Its thickness decreases in the entrance toward the port mouth.

Dredging work will be periodically done to maintain the water depth in the port and the dredged materials may be used for reclamation work.

4) Diesel oil Tank

There is the diesel tank just next to the coconut oil tank. These tanks shall be relocated from a future heavy traffic area for safety reason.

5) Disposal Wastes From Demolishing and Construction

There will come out some disposal wastes from demolition and construction. Especially two tanks of coconut oil and diesel will be demolished and built at new places.

(3) Expected Environmental Impacts

Examining the environment around project site as above, it is understood that Environment Impact Assessment (EIA) will be required in connection with the improvement Apia Port. The impacts to be assessed for EIA will be abstracted and itemized as follows:

1) Turbidity

Judging from the present natural turbidity in the coastal area around the port, distinction will be impossible between turbidity caused by port operations and that of natural phenomenon. The turbid area caused by the construction work shall be kept as small as that caused by natural phenomenon, flooding of rivers.

2) Bilge Oil

Oil films are not good from a scenery point of view and they cause pollution of oily smell to fish and shellfish.

3) Biota around the Neighboring Sea Area

Very poor biota inhabits around the reef flats close to the north end of main wharf where some area will be reclaimed, therefore the effect caused with reclamation is expected to a minimum.

4) Dredged Soil

Problem will not occur in the dredging work because it will be done behind the breakwater in the port area and the dredged soil will be piled up on the adjacent reclamation area. To prevent turbidity dispersion, a silt curtain shall be installed and a monitoring survey shall be conducted to confirm and improve its effectiveness if found necessary.

5) Diesel Oil Tank

Both coconuts and diesel oil tanks are planned to be demolished and built at new places where they will be separated to have enough distance from yard traffic.

6) Disposal Wastes from Demolition and Construction

The disposal wastes must be treated suitably by each kind of materials and dumped at a proper place designated by MOT or DEC.

7) Fisheries

The general fishing is prohibited in the Port area and Palolo Deep and there is no effect to production.

8) Remains and Culture Relic

Any historical remains or culture relic are not found in the planned development area.

(4) Results of Environmental Examination

Based on the checklist, the results of IEE are shown in the following Table 6.2.2-1.

Table 6.2.2-1 Screening of Environmental Impacts Factors

Environmental Impacts Factors	Environmental Impacts	Size of Impacts (mark appropriate boxes)			
		None	Minor	Mod-erate	Major
1. Impact from construction work					
1.1 Operation of working boats, machines	1.1.1 Generation of noise / vibration		○		
	1.1.2 Changes in marine ecosystem	○			
1.2 Dredging, stirring of bottom soil	1.2.1 Pollution of water and sediment			○	
	1.2.2 Reduction of aquatic lives		○		
	1.2.3 Pollution of marine product	○			
1.3 Rock and sand Removal	1.3.1 Extinction beach ecosystem	○			
1.4 Dumping of dredged Spoil	1.4.1 Pollution of water		○		
1.5 Employment of Labors	1.5.1 Change in Economic activity				○
1.6 Congestion of Work boats	1.6.1 Devaluation of Fishing ground	○			
1.7 Disposal waste from Demolish / construction	1.7.1 Deterioration of Environment	○			
2. Impact from port facilities and site					
2.1 Emergence site	2.1.1 Pollution of water	○			
	2.1.2 Coral flat erosion	○			
	2.1.3 Change in coastal current	○			
Environmental Impacts Factors	Environmental Impacts	Size of Impacts (check appropriate boxes)			
2.1 Emergence site	2.1.4 Suspended sediment		○		
	2.1.5 Decrease of habitats for aquatic lives	○			
	2.1.6 Decrease of habitats for beach lives	○			
3. Impact from dredging works					
3.1 Dredging	3.1.1 Pollution of water /bottom sediment			○	
3.2 Land reclamation	3.2.1 Leaking from landfill			○	
4. The culture heritage and traditional culture		○			

(5) Conclusion of IEE

In this study the problems and impacts were preliminarily discussed and port construction will not affect serious damages to environment around the project site since a few slight impacts to environment are assessed at the stage of IEE. As a conclusion of IEE, water turbidity during dredging work will be a kind of impacts to the environment around the port.

6.3 Environmental Impact Assessment (EIA)

6.3.1 Principal Policy

EIA is necessary to investigate environment impacts by the construction works. As mentioned before, Environmental Regulation is expected to be legislated by the end of 1998, EIA is conducted according to guideline of JICA as an alternative.

The Environment Guideline of Port Construction

Following the environment guideline, all the possible environmental impacts expected by port construction are listed below.

Activity	Process of Impact	Impact on Environment
Dredging	Turbidity Sedimentation Benthic destruction	Water quality reduction Habitat destruction Species loss
Piling(Blasting)	Concussion Noise Seismic Shock	Destruction of coral Fish death and escape Disturbance of marine species
Land based Works	Alteration of landscape	Coastal erosion Coral diminution
Waste disposal	Leaking from landfill	Diffusion into water
Oil spill from Construction	Oil film	Water quality degradation Ecosystem damage
Land reclamation	Turbidity	Diffusion into water
Seawall/Breakwater Construction	Current/Wave Alternation	Wave agitation Coastal erosion

These are environmental impacts that could be caused by the construction works and affect natural environment.

The project shall be implemented with the best constructional engineering technology to make the influence given to the environment as small as possible. The measures to be adopted in order to minimize the environmental damage are as follows:

a) To plan to avoid the area, season and period which is so sensible to the environmental impact.
b) Management of muddy sediments.
c) Safe usage of big quantity of dredged spoil.
d) Recovery of environmental damages.
e) Pre-evaluation of biota before construction.
f) Monitoring during the construction.
g) Implementation of evaluation of biota and monitoring.
h) Improvement of quality of habitat in compensation.
i) Controlling system of wastewater.

6.3.2 Environmental Impact Assessment (EIA)

Through consideration above, increase and diffusion of turbidity caused by a dredging work at the project site is pointed out as a possible environmental impact and countermeasures to minimize and prevent the impact to the environment in and around the site are discussed below;

(1) Possible Environmental Impact

Water quality contamination by turbidity (muddy suspended sediment) caused by dredging work.

(2) Arrangement for Environment Preservation

Establishment of the safety standard on turbidity caused by the Construction.

Establishment of monitoring system/indicator: Transparency, SS.

(3) Environment Countermeasures

1) Monitoring of Suspended Sediment (SS)

The monitoring sites should be carefully selected before the construction works. The monitoring frequency should be at one-day intervals during construction period. At times when a particular effect or process occurs, the frequency of monitoring should be adjusted.

SS measurement by using the Turbidity Meter shall be conducted at two stages: during-construction stage and after-construction stage

(a) Construction Period

For turbidity caused by dredging or reclamation, it is necessary to take perfect countermeasure for prevention of water quality contamination by providing a shelter for preventing turbidity diffusion near the source of turbidity.

When turbidity exceeds the SS target in the sea area and some damages are observed on the corals, faulted SS must be removed quickly. And when coral die, countermeasures to recover growth of corals by planting will be taken.

(b) After Construction Operations

Turbidity observed after the construction work is assumed that most part of it is caused by the present natural conditions. Therefore much attention has to be paid to the possible reasons in monitoring environment.

2) Dredged Soil

When dredged silty soil is used for reclamation, soil shall be kept for deposition.

3) Bilge Oil

Bilge oil from cargo ships or work boats can be collected and kept in a bilge oil tank. After oil floats being separated, oil will be burnt. The remaining contaminated seawater is discharged after treatment by chemical agent to remove emulsion oil.

4) Waste Water Treatment

Waste water treatment facilities have to be provided in the port area.

(4) Overall Evaluation

As a countermeasure to prevent diffusion of turbidity (SS) during dredging work, a silt-curtain shall be installed enclosing the dredging site to minimize leakage and dispersion of muddy water. Other adequate countermeasures shall be taken to prevent dispersion of dredged spoil from the existing basin of the port.

Through environmental examination discussed above, it is concluded that the construction work of the project will not generate any significant impact to the environment if necessary countermeasures are taken.

CHAPTER 7

ECONOMIC AND FINANCIAL ANALYSES

CHAPTER 7 ECONOMIC AND FINANCIAL ANALYSIS

7.1 Economic Analysis

7.1.1 Methodology

The project is evaluated by means of cost-benefit analysis, comparing the case of achievement of the project (with-case) with the present case of non-achievement of the project (without-case). Using discounted cash flow method, economic internal rate of return (EIRR) are calculated by comparing benefits with costs with appropriate sensitivity analyses.

The EIRR is a discount rate which makes costs and benefits of the project equal during the project life.

" With" cases are the improvement plan 1 and 3-2 presented in Chapter 4.
As "Without" case, the following conditions are assumed.

a) The existing wharf is rehabilitated in the same way as Plan 1, and the cargoes other than container cargoes are handled in the present manner.

b) The container cargoes are handled in the way that they are unloaded on the apron by ship's crane and devanned by 3-ton forklifts. Cargo handling time becomes longer and cargo handling costs increase considerably.

The project costs and benefits are evaluated in terms of economic prices (shadow prices) converted from market prices by conversion factors.

All the benefits and costs in the analysis are as of 1998. Project life in the economic analysis is assumed to be 32 years in consideration of service life of the container berth planned in the project. The exchange rates adopted in this analysis are Tala 1.00 = US$0.328 = ¥44.95, the same as those in the cost estimation.

7.1.2 Costs of the Project

(1) Investment Cost, Maintenance Cost and Residual Value

Tables 7.1.4-1 and 7.1.4-2 show investment costs, maintenance costs and residual value after depreciation in 2032 for each alternative plan.

As investment costs do not include any transfer items such as customs duties and a foreign exchange adopts a floating rate, it is not necessary to convert them into shadow prices. The construction costs of Plan 1 and Plan 3-2 are estimated to be 45,868,000 Tala and 40,025,000 Tala, respectively.

The annual maintenance and repair costs of the facilities planned in Phased Improvement Plan are assumed to be 10% of the depreciation cost.

(2) Operation Cost

The operation cost from 2001 to 2032 is shown in Tables 7.1.4-1 and 7.1.4-2.

7.1.3 Benefits of the Project

The following items are identified "With" and "Without" cases, as major benefits of Phased Improvement Plan from a viewpoint of the national economy.

(1) Saving of Ship Staying Costs

Total waiting time is calculated for both without-case and with-case of each alternative plan. The difference between without-case and with-case is saving of waiting time. The ship staying cost is calculated by multiplying the waiting time by the charterage of ship.

Saving of ship staying costs for Plan 1 and Plan3-2 are shown in Tables 7.1.4-1 and 7.1.4-2. The ratio benefits shared by the national economy of Samoa are assumed to be about 60%.

(2) Saving of Cargo Handling Costs

Tables 7.1.4-1 and 7.1.4-2 show benefits from savings of cargo handling costs.

In "without case", container cargoes are assumed to be handled by many light weight forklifts and trucks due to load limitation of the wharf in a time consuming manner.

Difference of cargo handling costs between with-case and without-case is a benefit accrued by the project.

7.1.4 Calculation of EIRR and Evaluation

EIRR calculation sheet for Plan 1 of Phased Improvement Plan is shown in Table 7.1.4-1.

EIRR of Plan 1 is calculated as 12.84 % at shadow price.

From the viewpoint of the national economy, the cost/benefits are discounted by the social discount rate, which is commonly set at a rate higher than the opportunity cost of capital. According to the report of Overseas Development Ministry of United Kingdom, the estimated opportunity cost of capital in development countries range from 8% to 15% in general. Staff Appraisal Report prepared by World Bank in 1994 estimates the opportunity cost of capital in development countries to be 12%. It is generally considered that a project with EIRR higher than 10% is economically feasible. EIRR calculated as 12.84% for Plan 1 is higher than the estimated opportunity cost of capital and Phased Improvement Plan is evaluated to be feasible.

The calculation sheet of EIRR for Plan 3-2 is shown in Table 7.1.4-2.

EIRR of Plan 3-2 is calculated as 9.95% lower than that of Plan 1.

In order to determine whether the project is feasible against changes of costs and benefits, a sensitivity analysis is conducted and the results are shown in Table 7.1.4-3. EIRR for plan 1 are calculated higher than 11% with the fluctuation of the costs and benefits ±10%.

Figure 7.1.4-1 shows accumulated net benefit of Plan 1 and plan 3-2. As shown in the figure, Plan 1 requires higher capital cost but recover it quickly with higher benefit than Plan 3-2.

Table 7.1.4-3 Sensitivity Analysis of Plan 1 and 3-2

Fluctuation		Plan 1	Plan 3-2
Base-Case		12.84%	9.95%
Construction Cost	−10%	13.98%	10.93%
	+10%	11.87%	9.10%
Benefits	−10%	11.76%	8.99%
	+10%	13.88%	10.85%

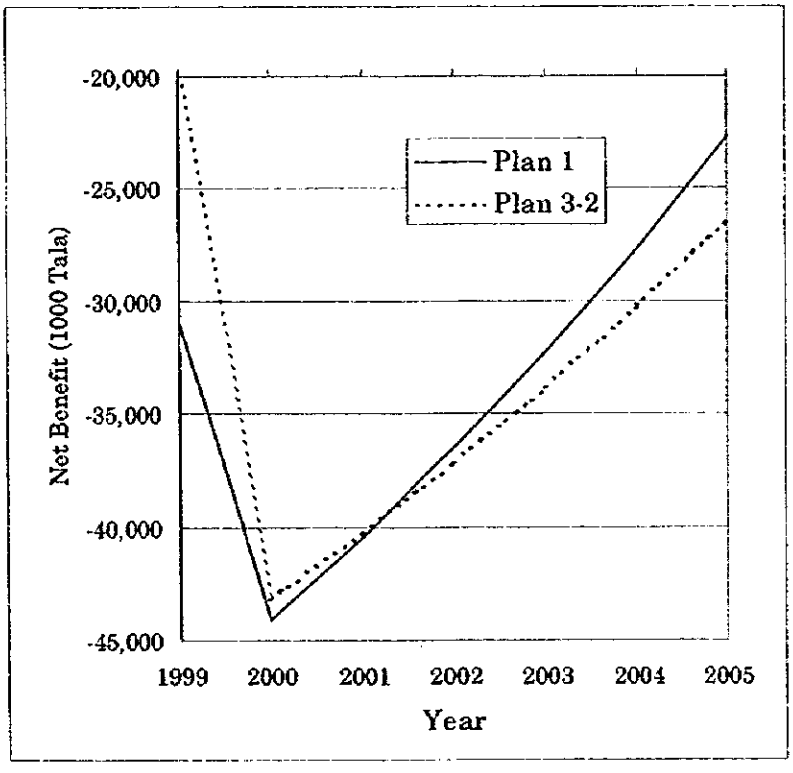


Figure 7.1.4-1 Accumulated Net Benefit

Table 7.1.4-1 Economic Internal Rate of Return Calculation Sheet, Plan 1

EIRR = 12.84%

(unit : 1000 Tala)

Cost, Benefit / Year	(A)				(B)			(B)-(A)
	Construction Cost	Maintenance Cost	Operation Cost	Total Cost	Ship Staying Costs	Cargo Handling Costs	Total Benefit	Net Benefit
2001	31,011	0	0	31,011	0	0	0	-31,011
2002	14,857	0	0	14,857	999	786	1,785	-13,073
2003	0	91	7	98	2,109	1,641	3,750	3,652
2004	0	91	8	98	2,346	1,706	4,051	3,953
2005	0	91	8	99	2,582	1,770	4,353	4,254
2006	0	91	8	99	2,850	1,837	4,687	4,588
2007	0	91	8	99	3,117	1,904	5,021	4,922
2008	0	91	9	100	3,426	1,974	5,399	5,300
2009	0	91	9	100	3,734	2,043	5,777	5,677
2010	0	91	9	100	4,276	2,123	6,399	6,299
2011	0	91	10	101	4,818	2,203	7,021	6,920
2012	0	91	10	101	5,441	2,279	7,719	7,618
2013	0	91	10	101	6,063	2,354	8,418	8,316
2014	0	91	11	102	6,998	2,432	9,431	9,329
2015	0	91	11	102	7,933	2,510	10,444	10,342
2016	0	91	11	102	7,933	2,510	10,444	10,342
2017	0	91	11	102	7,933	2,510	10,444	10,342
2018	0	91	11	102	7,933	2,510	10,444	10,342
2019	0	91	11	102	7,933	2,510	10,444	10,342
2020	0	91	11	102	7,933	2,510	10,444	10,342
2021	0	91	11	102	7,933	2,510	10,444	10,342
2022	0	91	11	102	7,933	2,510	10,444	10,342
2023	0	91	11	102	7,933	2,510	10,444	10,342
2024	0	91	11	102	7,933	2,510	10,444	10,342
2025	0	91	11	102	7,933	2,510	10,444	10,342
2026	0	91	11	102	7,933	2,510	10,444	10,342
2027	0	91	11	102	7,933	2,510	10,444	10,342
2028	0	91	11	102	7,933	2,510	10,444	10,342
2029	0	91	11	102	7,933	2,510	10,444	10,342
2030	0	91	11	102	7,933	2,510	10,444	10,342
2031	0	91	11	102	7,933	2,510	10,444	10,342
2032	0	91	11	102	7,933	2,510	10,444	10,342
Residual Value				-4,587				4,587
							EIRR	12.84%

Table 7.1.4-2 Economic Internal Rate of Return Calculation Sheet, Plan 3-2

EIRR = 9.95%

(unit : 1000 Tala)

Cost, Benefit / Year	Construction Cost	Maintenance Cost	Operation Cost	(A) Total Cost	Ship Staying Costs	Cargo Handling Costs	(B) Total Benefit	(B)-(A) Net Benefit
2001	17,938	0	15	17,953	-482	-975	-1,457	-19,410
2002	22,087	0	15	22,102	-594	-1,066	-1,660	-23,762
2003	0	83	0	83	1,124	1,851	2,976	2,893
2004	0	83	0	83	1,266	1,924	3,190	3,107
2005	0	83	0	83	1,407	1,997	3,404	3,321
2006	0	83	0	83	1,582	2,073	3,655	3,572
2007	0	83	0	83	1,758	2,148	3,906	3,823
2008	30,990	83	0	31,073	1,960	2,226	4,186	-26,887
2009	1,999	83	0	2,082	2,162	2,305	4,467	2,385
2010	0	206	9	215	4,800	2,395	7,195	6,979
2011	0	206	10	216	5,359	2,485	7,844	7,628
2012	0	206	10	216	6,032	2,570	8,602	8,386
2013	0	206	10	216	6,704	2,656	9,360	9,144
2014	0	206	11	217	7,718	2,744	10,461	10,244
2015	0	206	11	217	8,618	2,832	11,450	11,233
2016	0	206	11	217	8,618	2,832	11,450	11,233
2017	0	206	11	217	8,618	2,832	11,450	11,233
2018	0	206	11	217	8,618	2,832	11,450	11,233
2019	0	206	11	217	8,618	2,832	11,450	11,233
2020	0	206	11	217	8,618	2,832	11,450	11,233
2021	0	206	11	217	8,618	2,832	11,450	11,233
2022	0	206	11	217	8,618	2,832	11,450	11,233
2023	0	206	11	217	8,618	2,832	11,450	11,233
2024	0	206	11	217	8,618	2,832	11,450	11,233
2025	0	206	11	217	8,618	2,832	11,450	11,233
2026	0	206	11	217	8,618	2,832	11,450	11,233
2027	0	206	11	217	8,618	2,832	11,450	11,233
2028	0	206	11	217	8,618	2,832	11,450	11,233
2029	0	206	11	217	8,618	2,832	11,450	11,233
2030	0	206	11	217	8,618	2,832	11,450	11,233
2031	0	206	11	217	8,618	2,832	11,450	11,233
2032	0	206	11	217	8,618	2,832	11,450	11,233
Residual Value		0	0	-13,299				13,299
							EIRR	9.95%

7.2 Financial Analysis

7.2.1 Port Tariff

By comparing the present port charges of Apia Port with those of neighboring ports, the level of tariff revision, which is internationally competitive, is studied.

The present system of port charges of Apia Port legislated by the Port Charges Regulations 1984 and Port Charge Amendment Regulations 1987, and the port charges of Apia Port have never been revised since 1987.

The comparison of port charges to foreign ship in Apia Port with these in neighboring countries is shown in Table 7.2.1-1.

The stevedoring service in Apia Port is carried out by private shipping agencies at 7.42 Tala per ton. Stevedoring services are done by a port authority in Betio Port in Kiribati and Honiara Port in Solomon Islands.

As shown in Table 7.2.1-1, port charges to overseas ship of neighboring countries are 3.16 times to 4.95 times higher than the port charge of Apia Port. And, charges to overseas cargo of neighboring countries are 1.12 times to 4.50 times higher than the charge of Apia Port. The level of port charges can be adjusted and determined through examination of the scope of port service and the tariff level of neighboring ports.

Table 7.2.1-1 shows The level of tariff revision proposed in consideration of tariffs in neighboring ports and improved service level after implementation of this project. In order to maintain internationally balanced level, the tariff rates are proposed to be revised close to the rates of neighboring ports. The rates of pilotage and port dues are raised to the rate of Betio Port. With the rate of berthage of Apia Port set less than the rate of Honiara port, total port levied in charges Apia Port are less than the level of neighboring ports.

The current tariff level of Apia Port is significantly low compared with those of the port in neighboring countries. Information on port management and operation shall be periodically interchanged with the neighboring ports in South Pacific area in this regard.

Table 7.2.1-1 Tariff of Apia and Neighboring Ports

(unit : Tala)

Port Charge	Unit	Tariff Rate of Apia Port			Tariff Rate of Neighboring Countries			
		Present Tariff	Revised Tariff	increase in Tariff rate	Betio Port in Kiribati	Honiara Port in Solomon Islands	Suva Port in Fiji	Port Vila in Vanuatu
Light Dues	per visit	40.00	40.00	0.00				0.118
	GRT	0.01			0.20			
Pilotage	GRT	0.10	0.18	0.08	0.18	0.24	0.181	0.023
Port Dues	GRT	0.05	0.07	0.02	0.07	0.068	0.16	0.47
Berthage	up to 1500 GRT	40.0						
	> 1500 GRT/op	60.0						
	GRT	0.01	0.41	0.40	0.55	0.50		0.14
Dockage	GRT	0.05	0.05	0.00			0.03	
Cargo Dues	per ton	0.10	1.36	1.26		1.61	2.92	
Charge per Vessel		1,377	5,749		5,800	6,570	6,821	4,356
		[1.00]	[4.18]		[4.21]	[4.77]	[3.16]	[3.16]

Note 1) Exchange Rate 1 Tala =0.357 US$ = 0.5440 AUS$(Kiribati) = 1.5695 S$(Solomon)
1 Tala= 42.32 VT(Vanuatu) =0.6644 F$(Fiji) : 8 June 1998

2) Average Sizes of vessel and cargo are 5,800 GRT and 1.170t

3) [ ] : Index (Charge per vessel of Apia Port = 1.00)

7.2.2 Analysis of Financial Statement

Estimated financial statements consisting of Statement of Income & Expenditure, Statement of Source & Application of Funds and Balance Sheet are prepared on condition of implementing Improvement Plan and the financial soundness of the port administrative body is analyzed.

Premises

1) The project life is assumed to be 32 years from 2001 to 2032.

2) Depreciation is calculated by straight-line method and the salvage cost of the new facilities is assumed to be 10%.

3) The rate of income tax is assumed to be 35% of continuing profit, but no tax in loss.

4) The existing fixed assets of Marine Division of MOT and new port facilities planned in this project are assumed to be given in the capital account of SPA as the investment from the Government of Samoa.

5) In this project, no repayment and no loan are assumed. But the existing loan from Asia Development Bank (ADB) is assumed to be paid back by SPA.

In the Economic Analysis of the previous Section, the economic feasibility of an investment is analyzed from the point of view of a national economy.

Table 7.2.2-1 shows Profit and Loss (P/L), Balance Sheet (B/S) and Statement of Source and Application of Funds of the year 2003, 2010 and 2015 under the present tariff rates and the revised tariff rates shown in Table 7.2.1-1.

As shown in Table 7.2.2-1, the profit before depreciation is estimated to be plus and revenues of SPA can cover not only labor cost and operating cost but also maintenance cost (10% of depreciation) and repayment and interest of ADB loan.

But the profit after depreciation is minus every year. At the end of the project life, this project is to gain current assets estimated at 20.4 million Tala, which cannot cover the investment of 49.6 million Tala in 2001-2002 and cannot depreciate 28.8 million Tala. Therefore, SPA needs 28.8 million Tala in 2015 for renewal investment.

After SPA is established, port finance should be entirely separated from the finance of the Government. SPA as the port administrative body should have its own budget, and should function as an independent financial center. Thus, main source of fund of SPA should depend on port revenues. Port revenues by port charges should be used exclusively for port administration, maintenance including re-investment and improvement. Port tariffs should be set at a reasonable level under international competition, but must be sufficient for covering normal current expenses, including the depreciation costs of own port facilities.

Table 7.2.2-1 shows the increase of port revenue in 2003,2010 and 2015 by the revised tariff shown in Table 7.2.1-1. The revised tariff is estimated to give the increased revenue of about 50% of present port revenue for SPA.

By raising port charges to the level of neighboring countries, losses after depreciation decrease gradually. But, at the end of the project life, this project is to gain current assets estimated at about 38 million Tala, which cannot recover the investment of 49.6 million Tala in 2001-2002 and cannot depreciate 11.3 million Tala.

Analysis of the financial statements shows that the revenues of SPA are sufficient to cover recurrent costs excluding depreciation costs. The profits before depreciation are estimated at about 972,000 Tala in 2003. SPA has been confirmed financially sound through estimated financial statements.

Table 7.2.2-1 Estimated P/L, B/S and Source and Application of Funds of SPA

(unit : Tala)	in Present Tariff Rate			in Revised Tariff Rate		
				2003	2010	2015
Increase of Revenue in the Revised Plan of Port Tarrif				1,139,140	1,374,675	1,554,021
Rate of Increase of Revenue in the Revised Plan				49%	49%	50%

Year	2003	2010	2015	2003	2010	2015
(1) Total Revenue of SPA	2,344,722	2,788,247	3,110,101	3,483,862	4,162,922	4,664,122
Electricity / Water Charge	75,972	89,046	98,385	75,972	89,046	98,385
Running Cost of Tugboat	104,155	122,079	134,883	104,155	122,079	134,883
(2) Direct Cost	180,127	211,124	233,268	180,127	211,124	233,268
(3)=(1)-(2) Marginal Profit	2,164,595	2,577,123	2,876,833	3,303,735	3,951,798	4,430,854
Personel Expenses	733,820	733,820	733,820	733,820	733,820	733,820
Local Travel	11,770	11,770	11,770	11,770	11,770	11,770
Overseas Travel	33,340	33,340	33,340	33,340	33,340	33,340
Office Expenses	38,000	38,000	38,000	38,000	38,000	38,000
Office Operation Cost	32,000	32,000	32,000	32,000	32,000	32,000
Repair and Maintenance Cost	333,598	333,598	333,598	333,598	333,598	333,598
Interest by ADB Loan	9,900	7,975	6,600	9,900	7,975	6,600
(4) Fixed Cost	1,192,428	1,190,503	1,189,128	1,192,428	1,190,503	1,189,128
(5) = (3)-(4) Profit before Depreciation	972,167	1,386,620	1,687,705	2,111,307	2,761,295	3,241,726
(6) Depreciation Cost	3,335,981	3,335,981	3,335,981	3,335,981	3,335,981	3,335,981
(7) = (5)-(6) Profit after Depreciation	-2,363,813	-1,949,361	-1,648,276	-1,224,673	-574,686	-94,254

Year	2003	2010	2015	2003	2010	2015
Current Assets	4,497,130	12,746,596	20,446,483	5,648,062	22,818,746	37,929,381
Fixed Assets	72,099,413	48,747,548	32,067,644	72,099,413	48,747,548	32,067,644
(A) Assets	76,596,543	61,494,144	52,514,127	77,747,475	71,566,294	69,997,025
(B) Liability (unredeemable for 10 years with interest of 1%)	962,500	770,000	632,500	962,500	770,000	632,500
(C) Capital	80,722,565	80,722,565	80,722,565	80,722,565	80,722,565	80,722,565
(A-B-C) Surplus	-5,088,522	-19,998,421	-28,840,938	-3,937,590	-9,926,272	-11,358,041

Year	2003	2010	2015	2003	2010	2015
(5) Profit before Depreciation	972,167	1,386,620	1,687,705	2,111,307	2,761,295	3,241,726
(C) Capital	0	0	0	0	0	0
(D) Source of Funds	972,167	1,386,620	1,687,705	2,111,307	2,761,295	3,241,726
Initial Investment	0	0	0	0	0	0
Repayment of Loan (for 40 years since 1999)	27,500	27,500	27,500	27,500	27,500	27,500
(E) Application of Funds	27,500	27,500	27,500	27,500	27,500	27,500
(D-E) Increase of Current Assets	944,667	1,359,120	1,660,205	2,083,807	2,733,795	3,214,226

7.2.3 Discount Cash Flow Analysis

Financial feasibility of the project is evaluated in this section by a financial internal rate of return (FIRR) based on a cost-benefit analysis in the same way as the economic analysis

Incremental revenues and expenditures are calculated by comparing the "with" and "without" project cases.

The port management generate the revenues and expenditures under this project as follows:

1) Cargo handling works are conducted by private companies, therefore savings of cargo handling costs do not give incremental revenues to SPA.
2) In without case, since a number of vessels calling the port does not decrease even if waiting time of vessels increase, savings of ship staying costs do not give incremental revenues to SPA.
3) Port services of Apia Port will be improved by this project and the port charges can be revised as shown in Table 7.2.3-1 after completion of a new wharf. Since the port facilities in Apia Port will be improved better than those in the neighboring ports, the port charges in case 1 are set as the same rates as those in Honiara Port in Solomon Islands. While, the port charges of case 2 are set at the lowest among those of the neighboring ports giving lower revenues than those in case 1.

The result of FIRR calculation and the sensitivity analysis for Plan 1 are shown in Tables 7.2.3-2 and 7.2.3-3 respectively. The interest rate of ADB loan to Samoa is set at +1.0% as the opportunity cost of capital. FIRRs of the sensitivity analysis for Plan 1 range between +0.72% and +1.29% under the fluctuation of ± 5% of revenues and investments. FIRR of case 1 is calculated at +1.01%. The port revenues can recover not only operation cost including maintenance cost but also depreciation cost in project life. In the case that the investment of the project is borne by the government, Plan 1 can be implemented as planned from a financial viewpoint. While, in the case of raising port charge only to the lowest level among those of neighboring ports, FIRR of case 2 is calculated at –0.09%. The port revenues can cover operation cost including maintenance cost. The results of financial analysis show need to improve financial performance in order to cover all the expenses with the current level of port revenues suggesting necessity of

1) diversification of SPA activities in coordination with private companies,
2) revision of the present port tariff including stevedoring and
3) introduction of government subsidy etc. to achieve the financial independence of SPA.

Table 7.2.3-1 Revised Plans in Port Tariff Rate of Samoa Port Authority

(unit: Tala)

Port Charge	unit	Present Tariff	(Case1)Worth about Tariff Rate of Honiara Port		(Case2)Table7.2.1-1 Minimum Tariff Rate	
			Revised	increase	Revised	increase
Pilotage	GRT	0.10	0.24	0.14	0.18	0.08
Port Dues	GRT	0.05	0.07	0.02	0.07	0.02
Berthage	GRT	0.01	0.5	0.49	0.41	0.40
Cargo Dues	トン	0.10	1.47	1.37	1.36	1.26

Table 7.2.3-2 FIRR(Financial Internal Rate of Return)

Calculation of Plan 1

(unit : 1000 Tala)

Year	Construction Cost	Maintenance Cost	Operation Cost	(A) Total Cost	(Case1)Worth about Tariff Rate of Honiara Port (B) Incremental Revenue	(B)-(A) Net Revenue	(Case2)Table7.2.1-1 Minimum Tariff Rate (C) Incremental Revenue	(C)-(A) Net Revenue
2001	31,456	0	0	31,456	0	-31,456	0	-31,456
2002	15,295	0	0	15,295	0	-15,295	0	-15,295
2003	0	92	8	100	1,404	1,304	1,139	1,039
2004	0	92	8	100	1,444	1,344	1,172	1,072
2005	0	92	9	101	1,484	1,383	1,205	1,104
2006	0	92	9	101	1,525	1,424	1,239	1,138
2007	0	92	9	101	1,566	1,465	1,273	1,172
2008	0	92	10	102	1,607	1,505	1,307	1,205
2009	0	92	10	102	1,648	1,546	1,341	1,239
2010	0	92	10	102	1,690	1,588	1,375	1,273
2011	0	92	11	103	1,732	1,629	1,411	1,308
2012	0	92	11	103	1,775	1,672	1,446	1,343
2013	0	92	11	103	1,817	1,714	1,482	1,379
2014	0	92	12	104	1,861	1,757	1,518	1,414
2015	0	92	12	104	1,904	1,800	1,554	1,450
2016	0	92	12	104	1,904	1,800	1,554	1,450
2017	0	92	12	104	1,904	1,800	1,554	1,450
2018	0	92	12	104	1,904	1,800	1,554	1,450
2019	0	92	12	104	1,904	1,800	1,554	1,450
2020	0	92	12	104	1,904	1,800	1,554	1,450
2021	0	92	12	104	1,904	1,800	1,554	1,450
2022	0	92	12	104	1,904	1,800	1,554	1,450
2023	0	92	12	104	1,904	1,800	1,554	1,450
2024	0	92	12	104	1,904	1,800	1,554	1,450
2025	0	92	12	104	1,904	1,800	1,554	1,450
2026	0	92	12	104	1,904	1,800	1,554	1,450
2027	0	92	12	104	1,904	1,800	1,554	1,450
2028	0	92	12	104	1,904	1,800	1,554	1,450
2029	0	92	12	104	1,904	1,800	1,554	1,450
2030	0	92	12	104	1,904	1,800	1,554	1,450
2031	0	92	12	104	1,904	1,800	1,554	1,450
2032	0	92	12	104	1,904	1,800	1,554	1,450
Residual Value				-5,167	0	5,167	0	5,167
						1.01%		-0.09%

Table 7.2.3-3 Sensitivity Analysis

		Case 1		Case 2
Base-Case	×1.0	1.01%	×1.0	-0.09%
Investment	×1.05	0.75%	×1.05	-0.32%
	×0.95	1.28%	×0.95	0.15%
Revenue	×1.05	1.29%	×1.05	0.16%
	×0.95	0.72%	×0.95	-0.35%

CHAPTER 8

IMPLEMENTATION PLAN

CHAPTER 8 IMPLEMENTATION PLAN

8.1 Implementation Schedule

As shown in Table 8.1-1, the overall implementation of the master port development plan of Apia Port (target year 2015) requires fifteen years, of which the Phased Improvement Plan requires three years.

(1) Phased Improvement Plan

Total project cost of the Phased Improvement Plan is estimated at Tala 53.32 million.

Since the Phase Improvement Plan is formulated in order to urgently solve current constraints, this plan shall be implemented as soon as possible.

To make a smooth implementation of the project, additional detailed boring survey should be taken into consideration. Boring survey adjacent to the proposed site of the new wharf was conducted in this study. The subsoil at the site of new wharf is composed of very complicated soil layers. It is necessary to conduct the detailed boring survey in order to confirm the distribution and thickness of hard coral layer in detailed design stage.

(2) Master Port Development Plan

The master port development plan excluding the Phased Improvement Plan includes major works of dredging, expansion of container yard and construction of CFS and shed requiring a project cost of Tala 39.72 million. Implementation of the master plan shall be scheduled to meet increasing demand of port cargo in 2015 as shown in Table 8.1-1.

To make a smooth implementation of the project, relocation of the existing diesel and coconut oil tanks should be taken into consideration. The tanks are planned to be demolished and newly constructed at the innermost part of a container yard in the Master Plan.

Table 8.1-1 Overall Implementation Schedule

Stage	Phase	Activity	Cost (Tala thousand)	Year 1st 2000	2nd 2001	3rd 2002	4th 2003	5th 2004	6th 2005	7th 2006	8th 2007	9th	10th	11th	12th	13th	14th	15th 2014	16th 2015
Phased mprovement Plan	Phase 1	Detailed Design	980										to						
		Tendering	– – –																
		Construction	31,906																
		Construction Supervison	1,471																
		Total	34,357																
	Phase 2	Detailed Design	654																
		Tendering	– – –																
		Construction	17,324																
		Construction Supervison	981																
		Total	18,959																
Master Plan except Phased Improvement Plan	Phase 1	Detailed Design	650																
		Tendering	– – –																
		Construction	19,678																
		Construction Supervison	997																
		Total	21,325																
	Phase 2	Detailed Design	586																
		Tendering	– – –																
		Construction	16,926																
		Construction Supervison	879																
		Total	18,391																

Implementation schedule and yearly investment costs are summarized as follows:

Phase	Main Facilities	Investment (Tala million)	Implementation Schedule
Phased Improvement Plan			
First Phase	New Wharf	34.36	by 2002 (2 years)
Second Phase	Repair of Existing Wharf Improvement of Breakwater Administration Office Tug Boat	18.96	by 2002 (2 years)
Master Plan			
First Phase	Dredging Container Yard	21.33	2007 to 2014 (2 years)
Second Phase	CFS and shed Container Yard	18.39	2007 to 2014 (2 years)
TOTAL		93.04	2000 to 2014 (15years)

8.2 Project Implementation

In order to successfully implement the project and efficiently operate all the facilities planned, the following shall be given a thorough consideration.

(1) Port Authority

Samoa Port Authority (SPA) has been authorized by the parliament and is scheduled for establishment in January 1999. SPA is required to exercise following efforts in order to maximize the benefits of this particular project as well as to operate the port efficiently.

1) Management Division

SPA will be operated as a self-financing organization and shall work out improvement and development plans for this purpose. The present organization shall be reinforced in this aspect. Basic statistical information on cargo and ship shall be collected and analyzed for adequate port management and planning. Detailed examination and amendment if found necessary shall be made on each item of port revenue and expenditure. Budget enough for adequate maintenance works shall be secured to use each port facility for the full period of its service life.

2) Engineering Division

MOT has no engineering staff at present requesting assistance from PWD when required. To maintain the port facilities existing and planned in this project as well as to design new facilities in future, an engineering division consisting of civil, mechanical and architectural engineers shall be established in SPA.

The existing wharf is planned to be used for handling cargoes other than container. This plan requires periodical inspection of the wharf and timely repair work when required.

(2) Private Sector Participation

Diesel and coconut oil tanks are owned and operated by private companies. Two tanks, if will remain at the present location, will seriously interfere with container traffic and deteriorate safety of yard operation of the new wharf. The works related to the tanks and pipeline are proposed to be done by the users under control of and in close coordination with SPA.

Since stevedoring services are provided by private shipping companies with their own cargo handling equipment, introduction of cargo handling equipment is not included in the project.

(3) Environmental control

Environment control plan shall be prepared and examined well before commencement of the construction work. Dispersion of turbid water during dredging work shall be minimized by installing silt curtain and SS concentration be periodically measured.

CHAPTER 9

CONCLUTION AND RECOMENDATION

CHAPTER 9 CONCLUSION AND RECOMMENDATION

9.1 Conclusion

Major port facility of the existing main wharf of Apia Port suffers from serious deterioration to the extent that it could not continue to serve for container handling operation without an urgent rehabilitation work. Inefficient container handling operation would curtail the country's economy through increase of sea transportation cost.

In the present study, Master Port Development Plan with the target year of 2015 has been formulated and in line with the plan, Phased Improvement Plan has been worked out in order to urgently solve current constraints hampering efficient port activities. The Phased Improvement Plan includes the following major project components;

1) New Wharf	190 m
2) Staging Area	4,500 m^2
3) Existing Wharf	L.S. Corrosion Protection
4) SPA Office	450 m^2
5) Tug Boat	1 No. 1600 HP
6) Ferry Dolphin, etc.	L.S. Repair Works

The present problems and their improvement by the above facilities are summarized as below;

(1) Existing Wharf

Serious corrosion of the steel piles supporting the wharf deck has led to structural deterioration necessitating limitation of load on the wharf deck. Further deterioration of the wharf could suspend container handling operation by using heavy equipment and even lead to structural collapse. Drop in cargo handling capacity against increasing traffic demand will give a serious damage to the country's future economy through sharp rise of sea freight.

Construction of a new wharf will guarantee the port an efficient and safe handling operation of container cargoes. A paved staging area at the back of the new wharf will allow quick container transport between ship and yard. While rehabilitation of the existing wharf for handling the cargoes other than container will relieve the port from otherwise unnecessary long waiting time for berth.

(2) Other Facilities

A new office building is necessary to accommodate the staffs of SPA.

One of the existing tug boats shall be replaced with a new one for safe maneuvering of large ship calling the port.

The berthing facility of the existing ferry terminal requires a structural alteration to the access bridge for a new ferry boat.

9.2 Recommendation

(1) The Phased Improvement Plan as proposed in the study is recommended to be urgently implemented. A new wharf shall be constructed to take over container handling operation from the existing wharf, while the deteriorated existing wharf shall be rehabilitated to meet an increasing future traffic demand.

(2) The existing wharf as well as the new wharf shall be periodically investigated for any damages especially after occasions of cyclone, etc., and properly maintained with necessary repair under control and supervision of SPA. For safe and smooth operation of the port, engineering staff shall be trained for maintenance works to the port facilities.

(3) A new organization of SPA is under process of establishment. For sound management of Apia Port, SPA is recommended to exercise utmost effort to reinforce administration and management aspects. The staff of SPA shall be trained under appropriate training programs.

APPENDICES

Appendices

1. Study Team

The study team consists of an advisory committee and consultants as follows;

Advisory Committee

Mr. Hozumi KATSUTA	Chairman Japan International Cooperation Agency (JICA)
Mr. Takashi KADONO	Head Sakata Port Construction Office 1st District Port Construction Bureau Ministry of Transport
Mr. Isao SAKAI	Chief, 1st Design Laboratory Yokohama Investigation and Design Office 2nd District Port Construction Buraeu Ministry of Transport

Consultants

Title	Name	Responsibility
Team Leader	Mr. Hisanori KATO	Chief Consultant/ Port Planning
Economic/ Financial Expert	Mr. Masakazu ISHIHARA	Demand Forecast Economic and Financial Analyses
Design Engineer (Durability Evaluation/ Port Facility Design)	Mr. Hitoshi TAKEMOTO	Facility Design
Design Engineer (Structural Design/ Existing Wharf Investigation)	Dr. Chuanjun QU	Facility Design
Construction Engineer	Mr. Masanori IKEDA	Construction Method/ Cost Estimation
Natural Condition Surveyor	Mr. Shinji OKADA	Natural and Environmental Condition Survey

2. Schedule

The study will be completed upon submission of the Final Report. The Study will be conducted according to the time table presented in Table A.1 and Table A.2.

Appendix 2

Table A.1 Study Schedule

	1998								1999	
	5	6	7	8	9	10	11	12	1	2
Preparation of Inception Report		==								
Preparation and Discussion on the Inception Report		*								
Collection of Existing Data and Information, and Corresponding Review		****	******							
Field Survey for present Conditions of the Port		****	******							
Natural Condition Survey		****	******							
Praparation of outline of the Development Plan			***							
Presentation and Discussion on the Progress Report and Signing Minutes of				**						
Supplementary Data Collection and Field Surveys				**						
Preparation of outline of the Phazed Development Plan				====	===					
Conducting Feasibility Study					***	***				
Preparation of the Draft Fianl Report						***				
Presentation and Discussion on the Draft Final Report and Signing Minutes of						***				
Preparation of the Fianl Report						===				
Submission of the Final Report							===			

Note: **** Study work in Samoa ==== Study work in Japan

Appendix 2 TableA.2 Schedule of First Field Survey in Samoa

No.	Date	Itinerary	Activities(1)	Activities(2)
1	Jun 8 Mon	Lv. Tokyo		
2	9 Tue	Apia	JICA,MOT,PWD,MOF	
3	10 Wed	ditto	Presentation of Inception Report	
4	11 Thu	ditto	Discussion of Inception Report	
5	12 Fri	ditto	Site Survey on Apia Port	
6	13 Sat	ditto	Data Collection, Preparation of Survey	
7	14 Sun	ditto		Team meeting
8	15 Mon	ditto	Socio-Economic,Corrosion,Natural Survey	
9	16 Tue	ditto	ditto	
10	17 Wed	ditto	ditto	
11	18 Thu	ditto	ditto	
12	19 Fri	ditto	ditto	
13	20 Sat	ditto	ditto	
14	21 Sun	ditto		Team meeting
15	22 Mon	ditto	Ship-waiting,Demand forecast,Natural Condition	
16	23 Tue	ditto	ditto	
17	24 Wed	ditto	ditto	
18	25 Thu	ditto	ditto	
19	26 Fri	ditto	ditto	
20	27 Sat	ditto	ditto	
21	28 Sun	ditto		Team meeting
22	29 Mon	ditto	Cargo-Handling,Construction Price Condition	
23	30 Tue	ditto	ditto	
24	Jly 1 Wed	ditto	ditto	
25	2 Thu	ditto	ditto	
26	3 Fri	ditto	ditto	
27	4 Sat	ditto	ditto	
28	5 Sun	ditto		Team meeting
29	6 Mon	ditto	Facility Design,Cost Estimate,Environmental Condition	
30	7 Tue	ditto	ditto	
31	8 Wed	ditto	ditto	
32	9 Thu	ditto	ditto	
33	10 Fri	ditto	ditto	
34	11 Sat	ditto	ditto	
35	12 Sun	ditto		Team meeting
36	13 Mon	ditto	Outlining of Phased Development Plan	
37	14 Tue	ditto	ditto	
38	15 Wed	ditto	ditto	
39	16 Thu	ditto	ditto	
40	17 Fri	ditto	ditto	
41	18 Sat	ditto	ditto	
42	19 Sun	ditto		Team meeting
43	20 Mon	ditto	Presentation of Phased Development Plan	
44	21 Tue	ditto	Discussion of Phased Development Plan	
45	22 Wed	ditto	Preparation of Progress Report	
46	23 Thu	ditto	ditto	
47	24 Fri	ditto	ditto	
48	25 Sat	ditto	ditto	
49	26 Sun	ditto		Team meeting
50	27 Mon	ditto	Presentation of Progress Report	
51	28 Tue	ditto	ditto	
52	29 Wed	ditto	ditto	
53	30 Thu	ditto	Presentation of Progress Report	
54	31 Fri	ditto	Discussion of Progress Report	
55	Aug 1 Sat	ditto	Prepratation to Leave	
56	2 Sun	ditto		Team meeting
57	3 Mon	ditto	Final Team meeting,JICA,MOT,PWD,MOF	
58	4 Tue	Lv. Apia		
59	5 Wed	Wellington	Reporting to Embassy	
60	6 Thu	Arr. Tokyo		

Appendix 2 Table A.3 Schedule of Scond Field Survey in Samoa

No.	Date	Itinerary	Activities (1)	Activities (2)
1	Sep 21 Mon	Lv. Tokyo		
2	22 Tue	Apia	Couitesy Call to MOT, PWD, MOF, MOFA	
3	23 Wed	ditto	Site Survey on Apia Port	
4	24 Thu	ditto	Data Collection, Detailed Survey on Wharf	
5	25 Fri	ditto	ditto	
6	26 Sat	ditto	Cargo Handling Survey	
7	27 Sun	ditto		Team Meeting
8	28 Mon	ditto	Port Tariff Examination	
9	29 Tue	ditto	Coutesy Call to JICA Samoa Office	
10	30 Wed	ditto	Cost Estimate, Facility Design	
11	Oct 1 Thu	ditto	Economic and Financial Analysis	
12	2 Fri	ditto	ditto	
13	3 Sat	ditto	ditto	
14	4 Sun	ditto		Team Meeting
15	5 Mon	ditto	Preparation of Draft Final Report	
16	6 Tue	ditto	ditto	
17	7 Wed	ditto	Environment Impact Assessment	
18	8 Thu	ditto	Preparation of Draft Final Report	
19	9 Fri	ditto	ditto	
20	10 Sat	ditto	ditto	
21	11 Sun	ditto		Team Meeting
22	12 Mon	ditto	Preparation of Draft Final Report	
23	13 Tue	ditto	Discussion with MOT	
24	14 Wed	ditto	Presentation of Draft Final Report	
25	15 Thu	ditto	Discussion with MOT	
26	16 Fri	ditto	Signing of Minute of Meeting	
27	17 Sat	Lv. Apia		
28	18 Sun	Arr. Wellington		
29	19 Mon		Reporting to Japan Embassy	
30	20 Tue	Arr. Tokyo		

JICA