(4) Project Component B: Ather El Nabi Public River Port Project

1) Site Development

44 numbers river ports in total have been developed along the inland waterway networks to serve for cargo transportation to factories, silos, etc. The most of these ports belong to private industry companies. Among other river ports operated by private and public sectors, there exist 3 river ports owned by RTA at present. Ather Nabi Port in Cairo is one of the river port owned by RTA and, regarding possible development of Ather El Nabi port, MOT has signed a contract with the Egyptian transportation company "Egytrans" for Cairo based container terminal on an OT basis including exclusive right of transporting containers on July 28.

The Ather El Nabi site is closely located at River Transport Authority (RTA) Office in southern Cairo at about 952 km at the river Nile (starts at the Aswan High Dam) and connected to the Nile by a branch canal. The site contains existing quay along the branch canal built in the first half of the 60's. But it is presently not used for loading or unloading cargo operation.

RTA owns the land area. The part of this area that is proposed as container and general cargo terminal is to a great extent occupied by a greengrocery market and used by one of local private commission merchants in Cairo. The market area is provided with several dilapidated sheds, wooden sheds near the canal and a brick wall and concrete sheds near the road in the eastern part of the area.

2) Subsoil Conditions

According to the report of Cairo Container Terminal "Review and Updating of Existing Feasibility Study" prepared and drafted by SWECO International in September 1999, the results of earlier boring works indicate that silt and clay layers alternately deposit from the depth of 3m below ground level under the upper subsurface fill till the depth at 10.5 to 18.5 m below where medium sand layer is encountered. Alternating layer contains soft clay subsoil of 2 to 3 m thick at the depth of 7.5 to 10.5 m below ground level and the report suggests necessity to carry out complementary boring and soil sampling for further evaluation of the subsoil characters.

3) Existing Quay

The existing quay of piled pier type had been designed and constructed as the following structures:

Type of Structure	: Reinforced concrete deck founded on piles
Length of Quay	: 310 m & 160 m approximately
Width of Quay Deck	: about 11.4 m
Deck Surface Level	: +21.0 m
Flood Water Level	: +18.0m corresponding to a water level at water discharge 350 million m3/day in future

Max. Water Level	: +17.3m corresponding to a water level at water discharge 240 million m3/day in June and July
Min. Water Level	: +15.04m corresponding to a water level at water discharge 60 million m3/day for a short period of about 20 days in January
Deck Slab Thickness	: 0.13 m

A concrete slab has later been cast on top of the original deck. The deck is resting on a system horizontal reinforced concrete beams running in longitudinal and transverse directions of quay structure. Typical cross section profile of existing quay is as shown in Figure 13.5.5.

In the above referred SWECO report, the existing quay is planned to use for unloading/loading & remaining for waiting barges. But, the deck thickness would be insufficient to fully sustain the likely intensity of loadings onto the deck for container cargo handling operation and therefore possible utilization of existing quay structure is required structural reinforcement to the existing foundations, deck and beam members. In addition, in view of the above water levels at the branch channel and the low deck level of barges to be accommodated at the existing quay, it seems that the deck elevation +21.0 m of the existing quay is too high for unloading/loading cargo operation.

Based on the evaluation of the study report above referred, the load capacity of the existing quay is estimated as follows;

(Quay Deck)
The existing quay deck of 13 cm thick has the following load capacity under ultimate limit state and therefore may have to be reinforced for quayside cargo handling operation by mobile cranes in the scheme of newly proposed river port for container and general cargo handling.

- Uniformly distributed load of about 40 kN/m2
- Concentrated load of about 85kN

The load capacity of the front row beam is about 800 kNm in term of bending moment.

(Quay Foundation Piles)
The existing quay is founded upon 4 rows of square shaped reinforced concrete piles spaced at 3.5 m cross sectional center distance. The front row piles are placed at longitudinal center distance of 7.0 m and are clustered in pairs in a vertical tubular concrete pipe which is 1.5 m diameter and cover from the branch canal bottom to the top of quay deck. Single piles are used for other pile rows at a center distance 3.5 m. The existing pile system is estimated to have the following bearing capacity of a pile in terms of ultimate limit state;

- The paired pile at the front row may support a load of about 1600 kN per (twin) pile.
- The singles pile at other pile rows may have a load capacity of about 850 kN per pile

4) Reinforcement of Existing Quay

The following maximum design working loads on the quay deck with provision of rehabilitation work for the existing quay and the backup port area are recommended to apply in planning and designing of port facilities:

- Quay Deck (after the existing quay deck is reinforced)
Container load stacked at 1 tier: 20 kN/m2
Mobile Crane Outrigger Load: 1,300 kN (in consideration of Max. 63 tons load capacity class)

- Terminal Yard Area
Container Load stacked at 3 tiers: 60kN/m2
General Cargo Stacking Load: 30 kN/m2
Mobile Crane Wheel Load: 260kN

It is proposed that the existing quay be reinforced to sustain possible loads applying during port operation by renewing deck slabs and girders of reinforced concrete. Based on the development plan, the portion of the existing quay to be subjected to the reinforcement will be:

Container Terminal: One (1) berth of 115 m
General Cargo Terminal: Two (2) berths for length of 230 m
Total : Three (3) berths for 345m

The proposed reinforcement of existing quay structure is presented in Figure 13.5.6.

The portion of existing slab deck concrete will be demolished and the supplementary piles will be installed at possible 3 rows for reinforcing the existing quay at the front row, at the center position between the 2nd and 3rd existing pile rows and the rear of the deck, respectively. The supplementary piles will be constructed using steel pipe piles of about 800 to 1,000 mm diameter. These supplementary piles are spaced at 7.0 m interval for the longitudinal direction of the quay.

Some girder and slab concrete will be provided upon the supplementary piles to form rigid structure united with the existing remaining quay deck concrete. But, since the existing piles seems uncertain in view of load capacity, any stacking cargo in layers on the existing quay deck even after provision of partial reinforcement therefore should be refrained in the proposed river port operation in consideration of the above load capacity of the existing quay structure.

5) Rehabilitation of Existing Quay

The present auxiliary equipment such as docking fenders, bollards, ladders is recommended to be replaced so as to suit the likely accommodation for the objective type of barge convoy in terms of

design water level and alignment of berths. Although the existing quay seems to be elevated too high for quayside cargo handling, the proposed new quay may have to be positioned at the same elevation as the existing because of no choice for suitable alternatives.

Therefore, it is recommend to provide the following measures for safe and ease docking and berthing barges along two berth length of the existing quay (230m) for each container including a berth for waiting barge and general cargo terminal respectively.

- The docking fender pile system is additionally provided along the front face of quay deck to safely receive barge docking under water levels fluctuated from high level +18.0 m to min. +15.04 m. Fender pile system which is spaced at 14 m interval, may be suitable to receive docking of barges at any water levels changeable as above.
- The front longitudinal beam positioned at lower level is reinforced with provision of bollard for ease mooring of barges, which will be operational near the water level

6) Other Conditions

It is recommended that the design water depth should be +15.04 – 2.3 = +12.7m in order for branch canal to be accessible for the objective barge during the whole year.

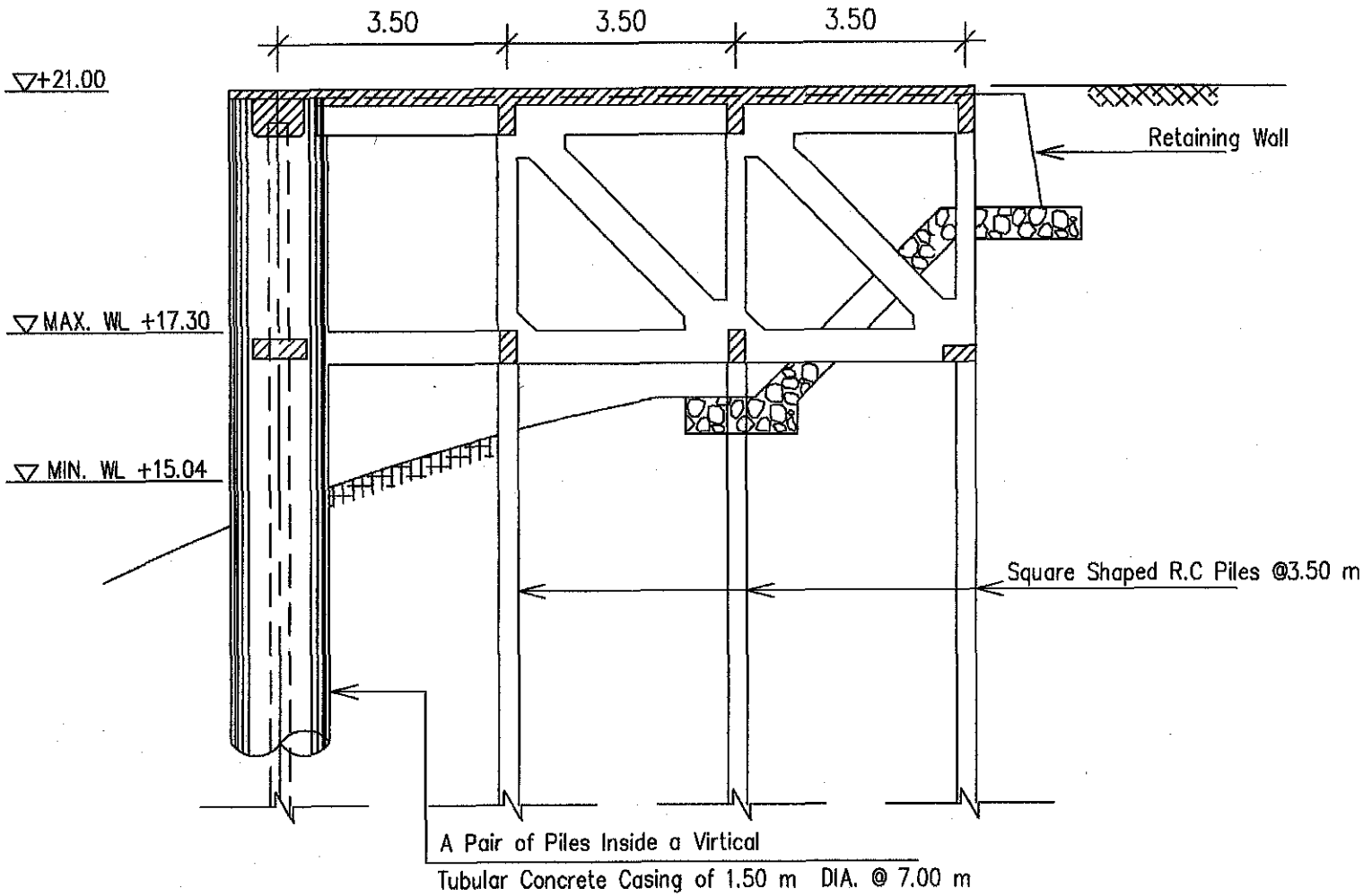


Figure 13.5.5 Typical Section Profile of Existing Quay at Ather El Nabi

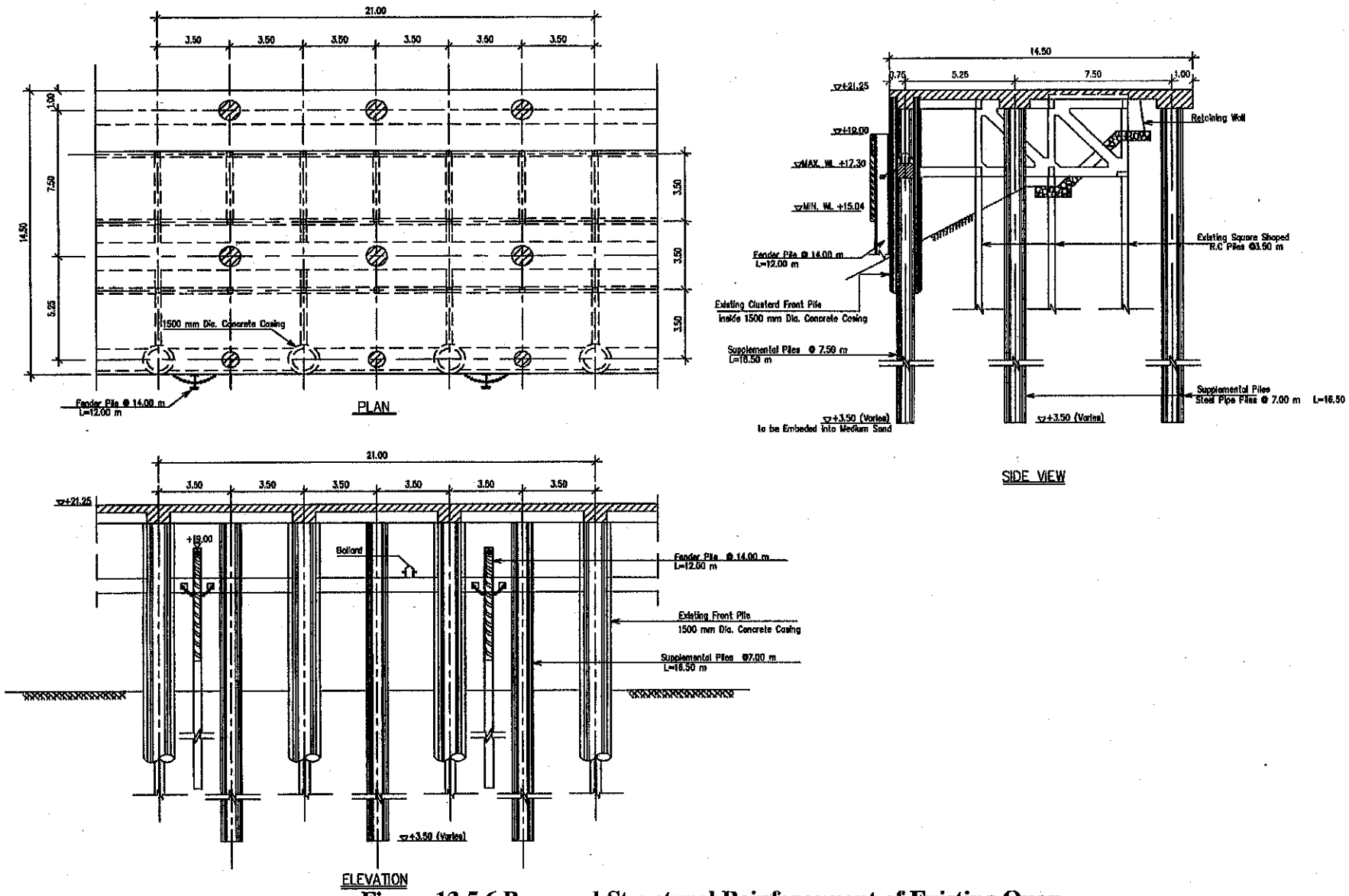


Figure 13.5.6 Proposed Structural Reinforcement of Existing Quay

(5) Project Components C: New Bolin Canal Project

Proposed new canal structures are shown in Figure 13.5.7 for typical canal section profile and in Figures 13.5 8 & 13.5.9 for general dimensions of navigation lock.

1) Deepening and Widening Existing Canal

The existing spillway will be deepened to have 2.3 m water draft under minimum water level for the whole year and widened to 35 m for new connection canal so as to have a standard dimensions for the 1st class waterway with provision of bank protection of 1 to 1 slope.

2) Subsoil Conditions along New Canal Alignment

The boring works executed by the Study Team indicate that the subsurface layer seems fill soil consisting of silty clay, fine sand and plant roots for about 2 m depth from the ground surface and about 4 to 8 m thick clay layer deposit exists under the subsurface layer which is medium stiff to hard silty clay of brown or yellowish brown color with some fine sands having SPT value ranging from 11 to 42 and 18 average. Under the clay deposit, medium dense to dense fine silty sand layer deposit succeeds with gradual increase of N value to reach 50 at the depth of around 17 m. Each layer evenly deposits with no substantial change of profile along longitudinal direction of the new canal alignment.

The conditions outlined above will not represent any serious technical issues on the bearing capability for supporting anticipated dead loads by newly constructed navigation lock or irrigation barrage structure. Besides, it can be said that clayey subsoil will be more suitable than sandy subsoil in view of water permeability or the likely occurrence of bottom ground swelling during drying-up of water inside temporary cofferdam.

3) Design of Lock

One number of lock will be provided to adjust the water level difference between Beheiry/Nobaria canals and Rosetta Branch, which is estimated 6.5m water head. New bridge across the new canal will be positioned at down stream of navigation lock to provide enough vertical air clearance 6.0 m above water level and horizontal distance of 16 m. The alignment of new canal is plotted in conformity of the requirements by for the 1st class inland waterway. The proposed new lock chamber is 116 m long and 17 m wide. The usable length of the lock chamber is about 104 m and therefore will be considered minimum for accommodating present type of twin unit of barge without any margin.

(Type of Structure)
Among other types of lock structures, maximum use of locally available materials and the precedent in type of construction in Egypt for navigation lock is taken into account for structure solution.

Therefore, the type of reinforced concrete structure is applied to the navigation lock with impermeable concrete walls instead of applying sheet piled solution.

(Water Filling and Emptying System of Lock)
Inland waterway lock in Egypt applies short bypass culvert system with vertical sluice rolling valves operated by electromechanical equipment. Mean water level difference at both heads for the proposed lock will be 6.5m and therefore the type of miter gates which is normally recommended for locks with lifts of less than 10 meters is adopted for up- and down-stream lock gates.

	Upstream Gate	Downstream Gate
Miter angle	20°	20°
Width	2 x 9.8 m	2 x 9.8 m
Height	4.5 m	12 m
Weight	approx 25 tons	approx 65 tons

Stoplogs are provided at up- and down-stream end of lock to dewater each miter gate independently for inspection, repair and maintenance.

4) Barrage

The existing barrage has to be replaced by newly constructed barrage and regulator to be provided beside the new navigation lock. Crest height will be at +8.90 m, which is equivalent to minimum water level at Bolin lock of Nobaria canal. Water discharge through regulator will be controlled to maintain the present level of discharge at max. 50.4 m3/s and average 30 m3/s.

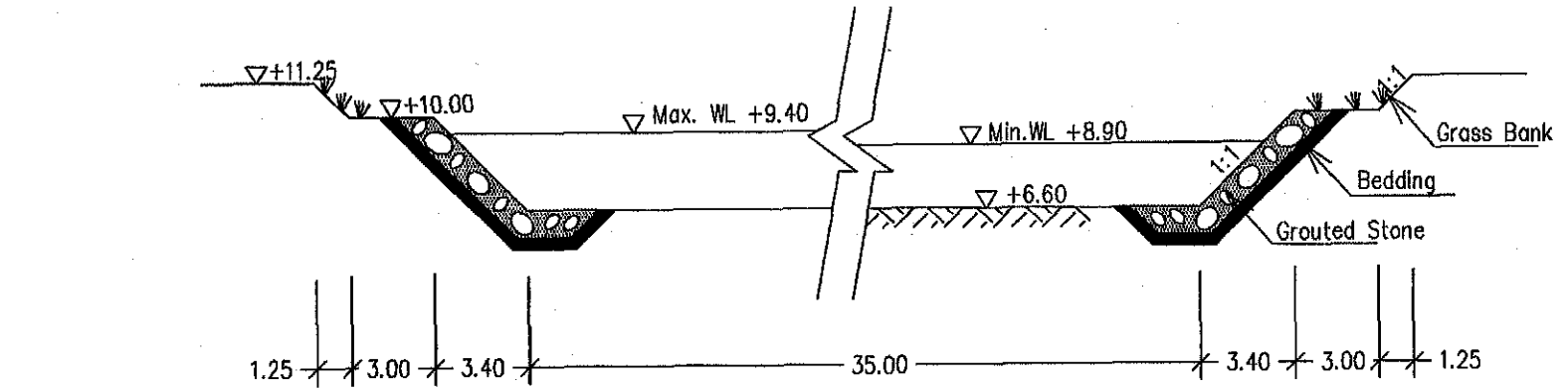
The gate operation at Nahda indicates that the convoy lockage time is 55 min. or 45 min. for upward and downward passing. Accordingly, the lock capacity of proposed lock is estimated about 12 times (=24 convoys) a day should it operates in 12 hrs a day. When the maximum capacity of the lock is reached, the water discharge through the navigation lock is estimated 12x116x17x6.5/(12x3600)=3.5 m3/sec average. Therefore, the water requirement for lock operation is quite low as compared with the present level of water discharge in the existing spillway and there will be expected no conflict between navigation and irrigation requirements.

5) Dredging of Rosetta Branch

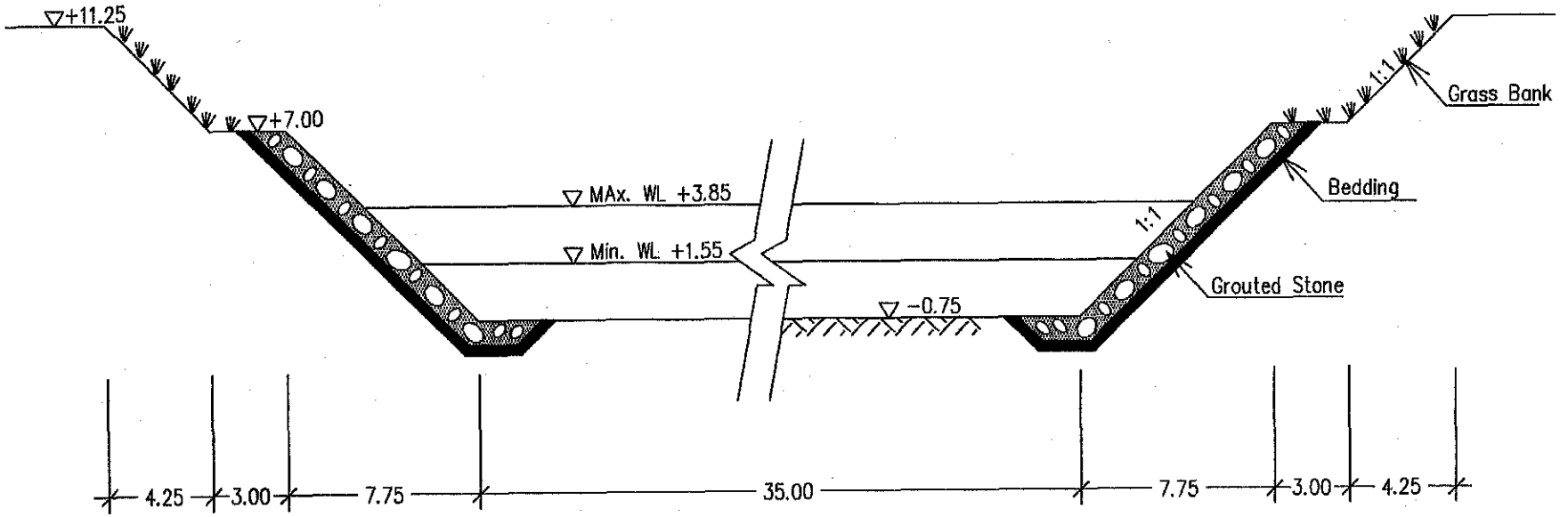
The 1st class navigation waterway is required to have a dimension of 35 m width, minimum 2.3 m water depth. In the new navigational connection along Rosetta Branch to Kafr El Zayat, present twin-ship unit of 102 m long, 7.5m wide and 1.8 m draft is expected to use so far. Therefore, since the Study Team evaluates that the fairway width of 3B (B= width of barge) deems sufficient for two ways navigational traffic, newly developed fairway along the Rosetta Branch in the short term

development plan will be deepened to have 2.3 m water draft under minimum water level for the whole year but be widened to 25 m (=approx 3B) so that the capital cost investment could be minimized.

As estimated in the master planning, the maintenance dredging will not be required along new connection canal at Bolin. But, the maintenance dredging for the newly dredged fairway along Rosetta Branch will be required at a rate of annual volume 3 % of the capital dredging. Therefore, an annual volume 14,400 cubic meters equivalent to 3 % of 480,000 cubic meters will be considered for maintenance dredging along the Rosetta Branch, the cost of which is estimated at an annual spending of 173 thousand L.E. for OM cost.



Canal Sec. Upstream



Canal Sec. Downstream

Figure 13.5.7 Typical Section of New Connection Canal

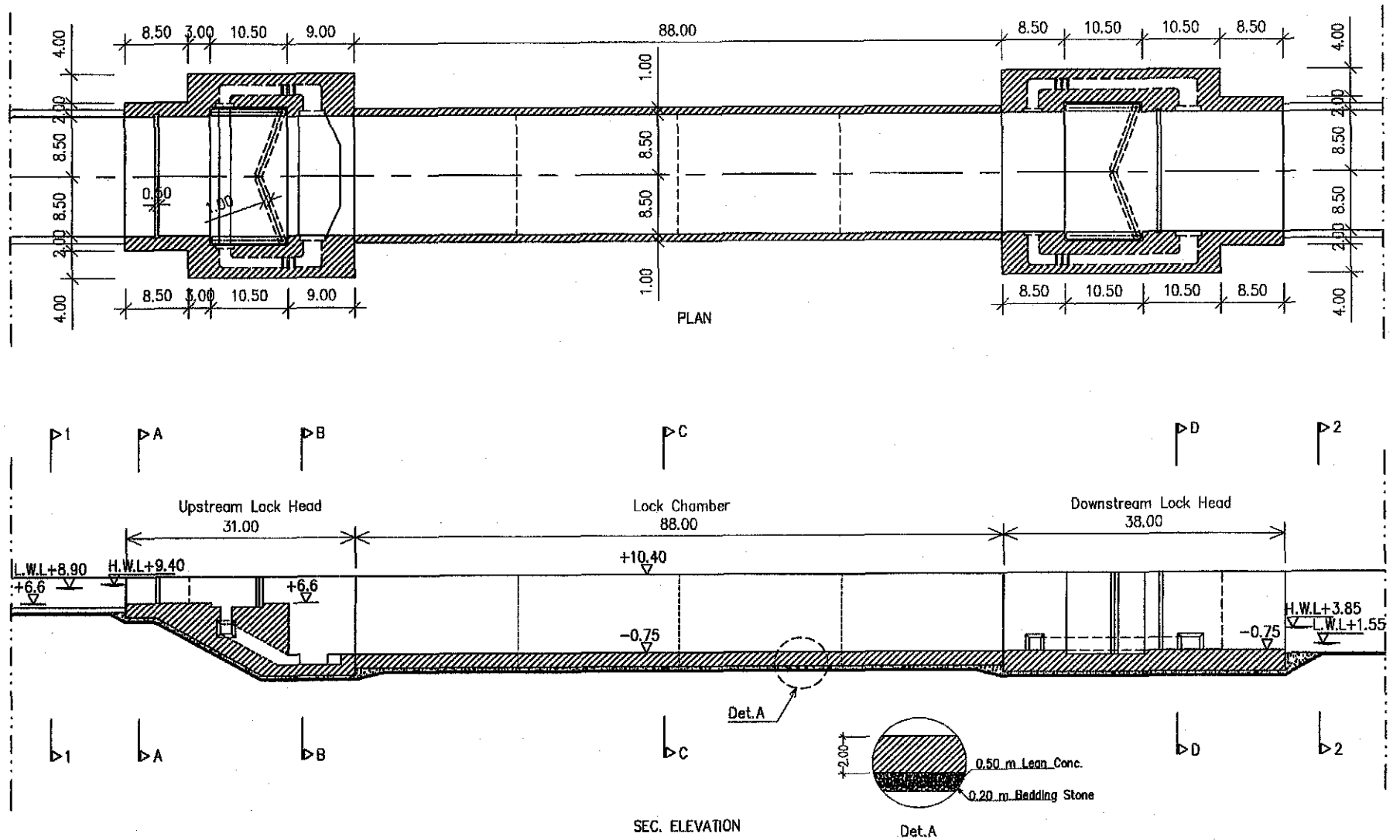


Figure 13.5.8 General Dimensions of Proposed Navigation Lock at Bolin

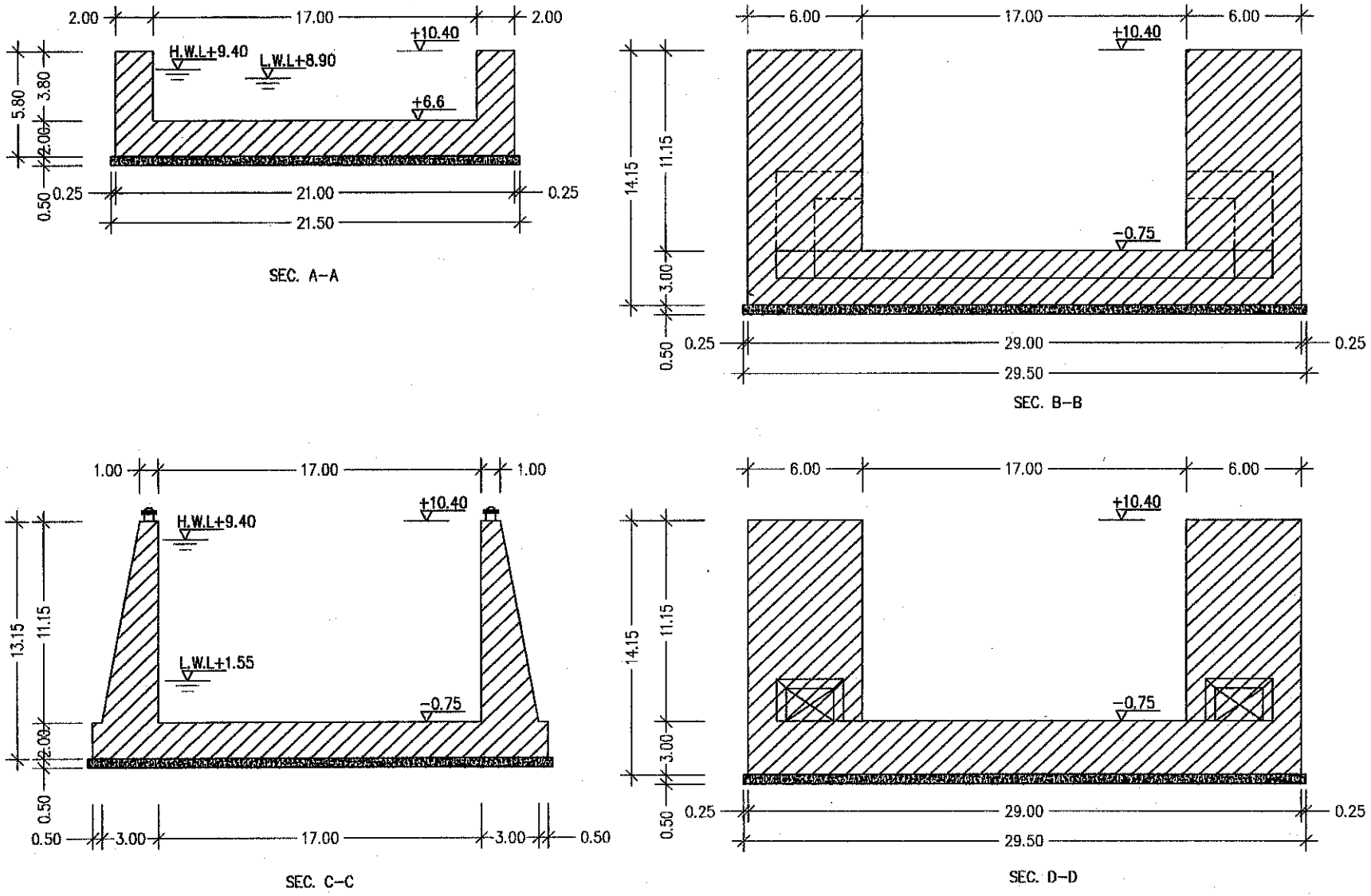


Figure 13.5.9 Sections of Proposed Navigation Lock at Bolin

13.5.3 Implementation Program of Each Project

(1) Method of Construction

1) Construction Materials

Such materials as sands, fill materials, stones, gravel, base coarse or crusher-run are locally available for use to structural foundation and earth works and will be transported by 20 tons (12 m^3 load) dump trucks from the borrow pits to the project sites.

Most of steel-products for use of the project construction are locally available in Egypt except for steel pipe piles and sheet piles which will be imported from outside countries due to non-availability in Egypt. ME equipment and materials including cargo handling machinery to be procured for navigation lock and public river port projects will be among those imported from outside counties.

Approximate quantity of major permanent construction materials (excluding ME and Cargo Handling Equipment) required for each project component is summarized as follows:

Table 13.5.2 Approx Quantity of Major Permanent Construction Materials

Major Construction Material	Unit	A1	A2	A3	B	C	Approx. Total
		Dredging & Bank Protection	Navigation Aids along Cairo/Alex	Alexandria Maritime Lock	Public River Port at Cairo	New Bolin Canal & Dredging	
Fill Sand	cu.m	Neg	Neg	2,500	5,500	66,400	71,900
Concrete (Plain)	cu.m	12,600	270	1,600	Neg	6,950	21,420
Concrete (RC)	cu.m	Nil	Nil	12,100	15,500	34,100	61,700
Reinforcing Steel Bar	ton	Nil	Nil	1,200	1,100	3,500	5,800
Asphalt Concrete	cu.m	Neg	Nil	60	820	3,300	4,180
Gravel	cu.m	21,000	2430	150	24,400	7,900	55,880
Armor Stones	cu.m	50,400	Nil	Neg	Neg	10,560	60,960
Steel Pipe Pile	ton	Nil	Nil	Nil	680	Nil	680
H-shaped Steel Pile	ton	Nil	Nil	Nil	70	Nil	70
Others for Building, etc.	l.s	Nil	Nil	l.s	l.s	l.s	1

Neg: Negligible

Nil.: None

2) Dredging Works

Dredged bed soils will be dumped at specific onshore disposal spots along the canal or river which is located within maximum 2 km distance form the dredging area, but the dredged river bed soil along

the Rosetta branch will be dumped into river water area beside the dredging spot.

In case of Alexandria Maritime lock extension work, due consideration should be exercised in disposal of contaminated soil. The seabed material excavated at the extension area of the site for maritime lock is considerably contaminated with heavy metal and, therefore, the subsoil excavated will be transported to the outer city area of Alexandria suitable for possible disposal.

The quantity of subsoil to be dredged from the projects is roughly estimated as follows:

Table 13.5.3 Estimated Volume of Dredging & Excavation required by the Project

Project Component	Soil Character	Quantity (m3)	Remarks
A. Alexandria/Cairo IW Project			
Improvement of IW by Dredging	Canal-Bed	355,000	
Navigation Aid System		Nil	
Extension of Alexandria Maritime Lock	Seabed	9,900	Contaminated by heavy metals
B. Ather El Nabi Public River Port Project	Canal Bed	120,000	Widening and Deepening
C. New Bolin Canal Project			
New Bolin Canal	River Bed	229,000	Widening and Deepening
Improvement of IW of Rosetta Branch	River Bed	480,000	
Total	Approx	1,212,000	

3) Construction of Alexandria Maritime Lock

All site works inclusive of demolition and in-situ reinforced concrete work will be carried out under dry work within a temporary shield double walls which will be installed along outer periphery of the space where the existing and the expansion of lock is positioned. The temporary shield double walls may be constructed by the use of double steel sheet piling wall driven to have sufficient embedment into subsoil rock layer. In considering hard subsoil deposits at the site, pile driving work is required to be done by supplementary water jet penetration or other suitable method of piling into hard layers.

Horizontal struts with waling at certain level intervals will be provided inside the double walls to support the both sides of walls.

Since the works for the extension of lock will be done within dry-up area by temporary shield wall at the site, the site construction work will decisively hamper the barge navigation at the adjacent Big Maleh lock and therefore due traffic control must be exercised during construction activities. A fast tracking method of construction is preferable to shorten the construction period as much as possible but it is estimated that one year period will be required to complete the lock extension work.

4) Ather El Nabi Public River Port Project

Once site clearance shall be completed, the temporary yard will be developed within the site area. The existing quay structures inclusive of container and general cargo terminal will be rehabilitated for the whole length by the use of steel pipe pile construction. Since the existing quay deck has been located upon the sloped canal bed along the existing branch canal bank, any driving work may be suitable to be carried out as offshore work using pile driving barge.

5) Construction of New Bolin Canal Project

For cost estimation, the following construction procedures are to be taken into account:

- Mobilization and demobilization of necessary equipment for dredging works inclusive of assembly of all necessary installation is initiated in the beginning of construction work. Surveying of river section before and after dredging works is carried out. Dredged riverbed soils along Rosetta branch is assumed to be discharged in the river water flow area beside the dredging site.
- To be firstly constructed will be the new barrage. Any in-situ concrete works for irrigation barrage will be carried out under dry works within a temporary cofferdam contingent on the local conditions for diversion of the water flow from the existing spillway.
- After completion of new barrage, existing spillway facilities will be demolished and the present spillway will be diverted into new waterway for the use of new barrage.
- New navigation lock construction will succeed new barrage and will be carried out under dry-up condition within the periphery of temporary cofferdam. Dry up work is also applied to construction of bank protection and canal excavation as well.

The existing water discharge will be maintained during whole construction work period. A series of construction works will be required two years period for its completion.

(2) Construction Time Schedule

1) Basic Assumption for Programming

The implementation of construction and equipment procurement will be scheduled under the following assumptions:

- Since each project component is related with each other aiming at an introduction of the improved inland navigational waterway for larger size of barge in 24 hrs operation, each project except for the project component C (Bolin Connection Canal Project) should be programmed to complete at the same time in future. Critical time pass for project completion will be estimated to fall in the project component A1: Dredging and Bank Protection, which will contain a hydrological/hydraulic study and engineering services for

the project construction. It is expected the earliest completion of projects except for project component C is 3 years after initiating the engineering service work.

- It is assumed that necessary financial arrangement for each project will be arranged till the time deadline so as to complete the works required for each project component within the expected time duration for implementation.

- Capital cost spending will start from engineering services for technical study or detailed design works required for each project component. Therefore, in programming of project implementation, overall project implementation time schedule is drawn up from initiation of engineering consulting service at the 1st year. Due to difference in the nature of project characters and the scope of works required for each project, engineering services for each project component are divided into separate service and assumed to be executed individually.

- It will be expected that the work for engineering services for the project could be commenced in early 2005 after necessary financial arrangement is successfully finalized within the likely period of 1 to 2 years spending. Therefore, the 1st year in the following time tables may be replaced by the year 2005.

- The likely period for bidding procedure is basically allocated 1 year in the time schedule for selection of a successful bidder through notice for bidding, pre-qualification of interested bidders and competitive bidding among pre-qualified bidders.

- One (1) year maintenance period is allocated in the time schedule for each project component, which is normally required for the contractor to maintain the work or procurement of cargo handling equipment under the contract.

2) Construction Time Schedule of Short-term Development Plan

Overall construction for projects in the short-term development plan is evaluated to take 5 years duration from commencement of engineering services for study or detailed design till completion of construction or procurement of equipment including maintenance period. Overall time schedule for construction works and equipment procurement is shown in the following construction time schedule of the short-term development plan. Overall time schedule is broken down into each project component as presented herein.

Table 13.5.4 Overall Project Implementation Time Schedule

Project Components	Year	1				2				3				4				5			
	Quarter	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
A Alexandria/Cairo IW Project																					
A1 Dredging and Bank Protection																					
1 Dredging/Bank Protection Construction																					
2 Engineering Services																					
Hydrological/Hydraulic Study																					
Detailed Design & Construction Supervision																					
A2 Procurement of Navigation Aids																					
1 Procurement of Equipment																					
2 Engineering Services																					
A3 Alexandria Maritime Lock Extention																					
1 Lock Construction																					
2 Engineering Services																					
B Ather El Nabi Public River Port Project																					
B1 River Port Terminal Construction																					
1 Civil Work Construction																					
2 Engineering Services																					
B2 Procurement of Cargo Handling Equipment																					
1 Procurement of Equipment																					
2 Engineering Services																					
C New Bolin Connection Canal Project																					
1 New Connection Canal Construction																					
2 Dredging of Rosetta Branch																					
3 Engineering Services																					
Expected Completion of Alexandira/Cairo Route																					
Expected Completion of New Connection Canal at Bolin																					

Remarks
- · Engineering Services for Technical Study, Detailed Design & Bid Documents Preparation
- · Bid Assistance for Pre-qualification & Evaluation of Bids for Contract
- · Construction or Equipment Procurement
- · Maintenance of Works done by the Contractor

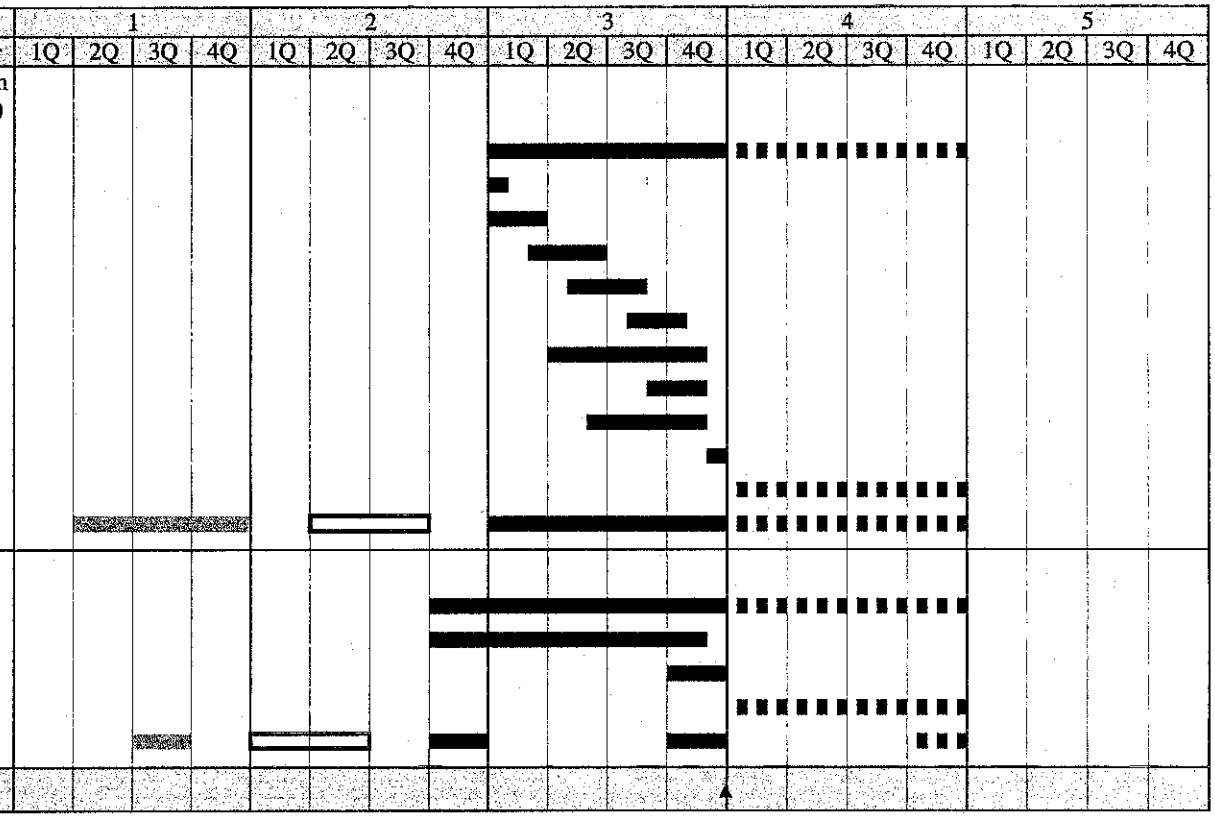
Table 13.5.5 Construction and Procurement Time Schedule of Alexandria/Cairo IW Project

Project Components	Quantity	Duration	Year	1				2				3				4				5			
			Quarter	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
A1 Dredging and Bank Protection																							
1 Dredging of Nobaria Canal	355,400 cu.m	(3 m)																					
2 Bank Protection																							
Construction	21,000 lin.m	(9 m)																					
Maintenance of Work	1.s	(12 m)																					
3 Engineering Services																							
Hydrological/Hydraulic Study	1.s	(15 m)																					
Engineering Services for Construction	1.s																						
A2 Procurement of Navigation Aids																							
1 Procurement of Equipment																							
Procurement and Site Installation	1.s	(9 m)																					
Maintenance of Work	1.s	(12 m)																					
2 Engineering Services	1.s																						
A3 Alexandria Maritime Lock Extension		(month)																					
1 Lock Extension Construction		(12 m)																					
Preparatory Works	1.s	(1 m)																					
Temporary Cofferdam Construction	1.s	(3 m)																					
Demolition of Part of Existing Lock	2,410 cu.m	(1 m)																					
Excavation of Seabed	9,860 cu.m	(1 m)																					
New Lock Extension Work	7,660 cu.m	(7 m)																					
Lock Side Revetment	5 lin.m	(1 m)																					
Misellaneous Works	1.s	(2 m)																					
Demolotion of Temporary Cofferdam	1.s	(1 m)																					
Site Clearance	1.s	(1 m)																					
2 Maintenance of Work	1.s	(12 m)																					
3 Engineering Services	1.s																						
Expected Completion of Alexandria/Cairo Route																							

Remarks : Engineering Services for Technical Study, Detailed Design & Bid Documents Preparation
: Bid Assistance for Pre-qualification & Evaluation of Bids for Contract
: Construction or Equipment Procurement
: Maintenance of Works done by the Contractor

Table 13.5.6 Construction and Procurement Time Schedule of Ather El Nabi Public River Port Project

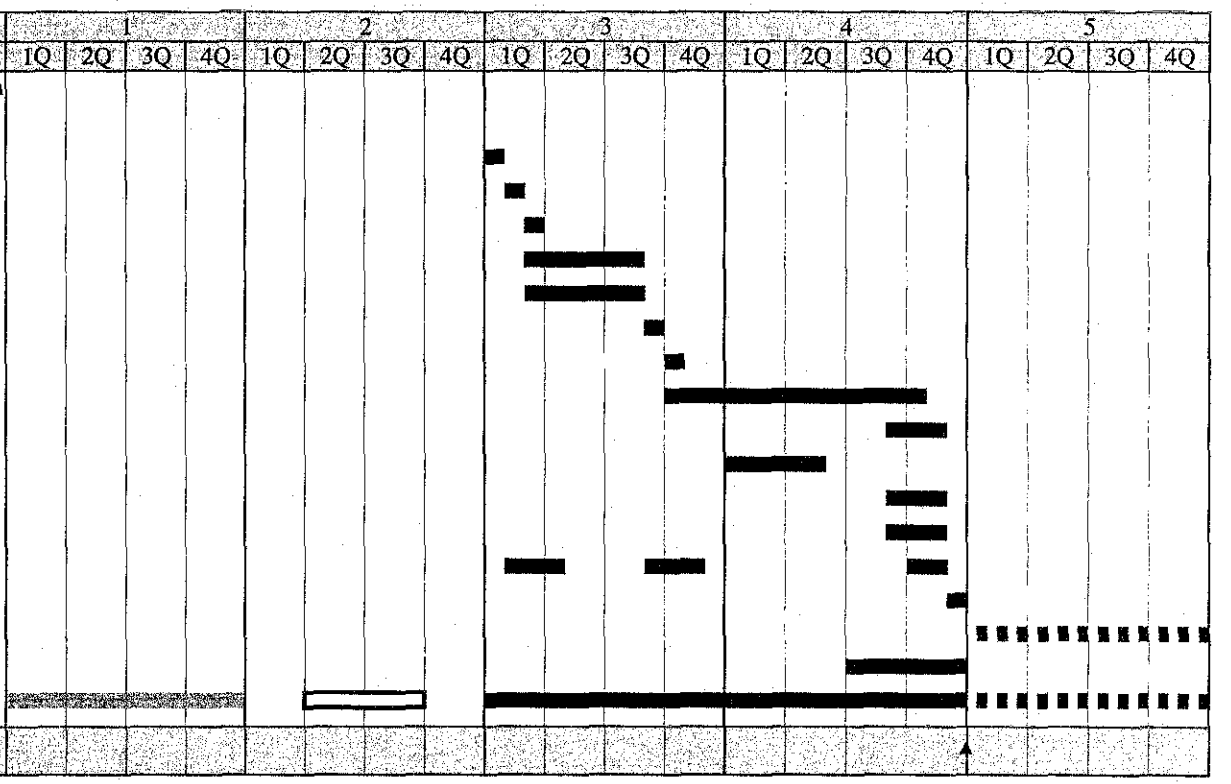
Project Components	Quantity	Duration (month)
B1 Ather El Babi Public River Port Construction		
1 Civil Work Construction		(12 m)
Site Clearance	65,000 sq.m	(1 m)
Demolition of Existing Quay	345 lin.m	(3 m)
Supplementary Pile Construction	150 nr	(4 m)
Quay Deck Reinforcement Work	3,280 cu.m	(4 m)
Quay Rehabilitation Work	460 lin.m	(3 m)
Terminal Yard Pavement	55,000 sq.m	(8 m)
Terminal Yard Utilities	55,000 sq.m	(3 m)
Terminal Building , Fence & Gate Works	l.s	(6 m)
Site Clearance	l.s	(1 m)
2 Maintenance of Work	l.s	(12 m)
3 Engineering Services		
B2 Procurement of Cargo Handling Equipment		
1 Procurement, Site Delivery & Installation		(15 m)
Procurement & Site Delivery	l.s	(14 m)
Site Installation and Commissioning	l.s	(3 m)
2 Maintenance of Work	l.s	(12 m)
3 Engineering Services		
Expected Completion of Alexandira/Cairo Route		



Remarks
: Engineering Services for Technical Study, Detailed Design & Bid Documents Preparation
: Bid Assistance for Pre-qualification & Evaluation of Bids for Contract
: Construction or Equipment Procurement
: Maintenance of Works done by the Contractor

Table 13.5.7 Construction Time Schedule of New Bolin Connection Canal Project

Project Components	Quantity	Duration (month)
1 New Connection Canal Construction		
Site Preparation	l.s	(1 m)
Cofferdam Construction	l.s	(1 m)
Demolition of Existing Cascades	l.s	(1 m)
Barrage Construction	11.5 lin.m	(6 m)
South Bank Area Construction	1,125 sq.m	(6 m)
Shift of Cofferdam for Diversion of Spillway	l.s	(1 m)
Demolition of Existing Barrage	l.s	(1 m)
Lock RC Structure Construction	21,900 cu.m	(13 m)
Lock ME Installation	l.s	(3 m)
North Bank Area Construction	3,525 sq.m	(6 m)
Cross Bridge Construction	l.s	(3 m)
Misellaneous Works	l.s	(3 m)
Canal Excavation inc.Demolition of Cofferdar	229,000 cu.m	(8 m)
Site Clearance	l.s	(1 m)
2 Maintenance of New Canal Work	l.s	(12 m)
3 Dredging of Rosetta Branch	480,000 cu.m	(6 m)
3 Engineering Services		
Expected Completion of New Canal & Rosetta Branch		



Remarks : Engineering Services for Technical Study, Detailed Design & Bid Documents Preparation
: Bid Assistance for Pre-qualification & Evaluation of Bids for Contract
: Construction or Equipment Procurement
: Maintenance of Works done by the Contractor

13.5.4 Cost Estimate of Projects

(1) Basis of Cost Estimate

1) Unit Rates

There is no bulletined data on currently prevailing unit prices for the construction industry in Egypt. Therefore, the related prices of materials, construction machinery and equipment locally available in the country are determined for the specific requirements for the envisaged geographical location and magnitude of the project with due consideration of construction program for possible implementation.

Preliminary estimates by the Study Team on unit costs in terms of currently prevailing costs as of September 2002 are tabulated in Table 13.5.8. The unit rates are derived from the countercheck on the precedents of construction works executed in Egyptian market in recent past years.

Table 13.5.8 Unit Prices for Construction Materials, Works, Fuel and Manpower

As of September 2002

	Item	Specifications	Unit	Price (L.E.)	Remarks
A	**Fill, Stone and Rocks**				
1	Fill Sands		M3	15	
2	Crushed Gravels		M3	40	
3	Rocks	1kg – 500 kg	M3	40 -80	Plus L.E.30 for transport
4	Rocks	2 –5 tons	M3	100	outside Suez or Cairo
B	**Concrete & Asphalt**				
1	Cement	Type V	Ton	250	
2	Cement	Type I	Ton	220	
2	Fine Aggregates		M3	25	
3	Coarse Aggregates		M3	50	
4	Asphalt		M3	180	
C	**Steel Products**				
1	Reinforcing Bars	Round	Ton	1,200	
2	Reinforcing Bars	Deformed	Ton	1,400	
3	Structural Steels	Shaped Steels	Ton	2,450	
4	Steel Sheet Piles		Ton	3,800	Import
5	Steel Pipe Piles		Ton	4,100	Import
D	**Concrete Products**				
1	Ready Mixed Concrete	Only major city area available	M3	330	10km distance from Major city area
2	RC Pile	400 mm square	l.m	240	
3	RC Pile	600 mm dia.	l.m	960	
E	**Fuel and Electric Power**				
1	Marine Diesel		ltr	0.183	In case of supply through
2	Diesel Oil		ltr	0.40	Local contractor
3	Gasoline		ltr	1.00	
4	Electricity		kWh	0.25	
F	**Construction Works (excluding material costs)**				
1	Site Clearance		M2	5	
2	Site Stripping		M3	5	

- continued

	Item	Specifications	Unit	Price (L.E.)	Remarks
3	Excavation		M3	15	
4	Dredging Channel	Discharge within 2 km	M3	23	Inc. mobilization
5	Reclamation Fill		M3	6	
6	Sandy Fill		M3	10	
7	Lean Concrete		M2	15	
8	Formwork	simple	M2	20	
9	Ditto	complicated	M2	45	
9	Base Coarse	t= 40 cm	M2	15	
10	Sub-Base Coarse	t=50 cm	M2	10	
11	Asphalt Pavement	t=10 cm	M2	23	
12	Ditto	t=15 cm	M2	30	
13	Paving Concrete	t=20 cm	M2	100	
14	Steel Sheet Piling	Offshore Work	M2	180	Ordinary subsoil
15	Structural RC Concrete	Inc. scaffolding	M3	920	
16	Piling Works	1,000 mm dia.	l.m	900	
17	Ditto	400-600 mm dia.	l.m	450	
18	Groin and Dike	1-40 kg Rock placing	M3	75 - 120	
19	Canal Bank Protection	80cm Stone Layers	M2	45 - 90	
20	Masonry Works		M3	75 - 150	For revetment
21	Seeding		M2	18	
G	**Building Works**				
1	Office Building		M2	1,000	Including Materials
2	Workshop		M2	700	
3	Shed		M2	450	
4	Wall Fence		M2	225	
H	**Manpower**				
1	Unskilled Worker	8 hrs/day	m.d	30	
2	Skilled Worker	8 hrs/day	m.d	50	
3	Operator	8 hrs/day	m.d	60	Including insurance and
4	Offshore Worker	8 hrs/day	m.d	50	social expenses
5	Captain	8 hrs/day	m.d	60	
6	Diver	8 hrs/day	m.d	250	
7	Foreman	8 hrs/day	m.d	60	

2) Project Cost Components

The cost of construction is derived from such major cost components for construction as direct costs for materials cost, depreciation of construction equipment and machinery, labor wages and indirect costs incidental to various construction activities. The indirect cost components will be a sum of overhead expenses required to providing temporary works for the site, mobilization cost, managing and operational overheads for site and in common needs and overhead profits.

The project cost estimate will be broken down into the following cost components below. Indirect cost component is approximately obtainable by adopting certain ratio against direct cost of construction for estimating the total cost of the project. The ratio to be applicable for certain project will be obtained through the scrutiny on the precedent of other project costing for similar project.

(a) Construction Cost Components

The overall construction cost consists of direct cost for each construction components which includes indirect cost components in this cost estimate.

The major components of direct cost are material, construction equipment and labor costs which are estimated based currently prevailing cost thereof. The following cost components are taken into account:

- Mobilization and demobilization costs for construction
- CIF costs of imported items plus local transport costs in Egypt
- Present costs of locally available materials and fuels
- Present level of locally available equipment cost or hire rates
- Present level of salaries and wages

The cost of mobilization and demobilization for construction is included in cost estimate for construction equipment, labor and materials necessary to be mobilized from and demobilized to the sources of origin by means of maritime transportation from abroad and inland transportation to the site. But, since the mobilization cost for construction works varies depending upon specific construction program for implementation by the contractor, the mobilization/demobilization costs may be obtained by applying a certain rate against direct construction cost. In calculating direct cost components, all quantities of construction work items are based on layout plan and basic design of proposed facilities as indicated in the design Figures.

Such indirect construction costs as 1) common temporary site facilities, site office and its expenses, site survey and testing laboratory, operation cost at the site, and 2) overhead and profit deem to be included in each construction cost component in this cost estimate. The following rates for

indirect cost components is deemed to consider in this study which will be reasonable in view of precedent of on-going projects in Egypt.

Site Temporary Work	3 to 6 % of Direct Cost
Overhead	12% of Direct Cost
Profit	10% of Direct Cost

(b) Engineering Service Cost

Engineering study is basically required to carry out basic and detailed design of proposed facilities, preparation of tender documents and construction supervision. In common infrastructure projects, Egyptian engineers or consulting firms could work out satisfactory to these engineering services. But, in case of the projects proposed in this Study, fully experienced professional engineering consultants are assumed to be employed in a series of engineering services from study or design stage to construction supervision and maintenance.

In the cost estimate for projects formulated in this study, the necessary cost to procure engineering services will be added at a rate of about 5% to 8 % against the total construction cost for construction of infrastructures or 2.5 to 3 % for the procurement of machinery and equipment. In the execution of engineering services in Egypt, General Technical & Department Tax of 6 to 9 % against the contract amount may be required by the engineering firm who undertakes the engineering services. But, this tax for engineering services is excluded in this cost estimate.

(c) Contingencies

The contingencies for the project consist of physical and price contingencies. Considering recent climate of international and domestic market, physical and price contingency for the project is taken at a rate of 10 % of the construction cost and 3 % for the procurement of equipment.

3) Procurement Cost for Equipment and Machinery

For the river port construction or other projects related to inland waterway, normal type equipment will be obtainable at local market. But, such specific equipment or machinery as cargo handling equipment, navigation aids, lock gate opening mechanics etc. may be procured through importation from manufacturing countries under the project base. The cost for procurement of equipment consists of purchasing cost on CIF basis, installation cost, mobilization cost and the overhead. Basically, the procurement cost of equipment and machinery will include additional costs for the spare parts for three (3) years operation.

The construction machinery and equipment which is not available in Egypt and are temporary imported from abroad for construction purpose will be estimated as mobilization cost or

machinery cost of direct cost item.

4) Unit Prices and Exchange Rates of Currencies

The project cost is estimated based on currently prevailing unit costs as of 2002. The following foreign exchange rate is applied:

US$=4.6 L.E.= JP¥en 120.00

The project cost is expressed in L.E. (Egyptian Pound) for foreign and local currency portions and the total amount of the project cost will be expressed in L.E. through currency conversion based on the above foreign currency exchange rate

5) Local and Foreign Cost Components

The construction costs of major cost components such as locally available construction materials, fuel and electricity and present level of salaries and wages for manpower costs will be classified into local cost portion and are expressed in terms of Egyptian Pound (L.E.)

Such specific equipment/machinery which may be procured through importation from the manufacturing countries or foreign skilled manpower to be deployed for the construction is estimated as foreign cost portion and are expressed in terms of Egyptian Pound (L.E.).

(2) Cost Estimate of Each Project Component

1) Major Facilities of the Project

Major works and the work quantity of each project component for the short-term development plan are summarized in Table 13.5.9.

Table 15.3.9 Major Facilities of the Project

Project Components	Major Work Item		
	Item	Unit	Quantity
A. Alexandria/Cairo IW Project			
A1. Dredging and Bank Protection	(1) Dredging Nobaria Canal	cu.m	355,400
	(2) Bank Protection	l.m	21,000
A2. Navigation Aids	(1) Light Beacon	nr	540
	(2) Bridge Traffic Lights	set	35
A3. Alexandria Maritime Lock Extension	(1) Demolition of Existing Lock Structure	cu.m	2,410
	(2) New Lock Extension RC	cu.m	11,100
B. Cairo Public River Port Project			
B1. Container Terminal	(1) Reinforcement of Existing Quay	l.m	115
	(2) Rehabilitation of Existing Quay	l.m	230
	(3) Terminal Yard	sq.m	44,000
B2. General Cargo Terminal	(1) Reinforcement of Existing Quay	l.m	230
	(2) Rehabilitation of Existing Quay	l.m	230
	(3) Terminal Yard	sq. m	11,000
B3.Procurement of Cargo Handling Equipment	(1) Quayside Mobile Crane	nr	2
	(2) RTG Container Yard Crane	nr	5
	(3) Tractor Head	nr	6
	(4) Trailer	nr	6
	(5) Truck Crane for General Cargo	nr	4
	(6) Lift Truck	nr	8
	(7) Truck Scale	nr	1
C. New Bolin Connection Canal Project			
	(1) Deepening & Widening Canal	cu.m	229,000
	(2) Navigation Lock (L=116m, W=17m)	nr	1
	(3) Irrigation Barrage	nr	1
	(4) Cross Bridge	nr	1
	(5) Dredging Rosetta Branch & Disposal	cu.m	480,000

2) Overall Project Costs

Overall Project Cost (Capital Cost Requirement) for the short-term development plan is estimated as summarized in the following tables.

Total overall project cost for short-term development plan is estimated at 295 million Egyptian Pound (L.E.) as shown in Table 13.5.10. The foreign and local currency portion of the total project cost is 152 million L.E. (33 million US$) and 143 million L.E (31 million US$), which is equivalent to 52 % and 48 % for the total cost of the project, respectively. The cost estimated for each project component is broken down into sub-item costs of major works as shown in Table 13.5.11.

In addition, the breakdown cost for cost category of foreign and local currency component is estimated as shown in Table 13.5.12 for each project component.

Table 13.5.10 Capital Cost for the Projects

Cost in 1,000L.E

Project Component	Cost Category	Total Cost	Foreign	Local
A. Alexandria/Cairo IW Project				
A1.Dredging & Bank Protection	1) Civil Work	25,981	2,979	23,002
	2) Engineering Services	2,779	1,315	1,463
	3) Contingencies	2,876	429	2,447
	Total Cost	31,636	4,724	26,912
A2.Procurement of Navigation Aids	1) Procurement	20,263	18,256	2,007
	2) Engineering Services	608	456	152
	3) Contingencies	626	561	65
	Total Cost	21,497	19,273	2,224
A3.Alexandria Lock Extension	1) Civil Work	54,993	27,059	27,934
	2) Engineering Services	3,224	1,972	1,252
	3) Contingencies	5,265	2,474	2,790
	Total Cost	63,481	31,505	31,976
B. Cairo Public River Port Project				
B1.River Port Construction	1) Civil Work	31,901	11,856	20,046
	2) Engineering Services	2,552	1,276	1,276
	3) Contingencies	3,445	1,313	2,132
	Total Cost	37,899	14,445	23,454
B2.Procurement of Equipment	1) Procurement	56,420	52,492	3,928
	2) Engineering Services	1,411	1,058	353
	3) Contingencies	1,735	1,606	128
	Total Cost	59,565	55,156	4,409
C. New Bolin Connection Canal Project	1) Civil Work	69,802	22,908	46,893
	2) Engineering Services	5,103	2,497	2,607
	3) Contingencies	6,313	1,646	4,667
	Total Cost	81,218	27,051	54,167
Overall Project Cost (A+B+C)				
(1) Civil Work Construction (A1+A3+B1+C)	1) Civil Work	182,677	64,802	117,875
	2) Engineering Services	13,658	7,060	6,598
	3) Contingencies	17,899	5,862	12,036
	Total Cost	214,234	77,725	136,509
(2) Procurement of Equipment (A2+B2)	1) Procurement	76,683	70,748	5,935
	2) Engineering Services	2,019	1,514	505
	3) Contingencies	2,361	2,167	193
	Total Cost	81,062	74,429	6,633
(3) Grand Total (Civil Work Construction + Equipment Procurement)		295,296	152,154	143,142

Table 13.5.11 Breakdown Cost for Each Project Component

(1) Project Component A1: Dredging and Bank Protection along Cairo-Alexandria Route

No.	Description	Unit	Quantity	Unit Price (L.E)	Cost	F/C (1000L.E.)	L/C
1	**Civil Work**						
1.1	Dredging Works				**7,419**	**0**	**7,419**
	Reach-1: Dredging and Disposal at 2km Distance	cu.m	0	23	0	0	0
	Reach-2: Dredging and Disposal at 2km Distance	cu.m	0	23	0	0	0
	Reach-3: Dredging and Disposal at 2km Distance	cu.m	0	23	0	0	0
	Reach-4: Dredging and Disposal at 2km Distance	cu.m	10,000	23	230	0	230
	Reach-5: Dredging and Disposal at 2km Distance	cu.m	250,800	23	5,768	0	5,768
	Reach-6: Dredging and Disposal beside Dredging Spot	cu.m	94,700	15	1,421	0	1,421
1.2	Bank Protection				**18,562**	**2,979**	**15,583**
	Temporary Sealing Embankment	l.m	21,000	216	4,536	680	3,856
	Excavation	cu.m	210,000	15	3,150	473	2,678
	Protection by Grouted Stones	sq.m	105,000	90	9,450	1,418	8,033
	Bedding Gravel Course	cu.m	21,000	6	126	19	107
	Dewatering	l.s	1		1,300	390	910
	Sub Total of Item 1				**25,981**	**2,979**	**23,002**
2	**Engineering Service Cost**						
2.1	Hydrological/Hydraulic Study						
	Survey and Sounding	l.s	1		450	113	338
	Hydrological/Hydraulic Study on Nobaria Canal	l.s	1		770	424	347
2.2	Engineering Service for Design & Construction (6% of Item 1)	l.s	1		1,559	779	779
	Sub Total of Item 2				**2,779**	**1,315**	**1,463**
3	**Contingencies (10% of Items 1 & 2)**				**2,876**	**429**	**2,447**
	Total Project Component Cost				**31,636**	**4,724**	**26,912**

(2) A2:Procurement of Navigation Aids System

No.	Description	Unit	Quantity	Unit Price (L.E)	Cost	F/C (1000L.E.)	L/C
1	**Procurement of Navigation Aids Equipment**						
1.1	Supply and Delivery of Navigation Aids Equipment				**17,870**	**16,977**	**894**
	Pole Type Light Beacon with Solar Panel & Battery	nr	540	30,500	16,470	15,647	824
	A set of Traffic Signal Lights at Bridge	set	35	40,000	1,400	1,330	70
1.2	Site Installation of Navigation Aids				**1,420**	**355**	**1,065**
	Pole Type Light Beacon with Base Concrete	nr	540	2,500	1,350	338	1,013
	Traffic Signal Light at Bridge	nr	35	2,000	70	18	53
1.3	Spare Parts				**973**	**924**	**49**
	Light Beacon	nr	27	29,000	783	744	39
	A Set of Traffic Signal Light at Bridge	set	5	38,000	190	181	10
	Sub Total of Item 1				**20,263**	**18,256**	**2,007**
2	**Engineering Services (3 % of Item 1)**				**608**	**456**	**152**
3	**Contingencies (3 % of Item 1 & 2)**				**626**	**561**	**65**
	Total Cost				**21,497**	**19,273**	**2,224**

(3) Project Component A3: Extension of Alexandria Maritime Lock

No.	Description	Unit	Quantity	Unit Price (L.E)	Cost	F/C (1000L.E.)	L/C
1	**Maritime Lock Extension Civil Work**						
1.1	Temporary Sealing Double Wall Construction				**32,650**	**17,843**	**14,808**
	Steel Sheet Pile Wall (Single Wall for One Side)	ton	450	3,800	1,710	1,454	257
	Diving of Steel Sheet Piles	lin.m	230	103,000	23,690	14,214	9,476
	Placing Waling and Struds	ton	260	7,500	1,950	975	975
	Dewaterring during Construction of Lock Extension	l.s	1		4,000	1,200	2,800
	Demolition of Temporary Wall	l.s	1		1,300	0	1,300
1.2	Demolition of Existing Lock	cu.m	2,410	500	**1,205**	**181**	**1,024**
1.3	Sheeted Excavation of Seabed & Disposal				**1,498**	**155**	**1,343**
	Subsurface Seabed Soils	cu.m	5,160	90	464	0	464
	Hard Stone Deposit	cu.m	4,700	220	1,034	155	879
1.4	Lock Extension				**11,332**	**2,833**	**8,499**
	Lock Chamber Lean Concrete	cu.m	1,600	400	640	160	480
	Lock Chamber Reinforced Concrete	cu.m	6,060	920	5,575	1,394	4,181
	Expansion Joint	l.s	1		110	28	83
	Upstream Lock Head Lean Concrete	cu.m	890	400	356	89	267
	Upstream Lock Head Reinforced Concrete	cu.m	5,055	920	4,651	1,163	3,488
1.5	Miscellaneous Work for Lock Extension	l.s	1		**100**	**50**	**50**
1.6	Lock Side Revetment				**508**	**119**	**389**
	Revetment Wall	l.m	5	85,000	425	106	319
	Backfilling	cu.m	2,535	25	63	10	54
	Pavement	sq.m	390	50	20	3	17
1.8	Control Building	l.s	1	120,000	**120**	**18**	**102**
	Sub Total of Civil Work				**47,413**	**21,198**	**26,215**
	Engineering Services (6% of Civil Work Cost)				**2,845**	**1,707**	**1,138**
	Contingencies (10% of Civil Work & Engineering)				**5,026**	**2,290**	**2,735**
	Total Cost				**55,284**	**25,195**	**30,088**
2	**Mechanical & Electrical Equipment**						
2.1	Mechanical Equipment				**6,830**	**5,254**	**1,577**
	Upstream Gate	l.s	1		1,800	1,260	540
	Operation System	l.s	1		500	425	75
	Stoplogs	l.s	1		900	630	270
	Bybass Culvert	l.s	1		980	686	294

| No. | Description | Unit | Quantity | Unit Price (L.E) | Cost | F/C (1000L.E.) | L/C |

Miscellaneous	ls	1	2,650	2,253	398
2.2 Electrical Equipment			**750**	**608**	**143**
Electric System Network	ls	1	490	417	74
Yard Lighting	ls	1	200	140	60
Miscellaneous	ls	1	60	51	9
Sub Total of ME Work			**7,580**	**5,861**	**1,719**
Engineering Services (5.0 % of ME Work Cost)			**379**	**265**	**114**
Contingencies (3 % of ME & Engineering)			**239**	**184**	**55**
Total Cost			**8,198**	**6,310**	**1,888**
Total of Civil & ME Construction			**54,993**	**27,059**	**27,934**
Total of Engineering Services			**3,224**	**1,972**	**1,252**
Contingencies			**5,265**	**2,474**	**2,790**
Total Project Component Cost			**63,481**	**31,505**	**31,976**

(4) Project Component B1: Cairo River Port (Ather El Nabi)

No.	Description	Unit	Quantity	Unit Price (L.E)	Cost	F/C (1000L.E.)	L/C
1	Container Terminal Construction						
1.1	Site Clearance				**890**	**0**	**890**
	Site Clearance	sq.m	50,000	1	50	0	50
	Stripping & Stuffing Existing Warehouse	sq.m	1,200	700	840	0	840
1.2	Demolition of Part of Existing Quay Deck	lin.m	115	3,500	**403**	**81**	**322**
1.3	Reinforcement of Existing Quay (L=115m)				**3,770**	**1,850**	**1,920**
	Supplementary Deck Foundation Pile	nr	51	32,350	1,650	1,320	330
	RC Beam & Slab	cu.m	1,000	1,920	1,920	480	1,440
	Miscellaneous	l.s	1		200	50	150
1.4	Rehabilitation of Existing Quay Including Waiting Berth	lin.m	230	1,600	**368**	**276**	**92**
1.5	Yard Pavement	sq.m	44,000	100	**4,400**	**1,100**	**3,300**
1.6	Yard Utility	sq.m	44,000	30	**1,320**	**330**	**990**
2	General Cargo Berth						
2.1	Site Clearance	l.s	15,000	1	**15**	**0**	**15**
2.2	Demolition of Part of Existing Quay Deck	lin.m	230	3,500	**805**	**161**	**644**
2.3	Reinforcement of Existing Quay (L=230m)				**7,458**	**3,626**	**3,832**
	Supplementary Deck Foundation Pile	nr	99	32,350	3,203	2,562	641
	RC Beam & Slab	cu.m	2008	1,920	3,855	964	2,892
	Miscellaneous	l.s	1		400	100	300
2.4	Rehabilitation of Existing Quay	lin.m	230	1,600	**368**	**276**	**92**
2.5	Yard Pavement	sq.m	11,000	100	**1,100**	**275**	**825**
2.6	Yard Utility	sq.m	11,000	30	**330**	**83**	**248**
3	Terminal Building Works				**5,715**	**3,139**	**2,576**
	CFS	sq.m	3,000	700	2,100	1,260	840
	Administration Building	sq.m	500	1,000	500	200	300
	Workshop Building	sq.m	1,000	700	700	420	280
	Shed	sq.m	2,700	450	1,215	729	486
	Other Terminal Buildings & Fence/Gate	l.s	1		1,200	530	670
4	Branch Canal & Access Road				**4,960**	**660**	**4,300**
	Dredging Canal	cu.m	120,000	23	2,760	0	2760
	Aids to Navigation	l.s	1		200	160	40
	Access Road	l.s	1		2,000	500	1500
	Sub Total of Civil Work				**31,901**	**11,856**	**20,046**
	Engineering Services (8% of Civil Work Cost)				**2,552**	**1,276**	**1,276**
	Contingencies (10% of Civil Work & Engineering)				**3,445**	**1,313**	**2,132**
	Total Project Component Cost				**37,899**	**14,445**	**23,454**

(5) Project Component B2: Procurement of Cargo Handling Equipment for Cairo River Port Construction

No.	Description	Unit	Quantity	Unit Price (L.E)	Cost	F/C (1000L.E.)	L/C
1	**Cargo Handling Equipment**						
	Movable Quayside Crane for Container	nr	2	9,010,000	18,020	17,119	901
	Container Yard Transfer Crane (RTG 40 ton cap.)	nr	5	4,700,000	23,500	21,150	2,350
	Tractor Head (40')	nr	6	400,000	2,400	2,328	72
	Trailer (40')	nr	6	200,000	1,200	1,164	36
	Quayside Truck Crane for General Cargo (60-80 ton cap)	nr	4	2,000,000	8,000	7,600	400
	Lift Truck (3 tons cap)	nr	3	200,000	600	582	18
	Lift Truck (5 tons cap)	nr	4	300,000	1,200	1,164	36
	Lift Truck (10 tons cap)	nr	1	500,000	500	485	15
	Truck Scale (80 tons)	nr	1	1,000,000	1,000	900	100
	Sub Total				**56,420**	**52,492**	**3,928**
2	**Engineering Services (2.5% of ME Work Cost)**				**1,411**	**1,058**	**353**
3	**Contingencies (3% of Equipment Cost & Engineering)**				**1,735**	**1,606**	**128**
	Total Project Component Cost				***59,565***	**55,156**	***4,409***

(6) Project Component C: New Connection Canal at Bolin

No.	Description	Unit	Quantity	Unit Price (L.E)	Cost	F/C (1000L.E.)	L/C
1	**New Connection Canal Civil Construction Work**						
1.1	Land Acquisition	sq.m	25,000	50	**1,250**	**0**	**1,250**
1.2	Demolition of Existing Spillway Facilities				**430**	**63**	**367**
	Existing Barrage	l.s	1	400,000	400	60	340
	Existing Cascades	nr	5	6,000	30	3	27
1.3	Widening & Deepening Canal				**8,620**	**1,485**	**7,135**
	Canal Excavation	cu.m	229,000	15	3,435	515	2,920
	Disposal of Excavated Soils	cu.m	165,000	5	825	124	701
	Sloped Grouted Stone Bank Protection	sq.m	22,000	90	1,980	297	1,683
	Sloped Grass Bank Protection	sq.m	9,200	50	460	69	391
	Canal Bank Road Pavement	sq.m	14,400	50	720	180	540
	New Cross Bridge	l.s	1	1,100,000	1,100	275	825
	Miscellaneous	l.s	1	100,000	100	25	75
1.4	Navigation Lock Construction				**25,906**	**6,380**	**19,525**
	Cofferdam for Spillway Diversion	l.s	1	660,000	660	99	561
	Dewatering during Lock Construction	l.s	1	100,000	100	30	70
	Bedding Gravel for Lock	cu.m	950	50	48	7	40
	Lean Concrete for Lock	cu.m	2,400	350	840	210	630
	Lock Chamber RC	cu.m	10,000	920	9,200	2,300	6,900
	Upstream Lock Head RC	cu.m	5,200	920	4,784	1,196	3,588
	Downstream Lock Head RC	cu.m	6,700	920	6,164	1,541	4,623
	Bollard and Other Fittings for Lock	l.s	1	500,000	500	250	250
	North Bank Area around Lock	sq.m	3,500	840	2,940	588	2,352
	Canal-bed Protection at Approach	sq.m	850	200	170	34	136
	Miscellaneous	l.s	1	500,000	500	125	375
1.5	Guard Island Wall				**7,405**	**1,744**	**5,661**
	Wall Revetment	l.m	250	24,700	6,175	1,544	4,631
	Fill for Guard Wall Area	cu.m	37,000	25	925	139	786
	Pavement at Guard Wall Area	sq.m	3,100	50	155	39	116
	Control Building, etc.	l.s	1	150000	150	23	128
1.6	New Barrage Construction				**4,409**	**1,018**	**3,391**
	Cofferdam for Spillway Diversion	l.s	1	60,000	60	9	51
	Dewatering during Barrage Construction	l.s	1	50,000	50	15	35
	New Barrage RC	l.s	1	2,180,000	2,180	545	1,635
	Operation Bridge RC	l.s	1	312,000	312	78	234
	Canal-bed Protection at Up- and Down-stream	sq.m	690	200	138	28	110
	South Bank Area at Barrage	sq.m	1,130	1,300	1,469	294	1,175

No.	Description	Unit	Quantity	Unit Price (L.E)	Cost	F/C (1000L.E.)	L/C
	Miscellaneous for Barrage	l.s	1	200,000	200	50	150
2	**Dredging & Disposal at the Rosetta Branch**	cu.m	480,000	12	**5,760**	0	**5,760**
	Sub Total of Item 1 & 2				**53,780**	**10,690**	**43,089**
	Engineering Services (8.0% of Civil Work Cost)				**4,302**	**1,936**	**2,366**
	Contingencies (10% of Civil Work & Engineering)				**5,808**	**1,263**	**4,546**
	Total Cost				**63,890**	**13,889**	**50,001**
3	**Mechanical & Electrical Equipment**						
3.1	Lock Mechanical Equipment				**13,126**	**9,971**	**3,155**
	Upstream Gate	l.s	1	1,280,000	1,280	896	384
	Downstream Gate	l.s	1	2,776,000	2,776	1,943	833
	Gate Operation System	l.s	1	1,020,000	1,020	867	153
	Bypass Culverts	l.s	1	1,820,000	1,820	1,274	546
	Stoplogs	l.s	1	2,030,000	2,030	1,421	609
	Miscellaneous	l.s	1	4,200,000	4,200	3,570	630
3.2	Lock Electrical Equipment				**1,996**	**1,697**	**299**
	System Network	l.s	1	1,500,000	1,500	1275	225
	Yard Lighting	l.s	1	166,000	166	141	25
	Miscellaneous	l.s	1	330,000	330	281	50
3.3	Barrage Mechanical Equipment				**900**	**550**	**350**
	Regulator Gates	l.s	1	500,000	500	350	150
	Gate Operation System	l.s	1	400,000	400	200	200
	Sub Total of ME Work (Item 3)				**16,022**	**12,218**	**3,804**
	Engineering Services (5.0% of ME Work Cost)				**801**	**561**	**240**
	Contingencies (3% of ME & Engineering)				**505**	**383**	**121**
	Total Cost				**17,328**	**13,162**	**4,166**
	Total of Construction Work				**69,802**	**22,908**	**46,893**
	Total of Engineering Services				**5,103**	**2,497**	**2,607**
	Contingencies				**6,313**	**1,646**	**4,667**
	Total Project Component Cost				**81,218**	**27,051**	**54,167**

Table 13.5.12 (1) Breakdown Cost of F/C & L/C Cost

A. Alexandria/Cairo IW Project

No.	Project Components	Total Cost	F/C Portion				L/C Portion				
			Total	Labor (Skilled)	Equipment/ Material	Others	Total	Labor (Skilled)	Labor (Unskilled)	Equipment/ Material	Others
A1:	**Dredging and Bank Protection along Nobaria Canal**										
1	**Total of Civil Construction Work**	**25,981**	**2,979**	**742**	**1,856**	**381**	**23,002**	**3,415**	**1,782**	**16,701**	**1,104**
2	**Engineering Service Cost**	**2,779**	**1,315**	**1,060**	**0**	**256**	**1,463**	**1,077**	**0**	**262**	**125**
3	**Contingencies (10% of Items 1 & 2)**	**2,876**	**429**	**180**	**186**	**64**	**2,447**	**449**	**178**	**1,696**	**123**
	Total Cost	**31,636**	**4,724**	**1,983**	**2,042**	**701**	**26,912**	**4,941**	**1,960**	**18,659**	**1,352**
A2:	**Procurement of Navigation Aids**										
1	**Total of Procurement of Navigation Aids System**	**20,263**	**18,256**	**85**	**18,071**	**99**	**2,007**	**561**	**85**	**1,129**	**231**
2	**Engineering Services**	**608**	**456**	**377**	**0**	**79**	**152**	**73**	**0**	**30**	**49**
3	**Contingencies (3% of Items 1 & 2)**	**626**	**561**	**14**	**542**	**5**	**65**	**19**	**3**	**35**	**8**
	Total Cost	**21,497**	**19,273**	**476**	**18,613**	**183**	**2,224**	**653**	**88**	**1,194**	**288**
A3:	**Alexandria Maritime Lock Extension**										
1	Civil Work										
1.1	Civil Construction Work	47,413	21,198	2,675	16,455	2,069	26,215	8,004	3,991	13,105	1,115
1.2	Engineering Services (6% of Civil Work Cost)	2,845	1,707	1,422		284	1,138	853		199	85
1.3	Contingencies (10% of Civil Work & Engineering)	5,026	2,290	410	1,645	235	2,735	886	399	1,330	120
	Sub Total of Item 1	55,284	25,195	4,508	18,100	2,589	30,088	9,743	4,390	14,634	1,320
2	Mechanical & Electrical Equipment										
2.1	Sub Total of ME Work	7,580	5,861	606	4,578	677	1,719	76	76	1,334	233
2.2	Engineering Services (5.0% of ME Work Cost)	379	265	220		45	114	91		15	8
2.3	Contingencies (3% of ME & Engineering)	239	184	25	137	22	55	5	2	40	7
	Sub Total of Item 2	8,198	6,310	851	4,715	744	1,888	172	78	1,390	248
	Total of Items 1.1 & 2.1	**54,993**	**27,059**	**3,282**	**21,033**	**2,746**	**27,934**	**8,080**	**4,066**	**14,439**	**1,348**
	Total of Engineering Services (Items 1.2 & 2.2)	**3,224**	**1,972**	**1,642**	**0**	**330**	**1,252**	**944**	**0**	**214**	**93**
	Contingencies (Items 1.3 & 2.3)	**5,265**	**2,474**	**435**	**1,783**	**257**	**2,790**	**891**	**401**	**1,371**	**127**
	Total Cost	**63,481**	**31,505**	**5,359**	**22,815**	**3,333**	**31,976**	**9,915**	**4,468**	**16,024**	**1,568**
Grand Total											
	Construction & Procurement Cost (A1, A2 & A3	**101,237**	**48,294**	**4,109**	**40,960**	**3,226**	**52,943**	**12,056**	**5,933**	**32,269**	**2,683**
	Enginnering Services (A1, A2 & A3)	**6,611**	**3,743**	**3,079**	**0**	**665**	**2,867**	**2,094**	**0**	**506**	**267**
	Contingencies (A1, A2 & A3)	**8,767**	**3,464**	**629**	**2,511**	**326**	**5,302**	**1,359**	**582**	**3,102**	**258**
	Grand Total	**116,614**	**55,502**	**7,818**	**43,470**	**4,217**	**61,112**	**15,509**	**6,516**	**35,877**	**3,208**

Table 13.5.12 (2) Breakdown Cost of F/C & L/C Cost

B: Cairo River Port Project

No.	Project Component	Cost	F/C				L/C				
			Total	Labor (Skilled)	Equipment /Material	Others	Total	Labor (Skilled)	Labor (Unskilled)	Equipment /Material	Others
1	Container Terminal Civil Work										
1.1	Civil Construction Work	31,901	11,856	1,787	8,473	1,596	20,046	3,536	2,119	13,500	890
1.2	Engineering Services (8% of Civil Work Cost)	2,552	1,276	1,072	0	204	1,276	1,072	0	102	102
1.3	Contingencies (10% of Civil Work & Engineering)	3,445	1,313	286	847	180	2,132	461	212	1,360	99
	Sub Total Cost of Item 1	37,899	14,445	3,144	9,320	1,981	23,454	5,069	2,331	14,962	1,091
2	Cargo Handling Equipment										
2.1	Procurement of Equipment	56,420	52,492	1,069	50,858	564	3,928	564	0	2,800	564
2.2	Engineering Services (2.5% of ME Work Cost)	1,411	1,058	875	0	183	353	169	0	71	113
2.3	Contingencies (3% of Equipment Cost & Engineering)	1,735	1,606	58	1,526	22	128	22	0	86	20
	Sub Total Cost of Item 2	59,565	55,156	2,002	52,384	770	4,409	755	0	2,956	697
	Total of Civil & Equipement (Items 1.1 & 2.1)	**88,321**	**64,348**	**2,856**	**59,331**	**2,160**	**23,974**	**4,100**	**2,119**	**16,300**	**1,454**
	Total of Engineering Services (Items 1.2 & 2.2)	**3,963**	**2,334**	**1,947**	**0**	**387**	**1,629**	**1,241**	**0**	**173**	**215**
	Contingencies (Items 1.3 & 2.3)	**5,180**	**2,919**	**344**	**2,373**	**202**	**2,260**	**483**	**212**	**1,446**	**119**
	Grant Total Cost	**97,464**	**69,601**	**5,146**	**61,704**	**2,751**	**27,863**	**5,824**	**2,331**	**17,918**	**1,788**

Table 13.5.12 (3) Breakdown Cost of F/C & L/C Cost

C: New Bolin Connection Canal Project

No.	Description	Cost	F/C				L/C				
			Total	Labor (Skilled)	Equipment /Material	Others	Total	Labor (Skilled)	Labor (Unskilled)	Equipment /Material	Others
1	New Connection Canal Civil Work										
1.1	Civil Construction Work	53,780	10,690	2,608	6,146	1,936	43,089	8,145	4,088	27,640	3,216
1.2	Engineering Services (8.0% of Civl Work Cost)	4,302	1,936	1,635	0	301	2,366	1850.0148	0	344	172
1.3	Contingencies (10% of Civil Work & Engineering)	5,808	1,263	424	615	224	4,546	999	409	2,798	339
	Sub Total Cost of Item 1	63,890	13,889	4,667	6,761	2,461	50,001	10,994	4,497	30,782	3,727
2	Mcnanical & Electrical Equipment										
2.1	ME Work	16,022	12,218	1,282	9,656	1,279	3,804	205	205	2,778	617
2.2	Engineering Services (5.0% of ME Work Cost)	801	561	481	0	80	240	200	0	24	16
2.3	Contingencies (3% of ME & Engineering)	505	383	53	290	41	121	12	6	84	19
	Sub Total Cost of Item 2	17,328	13,162	1,815	9,946	1,400	4,166	418	211	2,886	652
	Total of Civil & ME Work (Items 1.1 & 2.1)	**69,802**	**22,908**	**3,890**	**15,802**	**3,215**	**46,893**	**8,350**	**4,293**	**30,418**	**3,833**
	Total of Engineering Services (Items 1.2 & 2.2)	**5,103**	**2,497**	**2,116**	**0**	**381**	**2,607**	**2,050**	**0**	**368**	**188**
	Contingencies (Items 1.3 & 2.3)	**6,313**	**1,646**	**477**	**904**	**264**	**4,667**	**1,012**	**415**	**2,882**	**358**
	Grant Total Cost	**81,218**	**27,051**	**6,482**	**16,706**	**3,861**	**54,167**	**11,412**	**4,708**	**33,669**	**4,379**

3) Annual Capital Cost Requirement

Annual fund requirement for construction and equipment procurement is prepared for each project component based on study results of project implementation program as presented in Table 13.5.13 with sub-divided costs on foreign and local currency components. This annual cost requirements are broken down into such cost categories as manpower (skilled & unskilled), equipment & machinery and other costs of foreign and local currency components as shown in Table 13.5.14.

Table 13.5.13 Annual Cost Requirements

1,000L.E

Project Component		Total Cost	1st Year	2nd Year	3rd Year	4th Year	5th Year
A Alexandria/Cairo IW Project	Total	116,614	3,025	1,216	106,628	5,745	0
	F/C	55,502	1,655	655	50,456	2,735	0
	L/C	61,112	1,370	560	56,173	3,009	0
A1 Dreding & Bank Protection	Total	31,636	1,406	856	27,884	1,490	0
	F/C	4,724	665	405	3,460	193	0
	L/C	26,912	740	451	24,423	1,297	0
A2 Navigation Aids	Total	21,497	0	219	20,197	1,081	0
	F/C	19,273	0	164	18,141	968	0
	L/C	2,224	0	55	2,056	113	0
A3 Alexandria Maritime Lock Extention	Total	63,481	1,619	141	58,547	3,174	0
	F/C	31,505	989	86	28,855	1,574	0
	L/C	31,976	630	55	29,693	1,599	0
B Public River Port Project	Total	97,464	2,081	22,775	67,848	4,760	0
	F/C	69,601	1,167	21,030	43,988	3,416	0
	L/C	27,863	913	1,746	23,861	1,344	0
B1 River Port Terminal Construction	Total	37,899	1,572	140	34,375	1,811	0
	F/C	14,445	786	70	12,909	680	0
	L/C	23,454	786	70	21,467	1,131	0
B2 Procurement of Cargo Handling Equipment	Total	59,565	509	22,635	33,473	2,949	0
	F/C	55,156	381	20,959	31,080	2,736	0
	L/C	4,409	127	1,676	2,393	213	0
C New Bolin Connection Canal Project	Total	81,218	3,001	333	31,320	42,669	3,894
	F/C	27,051	1,462	162	10,252	13,903	1,271
	L/C	54,167	1,539	171	21,068	28,765	2,623
Overall Project Cost	**Total**	**295,296**	**8,107**	**24,325**	**205,796**	**53,174**	**3,894**
	F/C	**152,154**	**4,284**	**21,848**	**104,696**	**20,055**	**1,271**
	L/C	**143,142**	**3,822**	**2,477**	**101,101**	**33,118**	**2,623**

Table 13.5.14 Annual Cost Requirements for Each Project (1)Alexandria/Cairo IW Project by Cost Components *1,000L.E*

Project Components	Cost Item		Total Cost	1st Year	2nd Year	3rd Year	4th Year	5th Year
A Alexandria/Cairo IW Project Total	Total		116,614	3,025	1,216	106,628	5,745	0
	F/C		55,502	1,655	655	50,456	2,736	0
	L/C		61,112	1,370	560	56,173	3,009	0
F/C & L/C Breakdown	Labor Cost	F. Skilled	7,818	1,360	534	5,563	360	0
		L. Skilled	15,509	1,020	399	13,350	741	0
		L. Unskilled	6,516	0	0	6,190	326	0
	Eqipment/Material Cost	Foreign	43,470	0	0	41,296	2,173	0
		Local	35,878	240	101	33,751	1,786	0
	Other Costs	Foreign	4,218	295	122	3,597	203	0
		Local	3,208	110	60	2,881	157	0
Breakdown Cost by Project Component								
A1 Dreding & Bank Protection	Total		31,636	1,406	856	27,884	1,490	0
	F/C		4,724	665	405	3,460	193	0
	L/C		26,912	740	451	24,423	1,297	0
F/C & L/C Breakdown	Labor Cost	F. Skilled	1,983	536	326	1,055	64	0
		L. Skilled	4,941	545	332	3,853	212	0
		L. Unskilled	1,960	0	0	1,862	98	0
	Eqipment/Material Cost	Foreign	2,042	0	0	1,940	102	0
		Local	18,659	133	81	17,522	924	0
	Other Costs	Foreign	701	130	79	466	27	0
		Local	1,352	63	39	1,187	63	0
A2 Navigation Aids	Total		21,497	0	219	20,197	1,081	0
	F/C		19,273	0	164	18,141	968	0
	L/C		2,224	0	55	2,056	113	0
F/C & L/C Breakdown	Labor Cost	F. Skilled	476	0	136	312	28	0
		L. Skilled	653	0	26	593	33	0
		L. Unskilled	88	0	0	83	4	0
	Eqipment/Material Cost	Foreign	18,613	0	0	17,682	931	0
		Local	1,195	0	11	1,123	60	0
	Other Costs	Foreign	184	0	28	145	10	0
		Local	288	0	18	256	15	0
A3 Alexandria Maritime Lock Extention	Total		63,481	1,619	141	58,547	3,174	0
	F/C		31,505	989	86	28,855	1,575	0
	L/C		31,976	630	55	29,693	1,599	0
F/C & L/C Breakdown	Labor Cost	F. Skilled	5,359	824	72	4,195	268	0
		L. Skilled	9,915	475	41	8,903	496	0
		L. Unskilled	4,468	0	0	4,245	223	
	Eqipment/Material Cost	Foreign	22,815	0	0	21,674	1,141	0
		Local	16,024	108	9	15,106	801	
	Other Costs	Foreign	3,333	166	14	2,986	167	0
		Local	1,568	47	4	1,439	78	

Table 13.5.14 Annual Cost Requirements for Each Project (2)Public River Port Project by Cost Components 1,000L.E

Project Component	Cost Item		Total Cost	1st Year	2nd Year	3rd Year	4th Year	5th Year
B Public River Port Project	Total		97,464	2,081	22,775	67,848	4,760	0
	F/C		69,601	1,167	21,030	43,988	3,416	0
	L/C		27,863	913	1,746	23,861	1,344	0
F/C & L/C Breakdown	Labor Cost	F. Skilled	5,146	976	820	3,148	204	0
		L. Skilled	5,824	721	346	4,504	252	0
		L. Unskilled	2,331	0	0	2,214	117	0
	Eqipment/Material Cost	Foreign	61,704	0	19,906	38,713	3,085	0
		Local	17,918	88	1,129	15,810	891	0
	Other Costs	Foreign	2,751	192	304	2,127	127	0
		Local	1,788	104	271	1,331	84	0
Breakdown Cost by Project Component								
B1 River Port Terminal Construction	Total		37,899	1,572	140	34,375	1,811	0
	F/C		14,445	786	70	12,909	680	0
	L/C		23,454	786	70	21,467	1,131	0
F/C & L/C Breakdown	Labor Cost	F. Skilled	3,144	660	59	2,304	122	0
		L. Skilled	5,069	660	59	4,131	218	0
		L. Unskilled	2,331	0	0	2,214	117	0
	Eqipment/Material Cost	Foreign	9,320	0	0	8,854	466	0
		Local	14,962	63	6	14,149	745	0
	Other Costs	Foreign	1,981	126	11	1,751	92	0
		Local	1,091	63	6	972	51	0
B2 Procurement of Cargo Handling Equipmen	Total		59,565	509	22,635	33,473	2,949	0
	F/C		55,156	381	20,959	31,080	2,736	0
	L/C		4,409	127	1,676	2,393	213	0
F/C & L/C Breakdown	Labor Cost	F. Skilled	2,002	315	761	844	82	0
		L. Skilled	755	61	287	373	34	0
		L. Unskilled	0	0	0	0	0	0
	Eqipment/Material Cost	Foreign	52,384	0	19,906	29,859	2,619	0
		Local	2,956	26	1,124	1,661	146	0
	Other Costs	Foreign	770	66	292	376	35	0
		Local	697	41	265	359	33	0

Table 13.5.14 Annual Cost Requirements for Each Project (3) New Connection Canal Project by Cost Components

1,000L.E

Project Component	Cost Item		Total Cost	1st Year	2nd Year	3rd Year	4th Year	5th Year
C New Bolin Connection Canal Project	Total		81,218	3,001	333	31,320	42,669	3,894
	F/C		27,051	1,462	162	10,252	13,903	1,271
	L/C		54,167	1,539	171	21,068	28,765	2,623
F/C & L/C Breakdown	Labor Cost	F. Skilled	6,482	1,239	138	2,111	2,740	255
		L. Skilled	11,412	1,210	134	4,094	5,470	503
		L. Unskilled	4,708	0	0	1,883	2,589	235
	Eqipment/Material Cost	Foreign	16,706	0	0	6,682	9,188	835
		Local	33,669	218	24	13,383	18,372	1,671
	Other Costs	Foreign	3,861	224	25	1,457	1,975	181
		Local	4,379	111	12	1,708	2,334	213

13.6 Improvement Plan of Managerial and Operational System of RTA

13.6.1 General

For the purpose of IWT promotion it is paramount that RTA strengthen its function, organization and financial basis as an IWT management body.

Major roles of a management body are planning, construction and maintenance, granting permission for navigational license, leasing of facilities, establishing conditions for providing service, data collection, marketing and so on.

RTA should be the driving force behind IWT prosperity. In addition, RTA needs to maintain IWT facilities systematically.

Study Team approaches this matter from the following aspects.

- Organizational Improvements
- Establishment of financial collecting system
- Management & Repair for IWT

13.6.2 Organizational Improvements

(1) Strengthening Branch functions by transferring Headquarter authority

The administrative sector of RTA employs over 200 persons (35% of all RTA numbers). Based on the scale of the work at present, it seems that this number is excessive.

On the other hand there are not enough employees at each branch office. For example, the Aswan Office has 8 staff members excluding boat crews although many boat inspections for licenses are conducted in this area. And the Alexandria Office has only 15 staff member even though it operates 3 locks. In addition, branch offices do not have sufficient communication means such as telephones, vehicles, computers.

Study team would like to propose that the organizational capacity of RTA which is responsible for the management of IWs be strengthened to operate the new IWT system efficiently and smoothly. As the IWT system becomes more complex it will be more and more inefficient to manage all matters only through headquarters.

What is needed initially will be the allocation of required staff for 24-hour operation to regional offices and lock offices of RTA, and the installation of telecommunication equipment at these offices.

For 24-hour operation in future, it is desirable for RTA to carry out operations without increasing the number of staffs.

The supplement staffs for retired persons would post to Branch offices including Lock offices. Reshuffling of personnel might lead to reduce working efficiency and function. By means of gradual redeployment within RTA over ten years Headquarter authority will be transfered to Branch office step by step. This will strengthen Branch functions.

Table 13.6.1 Age structure of RTA Worker

Age	Headquarters	Branch
20 – 50	456	67
50 – 60	140	16
Total	596 (88%)	83 (12%)

10 years later filling up 140 supplements in Branch offices and Lock offices

(2) Effective data collection by using computers

a) Introduction of Management Information System (MIS)

Management Information System is a comprehensive system using computers which allows information to be accumulated and circulated to relevant personnel in a timely manner. Since there is a limit to the amount of information that can be managed by human power, information is generally distributed to a certain section and then filtered down to other sections. In other words, information is not immediately distributed. With MIS, however, information is dispersed from a central organization to all sections simultaneously.

Since information in IWT management and operation such as arrival and departure of vessels, use of port facilities, charge and due collection and port statistics is mutually related, the introduction of MIS will bring the following benefits.

1) Faster and more efficient operation

The integrated on-line network system allows advance processing of information related to the use of public port facilities, thus enhancing the speed and accuracy of business transactions.

2) Efficient management of public facilities

A wide range of data on the use of public facilities can be obtained anytime on-line, which allows efficient management of the facilities.

3) More efficient handling of charges

By computerizing the calculation of charges, billing, settlement, and issuance of receipts, the efficiency and accuracy of the charge-management are improved.

4) Utilization of advanced data

Policy-making and planning of IWT development are improved because users of the system can retrieve the necessary data and process it into diverse formats in a speedy and accurate manner.

b) Improvement of Statistics

One of the most significant assignments of the managing body is to compile and publish reliable statistics such as those on natural conditions, the accounting, the register list of their assets and activities. In formulating the development strategy, statistics are very important in projecting future demand of cargo or user, examining improvements on their facilities and equipments.

The basic policy to improve the statistics system is as follows;

a) Statistics should be kept in a uniform format by computers so that they can be easily accessed and understood.
b) Statistics should at least clarify the trend of cargo volume of each kind of commodity, its origin/destination and cargo type, the number of vessels, number of passengers, and water depth and land and facilities register.
c) If possible, statistics on inland waterways should be integrated with statistic system of land transportation, which is closely related to inland activities, and be compatible with international statistics systems.
d) In addition, data collection should be put to practical use on the accounting and the register list of their assets and activities for daily operations.

(3) Training of RTA's staff

There is a need to develop a training program focused on management and practical operational technique and serving central, branch staff as well as private companies in order to carry out cost effective and market oriented transport activities.

Training in new skills to improve managerial processes and procedures and to carry out effective management decision-making has been so far totally neglected in RTA. At present there are very few training course for the managing class in RTA.

Management training could cover issues (policy, planning, management and finance) common to inland waterways transport as well as the different modes.

Such training should be aimed not only at policy-level officials and senior managers who are obliged to function with more performance-oriented attitudes than in the past but also at middle level managers who need to expand their specialized skills and are engaged in matters such as procurement, marketing, financial analysis, project formation and evaluation, personnel development, transport costing and pricing, logistics distribution management.

The consensus is that technical and vocational training will continue to be inadequate unless major changes are made in improving physical facilities, quality of instructors, course content, and incentive systems for well-qualified and experienced training personnel.

Some general recommendations can be made in order to increase the quality and motivation of those vocational training centers, which provide in-house training:

a) Provision of better training materials including modern teaching aids (hardware

and software),

b) Providing trainers with training in teaching, opportunity for periodic updating of technical skills and establishing a career structure,
c) Improving procedures for monitoring and modifying course contents to meet the changing requirements within several modes of transport,
d) Improving procedures for evaluating training output and linkage with on-the-job training,
e) Increasing the budget allocated to training,

The Regional Institute for River Transport is part of RTA. But this institute does not provide the most up-to-date training in inland waterway transport. To provide the needed training, it is necessary to retrain teachers, reform curricula, upgrade textbooks, upgrade reference materials and improve availability of modern teaching aids.
Based on past studies and existing training capacity, the following strategy is proposed for inland transport training.

a) RTA renews its commitment to human resource development by a clear policy statement which sets out the goals and specific objectives including increasing training incentives such as higher minimum qualification standards and increasing training opportunities through the reorienting training institutes and programs to serve modern needs.
b) RTA should seek international assistance in those areas where local expertise is particularly lacking, for example in commercial aspects of transport business management, and in modern transport planning and economics aspects.

In addition, the Study Team would like to emphasize the importance of ethical training. It is said that any nation without an ethical code will fade from history. In all organizations managerial resources cannot be efficiently used if there is no code of ethics on their job to connect each element.
Industrialization inevitably leads to a division of work. Various tasks must be harmonized with each other. The most important key for industrialization is "Harmonization of each part and total". A code of ethics can act as an adhesive agent in this regard.

13.6.3 Establishment of Tariff System

Current financial scheme for development and maintenance is as follows;
The Government (MOT) and RTA are responsible for the development of infrastructure at inland waterways. The Government must approve all projects in advance which are financed from the national budget or from external loans contracted by the government.
As development budgets of RTA are very small, it is difficult to invest in large projects by itself. Moreover budgets and subsidies from the State to RAT are small due to the low priority given to inland waterways.

It is desirable that RTA secure enough revenue to cover at least ordinary expenses. The only solution is to increase revenue and minimize expenses, and to that end RTA should take any necessary measures immediately.

The study team would like to recommend the creation of a new section in RTA responsible for introducing and managing the tariff system. The tariff will be imposed on users in the form of land leasing fee, charge for using canal and navigation aids and so on. In order to manage the things to prepare the detailed inventory covering all of RTA's assets and accurately grasp the state of their utilization. And at the same time it will be necessary aspect of RTA taking into consideration these new sources of revenue.

(1) Land lease tariff

1) Land lease tariff

Generally speaking land lease fee is one of major revenues of port management bodies. However RTA doesn't have accurate data on the land which it owns along the river and the canals. What RTA should do firstly is to clarify the situation of proprietary rights and make lists in order to utilize idle public lots. And then they should negotiate with the occupants of land RTA owned to levy proper land lease fees. After going through this process RTA will be able to secure stable revenue from their land.

At the same time it is recommended that the present lease fee system be reconsidered. Therefore RTA should be stipulated the public land fee in the official tariff. It results in appropriate administration of public lands.

By collecting proper lease fee from land users, especially those who engage in profit making business, it would be possible for RTA to secure a part of the financial resources necessary for port construction, maintenance, dredging, etc.

It should be noted, however, that a sudden, dramatic increase in the lease fee would not be well received by land users. Therefore, a gradual, step by step increase in lease fees should be adopted.

According to the present tariff for land use, lease fee for 1 square meter of land is decided through the negotiation with users on a case by case basis. The usual sale price for land around Ather El Nabi is 1,000-1,500LE. Therefore it might be possible for RTA to collect 30LE-45LE for 1 square meter per year in general.

(Land sale price x 2.5/1000 x 12 = Land lease fee per year)

(2) Canal entrance dues

AT present RTA does not levy fees on barges going through canals and locks of inland waterways. In future RTA should consider the introduction of canal entrance dues or lock passing charge including night navigation. However, RTA must ensure that such a tariff would not hurt the competitiveness of IWT.

Introduction of canal entrance dues or lock passing charge taking the competitiveness of IWT with other modes into consideration

As shown Table 10.2.35 – 10.2.40, modal split generalized cost including time cost

between Alexandria Port and Greater Cairo is as follows;

	IWT	Railway	Road
Container cost (LE/TEU)	357	407	438
Break-bulk cost (LE/MT)	10.6	16.0	20.0
Bulk Cargo cost (LE/MT)	5.8	11.4	19.8

The difference of cost between IWT and Railway, Road in Container is

IWT and Railway	50 LE/TEU
IWT and Road	81 LE/TEU

In the same way,

Break-bulk	IWT and Railway	5.4 LE/MT
	IWT and Road	9.4 LE/MT
Bulk	IWT and Railway	5.6 LE/MT
	IWT and Road	14.0 LE/MT

It can be seen that the cost difference between IWT and Railway is less than that between IWT and Road. Next doing a trial calculation for the difference of cost between IWT and Railway per barge which would be constructed on a new project,

Container barge	50 LE/TEU x 96 TEU = 4,800 LE
Break-bulk barge	5.4 LE/MT x 1,380 MT = 7,452 LE
Bulk barge	5.6 LE/MT x 1,380 MT = 7,728 LE

These figures are competitive range for each barge.
Therefore, theoretically 4,800 LE, the least cost among the three types, would be the maximum tariff per barge for the canal entrance dues or lock passing charge.

14. Economic Analysis and Financial Analysis

14.1 Economic Analysis

14.1.1 Purpose of Analysis

The purpose of the economic analysis is to appraise economic feasibility from the viewpoint of national economy in the target year for the Short Term Development Plan (2010).

The analysis studies economic benefits as well as economic costs arising from this project, and evaluates whether the project benefits exceed those that could be obtained from other investment opportunities in Egypt.

14.1.2 Methodology

In this analysis, Short Term Development Plan is defined as "the case with project" (hereinafter referred to as "with case") and compared to "the case without project" (hereinafter referred to as "without case"). All benefits and costs in market prices of the differences between "With case" and "Without case" will be calculated and converted to economic price.

Feasibility of each project is appraised based on a cost-benefit analysis by the economic internal rate of return (EIRR) and the benefit/cost ratio (B/C ratio).

EIRR is a discount rate which makes the value between the total costs and the total benefits of a project during the project life equal; that is, EIRR shows the maximum interest rate of borrowing for the project. It is calculated by the following formula:

$$\sum_{i=1}^{n} \frac{Bi - Ci}{(1+r)^{i-1}} = 0$$

Where C_0: Capital cost
B_i: Benefit in ith year
C_i: Cost in ith year
r : Discount ratio

The benefit/cost ratio (B/C ratio) is obtained by dividing benefit by cost. In this method, it is necessary to set a suitable discount ratio based on the prevalent socio-economic conditions.

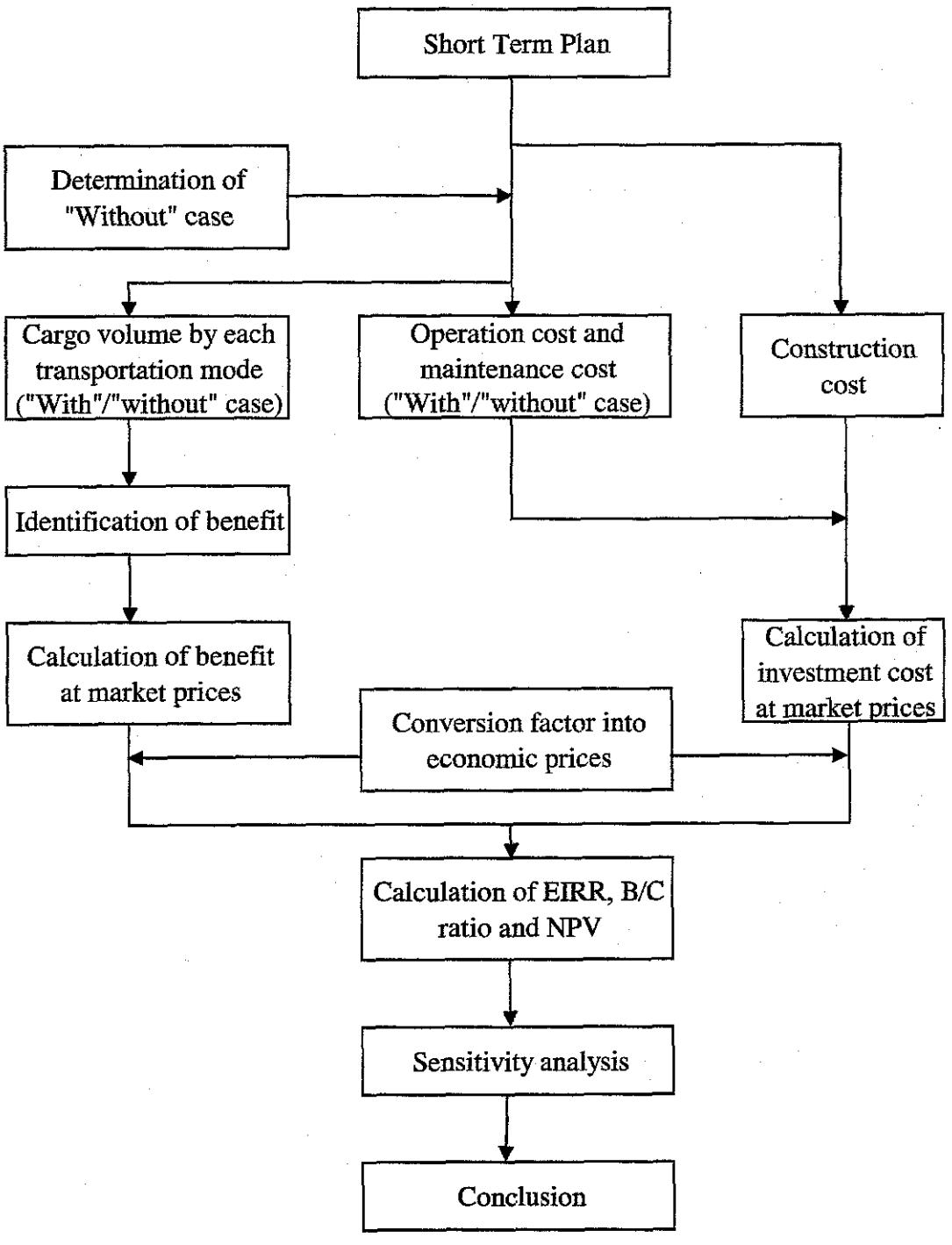


Figure 14.1.1 Procedure of Economic Analysis

If the benefit/cost ratio is more than or equal to 1.0 with a suitable discount ratio, the project is deemed to be economically feasible.

$$\frac{\sum_{i=1}^{n} \frac{B_i}{(1+r)^i}}{\sum_{i=1}^{n} \frac{C_i}{(1+r)^i}} = B/C \ ratio$$

The net present value (NPV) is obtained by deducting the cost from the benefit at present value. In this method, it is also necessary to set a suitable discount ratio based on the prevailing socio-economic conditions. If NPV is more than zero with a suitable discount ratio, the project is deemed profitable from the socioeconomic viewpoint. This method is used usually to grade the priority of projects.

$$\sum_{i=1}^{n} \frac{Bi - Ci}{(1+r)^{i-1}} = NPV$$

Feasibility of each project in the Short Term Plan is evaluated by referring to economic analyses in other feasibility studies recently conducted in Egypt.

The procedure of the analysis is shown in Figure 14.1.1.

14.1.3 Economic Prices

In general, the values of goods quoted at domestic market prices do not always represent the border prices (economic prices) of goods. The market prices usually include transfer items such as customs duties, subsidies, etc., which do not actually reflect consumption of resources. For the economic analysis, the market prices should be converted into economic prices.

Because the unskilled labor cost is controlled by the minimum wage system and other regulations, the unskilled labor cost at market prices often does not reflect the actual economic situation. The unskilled labor cost of the projects in this study should be converted into economic prices.

All the costs and benefits of the projects in the Short Term Plan are divided into tradable goods and non-tradable goods for materials, skilled labor and unskilled labor.
Conversion factors for each item of cost and benefit (economic price/domestic market price) are then calculated.

(1) Conversion Factor

1) Standard Conversion Factor (SCF)

The difference between the domestic market prices and the border prices is mainly attributed to customs duties. SCF is used to determine the economic prices of non-tradable goods that have

only the market prices in order to make up for this price difference. SCF is calculated by the following formula.

$$SCF = (I + E) / \{(I + D_i) + (E - D_e)\}$$

Where I: Total value of imports (CIF)
E: Total value of exports (FOB)
D_i: Total value of import duties
D_e: Total value of export duties

Result of calculation for SCF is shown in Table 14.1.1.

Table 14.1.1 Standard Conversion Factor

Year	1996	1997	1998	1999	2000	Average
SCF	0.816	0.815	0.817	0.823	0.833	**0.821**

2) Conversion Factor for Consumption (CFC)

The conversion factor for consumption is used to convert the market prices of consumer goods into economic prices. This factor is set as an equivalent to the standard conversion factor, replacing the total value of imports and exports in SCF by the total value of consumer goods (imports and exports) in CFC. CFC is calculated by the following formula.

$$CFC = (I_c + E_c) / \{(I_c + D_{ic}) + (E_c + D_{ec})\}$$

Where I_c: Total value of imported consumer goods
E_c: Total value of exported consumer goods
D_{ic}: Total value of import duties for consumer goods
D_{ec}: Total value of export duties for consumer goods

Conversion factor for consumption (CFC) is shown in Table 14.1.2.

Table 14.1.2.Conversion factor for consumption

Year	1996	1997	1998	1999	2000	Average
CFC	0.841	0.853	0.858	0.865	0.859	**0.855**

3) Conversion Factor for Skilled Labor (CFSL)

The cost of skilled labor is calculated based on the actual market wages on the assumption that the mechanism of skilled labor market is functioning properly. The data should be converted to economic prices because they are expressed by domestic prices or market prices. CFSL is calculated by the following formula.

$$CFSL = (O_s / W_{ns}) \times CFC$$

$$O_s = W_{ns} = W_s$$

Therefore

$$CFSL = CFC$$

Where O_s: Opportunity cost of skilled labor

W_{ns}: Nominal wage rate of skilled labor

W_s: Actual market wage rate of skilled labor

4) Conversion Factor for Unskilled Labor (CFUL)

A common practice is to set the economic cost of unskilled labor equal to the per capita income of the agriculture sector, which is normally the lowest in all the sectors. CFUL is calculated by the following formula.

$$CFUL = (O_{us} / W_{nus}) \times CFC$$

O_{us} = (GDP of agriculture sector) / (Population of agriculture sector)

Where O_{us}: Opportunity cost of unskilled labor

W_{nus}: Nominal wage rate of unskilled labor

The result of calculation is shown in Table 14.1.3..

Table 14.1.3 Conversion Factor for Unskilled Labor

	Unit	1995	1996	1997	1998	1999	2002
Gross Domestic Products(Current)	Milli.L.E.	204,000	229,500	256,300	280,200	302,300	
GDP Agriculture sector	Milli.L.E.	32,050	36,968	42,325	45,878	49,360	
Total population in Agriculture and Hunting Sector	thousand	9,644	9,796	9,951	10,107	10,265	
Opportunity cost of unskilled labor	L.E.	3,323	3,774	4,253	4,539	4,809	6,348
Nominal wage rate	L.E.						7,920
CFUL in 2002							**0.685**

14.1.4 General Prerequisites of Economic Analysis

(1) Base Year

"Base Year" means the year in the estimation of costs and benefits. The year already mentioned in the Master Plan study, viz., the year 2002, is adopted as the "Base Year".

(2) Project life

Period of calculation, namely the project life in the economic analysis, is assumed based on depreciation period of the main facility in the project. In this study, the project life of each

analysis item is mentioned in (4).

(3) Foreign Exchange Rate

The foreign exchange rate adopted for this analysis is the same as in the Master plan of this study, namely US$1.00 = LE4.6.

(4) "With Case" and "Without Case"

A cost-benefit analysis is conducted on the difference between the "with cases" where investments are made for executions of the Short Term Development Plan for Economic Analysis and the "without cases" where no investments are made.

1) "With case"

Investment items to each project are as follows:

- Alexandria-Cairo IWT Project
  * Maritime lock will be renovated.
  * Navigation aids to enable night navigation between Alexandria Port and Ather El Nabi Port will be installed.
  *Dredging and bank protection will be executed for keeping the suitable depth and width of channels for the proposed barge types.
  * Ather El Nabi Port will be developed to provide public port services

  50 years is adopted as the project life of this project.
- New Bolin Canal Project
  * New Bolin Canal will be created to connect Boulin and Rasheed Branch

  50 years is adopted as the project life of this project.

2) "Without case"

In the "without case", no investment will be made for IWT.

- Alexandria-Cairo IWT Project
  * Maritime lock will not be renovated
  * Navigation aids to enable night navigation between Alexandria Port and Ather El Nabi Port will not be prepared
  * Dredging and bank protection will not be executed.
  *Ather El Nabi Port will remain as it is without any development.
- New Bolin Canal Project
  * Rasheed Branch will be left disconnected with Bolin in IWT.

14.1.5 Benefits of the projects

There are two projects in the Short Term Development Plan, viz. the Alexandria-Cairo IWT Project including the development of a new public river port at Ather El Nabi and the New Boulin Canal Project.

In this study, economic analysis is executed for three items, viz, Alexandria-Cairo IWT Project, New Boulin Canal Project and the new public river port development at Ather El Nabi, which is the biggest investment and the most commercialized item among these projects.

(1) Alexandria-Cairo IWT Project

This project aims at safe and inexpensive water transport of large volumes of cargoes including containers between Alexandria and Cairo by repairing the maritime lock, constructing a highly efficient river port, repairing the channel, and installing navigation aids.

Major benefits expected from this project are described below.

1. Cost reduction by mass transportation and energy saving
2. Reduction of NO_2 exhaust by waterway transportation
3. Waterway transportation including night transport will prevent cargo theft, etc.
4. Less vibration during transport will prevent cargo damage, etc.

Among the above benefits, items 2 through 4 cannot quantified due to a lack of required data.. Therefore, differences in the costs of other land transportation (the main mode usually used for cargo transportation for this route) and the waterway transportation were sought and the result was deemed as benefits.

The costs of transportation include those of freight and time. The freight includes the running costs of barges, trucks and railway including depreciation, the cargo handling charges, construction, installation, purchase, etc. of facilities and machineries that are required anew.

The cost of time is sought by first obtaining the time value of cargo per hour using the standard cost of the cargo and the discount rate, or the interest per hour accruable on the cargo, and multiplying by the transportation hours of each mode.

The following table shows the costs for each transportation mode between Alexandria and Cairo and Damyat and Cairo by Cargo style.

Table 14.1.4 Transportation Cost between Cairo and Alexandria between Cairo and Damyat

(US$/MT)

Route	Cago style	Transportation Cost	
		IWT	Land transportation
Alexandria-Cairo	Bulk	1.86	3.08
	Break Bulk	1.93	3.08
	Container	63	70
Cairo-Damyat	Bulk	0.9	3.05
	Break Bulk	1.54	3.05
	Container	48	69

The transportation costs were calculated under the same conditions as those sought for modal split in the demand forecast in Chapter 10.

(2) New Bolin Canal Project

Raw materials are transported from seaports or upper Egypt to many factories located along the Nile.

This project is concerned with opening a canal between Bolin which is the nodal point of Bahera Canala and Nobaria Canal for mass waterway transport of raw phosphate from Sibaya upstream to fertilizer plants at Kafr El Zayat along the Rasheed Branch of the Nile, and transporting the products from those plants directly to Alexandria Port by barges. The products are currently being transported by land.

Benefits of this project are similar to those of the Alexandria-Cairo IWT Project. This study sought the difference in transportation costs compared to other land transport modes, and regarded this as the benefit.

The following table shows the costs of transportation modes between Sibaya and Kafr El Zayat and between Alexandria Port and Kafr El Zayat, and their differences.

Table 14.1.5 Transportation Cost between Sybaya and Kafr El Zayat and between Kafr El Zaya and Alexandria

(Unit:Us$/M

Rout	Cargo sty	Transportation Cost	
		IWT	Land transportati
Sybaya -Kafr El Zayat	Bulk	2.50	6.50
Kafr El Zayat - Alexar	Bulk	0.74	2.42
Alexandria - Kafr El Z	Break bul	1.18	2.42

(3) Ather El Nabi Public Port

The Short Term Development Plan in this study proposes the construction of a public river port for container and break bulk cargoes at Ather El Nabi along the Nile in the north of Cairo.

The aims of the project is to facilitate inexpensive waterway transport and handling of container and break bulk cargoes that are transported between Alexandria Port/Damietta Port, which are typical seaports of Egypt, and Cairo.

There is no full-fledged river port handling container and break bulk cargoes in Egypt, and these cargoes are currently transported by land.

Construction of this port will enable transport of these cargoes between Cairo and the seaport by

taking advantage of inland transportation discussed above.

Economic analysis of the port construction plan shall be conducted by this study and a socioeconomic evaluation made.

Differences in transportation costs between the waterway transport and other modes will be deemed as benefits to be expected from this project, since the port will enable inland waterway transport of container and break bulk cargoes as in the case of two projects discussed above.

14.1.6 Cost of Projects

(1) Construction cost

The construction cost is estimated based on market prices and is classified into the foreign currency portion and the local currency portion. The local currency portion consists of the costs for skilled labor, the unskilled labor and the non-tradable materials.

The classified construction costs are converted from market prices to economic prices by multiplying the local currency portion with the conversion factor.

The construction cost also includes the required purchase price of transportation equipment such as new type barges in the "With case" and required additional trucks or trains in the "Without case".

(2) Re-investment

Facilities and machineries of which depreciation periods end within the project life of each project will be renewed. Table 14.1.6 shows the depreciation periods for main facilities and machineries.

(3) Maintenance cost

The annual maintenance costs for facilities and machinery are calculated based on the estimated fixed rate for the annual maintenance costs vs. their initial investments. In this study, the fixed rates are set as follows: 2% for structures made mainly of concrete and stones, 4% for those made of steel stocks and machines and 5% for transportation machinery such as automobile, vessels.

(4) Personnel and administration costs

The annual personnel cost is calculated based on the number of employees necessary for management of each project. The cost includes welfare and the general management costs.

(5) Total cost

The total cost of each project in the Short Term Development Plan is shown in the Table14.1.7.

14.1.7 Evaluation of Project

(1) EIRR, B/C ratio and NPV

EIRR, B/C ratio and NPV discussed in 14.1.2 of this chapter are calculated for each project and shown in Table 14.1.8.

(Calculation sheets of benefits, costs and discount rate of each project is shown in Appendix 14.1.)

Table 14.1.6 Depreciation periods for main facilities and machinery

Items	Depreciation Period (years)	Note
Quay crane	20	Movable crane for container
RTG(40ton)	20	
Tractor Head(40')	5	
Trailer(40')	5	
Truck Crane(60-80ton)	10	At quay side in the general cargo terminal
Fork lift(3ton)	5	For container(CFS)
Fork lift(5ton)	5	For G.C.(Warehouse/quay side)
Fork lift(10ton)	5	At quay side in the general cargo terminal
Track Scale(80ton)	20	At the gate of container terminal
Quay (115m)	50	
Quay (115m)	50	
CFS (3,000m^2)	30	
Maintenance shop	30	Machinery in the maintenance shop is not included.
Adom.bulding	30	
Gate	30	Not including weight scale.
Shed (2,700m^2)	30	
Other terminal building	30	
Barge		
Engin of barges	15	
Hull of barges	50	

(2) Sensitivity Analysis

The sensitivity analysis is performed in order to assess effects of unexpected changes in cargo volumes, construction costs, benefits, etc. for each project.

In this study, the following three cases are envisioned:

Case 1: Where the costs increase by 10%

Case 2: Where the benefits decrease by 10%

Case 3: Where the costs increase by 10% and the benefits decrease by 10%

(3) Evaluation

A project of which EIRR is more than 10% is generally considered economically feasible by considering the opportunity cost of capital. In this study, the results of calculation for three projects all exceed 10% and B/C ratio is larger than 1. Therefore, the projects proposed for the Short Term Development Plan in this study are considered feasible from the viewpoint of the national economy.

Table 14.1.7 Cost of each Project in the Short Term Development Plan

Item	Total Cost	F/C Portion Cost	L/C Portion Cost	Foreign Skilled Cost	Local. Skilled Cost	Local .Unskilled Cost	F/C Portion Cost	L/C Portion Cost
Market Price								
1 Alexandria-Cairo IWT Project	214,080	125,106	88,974	12,964	21,333	8,846	112,142	58,794
Ather El Nabi Public Port	97,464	69,601	27,863	5,147	5,824	2,331	64,455	19,707
2 New Bolin Canal Project	81,218	27,051	54,167	6,482	11,412	4,708	20,568	38,047
Conversion factor				1.000	0.855	0.685	1.000	0.821
Economic Price								
1 Alexandria-Cairo IWT Project	197,665	125,106	72,559	12,964	18,242	6,060	112,142	48,257
Ather El Nabi Public Port	92,354	69,601	22,753	5,147	4,981	1,597	64,455	16,175
2 New Bolin Canal Project	71,262	27,051	44,212	6,482	9,758	3,225	20,568	31,228

Table 14.1.8 EIRR, B/C Ratio and NPV

Project	EIRR	B/C Ratio	NPV
(1) Alexandria-Cairo IWT Project	19.0	2.25	24,114
(2) New Bolin Canal Project	17.7	1.23	2,010
(3) Ather El Nabi Public Port	10.5	1.09	1,570

Table 14.1.9 Result of Sensitivity Analysis

	Project	EIRR	B/C Ratio	NPV
Case1	(1) Alexandria-Cairo IWT Project	14.3	5.15	15,260
	(2) New Bolin Canal Project	16.4	1.12	1,145
	(3) Ather El Nabi Public Port	10.1	1.05	241
Case2	(1) Alexandria-Cairo IWT Project	14.2	1.52	13,473
	(2) New Bolin Canal Project	16.3	1.11	944
	(3) Ather El Nabi Public Port	10.1	1.03	398
Case3	(1) Alexandria-Cairo IWT Project	13.2	1.38	10,857
	(2) New Bolin Canal Project	15.1	1.01	780
	(3) Ather El Nabi Public Port	10.0	1.01	221

14.2 Financial Analysis

14.2.1 Purpose of the Analysis

In general, the purpose of the financial analysis is to appraise the financial feasibility of the short-term development plan. This analysis focuses on the project viability and financial soundness of the management body of the project, namely RTA, during the project life.

14.2.2 Methodology

(1) Project viability

The project viability is analyzed using the discount cash flow method and appraised by Financial Internal Rate of Return (FIRR). FIRR is a discount rate that makes the costs and revenues during the project life equal. Calculation of FIRR uses the following formula:

$$\sum_{i=1}^{n} \frac{Bi - Ci}{(1+r)^{i-1}} = 0$$

Where n: Project life
B_i: Revenue in the i th year
C_i: Cost in the i th year
r: Discount rate

In general, the project is regarded as financially feasible if FIRR exceeds the weighted average interest rate of the total funds for the investment of the project.

(2) Financial Soundness of RTA

Financial soundness of RTA is appraised based on the financial statements of RTA, namely Profit and Loss Statement, Cash Flow Statement and Balance Sheet. Appraisal is made from the viewpoint of profitability and operational efficiency. If the components of financial resources of the Short Term Plan include a loan, the loan repayment capacity must be included in the appraisal items.

Required data such as the income statement, balance sheet and cash flow statement are not available at RTA, because RTA is a government agency. The budget statement, expenditure table, revenue table and combined datum table were submitted to the study team by RTA.

According to these financial statements and the interview with financial officers at RTA, more than 90% of the total revenue of RTA is governmental or foreign subsidy.

Therefore, required financial data, such as Profit and Loss Statement, Cash Flow Statement, and Balance Sheet related to this project will be prepared based on the financial documents submitted.

Appraisal of financial soundness is carried out generally using the following factors:

1) Profitability
Profitability of the investment is shown generally by the rate of return on net fixed assets, which is calculated by the following formula:

(Rate of return on net fixed assets) = {(Net operating income)/(Net fixed assets)} X 100%

It is preferable to keep the rate higher than the average interest rate of the funds for the investment.

2) Operational efficiency
In general, operational efficiency of an organization as an enterprise management entity from the economic viewpoint is shown by the operating and the working ratios, calculated by the following formula:

(Operating ratio %) = {(Operating expenses)/(Operating revenues)} X 100

(Working ratio %)=[{(Operating expenses)-(Depreciation costs)}/(Operating revenues)] X 100

In general, the operational ratio must be less than 70%-75% and the working ration less than 50%-60%.

3) Loan repayment capacity
Loan repayment capacity should be appraised if the components of financial resource of the Short Term Plan include a loan.

In general, loan repayment capacity is shown by the debt service coverage ratio, which is calculated by the following formula:

(Debt service coverage ratio)=(Net operating income before depreciation)
/(Repayment of principal and interest on long-term loan)

The ratio must be higher than 1.0 in general.

14.2.3 General Prerequisites of Financial Analysis

(1) Scope of Analysis

Financial analysis is implemented for the project in the short-term development plan from the viewpoint of the project management body, namely RTA.

The Short Term Development Plan proposes three projects of Alexandria/Cairo IW Project, New Bolin Connection Canal Project and Public River Port Project. Except for the Public River Port Project, their profitability is nil. (Their public works character suggests that it would be difficult to raise enough revenue from management of the project to recover the investment and management costs.) Thus, it is not worthwhile to implement financial analyses for them. We therefore propose to conduct the financial analysis only in respect of the Public River Port Project.

In this study, the management of the public river port at Ather El Nabi is assumed to be implemented by the management office for this terminal under the RTA. As for the financial analysis in this study, the project viability and financial soundness of the management body is appraised for this office which is assumed to be financial in dependent in this study because RTA is not financial in dependent office with a lot of genuine public works.
(Hereafter, the management office is referred to as RTA.)

(2) "With Case" and "Without Case"

Project viability is assessed by FIRR. FIRR analysis is based on the differences of revenue and expenditure between the "With Case" and "Without Case". In this study, the case where the Short Term Development Plan including the Public River Project is implemented shall be deemed as the "With Case", and the case where the current status prevails without the Short Term Development Plan shall be deemed as the "Without Case". In other words, RTA earns no revenue (concession fee) from the Public River Port Project in the "Without Case".

(3) Base Year

"Base Year" means the year for estimation of the costs and revenue. The year 2002 is adopted as "the Base Year" in this study.

(4) Project life

The project life for the financial analysis is based on depreciation of main facilities in the project and the period of the long-term loan in general.

The project life in this study is 50 years including the periods of the detail design and construction.
Inflation and nominal wage raises during the project life are disregarded.

(5) Fund Raising

Funds are raised from foreign and domestic sources. In this study, the maximum financing from foreign funds will be the total of project investments in foreign currency or 75% of the initial investment, whichever is higher, by considering the fund raising conditions of international financing institutions including international cooperation banks. For the project proposed by this study, we shall assume that 75% of the initial investment costs is raised from foreign sources. The remaining initial investment and reinvestment costs will be raised domestically. The financing conditions are as follows.

1) Foreign funds

Term of repayment: 30 years (including the grace period of 10 years for capital repayment)

Interest rate: 2.2% per annum

Method for repayment: Level payments of principal and interests

2) Domestic funds

Term of repayment: 10 years

Interest rate: 13.0% per annum

Method of repayment: Level payments of principal and interests

3) Weighted average interest rate on the funds raised

4.90% per annum

(6) Cargo Handling Volume

At the public river port which is proposed by this study, the commodities of handling cargoes at the public port are container and the break bulk cargoes which are transported by dedicated barges for break bulk cargoes and container cargoes. (For the break bulk cargo, the same type craft as that used for the bulk cargo will be used. This means that the same crafts are used for both types of cargoes.)

The cargo handling volumes of container and the break bulk cargoes at the proposed public river port in the Short Term Development Plan are obtained by the result of the demand forecast in Chapter 10 and the capacity of the port which is indicated by the port development plan in Section 13.4 of Chapter 13 in this report.

The cargo handling volumes at the public river port are shown in Tables 14.2.1 and 14.2.2.

Table 14.2.1.Number of TEU at Public River Port in Cairo

(1000 TEU)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of TEU	138	166.6	195.2	223.8	252.4	281	281	281	281	281	281

Table 14.2.2 Cargo Handling Volume at Public River Port in Cairo for Break Bulk Cargo

(1000 MT)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cargo volume	263	292.2	321.4	350.6	379.8	409	409	409	409	409	409

(7) Revenues

In this study, the Public River Port proposes management based on the concession system, and therefore RTA's revenues in this project accrue from the concession fee. All the charges paid by concessionaires to RTA will be placed in the national treasury after subtracting the amount required by RTA for administration and management of the project. The applied concession fee in the financial analysis and its components are mentioned in Appendix 14.1.

(8) Expenses

Main items of expenses of the projects in the Short-term Development Plan are assumed as follows: the investment in capital assets and the management costs including maintenance costs.

1) Investments in capital assets

Of the capital assets, the initial investment in the part to be managed by the port manager shall be according to the implementation plan of the construction. During the project term, these capital assets are renewed by the internal investments after expiration of their service life.

(Refer to Table 14.1.6)

The yearly depreciation amounts for facilities and equipment are calculated by the straight line method. Analysis in this study does not consider residual values at the time of expiration of the project term.

2) Maintenance and repair costs

The annual maintenance and repair costs for the facilities and equipment in this project are given below.

Basic facilities: 2% of the initial investments

Equipment and machinery: 4% of the initial investments

3) Personnel costs

The annual personnel costs of RTA for administration and management of this project are estimated from the number of employees and their average wages which is estimated based on interviews with private companies and the past records of RTA.

All governmental agencies including RTA are exempted taxes.

Table 14.2.3.Calculation of FIRR

	Revenue	Cost			Loan	Rev.-Co. -Loan	Present value	Discount rate
		Investment	Op.Ex.-D.	Total				
2007	0	281	0	281	281	-562	-562	1.000
2008	0	25	0	25	25	-50	-47	0.943
2009	0	6134	0	6134	6134	-12268	-10,903	0.889
2010	0	67	101.96	168.96	67	-235.96	-198	0.838
2011	1001	0	101.96	101.96	0	899.04	710	0.790
2012	1001	0	101.96	101.96	0	899.04	669	0.745
2013	1001	0	101.96	101.96	0	899.04	631	0.702
2014	1001	0	101.96	101.96	0	899.04	595	0.662
2015	1001	0	101.96	101.96	0	899.04	561	0.624
2016	1001	0	101.96	101.96	0	899.04	529	0.588
2017	1001	0	101.96	101.96	0	899.04	498	0.554
2018	1001	0	101.96	101.96	0	899.04	470	0.523
2019	1001	0	101.96	101.96	0	899.04	443	0.493
2020	1001	0	101.96	101.96	0	899.04	418	0.465
2021	1001	0	101.96	101.96	0	899.04	394	0.438
2022	1001	0	101.96	101.96	0	899.04	371	0.413
2023	1001	0	101.96	101.96	0	899.04	350	0.389
2024	1001	0	101.96	101.96	0	899.04	330	0.367
2025	1001	0	101.96	101.96	0	899.04	311	0.346
2026	1001	0	101.96	101.96	0	899.04	293	0.326
2027	1001	0	101.96	101.96	0	899.04	276	0.307
2028	1001	0	101.96	101.96	0	899.04	261	0.290
2029	1001	0	101.96	101.96	0	899.04	246	0.273
2030	1001	0	101.96	101.96	0	899.04	232	0.258
2031	1001	0	101.96	101.96	0	899.04	218	0.243
2032	1001	0	101.96	101.96	0	899.04	206	0.229
2033	1001	0	101.96	101.96	0	899.04	194	0.216
2034	1001	0	101.96	101.96	0	899.04	183	0.203
2035	1001	0	101.96	101.96	0	899.04	172	0.192
2036	1001	0	101.96	101.96	0	899.04	163	0.181
2037	1001	0	101.96	101.96	0	899.04	153	0.170
2038	1001	0	101.96	101.96	0	899.04	144	0.161
2039	1001	0	101.96	101.96	0	899.04	136	0.151
2040	1001	0	101.96	101.96	0	899.04	128	0.143
2041	1001	0	101.96	101.96	0	899.04	121	0.135
2042	1001	0	101.96	101.96	0	899.04	114	0.127
2043	1001	0	101.96	101.96	0	899.04	108	0.120
2044	1001	0	101.96	101.96	0	899.04	101	0.113
2045	1001	0	101.96	101.96	0	899.04	96	0.106
2046	1001	0	101.96	101.96	0	899.04	90	0.100
2047	1001	0	101.96	101.96	0	899.04	85	0.095
2048	1001	0	101.96	101.96	0	899.04	80	0.089
2049	1001	0	101.96	101.96	0	899.04	76	0.084
2050	1001	0	101.96	101.96	0	899.04	71	0.079
2051	1001	0	101.96	101.96	0	899.04	67	0.075
2052	1001	0	101.96	101.96	0	899.04	63	0.070
2053	1001	0	101.96	101.96	0	899.04	60	0.066
2054	1001	0	101.96	101.96	0	899.04	56	0.063
2055	1001	0	101.96	101.96	0	899.04	53	0.059
2056	1001	0	101.96	101.96	0	899.04	50	0.056
2057	1001	0	101.96	101.96	0	899.04	47	0.052
2058	1001	0	101.96	101.96	0	899.04	44	0.049
2059	1001	0	101.96	101.96	0	899.04	42	0.047
						Total	0.00	

FIRR = 6.1%

14.2.4 Evaluation

(1) Result of FIRR calculation

The result of FIRR calculation is 6.2%. FIRR as calculated exceeds the weighted average interest rate on funding. (Refer Table 14.2.3)

(2) Sensitivity Analysis

Sensitivity analysis is conducted to investigate influence of future changes that are difficult to foresee such as those of the cargo volume, construction costs, inflation, and exchange rate. In this study, the following cases are envisaged by considering the gap between the high and the low cases and inflations of the past decade.

Case 1: when the investment cost increases by 10%
Case 2: when the revenue decreases by 10%
Case 3: when the investment cost increases by 10% and the revenue decreases by 10%

The result of sensitivity analysis is shown in Table 14.2.4. In all the cases, FIRR exceeds the weighted average interest rate of the funds.

Table 14..2. 4 Result of the Sensitivity Analysis

Original	Case-1	Case-2	Case-3
6.20%	5.60%	5.60%	5.10%

(3) Appraisal

Based on (1) and (2), the proposed project in this study is financially feasible.

14.2.5 Financial Soundness of the Project Management Body

The required financial statements of RTA for the project and financial indicators are shown in Tables 14.2.5. Table 14.2.6 shows the financial indicators from 2011 to 2020.

(1) Profitability

The rate of return on the net fixed assets exceeds the weighted average interest rate on funds raised after the year 2012.

(2) Loan Repayment Capacity

The debt service coverage ratio will exceed 1.00 in the year 2011.

(3) Operational Efficiency

The operating ratio will maintain the level of below 70% after the year 2011.

As for the working ratio, the basic case will maintain the level of below 50% after the year 2011.

(4) Appraisal

As far as the indicators (1) through (3) above indicate, it is judged that the financial soundness of RTA, the project management body, falls within the adequate scope.

14.2.6 Conclusion

In the basic case and all the cases used for sensitivity analysis, FIRR falls within the allowable scope. The result of analysis of financial soundness also falls within the adequate scope. Therefore, it is determined that this project is financially feasible and will not adversely affect the finance of RTA, the project management body.

14.2.7 Financial Analysis from a point of view of a concessionaire

In order to further analyse the project feasibility in more concrete terms, it is important to examine whether or not private concessionaires of the Public River Port will sufficiently benefit from this project. In this study, we calculated FIRR of the basic case under the same premises as of 14.2.3, and studied the approximate financial feasibilities of the private companies.

Condition of funds (for terminal operator)

Term of repayment: 10 years
Interest rate: 13.0% per annum
Method of repayment: Level payments of principal and interests

Result of FIRR calculation for the terminal operator: 12.6%

(Refer to tables from 14.2.7 to Table 14. 2.9)

As a result, FIRR exceeded the interest rate of procured fund, viz, this project is financially feasible. (See the following table).