Traceca Corridor

Traffic and Feasibility Studies - TNREG 9803

Module C :

Redevelopment of Aktau Ferry Terminal, Kazakhstan

Feasibility Study

March 2000

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European Union

Tacis

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ST-PETERSBURG
VOLOGDA
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YEKATERINBURG
OMSK
PETROPAVLOVSK
PAVLODAR
UST' KAMENOGORSK
SEMIPALATINSK
CHELYABINSK
KURCHETAV
ASTANA
KARAGANDA
CHINA
KAZAN
NIZHNI NOVGOROD
MOSCOW
RUSSIAN FEDERATION
SMOLENSK
SAMARA
MINSK
POLAND
BELARUSSIA
BREST
GOMEL
KURSK
VORONEZ
URALSK
AKTYUBINSK
KAZAKHSTAN
ALMATY
BISHKEK
KYRGHYZSTAN
KIEV
UVIV
KHARKOV
POLTAVA
VOLGOGRAD
Aral Sea
TASHKENT
TAJIKISTAN
UKRAINE
VINNICA
LUGANSK
DNEPROPETROVSK
KRIVOJ ROG
DONETSK
ZAPOROZ'JE
MARIUPOL
ROSTOV ON DON
ASTRAKHAN
MOLDOVA
ROMANIA
CHISINAU
NIKOLAJEV
MELITOPOL
ODESSA
UZBEKISTAN
SAMARKAND
DUSHANBE
BUYICHEVSK
KRASNODAR
AKTAU
BUKHARA
SERBIA
BUCAREST
CONSTANTA
NOVOROSSIJSK
GROZNY
MAKHACHKALA
TURKMENISTAN
SOFIA
VARNA
GEORGIA
TBILISI
AZERBAIJAN
POTI
BATUMI
TURKMENBASHI
ASHGABAT
KABUL
Black Sea
BULGARIA
BURGAS
SAMSUN
Caspian Sea
AFGHANISTAN
PAKISTAN
THESSALONIKI
ISTANBUL
YEREVAN
ARMENIA
ANKARA
TURKEY
Aegean Sea
ATHENS
TEHRAN
IRAN
IRAQ
SYRIA

TRACECA INDEX

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2	ODESSA/POTI/BATUMI
3	Port of POTI
4	Port of BATUMI
5	POTI/BATUMI/TBILISI
6	TBILISI /YEREVAN
7	TBILISI/BAKU
8	YEREVAN/BAKU
9	Port of BAKU
10	Port of AKTAU
11	Port of TURKMENBASHI
12	TURKMENBASHI/CHARDZHOU
13	CHARDZHOU/BOKHARA/ SAMARKAND TASHKENT
14	SAMARKAND/TERMEZ/ DUSHANBE
15	KURGAN TUBA/ KULAB (rail only)
16	AKTAU BEJNEU/ CHU ALMATY/DRUZHBA
17	LUGOVAYA/BISHKEK/ BALYKCHI

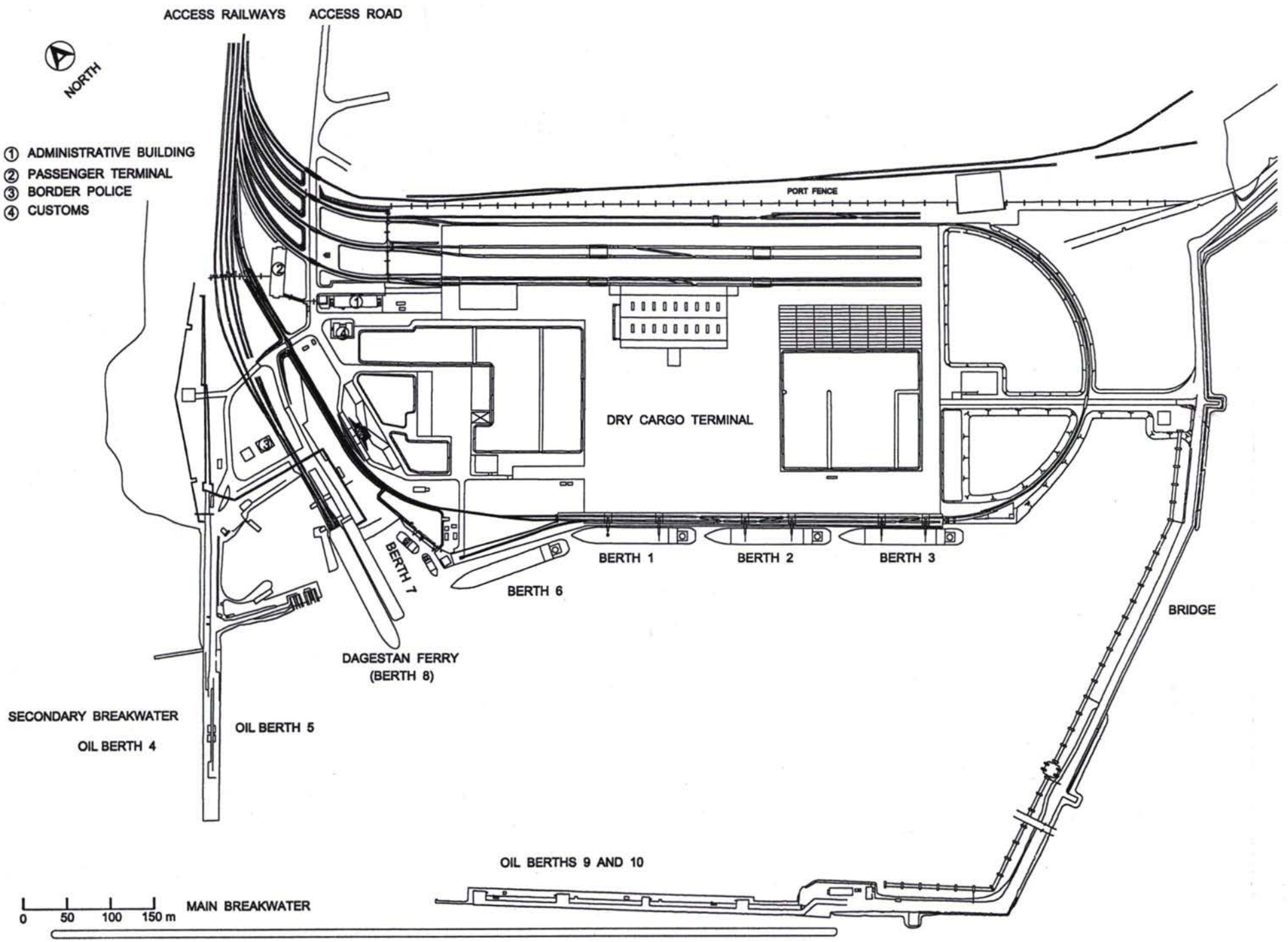
LEGEND

0 50 100 km

- Highway
- Main road
- Other road
- Railway
- Major city
- City up to 500.000 inhabitants
- City up to 50.000 inhabitants

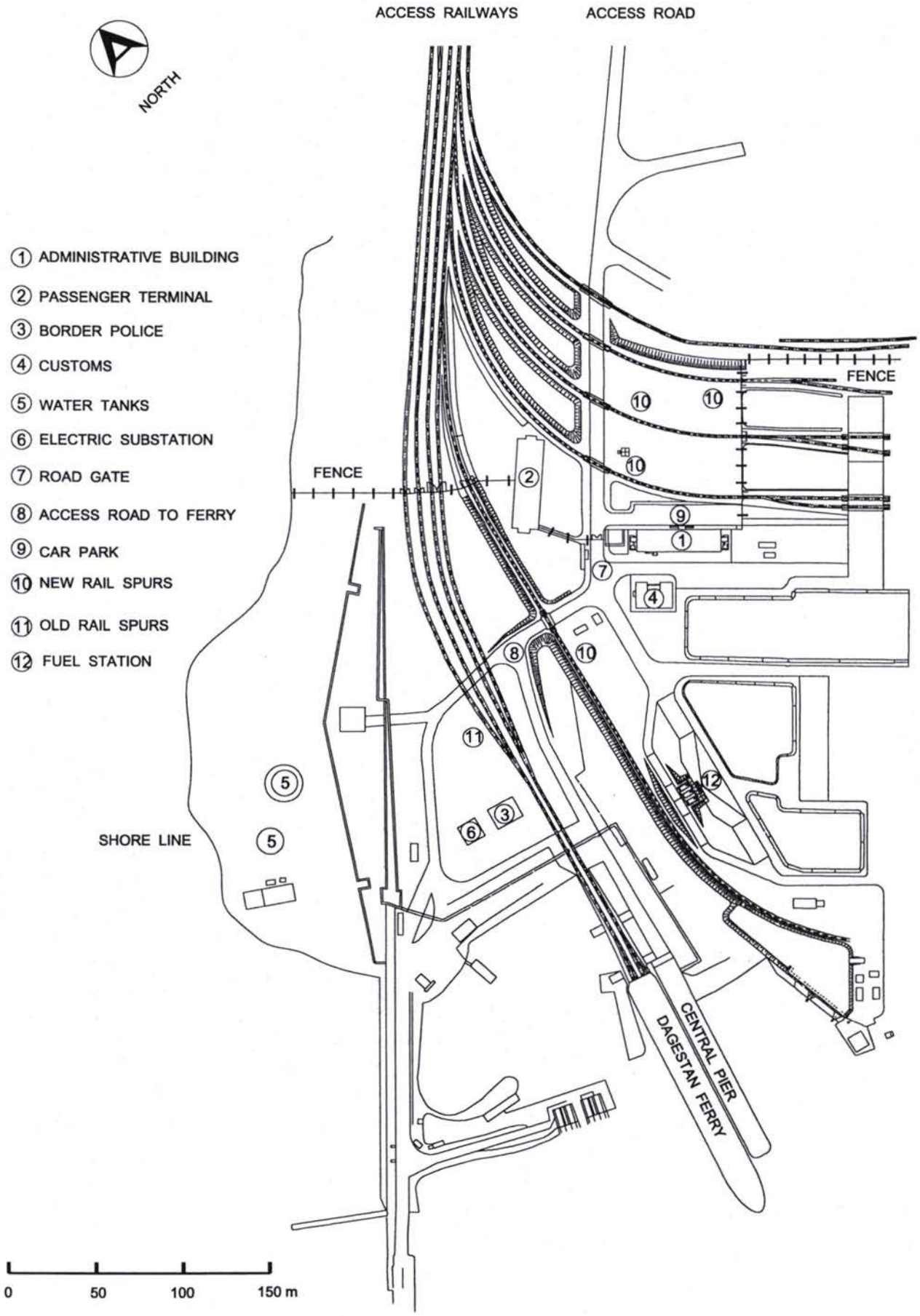
TRACECA LEGEND

- Ports
- Maritime route
- Rail Corridor
- Road Corridor



General Layout of Aktau Port

Layout of Aktau Ferry Terminal



INTRODUCTION AND EXECUTIVE SUMMARY

Introduction and Executive Summary

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1. Introduction

According to the ToR, initial objective of this module was to reveal investment merit of the redevelopment of AFT for road and rail traffic and, in case investment merit was shown, negotiation for financing the project and tendering the works had to be launched.

Since preparation of the ToR the beneficiaries have decided themselves to recommence ferry operations and Traceca has committed to provide co-financing for the rehabilitation of the ramp and access (ref. Annex 3). The emphasis was therefore on preparation of tender documents for the Traceca intervention.

A tender dossier was submitted to the European Commission in January 2000. The related procedure is likely to be launched in March 2000, whilst the work programme would be as shown in the attached timetable. The tender dossier enables further preparation of two separate contracts, the main one to be covered by Tacis for an amount of euro 1,860,000 million, potentially a second contract to be covered by ACSP, for a maximum amount of euro 430,000.

In addition to the tender dossier all study components were developed. They make up this report, which frame complies with that of the ToR.

2. Refine, Verify and Complete Previous Technical Investigations

After a seven-year break AFT reopened in June 1999, however the ferry service is operated under very arduous conditions. The ferry berth and the ramp have deteriorated due to age and to lack of maintenance. Compared to previous technical investigations:

- Diving inspections revealed that sea-bed has to be cleaned from miscellaneous obstacles.
- Aerial parts of sheet pile walls are a bit more corroded, however all underwater parts of the walls are still protected.
- Condition of concrete walls topping berthing structures is worsening.
- Fendering systems are quickly deteriorating, since ferry traffic started again.
- Pier pavements are still in poor condition, as well as sea-slope protections.
- Ramp-deck rotten beams are breaking little by little, due to truck traffic.
- Corrosion of ramp steel guiders is progressing.
- Central control tower is still in the same condition: the building is almost all-right but control panels and piloting station are out of order.
- Lifting towers are still in need of rehabilitation works on mechanical and electrical parts.
- Counterweight pits are still flooded but pump tests showed that infiltration is fairly limited.
- Rail-tracks are in good condition, but associated remote operating systems are out of order.
- Electricity supply system is still completely to be renewed, even the feeder cable reaching the transformer substation.

Moreover:

- Since 1997 Caspian sea level is continuously decreasing.
- Phase 1 reconstruction works, concerning the dry cargo terminal, are completed.
- ACSP has refurbished an old building which is now the passenger terminal.
- The former railway control building has been emptied since border policemen moved.

A rehabilitation project was elaborated to allow AFT to better cope with a basic traffic level (one or two ferry calls per week), under improved conditions of safety, including provision for rail traffic. In this project two categories of works are foreseen: essential items, related to safety and speed of

operation of the ferry ramp, and non-essential items, which are of lower priority (though not exclusively, relating to works on land facilities). For tendering purposes non-essential items are optional; they may be included in the future Traceca contract, if the Traceca budget is sufficient, or contracted by the MoTCT, at the discretion of the MoTCT.

It was agreed not to raise any terminal facility, since the project is of modest investment and because the Caspian sea level is now slowly decreasing. Besides, the available budget did not allow to foresee any lengthening of berthing structures.

3. Traffic Forecasts and Demand Analysis

ACSP traffic has increased from 0.7 million to 2.5 million tonnes in the last four years due to the sharp increase of oil exports, but the traffic volume is still less than in 1992, when it was almost 3 millions tonnes. During the former period of AFT operation (1986 to 1992), yearly traffic reached peaks of 27,000 tonnes of cargo and 15,000 passengers. Since reopening of ferry service, in June 1999, average monthly turnovers were 650 tonnes of cargo and 520 passengers, almost exclusively based on exchanges between Azerbaijan and Aktau region.

Although the regional economic situation is still weak and shaky, Kazakh oil production steadily increases as well international oil prices, whilst Kazakh grain crops and Uzbek cotton harvests remain robust (the hinterland of ACSP consists of southern Kazakhstan and Uzbekistan, which are both linked to Aktau by railways). Regional Asian exports are therefore promising and, consequently, import capacity should improve.

The general structure of imports and exports in the hinterland will somewhat change compared to the present situation due to the following factors:

- a geographic diversification of exports and imports (less oriented towards Russia though this trade will still be dominant);
- an increase of oil exports;
- an increase in imports of equipment generated by new investors in the oil production field and of other industries due to the recovery of the economy in a first phase;
- an increase of general cargo imports due to the increase of purchasing power in a second phase;
- the intra-trade: trade between the countries located around the Caspian Sea is not intensive as national productions are not complementary (production was formerly oriented towards providing the Russian industry).

From the transport point of view, this means that containerised traffic could increase because of the opening of the Traceca countries to the western economy and the development of modern logistic methods and consequently, containerisation of exports could also increase to avoid the return of empty containers. The local traffic (intra-trade) across the Caspian Sea will remain low. Ships sailing in the Caspian Sea will carry more transit international cargo than regional cargo.

Regarding the whole port of Aktau, new trade opportunities should induce following traffic:

- additional export of crude oil;
- import of oil industry equipment;
- import of mud for oil-pit drilling operations;
- export of sulphur for chemical industries (sulphur results from oil production);
- additional export of Uzbek cotton;
- additional import of foodstuff;
- additional export of Kazakh grain.

To answer the key question regarding shares of cargo that may be transported by ferry vessels, modal split in transport and packaging types have been considered:

- crude oil is often transported into rail-cars, however for sea transportation tankers are more economical than ferries;
- ferries are quite suitable for oil industry equipment, drilling mud and foodstuff;
- ferries can carry wagons of grain and sulphur, but for large quantities bulk cargo vessels are more economical;
- a certain share of cotton export should be carried by ferries however, given the remote location of importers, rail transportation through Russia will probably prevail.

On these bases three scenarios have been elaborated; they lead to the following traffic forecasts.

Exports by ferries:

Commodities	Transport Modes	Year 2005 (tonnes)	Year 2010 (tonnes)
Low Scenario			
Grain	Rail cars	0	0
Sulphur	Rail cars or trucks	6 000	7 000
Cotton	Rail cars 40′ containers	0 0	0 0
Others	Trucks Cars	2 400 600	2 800 700
Total		**9 000**	**10 500**
High Scenario			
Grain	Rail cars	22 000	25 000
Sulphur	Rail cars or trucks	8 000	11 000
Cotton	Rail cars 40′containers	7 500 0	10 500 0
Others	Trucks Cars	12 000 700	16 800 1 000
Total		**50 200**	**64 300**
Medium Scenario			
Grain	Rail cars	3 000	3 000
Sulphur	Rail cars or trucks	7 500	10 500
Cotton	Rail cars 40′containers	0 7 500	0 10 500
Others	Trucks Cars	2 000 600	2 500 800
Total		**20 600**	**27 300**

Import by ferries:

Commodities	Transport Modes	Year 2005 (tonnes)	Year 2010 (tonnes)
Low Scenario			
Mud for oil industry	Rail cars or trucks	1 200	1 200
Equipment	Containers on ferry	15 000	21 000
Food & housing	Trucks & rail cars	12 000	13 800
Others	Trucks Cars	0 600	0 700
Total		**28 800**	**36 800**
High Scenario			
Mud for oil industry	Rail cars or trucks	1 200	1 200
Equipment	Containers on ferry	17 800	28 500
Food & housing	Trucks & rail cars	15 000	21 000
Others	Trucks Cars	0 800	0 1 000
Total		**34 800**	**51 700**
Medium Scenario			
Mud for oil industry	Rail cars or trucks	1 200	1 200
Equipment	Containers on ferry	17 800	28 500
Food & housing	Trucks & rail cars	12 300	16 400
Others	Trucks Cars	600 600	800 800
Total		**32 500**	**47 700**

Global Traffic Forecasts:

Scenarios	**2005**	**2010**
Low Scenario	37 800	47 300
High Scenario	85 000	116 000
Medium Scenario	53 000	75 000

Detailed calculations show that such traffic levels can be satisfied by one call per week in the low scenario case and two calls per week in the high scenario case.

As a comparison, total ferry traffic between Baku and Turkmenbashi is around 700,000 tonnes per year.

4. Financial Projections

Financial projections were made on the basis on the investment cost estimate prepared for the needs of the tender, considering essential items and non-essential ones:

(figures in thousands euro)

Works	Total Traceca & Aktau Port		Traceca share		Maximum share of Aktau Port	
Alternatives	**Essential**	**Full**	**Essential**	**Full**	**Essential**	**Full**
General Items	276.0	276.0	276.0	276.0	0	0
Marine Works, Berthing Structures	165.5	165.5	150.9	150.9	14.6	14.6
Ramp Works	514.4	514.4	514.4	514.4	0	0
Central Control Tower	80.1	80.1	80.1	80.1	0	0
Lifting Tower Structures and Machineries	200.1	200.1	200.1	200.1	0	0
Rail-track Works	16.9	76.9	0	0	16.9	7 6.9
Electricity Supply	197.0	197.0	197.0	197.0	0	0
Earthworks & Pavements	60.8	293.1	0	155.0	60.8	138.1
Miscellaneous	0	174.0	0	174.0	0	0
Passenger Facilities	0	277.0	0	81.0	0	196.0
Contingencies	35.8	35.9	31.4	31.5	4.4	4.4
Works Supervision	140.0	140.0	140.0	140.0	0	0
TOTAL	1,686.6	2,430.0	1,589.9	2,000.0	96.7	430.0

Then yearly operating expenses, including labour cost, maintenance costs, overhead expenses, depreciation as well as potential financial charges were summed up (financial charges were computed under the theoretical assumption that ACSP would borrow funds to cover its share):

(figures in thousands euro)

	Year 2001	Year 2005	Year 2010
Low traffic scenario			
Full project	259.4	260.7	245.6
Essential project	184.4	185.7	184.0
High traffic scenario			
Full project	270.1	277.5	273.8
Essential project	195.2	202.5	212.2
Medium traffic scenario			
Full project	261.3	263.8	254.9
Essential project	186.3	188.8	193.2

Lastly, yearly operating revenues, i.e. port dues on ferries, port dues on cargo, fees on freight and fees on passengers have been computed for each traffic scenario (low, high and medium) and for three terms: year 2001, year 2005 and year 2010 (revenues are in thousands euro):

	Year 2001	Year 2005	Year 2010
Low traffic scenario	202.7	213.4	230.5
High traffic scenario	291.8	352.4	466.4
Medium traffic scenario	217.7	238.2	308.1

The above tables have enabled computation of projected cash-flows and internal rates of return, taking also into account taxes on profit:

Net potential cash flow (in euro)

	Year 2001		**Year 2005**		**Year 2010**	
	Full	**Essential**	**Full**	**Essential**	**Full**	**Essential**
High traffic scenario						
Gross cash flow	77,400	115,200	87,200	125,000	119,600	144,100
Taxes on profit	0	5,300	0	8,300	0	14,000
Foreign loan refunding	0	0	43,000	9,700	43,000	9,700
Net cash flow	77,400	**109,900**	44,200	**107,000**	76,600	**120,400**
Low traffic scenario						
Gross cash flow	156,300	194,100	209,800	247,600	326,700	351,200
Taxes on profit	6,500	29,000	22,600	45,100	57,600	76,100
Foreign loan refunding	0	0	43,000	9,700	43,000	9,700
Net cash flow	149,800	**165,100**	144,300	**192,800**	226,100	**265,400**
Medium traffic scenario						
Gross cash flow	91,100	128,900	109,400	147,200	187,700	212,200
Taxes on profit	0	9,500	0	15,000	15,900	34,400
Foreign loan refunding	0	0	43,000	9,700	43,000	9,700
Net cash flow	91,100	**119,400**	66,400	**122,500**	128,700	**168,100**

The above table shows that the net cash-flow is fairly high, which is due to the contribution of the Tacis programme.

A simulation assuming that the port has to borrow 80 % of the total investment shows that the cash-flow would be negative during the next 10 years, except in the most optimistic traffic option (essential project, high traffic scenario) where the cumulative net cash-flow becomes positive in 2009.

Internal Rates of Return

Traffic scenarios	Full Project	Essential Project
Low	10 %	115 %
High	36 %	174 %
Medium	18 %	126 %

Comments:

- As far as the high traffic scenario is concerned, extremely strong rates of return do not mean that the investment is profitable itself, as these good rates are due to the contribution of the Tacis Programme, which represents 83 % of the total cost of the rehabilitation works in the full project and 95 % in the essential project.

- As to the low and medium traffic scenarios, rates of return are still acceptable in the case of the full project. They are very high if only the essential project is implemented, but these figures are not really meaningful, as already explained.

5. Environmental Due Diligence

5.1 Environmental impacts related to the construction phase

The impacts related to water during the construction phase will come largely through removal of debris and old sheet pile walls, and installation of new sheet wall protection and fenders, on the central pier and finger pier. However, the harbour is well-protected from Caspian waves and currents, and there appears to be little in the way of zoobenthos in the sediment or other marine life in and around the ferry dock that would be at risk.

Land-based sources of risk include safety related to the transport of materials to and from the site, and release of dust. The intended demolition of the old transformer station could result in the escape of polychlorinated bi-phenyls or other toxic substances. Sandblasting and re-painting activities also pose risks for the soil as well as the water.

Part 5 of this report provides a comprehensive list of mitigation measures and laws to be complied with during construction phase.

5.2 Environmental impacts related to the operation of the ferry terminal

Although the nature of cargo to be transported by the ferries once the AFT is renovated is still uncertain, there is a possibility to be shipment of petroleum crude and petroleum products. These pose the greatest risk to the environment in and around the port. However, given that there is an existing offloading and onloading facility for petroleum crude and petroleum products at the port, impacts posed by the ferry cargo are limited. Port facilities exist to handle the eventuality of oil spills. However, a specific plan must be developed for the AFT, and ACSP must ensure that any additional required equipment is present. Also, ACSP must involve the AFT in any practice events.

Other risks to the environment involve the expected increase in ferry traffic. This normally might be expected to be of concern for the port waste management facility (concerning both waste water and solid waste). Although the ferries do not currently offload sanitary waste water at the port, discussions with a ferry captain indicated that they might wish to do so. Solid waste is offloaded at the port. The

ferry captain stated that the ballast water, which consists of sea water, need not be and is not disposed at the port.

ACSP must ensure that waste reception facilities are adequate for handling the expected quantity of wastes.

5.3 Required approvals and consents

Part 5 of this report provides information about required approvals and consents which are needed from environmental agencies before starting the site works.

6. Recommendations for Redevelopment

6.1 Technical improvements

Current condition of the ramp is so bad that the rehabilitation project has to be launched without as soon as possible. The results of the financial study should incite ACSP to only implement the so-called "essential" project, avoiding works such as installation of railway remote operating systems and pavement of parking areas.

6.2 Use of Dagestan ferry vessels

Though not perfectly suitable for modern ro-ro service, Dagestan ferries exist, are still in good condition and are apparently operated on a positive cash-flow basis. They should therefore still be trusted for a certain period.
To increase their capacity operators may choose to avoid crossings of tractors (tractors can remain on land, only trailers being on board).

6.3 Border-crossing procedures

AFT was not initially designed for border-crossings since Azerbaijan, Kazakhstan and Turkmenistan belonged to the Soviet Union. When AFT re-started to operate, passenger border-crossing procedures were first carried out in the open air and it used to take several hours to check twenty to thirty passengers. Vehicles were checked inside the vessel. In February 2000 the passenger terminal opened and passenger control became much faster (however, the building still needs to be equipped with luggage x-ray machines and a computer network). Vehicle documents are still checked inside the vessel after berthing, which is not efficient.

Customs now benefit from new premises on the dry cargo port, but border policemen are still temporarily settled in containers, whereas immigration officers are in Aktau city (they move to the port each time a ferry arrives or leaves). All of them should have permanent rooms within the ferry terminal building.

Apart from premises and equipment purposes, improvement of border-crossing procedures at AFT will require enforcement of recommendations resulting from:

- The Basic Traceca Multi-Lateral Agreement on International Transport, signed in Baku on 08 September 1998, together with its technical annexes on international rail transport, international road transport, international commercial maritime navigation, customs procedures and documentation handling.

- Works of the Permanent Inter-Governmental Commission which is being set up in Baku to help implement the above Multi-Lateral Agreement.

- The soon-to-commence Tacis project "Customs Facilities at Central Asian Road Border Crossings".

6.4 Management and operation of AFT

The Institutional Development Programme which is being implemented at ACSP since 1996 benefits to the whole port, including the ferry terminal. However, ACSP still needs to properly integrate AFT as a complementary port terminal and especially to select the share of port traffic which needs to be directed towards AFT.

A few companies are willing to operate AFT but none of them is ready to invest any fund, therefore ACSP should keep with itself both management and operation of the ferry terminal. A concession might be granted later on, preferably to a candidate which would invest funds to improve or to extend the terminal.

Besides, in order to efficiently operate AFT, ACSP should get ready to appoint a team of employees for the ferry terminal (a staff list is proposed in Part 6 of this report), and to create a specific accounting profit centre.

6.5 Marketing actions

Many relevant marketing actions were developed in the framework of the Institutional Development Programme. However, so far no specific action was undertaken regarding AFT.

An essential action group deals with information about the ferry link:

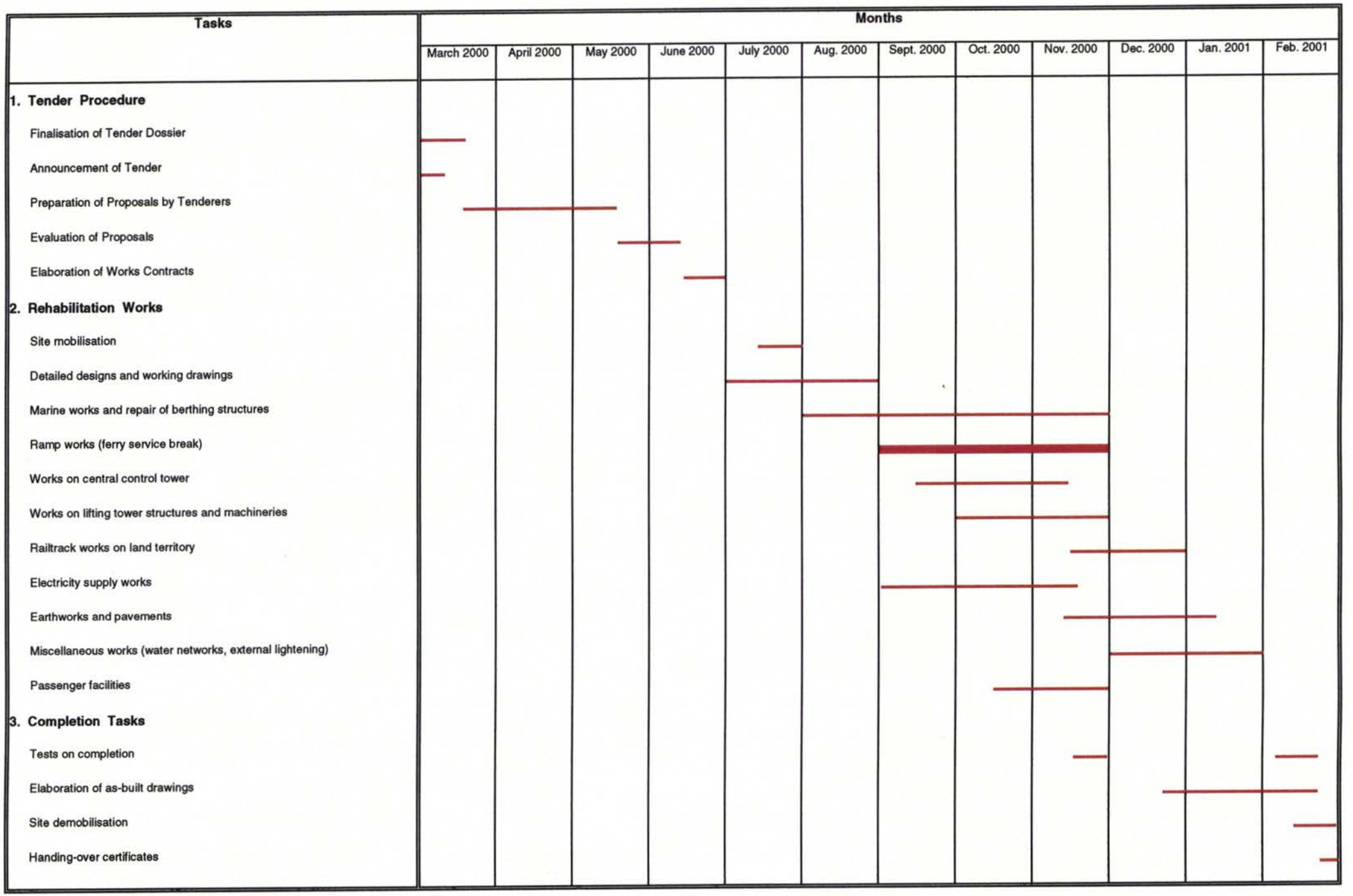
- Information of local and national companies in Kazakhstan, Uzbekistan and Caucasus (exporters, importers, freight-forwarders). National and regional newspapers are efficient media for such purposes.
- Information to European companies, through announcements in international port and transport magazines.

Besides, in order to target the right customers, ACSP should work out all complete transport chains, from real origins to final destinations.

On the other hand, even if Baku remains Aktau key partner, other ports should be targeted for medium and long term ferry links, in Iran and in Russia. When properly managed triangular routes enable to increase vessel loading rates.

Lastly, any marketing action aiming at promoting the ferry service should be carried out in close cooperation with the Caspian Shipping Company.

Attachment: General Work Programme for AFT Rehabilitation


Tasks
Months
March 2000
April 2000
May 2000
June 2000
July 2000
Aug. 2000
Sept. 2000
Oct. 2000
Nov. 2000
Dec. 2000
Jan. 2001
Feb. 2001
1. Tender Procedure
Finalisation of Tender Dossier
Announcement of Tender
Preparation of Proposals by Tenderers
Evaluation of Proposals
Elaboration of Works Contracts
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Site mobilisation
Detailed designs and working drawings
Marine works and repair of berthing structures
Ramp works (ferry service break)
Works on central control tower
Works on lifting tower structures and machineries
Railtrack works on land territory
Electricity supply works
Earthworks and pavements
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PART 1

REFINE, VERIFY AND COMPLETE PREVIOUS TECHNICAL INVESTIGATIONS

Refine, verify and complete previous technical investigations

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1. PREVIOUS TECHNICAL INVESTIGATIONS

Previous technical investigations of AFT were performed in 1997 by the Danish Consultant Ramboll under a Tacis-Traceca contract (ref. 3). Ramboll findings and recommendations are summarised in chapters 1.1, 1.2 and 1.3.

1.1 Setting of the terminal

AFT was designed in Baku by Caspmorniiproject in the 60s and constructed from 1966 through 1976. AFT was only used from 1986 till 1992, for passengers and for road traffic (rail cars were never transhipped, though AFT was mainly designed for rail traffic). Similar ferry terminals were built in the Caspian ports of Baku, Turkmenbashi (former Krasnovodsk) and Bektash (northern Turkmensistan). Ferry operation in Aktau stopped in 1992 because of lack of traffic and also because the Caspian sea level was so high that it became very difficult to operate the ramp lifting equipment.

From 1981 till 1989 central pier of AFT was also used to berth oil tankers. For this reason central pier was equipped with oil loading arms, oil feeding pipes and fire fighting equipment. Fender system was changed: wooden panels were replaced by rubber tyres. Oil traffic on central pier stopped in 1989 when new oil berths were opened at the head of the main breakwater.

AFT was initially designed for Azerbaijan-type vessels, which were replaced in 1985 by Dagestan-type units, all operated by CSC. Dagestan ferries are longer than Azerbaijan ones and they are fitted with only two entrance railways, instead of four (c.f. attached drawing 3).

Following the preparation of a port master plan in 1994 (ref. 1), a phased development of ACSP was launched. Phase 1 reconstruction works, addressing the dry cargo area, started in June 1997 and was fully completed in September 1999. Phase 2 should address the causeway and the main breakwater. AFT is concerned neither by Phase 1 nor by Phase 2.

Regarding Caspian sea levels, the most responsive study (ref. 2) predicts that until year 2050 sea level should remain within the -25 m to -30 m range (in meters, BSL). The latest steep raise of the Caspian sea level started in 1977 (-29.10 m BSL) and stopped in 1995 (-26.6 m BSL), i.e. a 2.4 m raise in a 18 year time. Tides are negligible, whilst waves do not affect AFT.

1.2 Condition of terminal facilities

Central pier is composed of two parallel sheet pile walls anchored to each other, capped by reinforced concrete bulkheads and protected by rubber tyres on the ferry side (2 m diameter, 0.5 m thick). In 1997 Ramboll stated that 1) corrosion of sheet piles was of concern on south-eastern side of pier, 2) concrete walls needed maintenance repair, 3) rubber tyre fenders should be replaced by proper guiding fenders, 4) stop fenders had to be tested, 5) asphalt pavement needed renewal, 6) oil loading arms and fire fighting tower should be removed.

Finger pier is made of a sheet pile box capped by concrete and protected by a wooden fender system. Ramboll recommended 1) to provide sheet piles with corrosion protection, 2) to repair the upper concrete wall, 3) to upgrade concrete pavement, 4) to renew wooden fender.

AFT control building (or control tower) is located at the shore end of central pier, elevated from the ground to allow free traffic underneath. It is composed of one room containing ramp control boards. Ramboll recommended to renovate the roof and to replace all control panels.

Access road to central pier is bordered by a short sheet pile wall and by stone slope protection (rubble mound type). Ramboll highlighted the need of 1) protecting sheet piles against corrosion, 2) strengthening slope protection, 3) upgrading asphalt pavement, 4) replacing underground electric cables.

The ferry ramp is composed of two movable link spans supported by a shore base and four lifting towers. Lifting towers are fitted with counterweights which balance span dead weights, whereas electrical hoists allow lifting and dropping operations. The major problem underlined by Ramboll was the fact that lifting equipment was out of order, mainly because counterweights were flooded (flooded counterweights loose part of effective loads). Besides, all steel structures were reported to required corrosion protection, including pivot bearings on the shore base and on central beam. Ramboll also mentioned that the wooden deck was to be replaced.

Lifting towers are founded on sheet pile boxes which are partly filled with concrete and partly hollow, hollow parts being counterweight pits. Tower structures are composed of a lower part, consisting of a heavy steel frame bearing the weights of both span and counterweight, and an upper part consisting of a machinery house. Ramboll stressed that 1) sheet piles needed corrosion protection, 2) pits should be emptied from water, 3) machinery houses required some minor repair works (roof rehabilitation, painting, replacement of broken glass), 4) electrical engines should be replaced, 5) mechanical parts needed maintenance operations.

The land base of the ramp is a sheet pile box filled with mass concrete. Ramboll recommended 1) to protect sheet piles against corrosion, 2) to replace bearings of span girders, 3) to eliminate the level difference between ramp rails and land rails (approximately 15 cm).

Access railway tracks consist of two parallel tracks, 60 m long, and four parallel tracks, 750 m long, all belonging to Cascor (Cascor also owns the railway control building. However, ACSP owns the whole land within the port territory). No damaged was noticed, except slight corrosion.

Access road to the ramp was through the port access. Ramboll didn't report about the road condition since its major part was going to be rehabilitated under Phase 1 reconstruction works.

1.3 Rehabilitation options

In 1997 Ramboll submitted several rehabilitation options likely to allow AFT to cope with road traffic, rail traffic, container services as well as passenger flows.

Option 1 was a minimum programme which did not consider rail traffic. It amounted to USD 3.8 million and consisted of:

- Development of a parking area for road vehicles
- Renovation of central pier (sheet pile protection, concrete wall, pavement - no fender works -)
- Renovation of finger pier (sheet pile protection, concrete wall, pavement, new fenders)
- Renovation of access road (underground piping, land raising, pavement)
- Renovation of ramp and tower supports (raising of concrete base, sheet pile protection)
- Renovation of tower superstructures (roofs, walls, surface protection)
- Renovation of link spans (deck replacement, steel frame coating - no rail works -)
- Renovation of ramp machinery (engines, spindles, wires, counterweights)
- New control system for ramp lifting operations
- Construction of a passenger hall (ticketing, waiting lounge, border crossing, shops and restaurant)
- Procurement of a shuttle bus for links between ferry and passenger terminal

In the above list the sole ramp rehabilitation amounted to USD 1.9 million.

Option 2, amounting to USD 4.6 million, only differed from option 1 by the fact that it included rail traffic facilities. Additional foreseen works were related to reconstruction of rail tracks and raising the territory of the railway marshalling area.

Option 3, amounting to USD 15 million, consisted in building a complete ferry terminal including a large reclaimed and fully equipped yard, north of the existing railway marshalling area. Moreover, option 3 included renovation of fenders on central pier, internal roads and engineering networks, sea-slope protections as well as a passenger bridge between the ferry and the passenger hall. No container facility was included.

2. REFINING AND UPDATING TECHNICAL INVESTIGATIONS

2.1 Introduction: new ferry link

Since June 1999 a ferry vessel belonging to CSC (M.S. Mercuri 2, Dagestan type) is again serving the route Baku-Aktau, on the basis of one call per week. Until now only road vehicles and passengers were transported (recent traffic figures are in Part 2).

Currently loading and unloading operations are unsafe and slow because of the following reasons:

- The ramp cannot move, therefore the ferry has to use its water ballasts to adjust deck level (the ferry stern is fitted with short flaps and the ramp has to sit on the ferry structure).
- Since ferry vessel is longer than central pier she has to drop a bow anchor to secure her mooring conditions.
- No adequate border crossing facilities are available.
- The war in Caucasus urges Border Police and Immigration Services to undertake very thorough inspections.

2.2 Sea levels

Since 1995 average yearly levels are luckily almost stable, even slightly dropping: from -26.6 m BSL in 1995 down to -27.2 BSL in 1999. The former sharp raise stopped, for the moment.

2.3 ACSP phase 1 works

American-Turkish joint-venture Bechtel-Enka completed phase 1 reconstruction works in September 1999. Phase 1 mainly consisted in rehabilitating the dry cargo part of the port by raising the whole platform by 2.5 m, reconstructing quay walls, rail-tracks, electricity stations, administrative building, warehouses, internal roads, engineering networks and port gates. Phase 1 platform reaches the southern boundary of AFT territory.

2.4 Topography and bathymetry

In October 1999 BCEOM ordered a topography survey of AFT territory to the local company Casgyz. Its results were used to prepared enclosed drawings. On the territory of phase 1 works, BCEOM made use of as-built drawings issued in October 1999 by Bechtel-Enka. Regarding water depths, results of the survey ordered by ACSP in July 1999 were used and complemented by a few underwater measurements made by BCEOM in October 1999.

The ferry terminal is located on a reclaimed land with surface level of -25.5 m BSL near the ramp, i.e. approximately 1.5 m above current sea level. The area of the dry cargo terminal is higher, standing around -24 m BSL. Drawing number 5 shows topographic levels provided by the survey performed in October 1999.

Seabed levels in the vicinity of the ferry terminal are reported on drawing number 4 : around -6.5 m Caspian system, which means that water depths are currently close to 7.5 m, far enough for Dagestan ferries which draught is only 4.5 m. Port entrance channel has a depth of -7 m Caspian system.

2.5 Results of inspections performed by BCEOM from September to November 1999

Note: attached photographs and drawings make understanding of the following text easier.

2.5.1 Berthing structures and other marine parts

a. Sea-bed

Some obstacles were noticed on the sea-bed in the area comprised between the finger pier and the central pier :

- Two rubber tyres of 2 m diameter and 0.5 m thick.
- A metal frame, approximately 5 m wide.
- A stretch of Larssen V sheet piles vertically driven in the subsoil along the finger pier (app. 1 m away from finger pier, parallel to it), about one metre long.

b. Sheet piles

All sheet pile elements which are located above sea water level are corroded: eastern side of central pier, western side of finger pier and front part of base ramp. However, all underwater coatings of sheet piles are in still good condition.

c. Capping concrete walls

Capping concrete walls on central pier and finger pier are damaged: several areas of skin concrete are destroyed and steel bars are visible.

d. Rubber fenders on central pier

Fender system of central pier is made of rubber tyres, 2 m diameter and 0.5 m thick. When this fender system was set up the whole pier was covered with two rows of double tyres hung with galvanised chains to steel profiles fixed to the concrete wall. Currently several tyres are missing, as well as their chains and profiles (they fell because of ferry belt friction).

e. Wooden fender on finger pier

The condition of this wooden fender is quickly worsening. Wooden beams might collapse soon.

f. Stop fenders

Several steel arms broke since reopening of the ferry line. Moreover, front shields are very corroded.

g. Pavements on top of piers

Asphalt pavement on central pier, from control tower to pier end, is severely cracked. Finger pier is topped with a layer of in-situ cast concrete which is damaged at its head part (several cracks and a hole are visible).

h. Rubble mound protections

Sea-slope protections alongside the ramp and on both sides of the land base are made of fragile and flat limestone blocks. This armour layer is not stable, moreover there is no filter underneath. Such stones cannot efficiently protect slopes against propeller-induced currents.

2.5.2 Ferry ramp

a. Ramp deck

Ramp deck is made of two layers of wooden beams. The upper layer is deeply rotten (some beams even broke under truck traffic). The lower layer looks better but is also partly rotten.
It may also be noticed that in case of rain wood becomes slippery for road vehicles.

b. Ramp rail-tracks

There are two rail tracks on the shore part of the ramp, dividing into four tracks on the outer span. This system is not suitable for Dagestan ferries, who only have two entrance rail-tracks. Rails are of P-50 type.

c. Span structures

Corrosion of steel guiders and traverse beams is slowly progressing. Lower parts completely lost their paint cover. All pivot bearings are also corroded, on base ramp (4 units) as well as on traverse beam (3 units).

2.5.3 Central control tower

- Control panels and piloting station are completely out of order.
- The roof of this building is not watertight , in case of rain water leaks through it.
- Outdoor stairs are still in use but they are corroded.
- Indoor perimeter walls, made of concrete coated with mortar, are in poor condition.

2.5.4 Lifting towers and machineries

a. Initial technological principles

The ramp was designed for loading and unloading rail-cars and road vehicles under various sea levels and ferry draughts.

The ramp consists of 2 spans, a 27 m long inner span (140 tonnes dead weight) and a 33 m long outer span (220 tonnes dead weight). These structures are supported by a land base and four towers equipped with lifting mechanisms.

Each span was partially balanced with reinforced-concrete counterweights which were vertically moving in pits arranged inside the towers (80 tonnes each in inner towers, 65 tonnes each in outer towers). The unbalanced part of the inner span was 1 tonne whilst that of the outer span was 10 tonnes.

Displacement of the inner span, which is joined by hinges with the outer span, was carried out by two cap screws fixed on inner towers. Lowest ends of screws are hinged with the structure; supporting nuts are fixed to the upper ends of the screws and connected with conic devices which were driven by electric motors. Rotation of the nut and consequent displacement of the structure could only be carried out in the absence of temporary loading on the structure (no rail-car, no road vehicle).

The lifting and pulling down of the outer span was operated according to a different scheme, caused by the necessity to enable free displacement of the ramp end, laid on the ferry stern during loading and unloading operations. Tensioning load was arranged on one of the outer towers, supporting a wire running between both sides of the ramp. While taking the ramp structure off the ferry, the tensioning load set against the spring buffer, after what further winding of the rope on the winch drum led to lifting of span end.

When structure end was laid on the ferry the tensioning load was hanging freely, keeping the rope in tension. The above mentioned kinematics allowed the ramp end to follow the motion of the ferry stern during loading and unloading operations.

All lifting mechanisms were driven with alternative current motors (7.5 kW each in inner towers, 1.25 kW each in outer towers). Two regimes of work were possible : with one motor and with two motors. In two-motor regime rotors of both engines were connected.

Two kinds of controls were provided : remote control from central tower and local control by push-button panels located within the towers. In normal conditions all mechanisms were operated by remote control system.

Beside ordinary protection of electric engines from working in abnormal regimes, protection of spans against twisting or breakage was also provided. In addition, control systems were able to ensure that span rails were properly connected to vessel rails. Lastly, limitation of ramp movement was controlled by track command devices placed on mechanisms and also by final switches on spans.

b. Current condition of towers, counterweights and machineries

Currently all lifting mechanisms and engines are out of order, whereas counterweight pits are flooded up to sea water level. Spans are simply hung by chains which are welded to the tower superstructures. When the ferry berths she uses its ballasts to drive under the ramp.

Mechanical parts (gearboxes, winches, wheels, brakes and spindles) are not deteriorated but they need thorough cleaning and lubricating operations. However, electrical engines, electrical boxes and electrical cables are so damaged that they cannot be reused. All hoisting wires are also to be replaced.

Regarding counterweight pits, BCEOM arranged a pumping test which showed that pits are almost watertight: water comes back very slowly through the tower walls. Slight sealing works plus small permanent pumps will allow to keep pits dry.

Lastly, some glass bricks and windows are to be replaced on the upper part of tower superstructures.

2.5.5 Rail-tracks on land territory

As shown on drawing number 2, four railway tracks reach the ferry terminal (ferry terminal railway station is called "Morport" station). They belong to Cascor company, which also owns a fleet of locomotives and wagons operating in the area of Aktau. The station was designed for :

- parking of wagons waiting for ferry transfer.
- sorting of wagons arriving in the terminal before shunting to the ferry.
- inspection of wagons for defects.
- forming of trains from wagons arriving from Baku.

Total length of rails at Morport station can accommodate the full capacity a Dagestan vessel (28 rail-cars, each 13.92 m long).

Railways are laid with rails of P-43 and P-50 type, 1600 sleepers per km, on sandy and gravel ballast. Condition of track structure is fair (rails and sleepers). Switches specification is 1/9, made of rails of P-43 and P-50 type. The station is mainly located in a straight line, partially in a curve of 300 m radius.

Morport station was equipped with electric interlocking systems of switches and signals. Connection devices of electric interlocking system with control sensors and automatic equipment of the ferry terminal were also constructed.

Now on this section shunting order of traffic, enumerated facilities of the station do not function, ground-type equipment (electric drives, control-rods, cables and traffic lights) is completely disassembled. However, switches can be operated by hand.

The building where all remote control systems were installed is no longer occupied.

Fluorescent lamps hanged up on T-shaped poles as well as projectors installed on masts at the station yard can still be used for lightening.

2.5.6 Electricity supply

Transformer substation TP 803 is the source of electric power for the ferry terminal. From TP 803 two 400 Volt cables reach the central control tower, whilst a complex net of cables feeds electrical motors in lifting towers.
Transformer substation as well as all electrical cables are out of order, they are in need of complete replacement.

2.5.7 Passenger terminal

ACSP is currently refurbishing an old building at the port entrance, which recently became an operating passenger terminal. Drawing number 28 shows the final arrangement which is to be completed by the end of March 2000, including all required border crossing facilities: customs, immigration and border police equipment.
However, ACSP is in need of assistance for procurement of computers and luggage checking equipment (x-ray machines).

3. REHABILITATION PROJECT

3.1 Major design criteria

In consistency with ferry terminal rehabilitation projects in Baku and Turkmenbashi, AFT rehabilitation project is designed for:

- Dagestan ferries (CSC doesn't intend to replace these vessels, which are still operated on a positive cash-flow basis).
- Road and rail traffic (detailed loads are in the attached tender specifications).

Regarding sea water levels, ferry terminal projects of Baku and Turkmenbashi foresee to raise all structures in order to cope with a possible increase of water level up to -25 m BSL (see §1.1). In Aktau it was decided not to raise any structure because of the following reasons:

- Caspian sea level (temporarily ?) stopped increasing in 1995 (see following table).
- AFT existing levels allows to accept a 1 m increase of the Caspian sea level. AFT yard stands 1.5 m above current sea level.
- AFT rehabilitation project is based on short term, with a fairly modest investment (approximately euro 2 million, in consistency with the agreement of 1st June 1999 and that of 15 December 1999).

Caspian sea levels

Daily fluctuations usually don't exceed a few centimetres, whilst yearly fluctuations may reach +/- 20 cm.
Levels below are yearly averages

Year	1900	1930	1960	1977	1991	1992	1993	1994	1995	1997	1998	1999
Sea Level (m, BSL)	-25.7	-26.5	-28.5	-29.1	-27.2	-27.1	-26.9	-26.7	-26.6	-27.1	-27.1	-27.2
Sea Level (m, Caspian System *)	2.3	1.5	-0.5	-1.1	0.8	0.9	1.1	1.25	1.4	0.9	0.9	0.8

* Caspian System Zero is located 28 m below Baltic System Zero

3.2 Project features

AFT rehabilitation project, which has been approved by MoTCT on 15 December 1999, will allow the terminal to better cope with a basic traffic level under improved conditions of safety. The project also includes provision for rail traffic. It consists of:

- **Marine works, comprising:**
  . sea-bed cleaning in front of the ramp (tyres, metal frame and sheet piles)
  . sheet pile protection on central pier, finger pier and base ramp
  . repair of concrete walls on central pier and finger pier
  . placement of rubber tyres on central pier, finger pier and stop fenders
  . dismantling of old wooden fender on finger pier
  . repair of pier pavements (asphalt on central pier, concrete on finger pier)
  . reconstruction of sea slope protections along the ramp and near the shore base

- **Ramp works, comprising:**
  . replacement of span decks (removal of wooden beams and placement of a coarse steel deck)
  . replacement of span railways (two rail-tracks instead of four)
  . replacement of pivot bearings (four units on base ramp, three units on traverse beam)
  . sandblasting and repainting of all span structures

- **Works in central control tower, comprising:**
  . renovation of roof, walls and stairs
  . replacement of control panels and piloting station
  . supply of new furniture

- **Works on lifting towers, comprising:**
  . sealing of counterweight pits
  . supply of permanent bilge pumps
  . replacement of hoisting wires
  . dismantling and cleaning of mechanical equipment
  . replacement of electrical parts (motors, cables and boxes)
  . repair works on steel and glass superstructures

- **Rail-track works on land territory, comprising:**
  . dismantling and cleaning of rail switches
  . renovation of railway control room
  . renovation of railway control panels, piloting equipment and communication cables
  . renovation of traffic lights

- **Electrical works, comprising:**
  . reconstruction of transformer substation TP 803
  . laying a 6 kV feeder cable from the port entrance to the new transformer substation
  . installing 400 V distribution cables between TP 803, control building and lifting towers

- **Earthworks and pavement works, comprising:**
  . filling and paving access ramps to the passenger terminal
  . pavement of parking areas near the ramp and at the port entrance

- **Miscellaneous works, comprising:**
  . water supply piping (passenger terminal)
  . sewage water networks (passenger terminal)
  . rain water drainage networks on future paved areas (access roads and parks)
  . floodlighting (installation of three additional lighting masts)

- **Passenger facilities, comprising:**
  . improvement of refurbishment at the passenger terminal
  . supply of border control equipment (computers and x-ray machines)
  . procurement of a shuttle bus to carry passengers between the ferry and the terminal

More detailed project description is provided by the attached tender specifications, whilst work quantities are in the schedule of Part 3 (Cost Estimates).

Remarks:

1. Although the project doesn't foresee to shift the old railway control building so far, BCEOM is of the opinion that this idea should be given concrete expression, to increase storage capacity of trucks and containers near the ferry ramp. This requires a preliminary agreement between Cascor and ACSP. In this case the location of the new transformer substation should be a bit different from that of the existing one.

2. Rubber tyres are not ideal fenders for a ferry berth, however they can be accepted for a short term project (flat panels would be more suitable but much more expensive).

3. Budget constraints do not allow to lengthen the central pier or to add any mooring dolphin. Ferries will still have to use bow anchors to secure their mooring.

4. At the request of ACSP, the project doesn't include removal of unused oil loading facilities (pipes and arms). They belong to Kaztransoil company and, since ferry access roads will not be raised, they won't hamper traffic flows.

5. So far no facility is foreseen for ferry bunkering, discharge of waste waters or garbage collection, but these ferries have sufficient capacity to proceed to all related operations in Baku.

6. The level difference between on-shore rails and ramp rails will be corrected during replacement of ramp rails.

ATTACHMENTS

- **Photographs**
- **Drawings**
- **Tender Specifications**

24 Photographs

(September, October and November 1999)

1- Ramp deck and inner lifting towers (notice aerial oil and water pipes).

2- Two entrance rail-tracks, ramp deck and inner lifting towers.

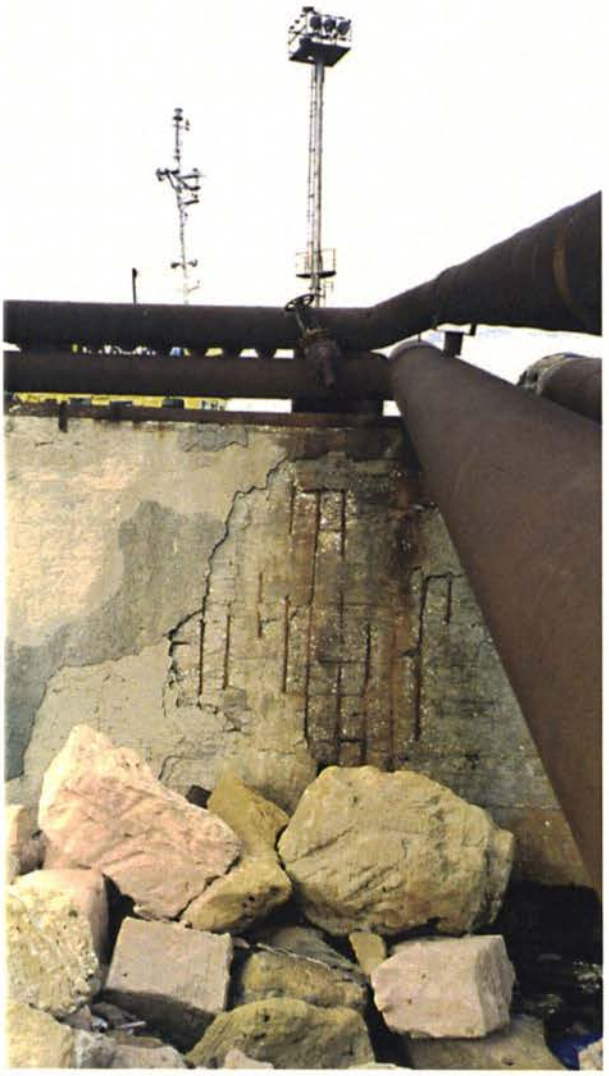
3- Ferry railway station (Morport station) and former railway building (on the left hand side).

4- Ferry parking area and access road to the ferry ramp (the rail-track was rebuilt under phase 1 programme).

5- Morport railway station control building and transformer substation TP 803.

6- Dagestan vessel « Mercuri 2 » at ferry berth.

7- Open stern door on « Mercuri 2 «.



8- Eastern side of central pier
(old oil loading pipes and damaged concrete).

9- Western side of central pier.

10- Damaged pavement on central pier.

11- Wooden fender on finger pier.

12- Poor slope protection.

13- Cracked concrete pavement at the head of finger pier.

14- Broken arms on starboard stop fender.

15- Poor fendering on starboard stop fender.

16- Corroded pivot bearing on shore base (starboard).

17- Corroded ramp guider.

18- Central control tower and front end of the ramp.

19- Control boards in central control tower.

20- Outer lifting tower (starboard).

21- Inside an outer lifting tower.

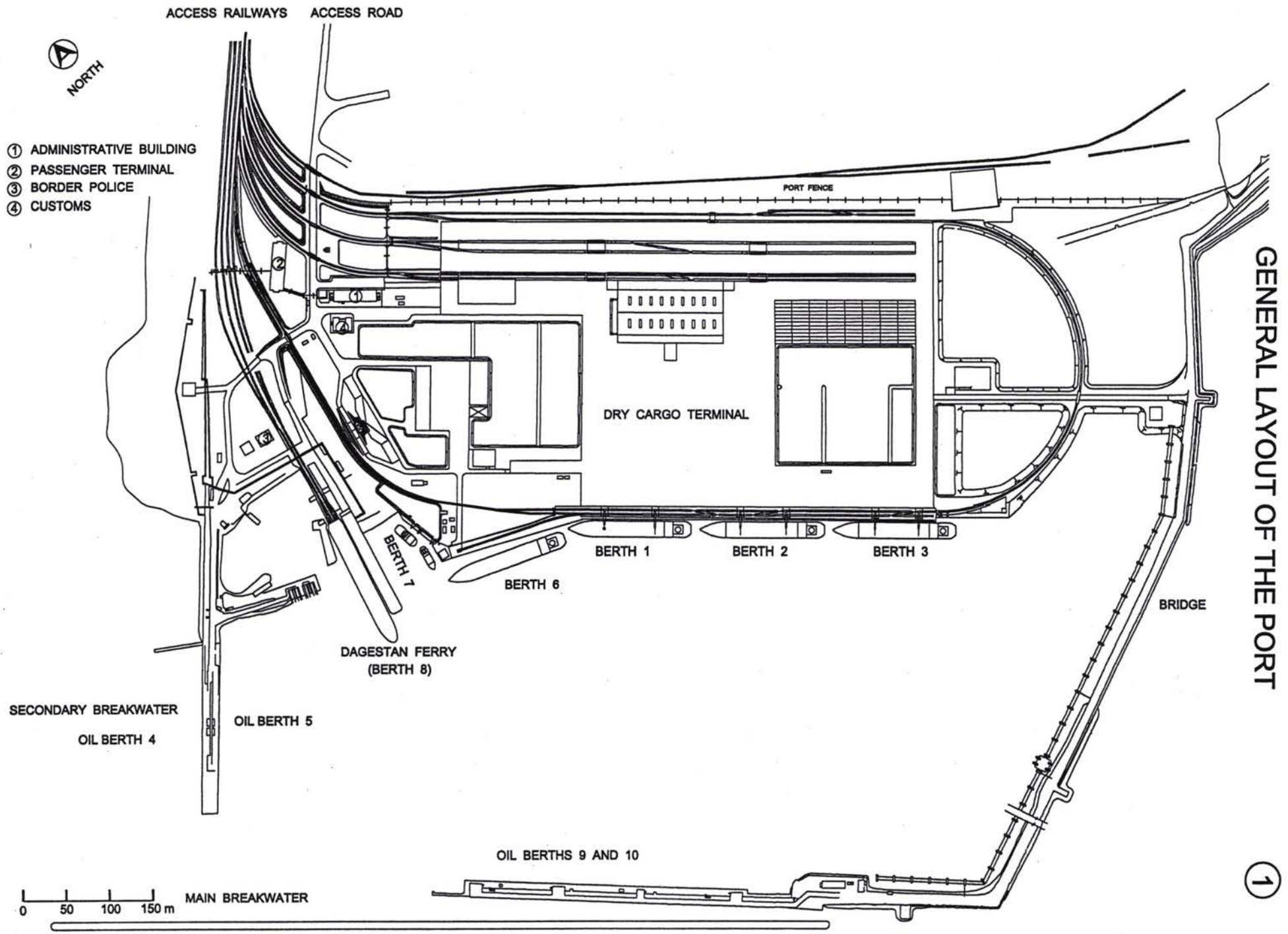
22- Electrical panels inside transformer substation TP 803.

23- Access road to central pier.

24- Passenger terminal under rehabilitation.

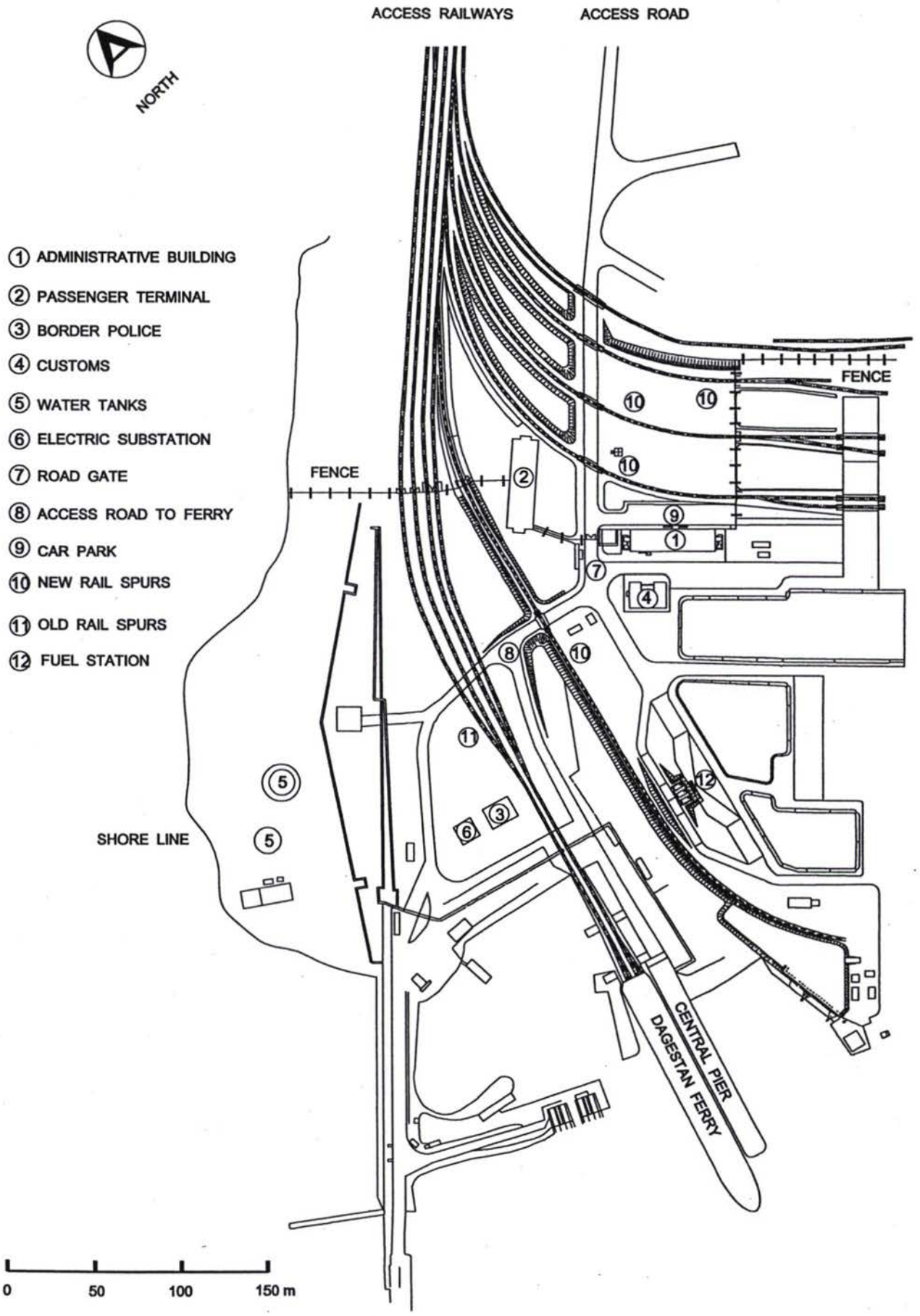
Drawings

1. General layout of the port
2. Layout of ferry terminal
3. Dagestan ferry
4. Bathymetric chart
5. Topographic levels
6. Marine part of ferry terminal
7. Central pier
8. Finger pier
9. Stop fenders
10. Span structures
11. Detailed structure of inner span
12. Detailed structure of outer span
13. Details of wooden beams
14. Pivot bearings
15. Connection between ramp end and ferry stern
16. Cross-section on inner towers
17. Cross-section on outer towers
18. Span profiles
19. Layout of railway tracks on ramp
20. Central control tower
21. Central control tower (details)
22. Existing control panel
23. Layout of projected 6kV power cable
24. Projected 0.4 kV cables at the ferry terminal
25. Power dispatching scheme
26. Transformer substation 803
27. Project layout
28. Passenger terminal

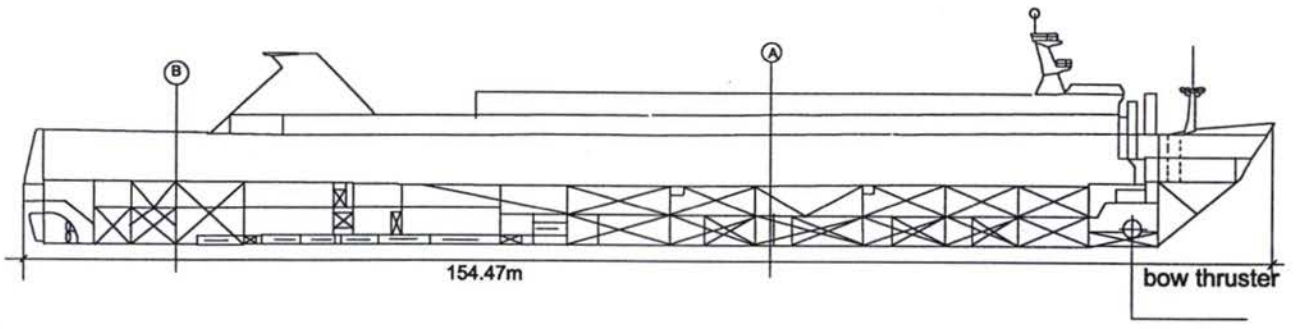


GENERAL LAYOUT OF THE PORT

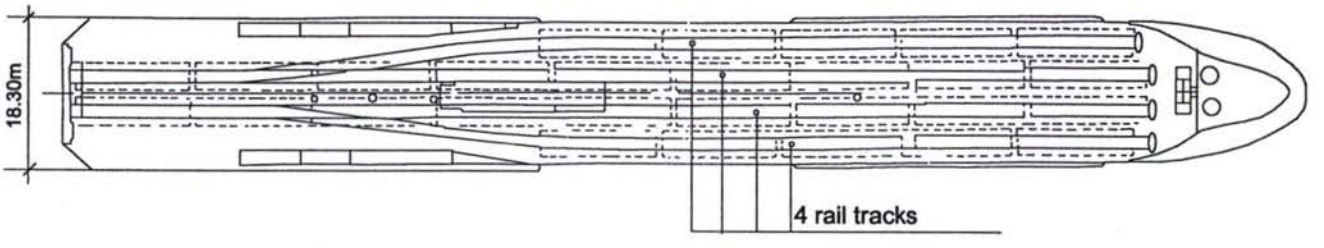
LAYOUT OF FERRY TERMINAL



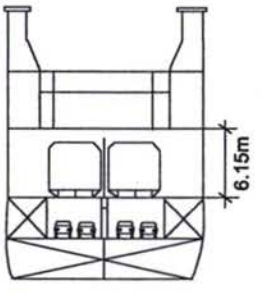
DAGESTAN FERRY



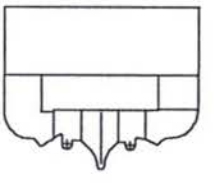
Rail-Car Deck



section A



section B

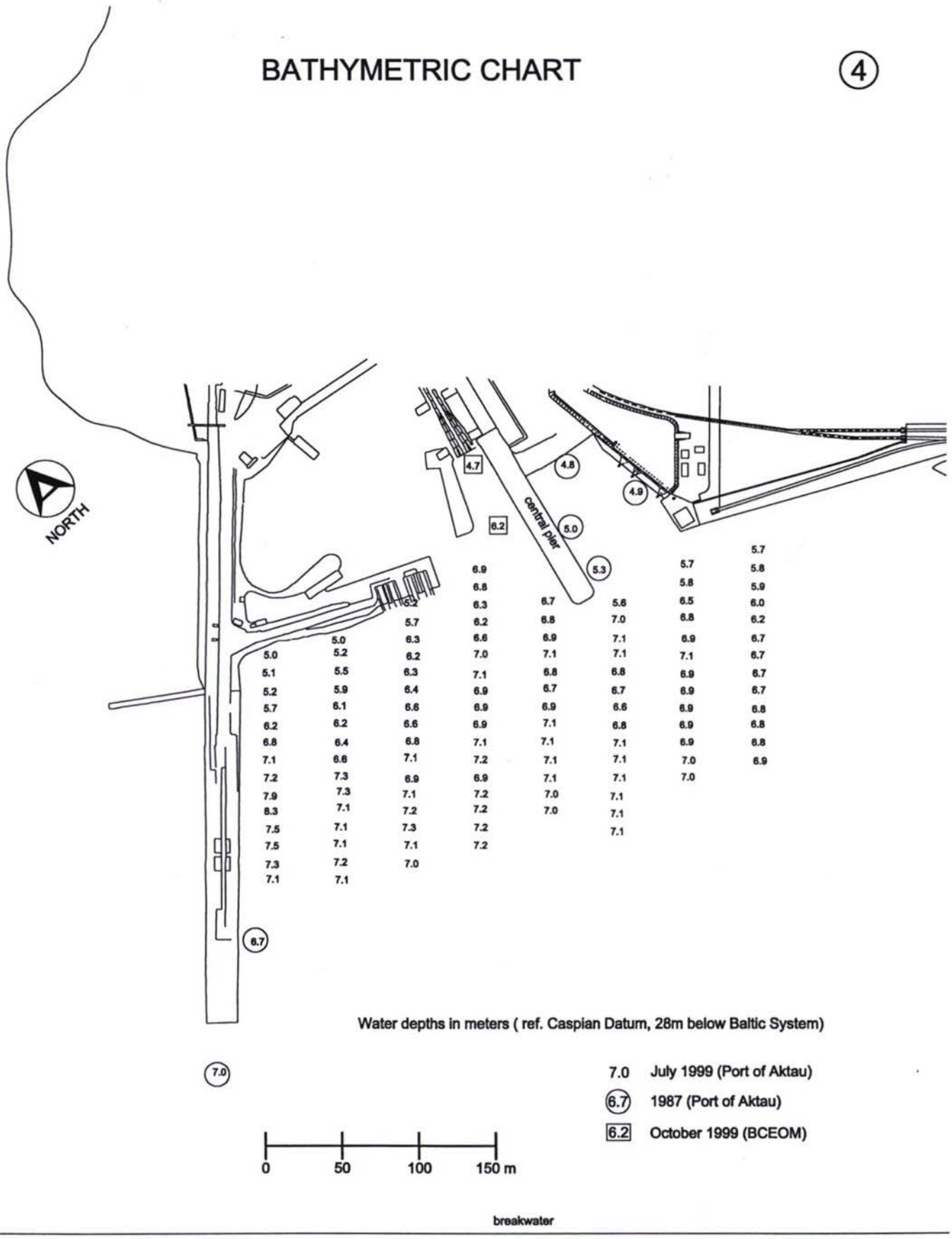


DAGESTAN-TYPE FERRY VESSEL - TECHNICAL DATA

Owner	CSC,Baku
Overall length	154.47 m
Beam (max. width)	18.3 m
Max. draught	4.5 m
Carrying capacity (DWT)	3.950 tonnes
Full displacement	7.948 tonnes
Gross Registered Tonnage (GRT)	11.450 tons
Stern door (no bow door)	11.5 m wide, 6.15 m high
Rail-car deck capacity	28 rail-cars (4 times 130 m) or 37 trailers or 140 Lada-type cars
Car deck under rail-car deck, capacity	55 Lada-type cars
Passenger capacity	138 (106 in cabins plus 32 in salon)
Sailing speed	13.5 knots
Sailing range	1000 nautical miles
Twin propeller plus bow thruster	

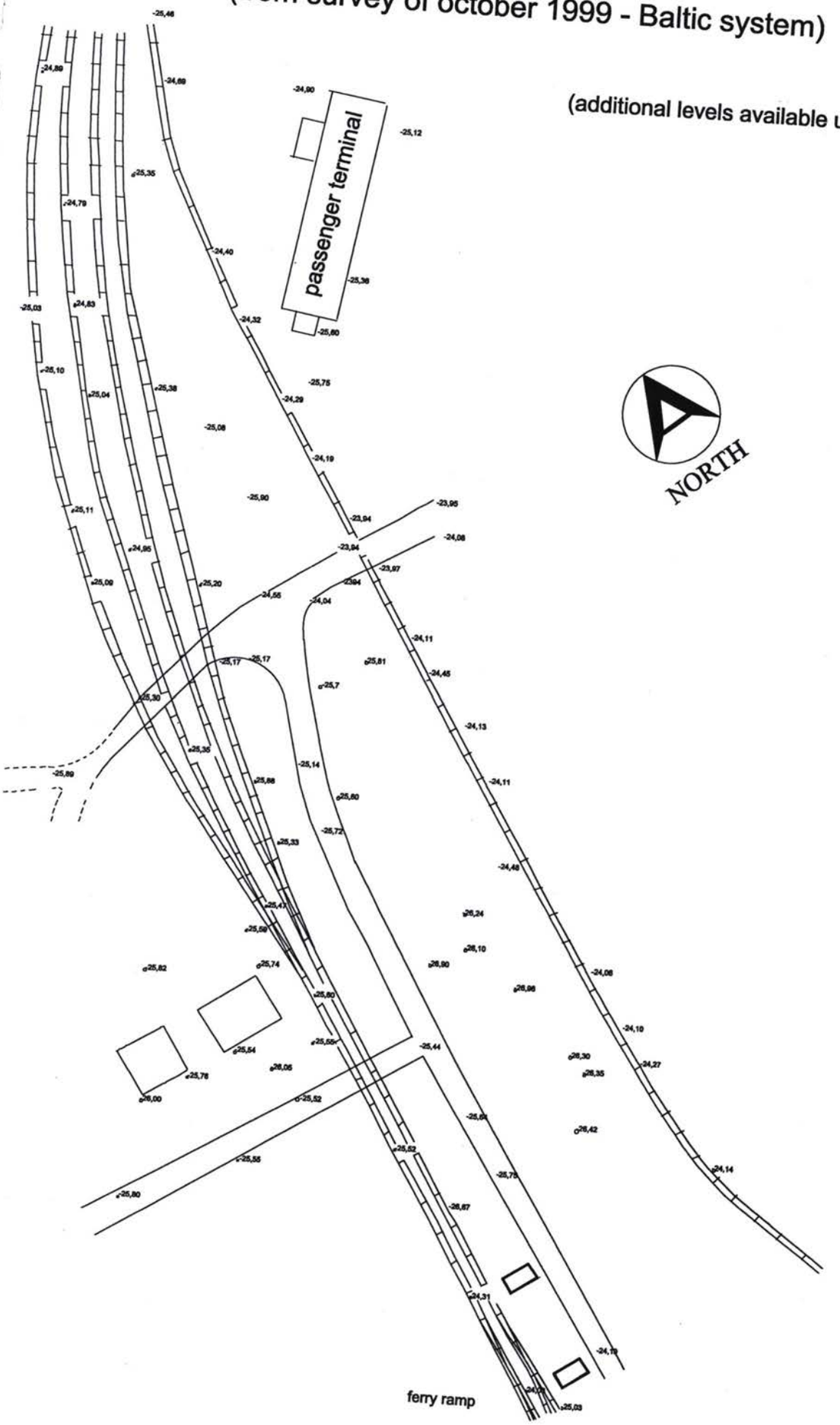
BATHYMETRIC CHART

④

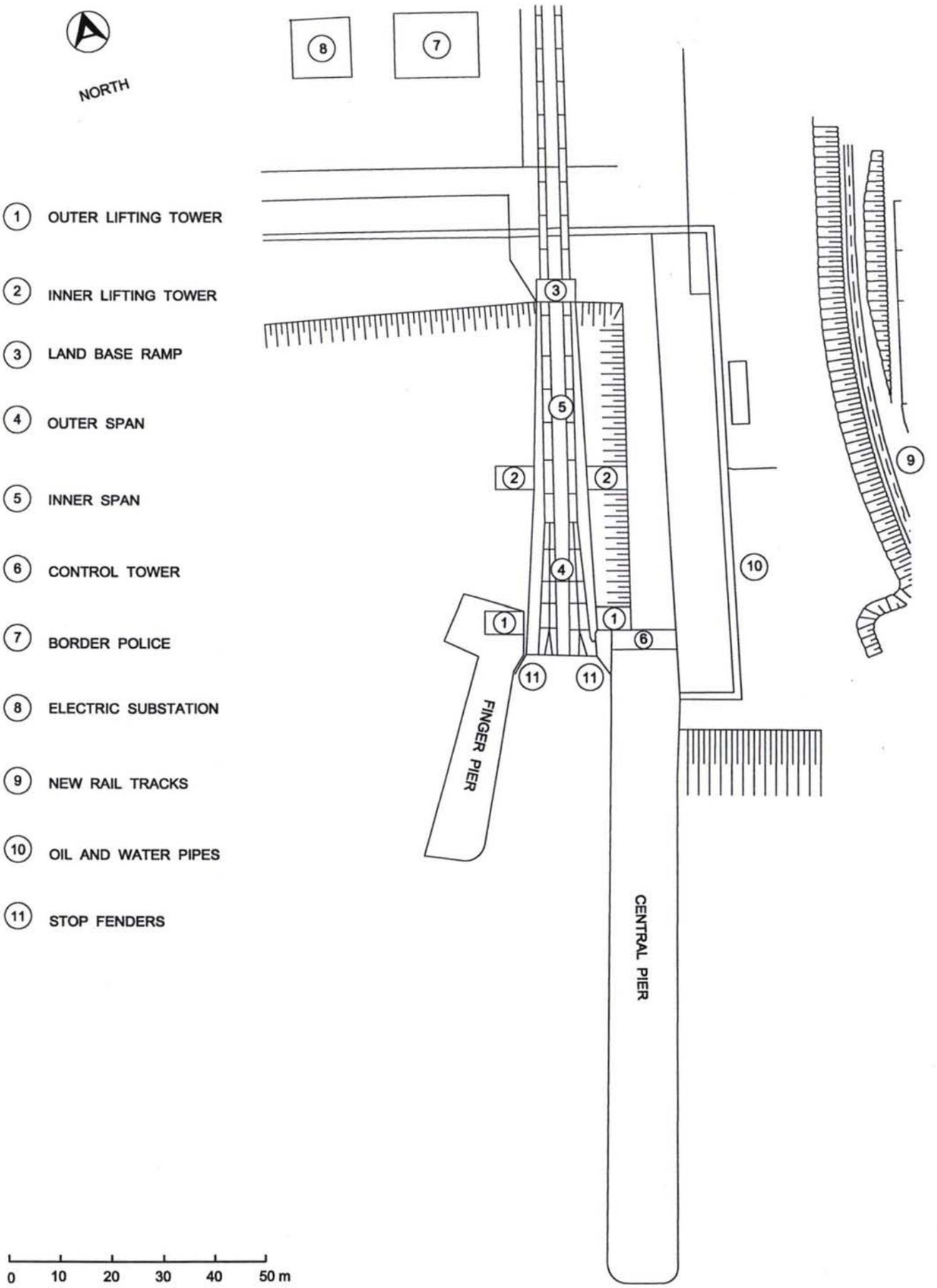


TOPOGRAPHIC LEVELS
(from survey of october 1999 - Baltic system)

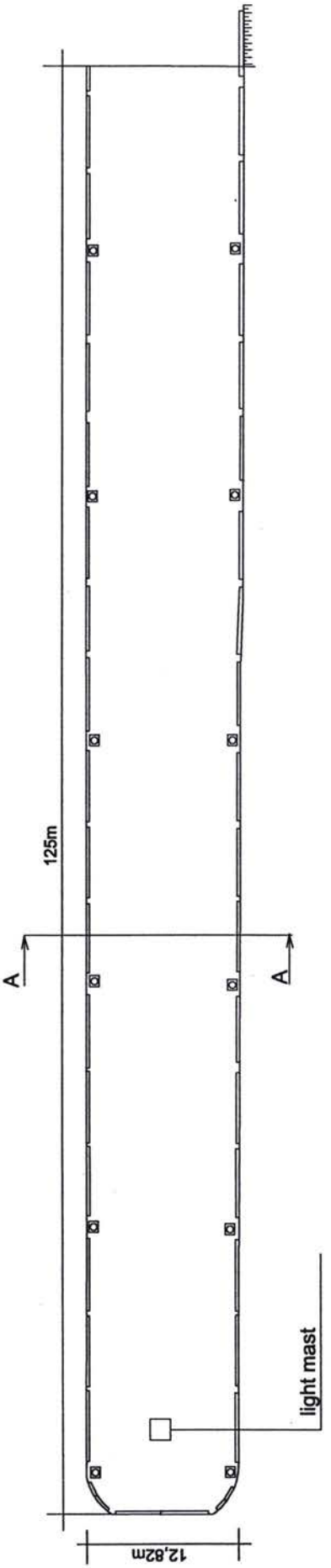
(additional levels available upon request)

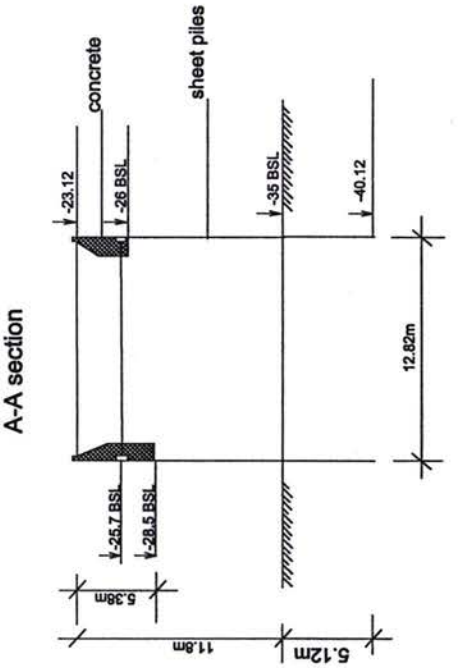


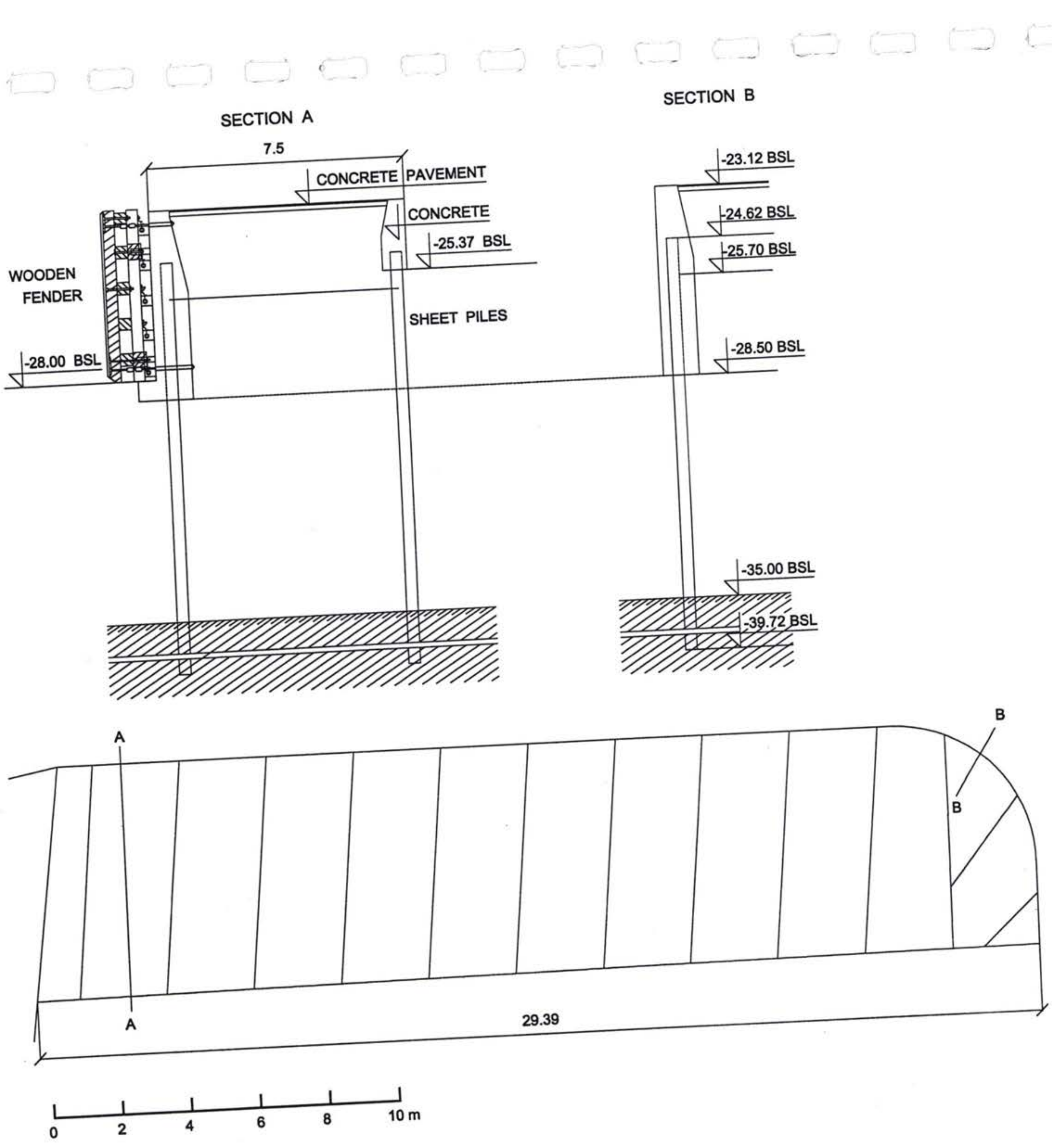
MARINE PART OF FERRY TERMINAL



CENTRAL PIER



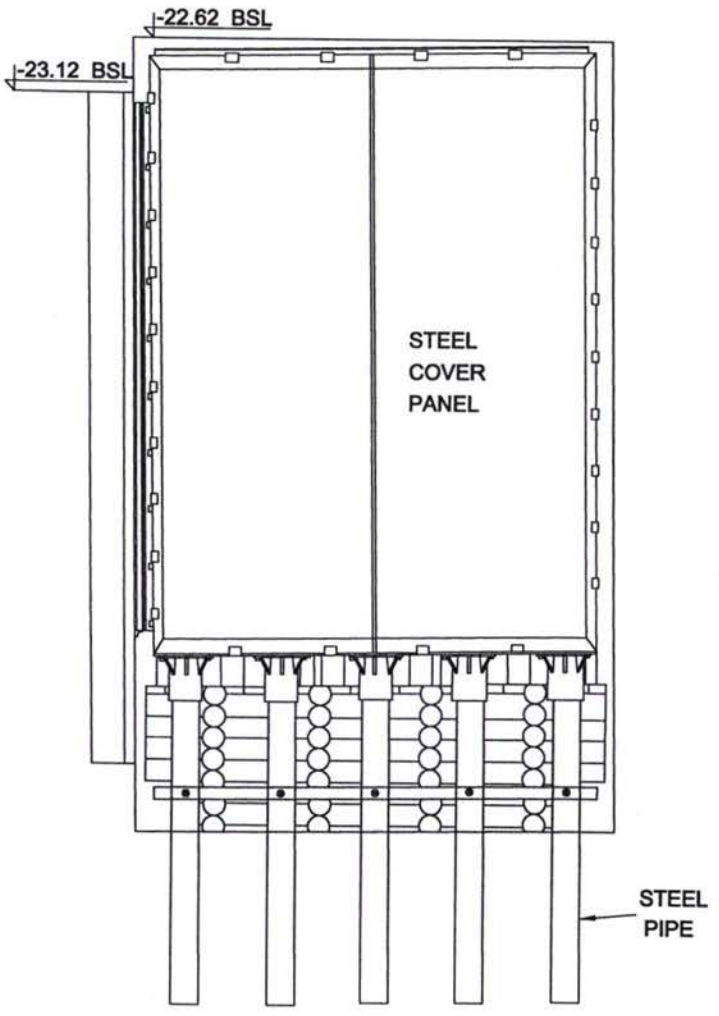



SECTION A
7.5
CONCRETE PAVEMENT
CONCRETE
-25.37 BSL
WOODEN
FENDER
SHEET PILES
-28.00 BSL
SECTION B
-23.12 BSL
-24.62 BSL
-25.70 BSL
-28.50 BSL
-35.00 BSL
-39.72 BSL
A
A
B
B
29.39
0
2
4
6
8
10 m

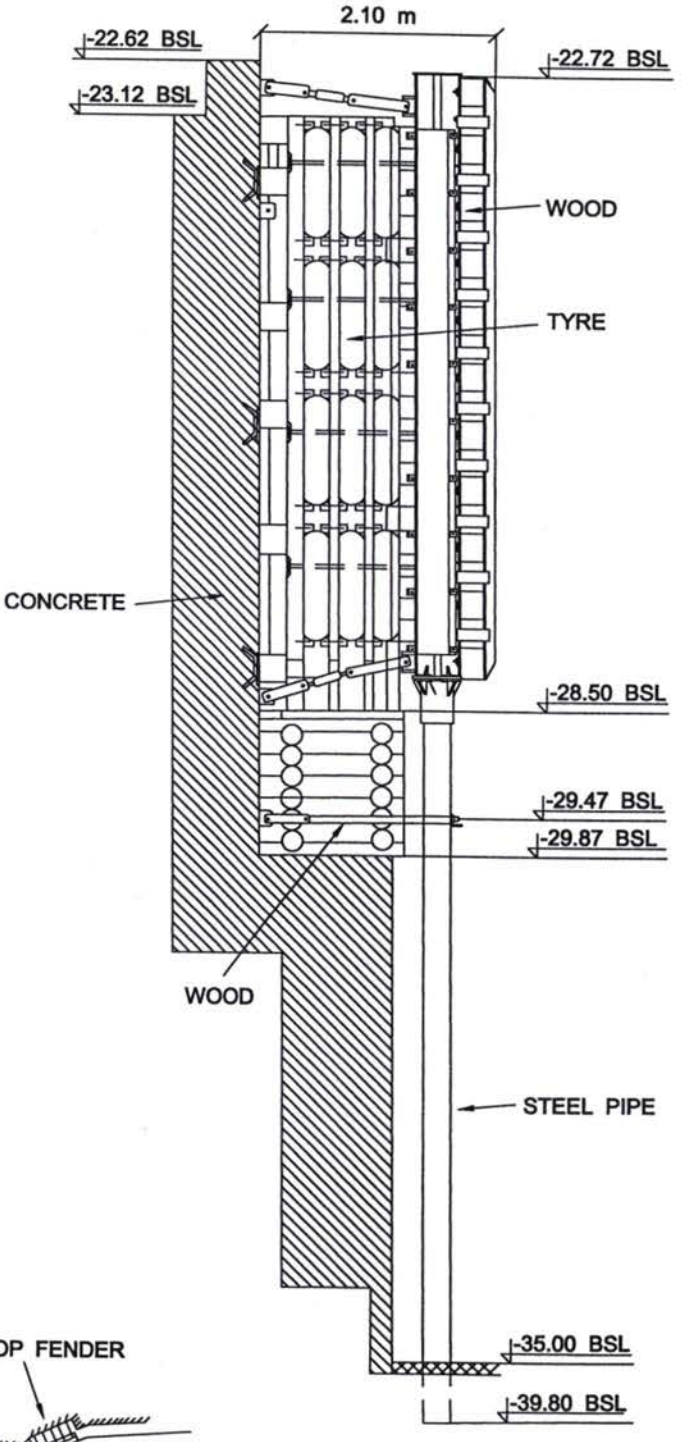
FINGER PIER

STOP FENDERS

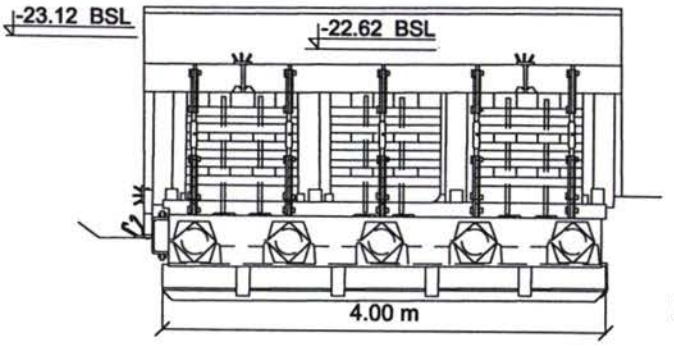
FRONT VIEW

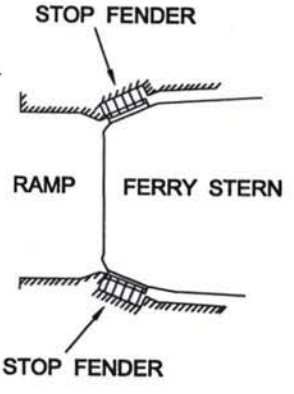


CROSS - SECTION

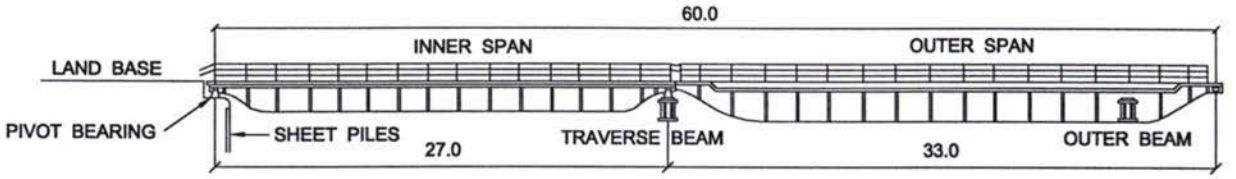


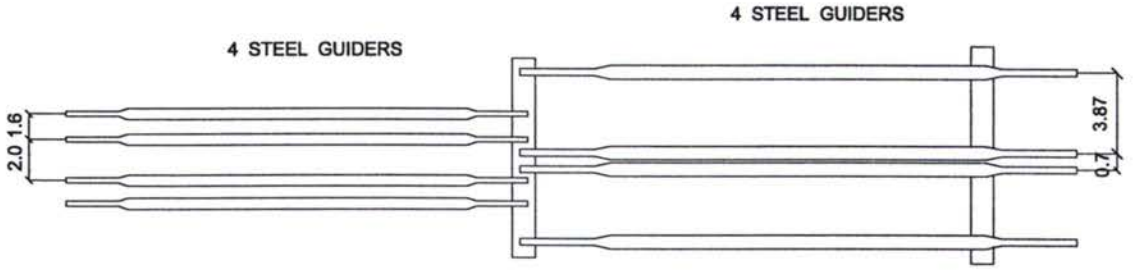
TOP VIEW

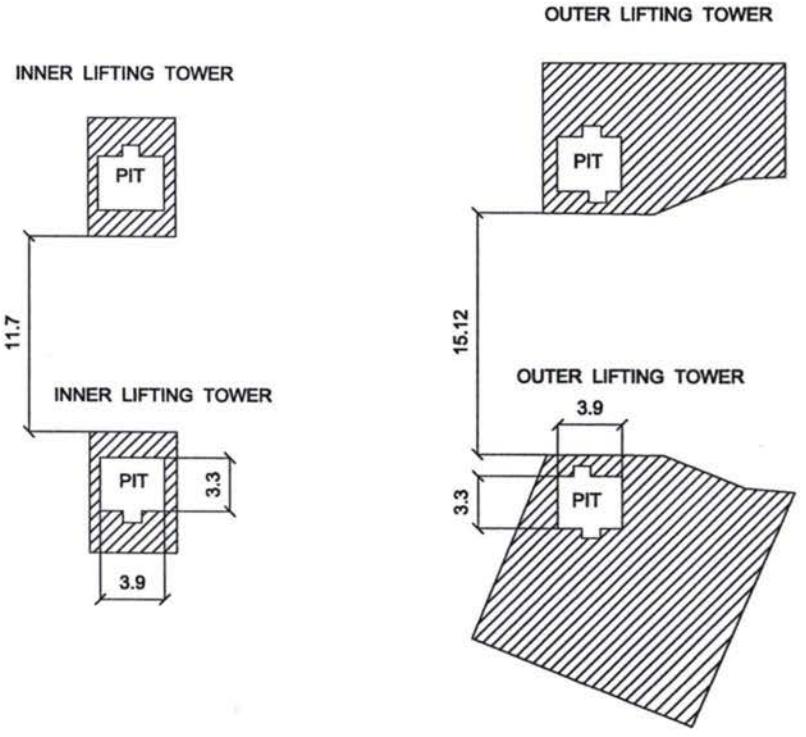




SPAN STRUCTURES

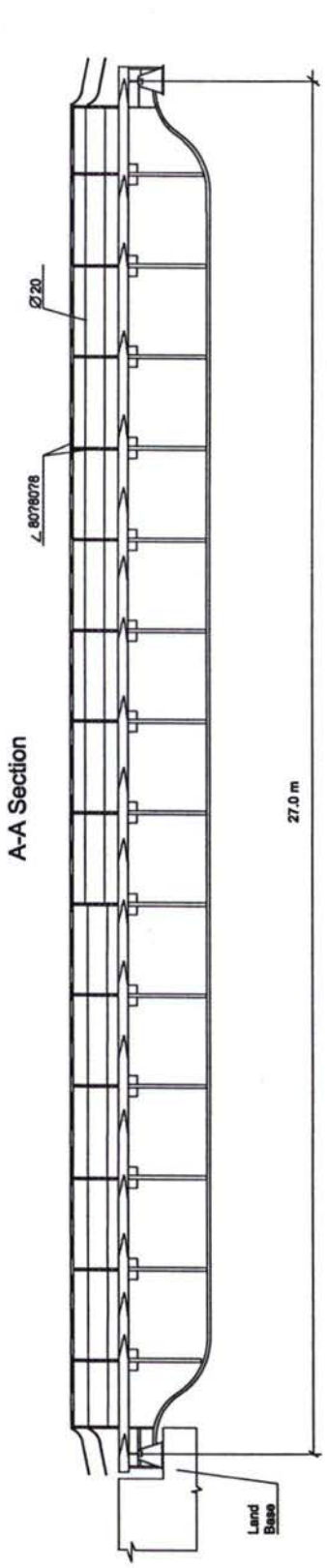




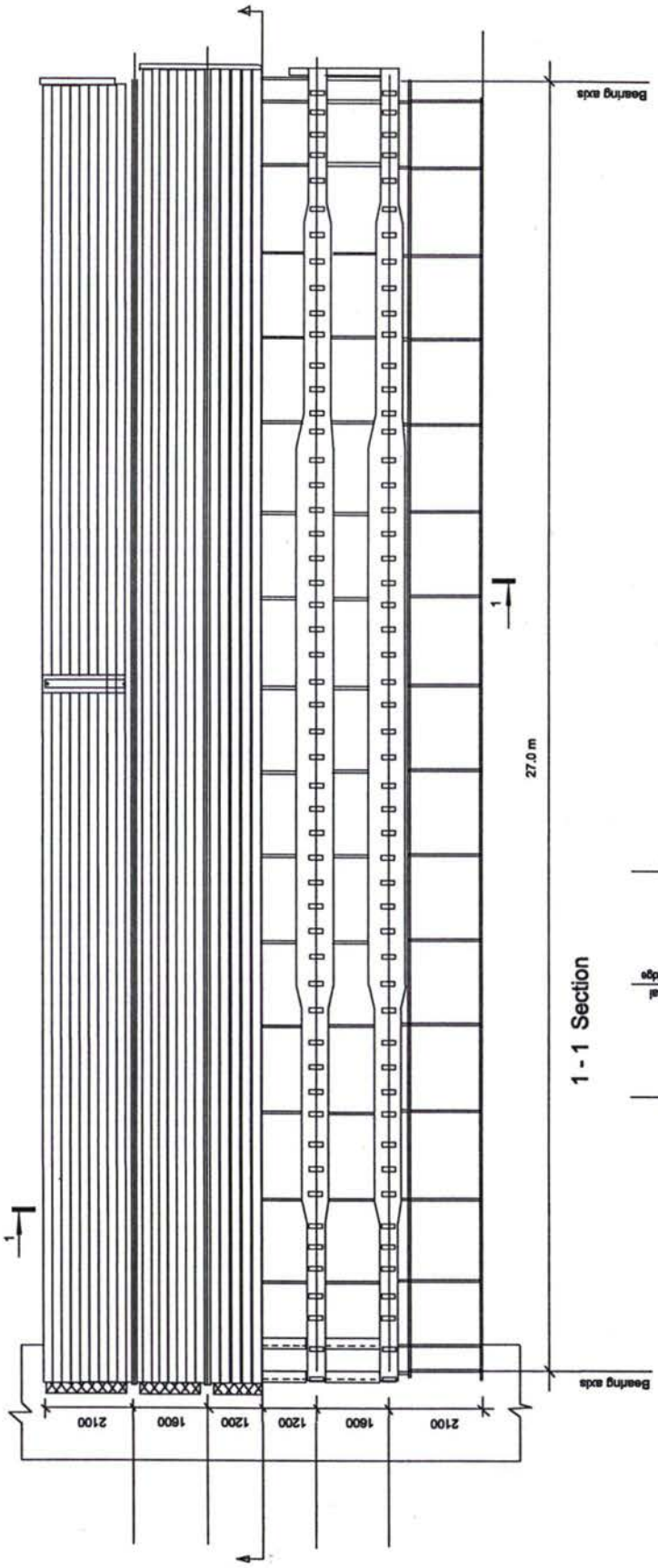


DIMENSIONS IN METRES

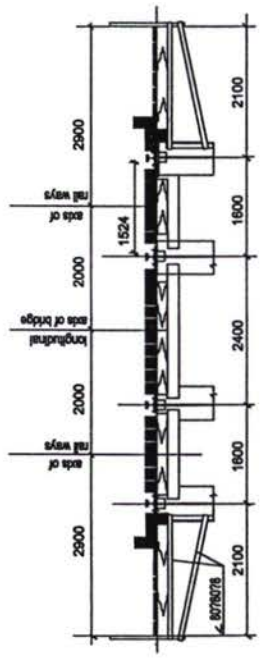
DETAILED STRUCTURE OF INNER SPAN



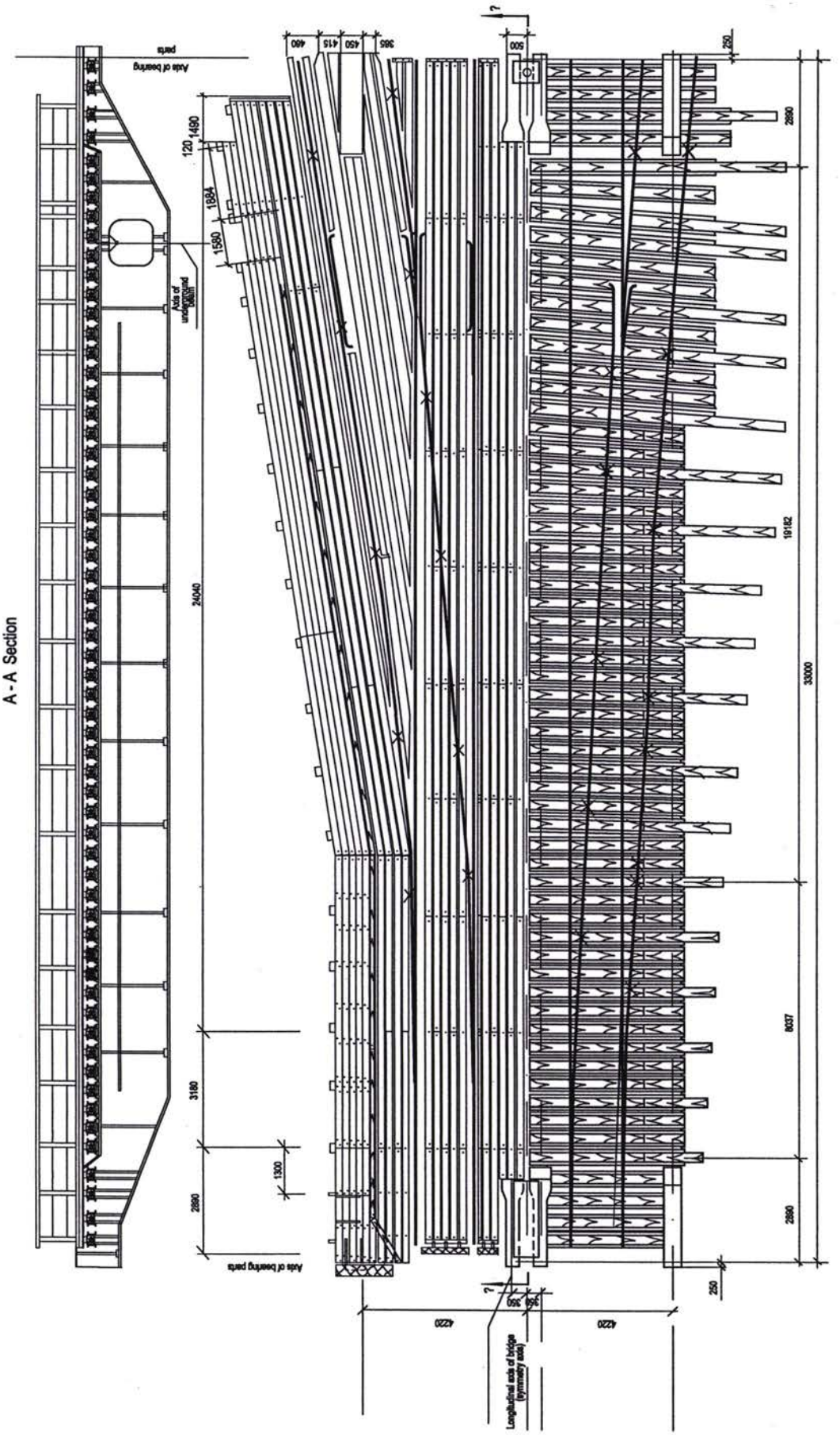
A-A Section

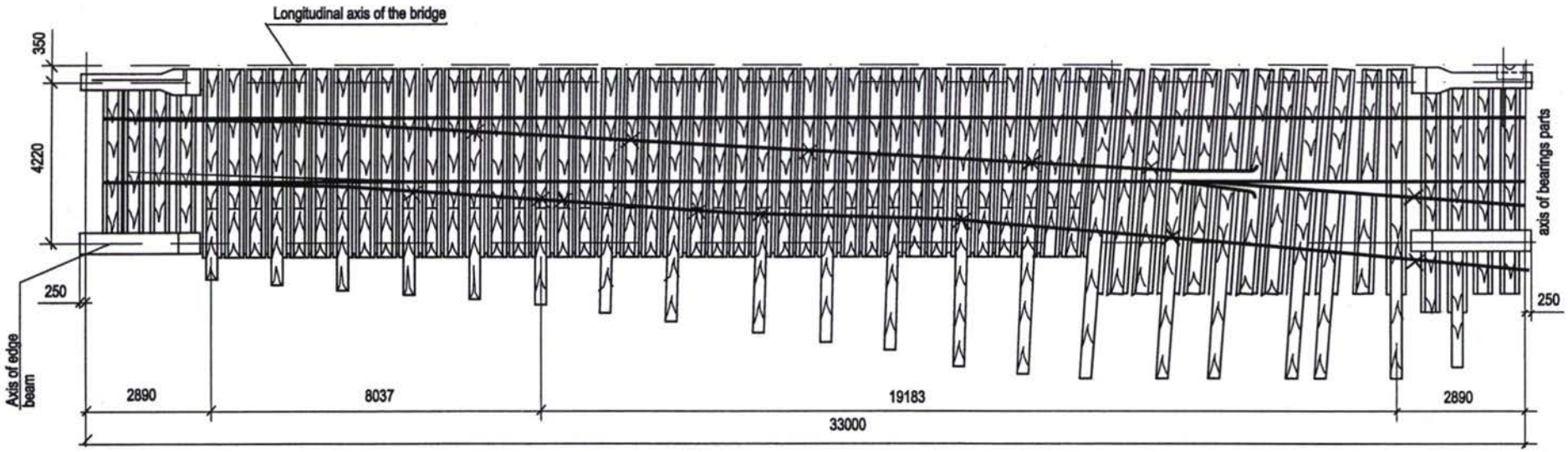


1 - 1 Section

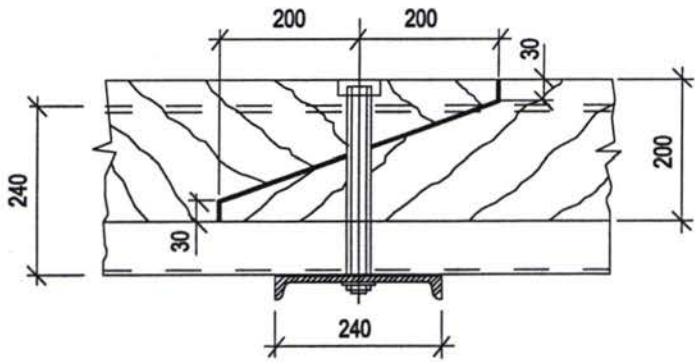


DETAILED STRUCTURE OF OUTER SPAN

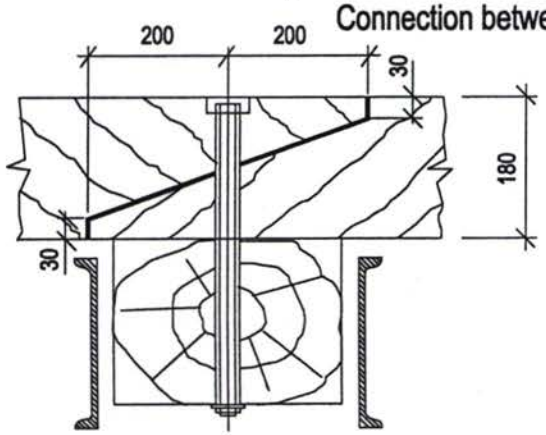


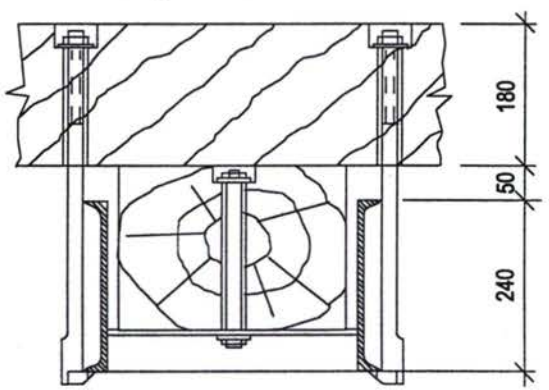


Connection of bridge beams



Connection between wooden deck and bridge beams

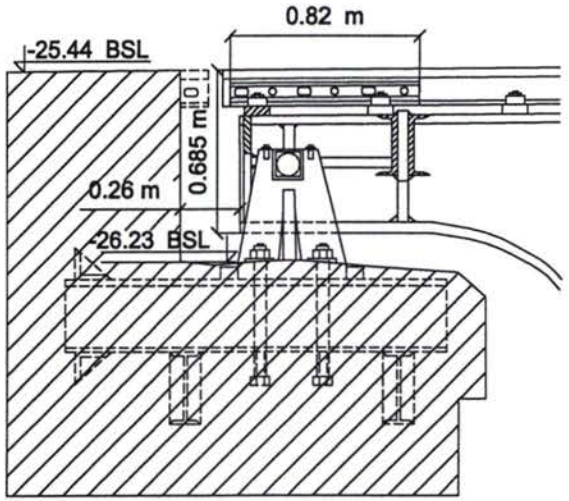




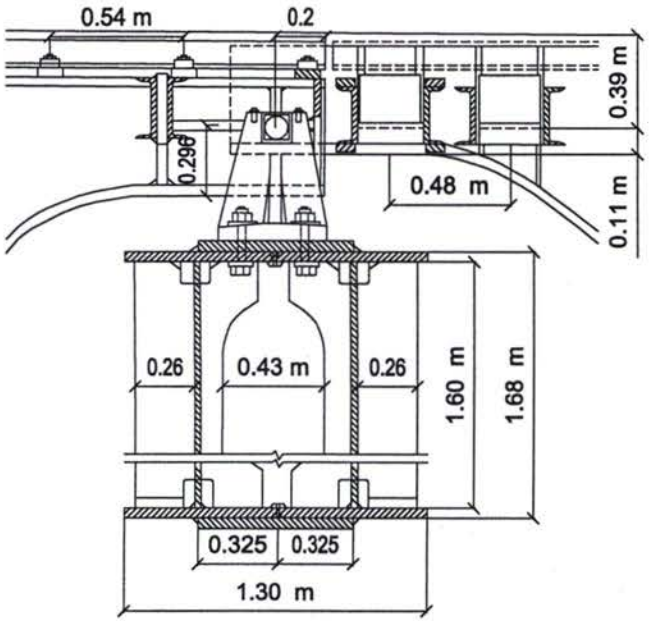
All dimensions in mm

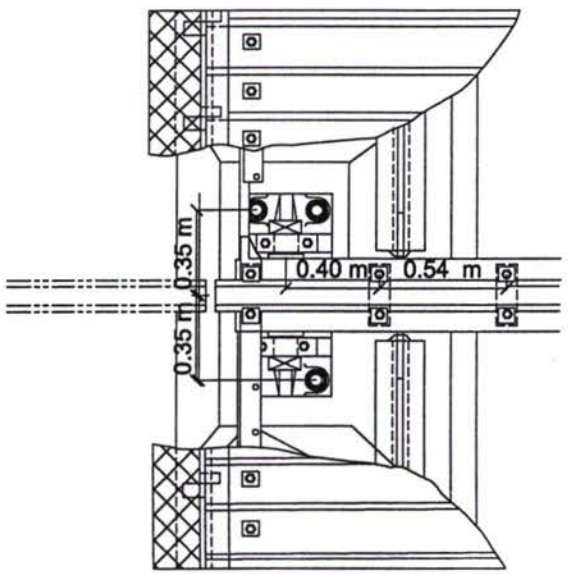
DETAILS OF SPAN WOODEN BEAMS

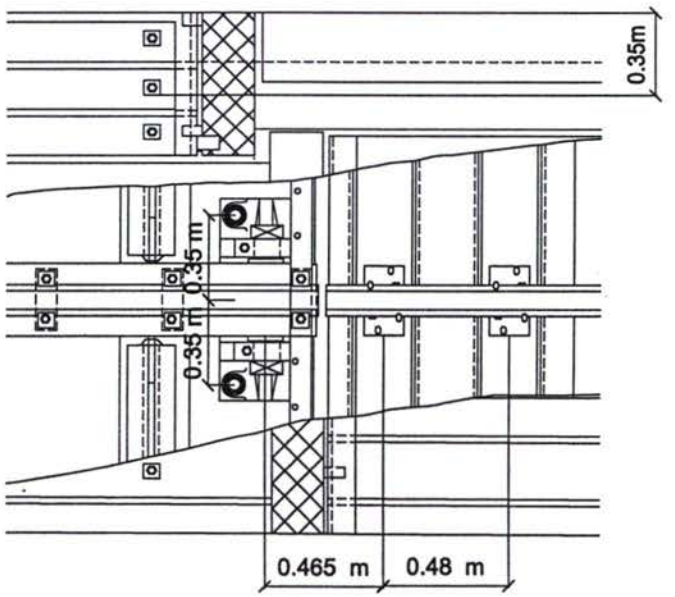
BASE RAMP



CENTRAL TRAVERSE BEAM

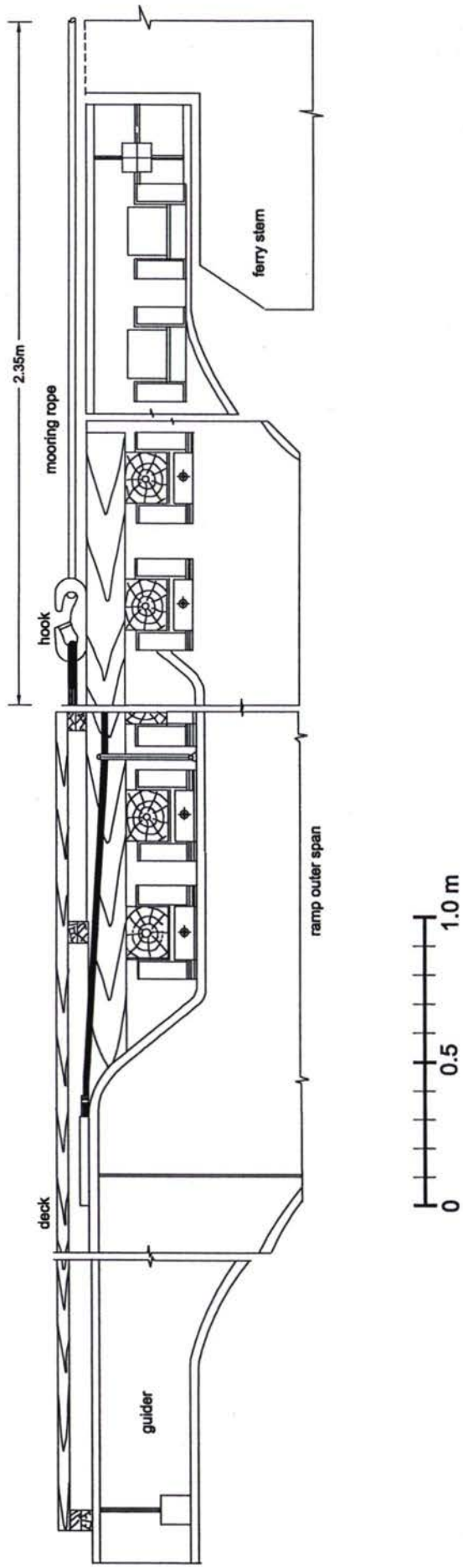




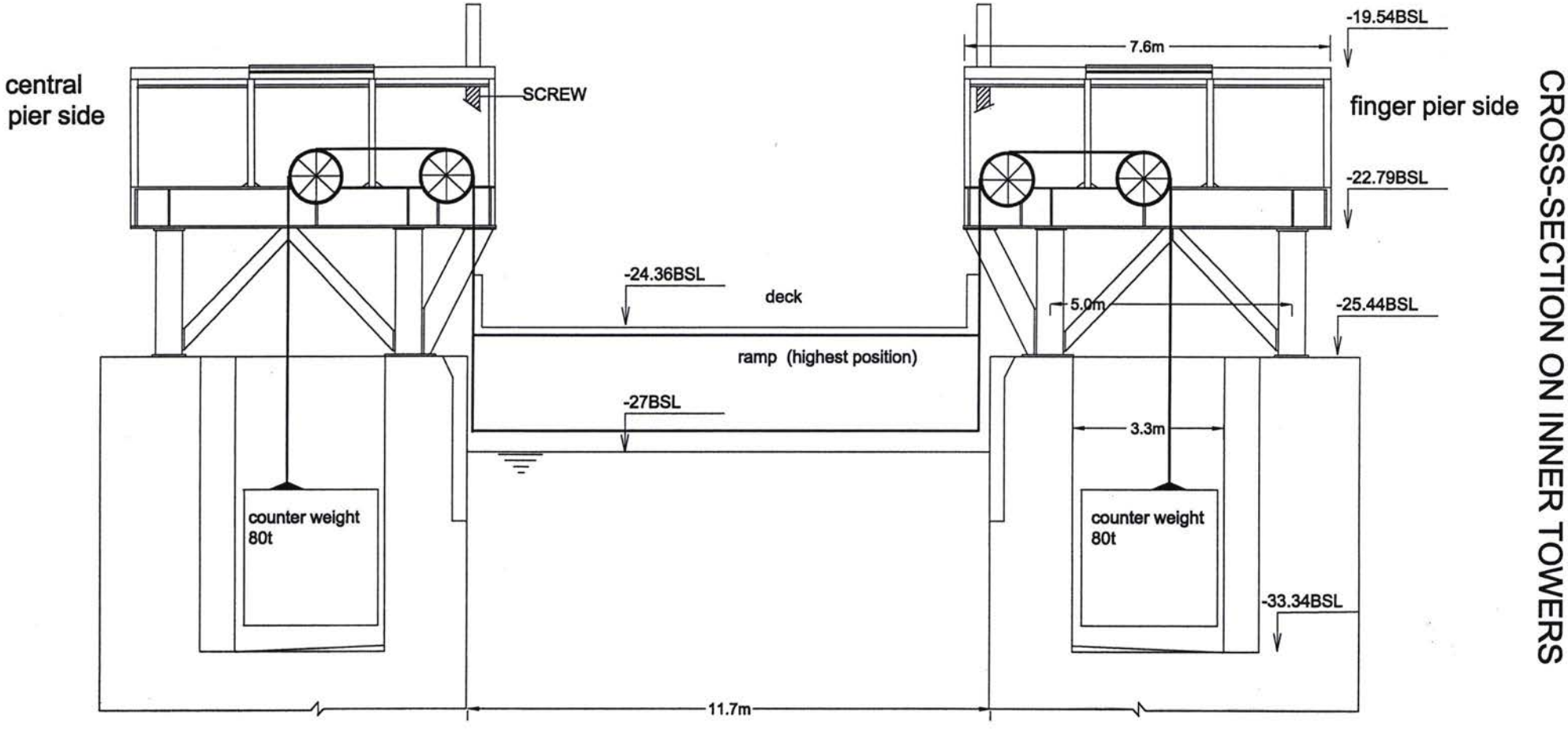


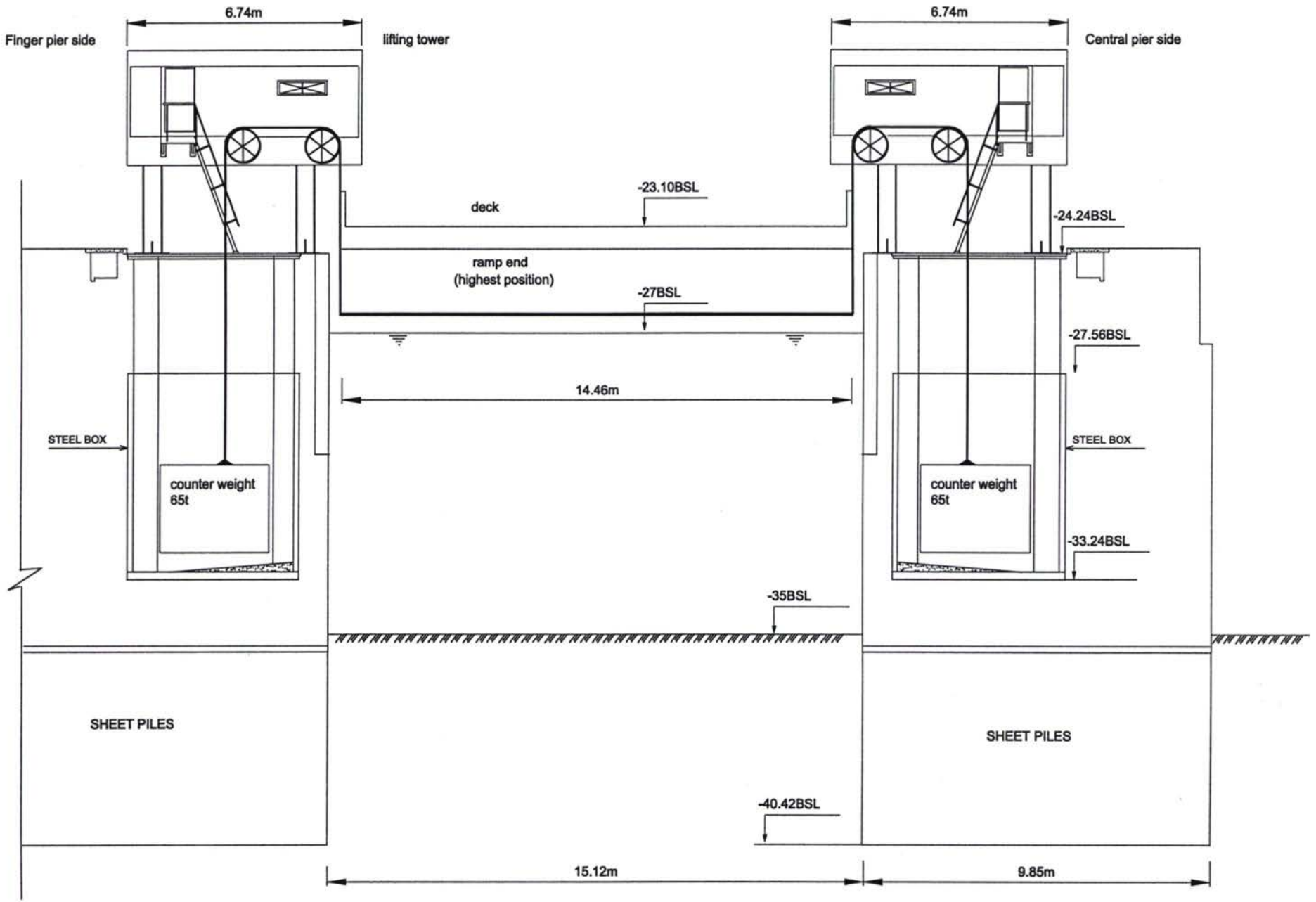
PIVOT BEARINGS

CONNECTION BETWEEN RAMP END AND FERRY STERN



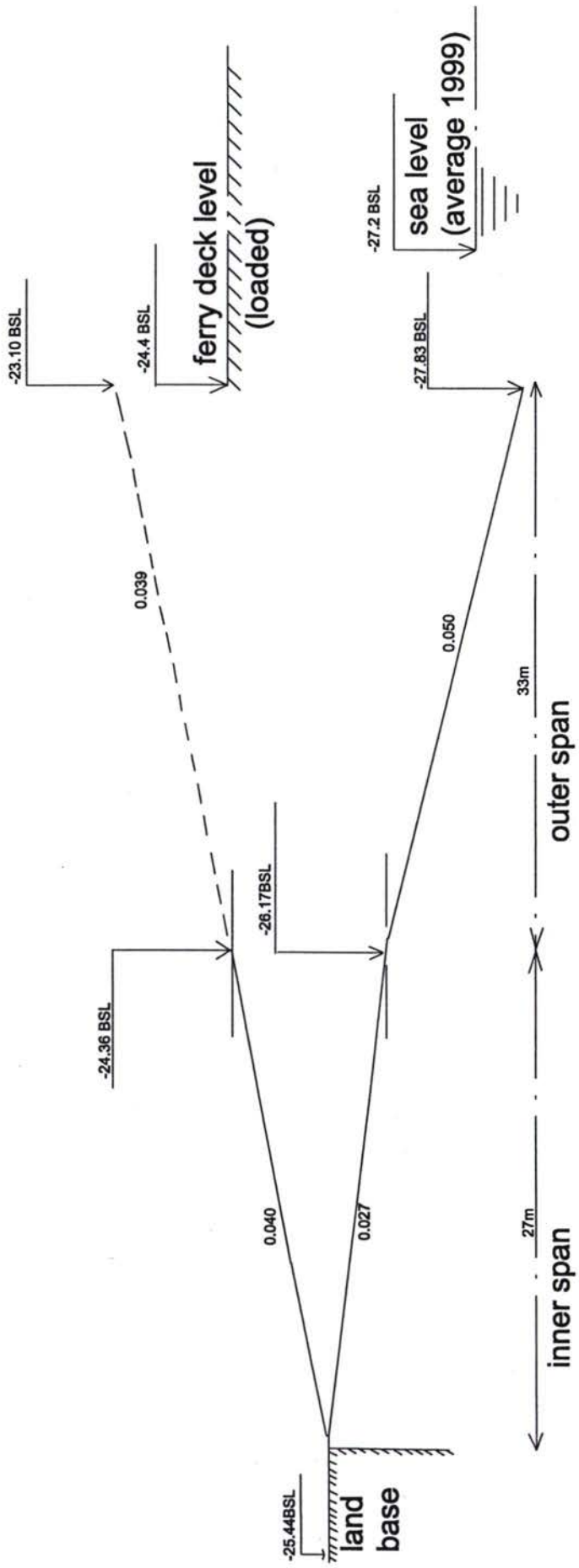
CROSS-SECTION ON INNER TOWERS



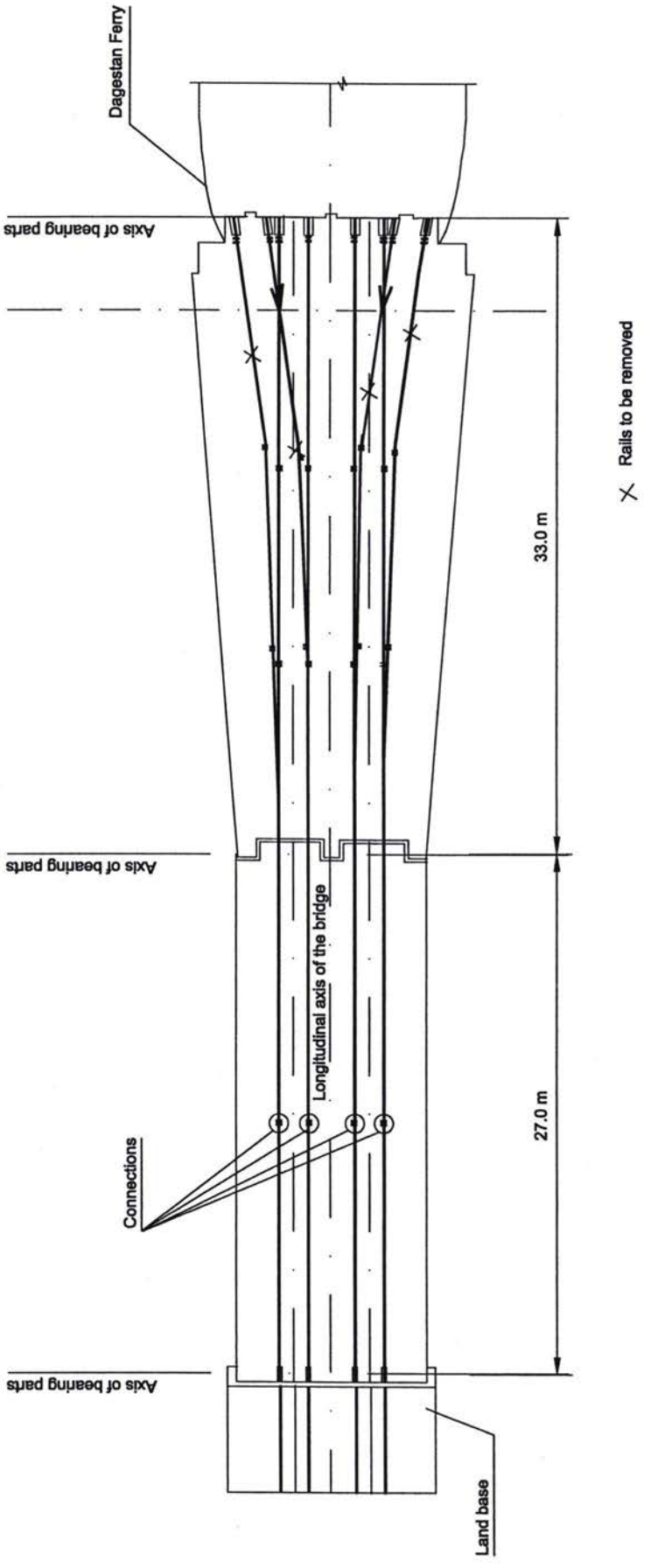


CROSS-SECTION ON OUTER TOWERS

SPAN PROFILES
(highest level and lowest level)

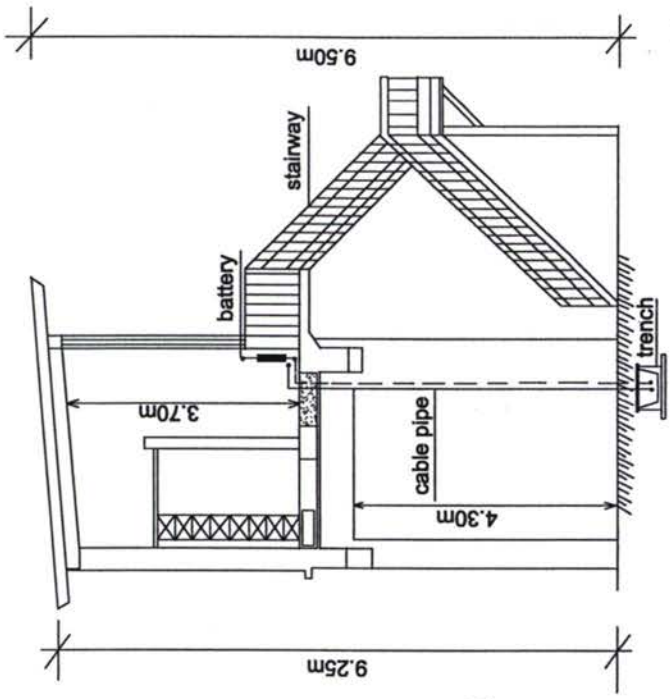


LAYOUT OF RAILWAY TRACKS ON RAMP

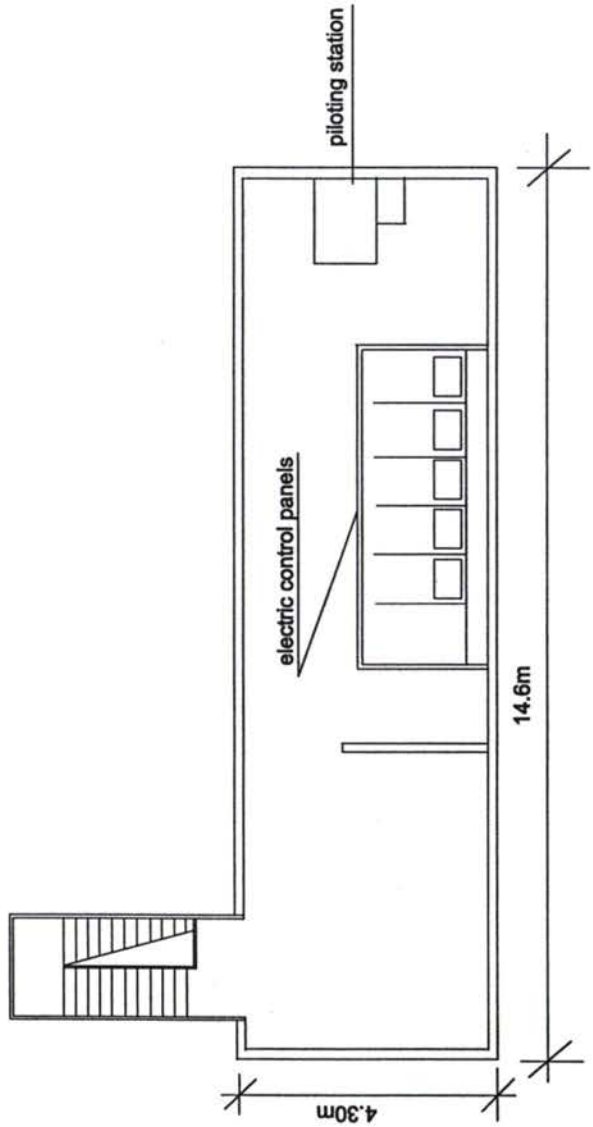


CENTRAL CONTROL TOWER

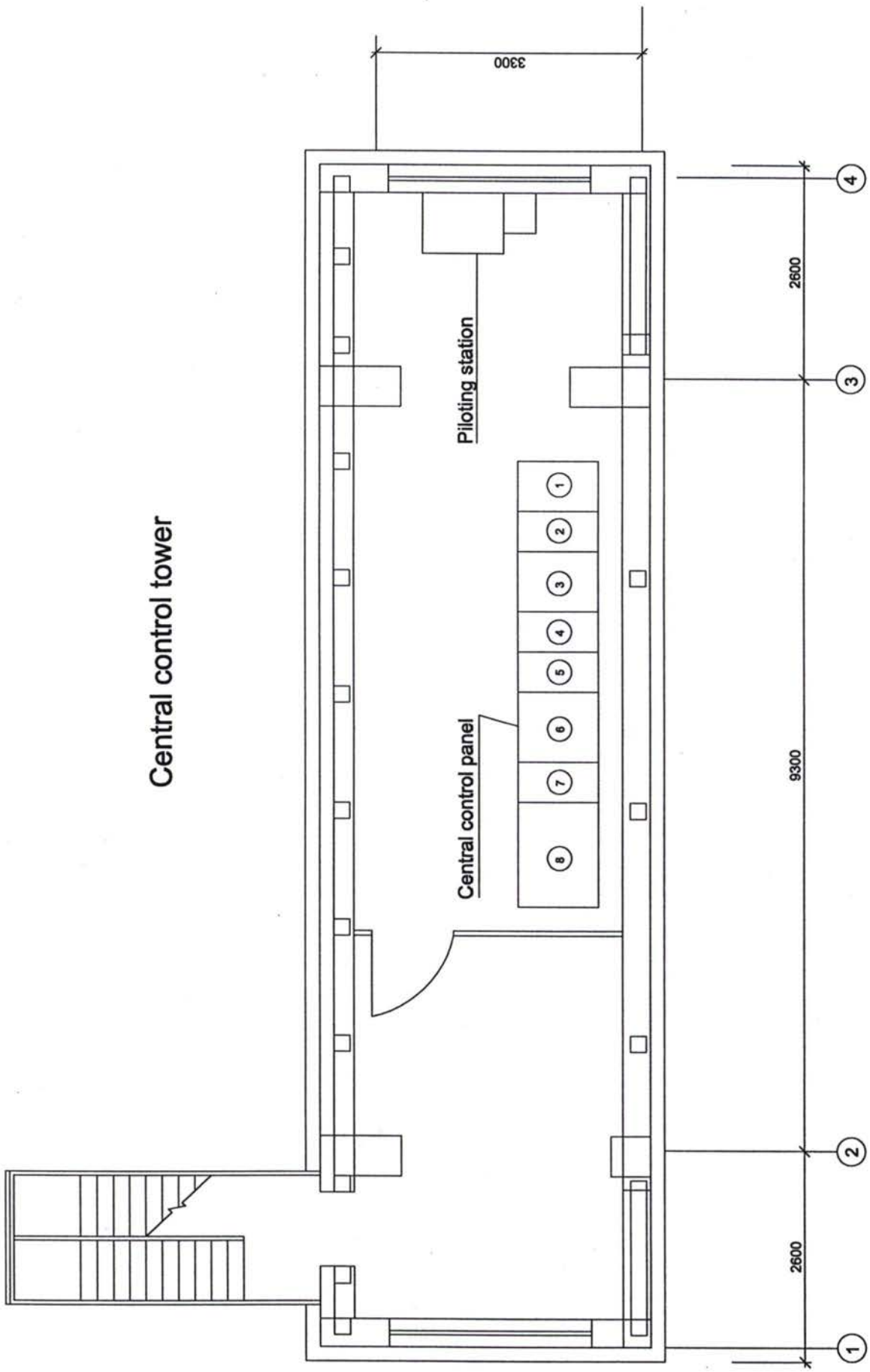
SIDE VIEW



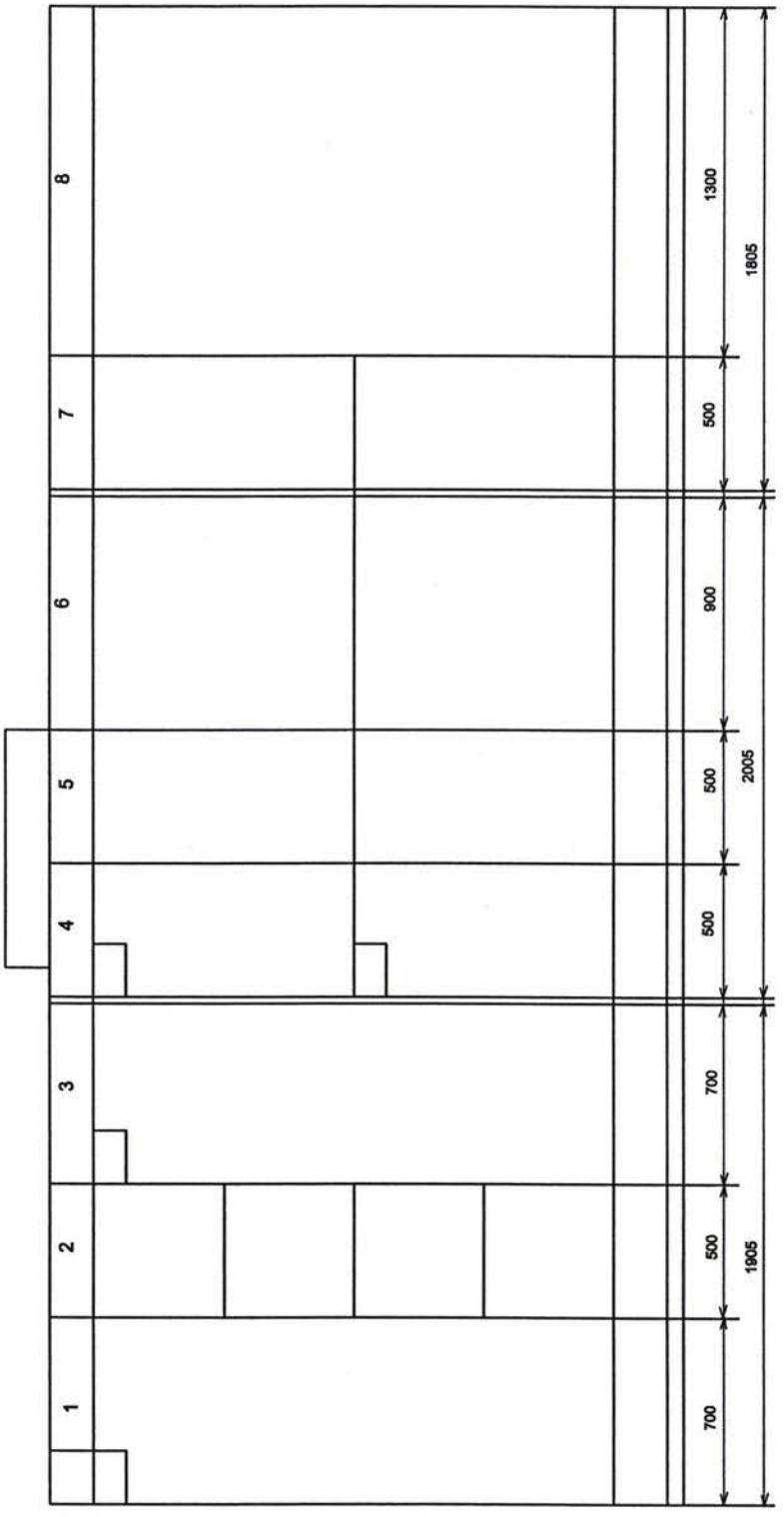
TOP VIEW



CENTRAL CONTROL TOWER (DETAILS)

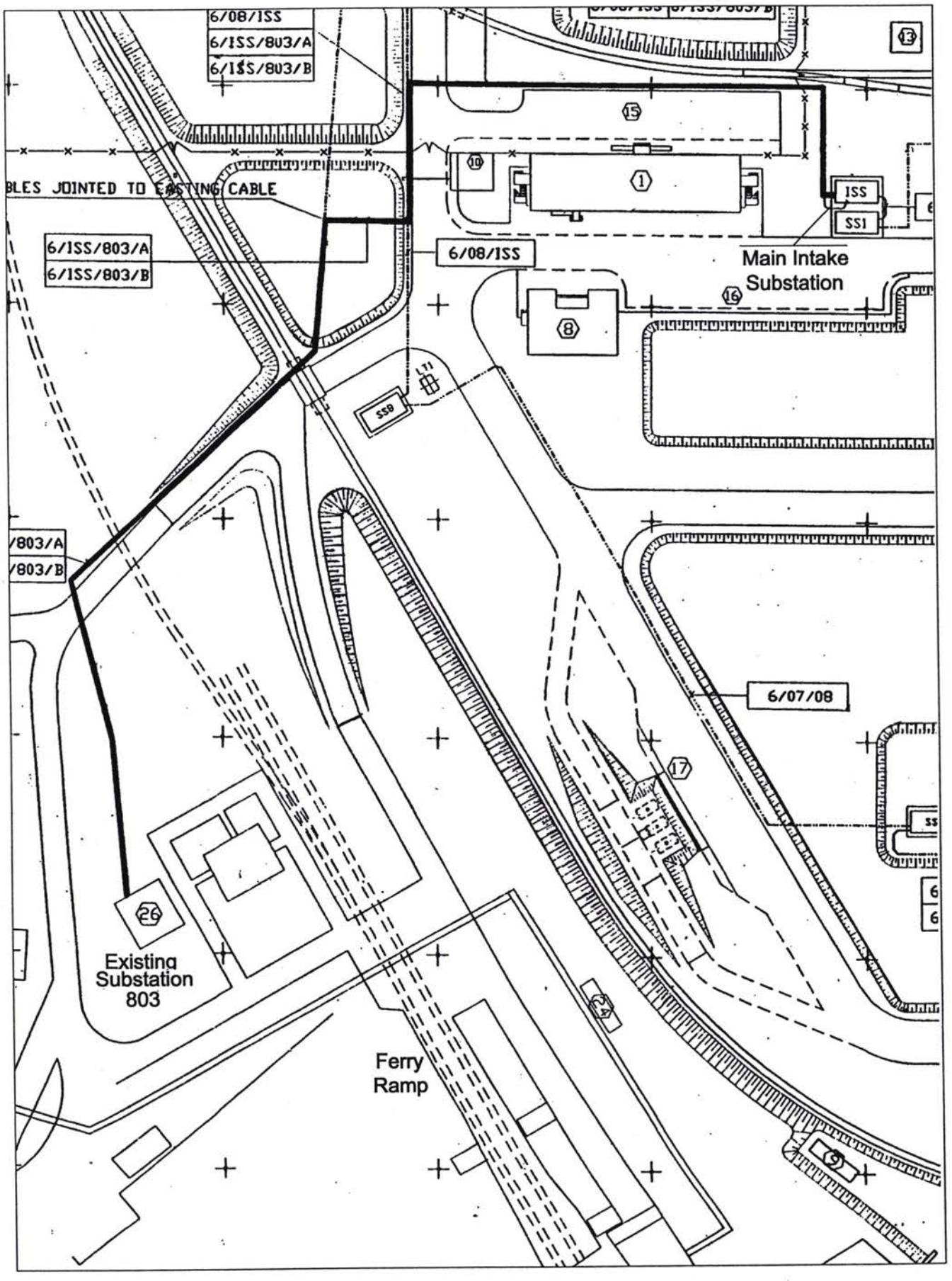


EXISTING CONTROL PANEL

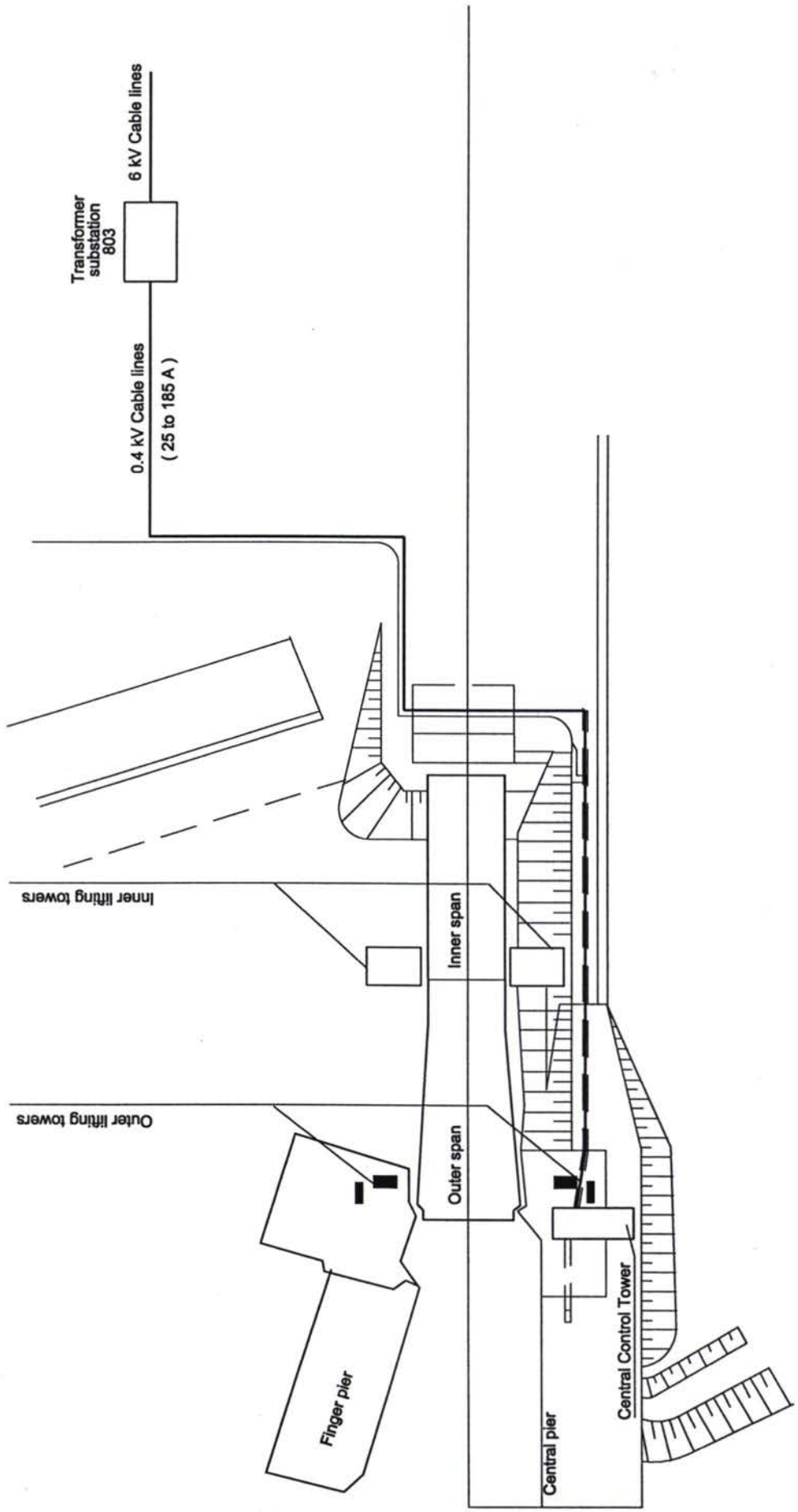


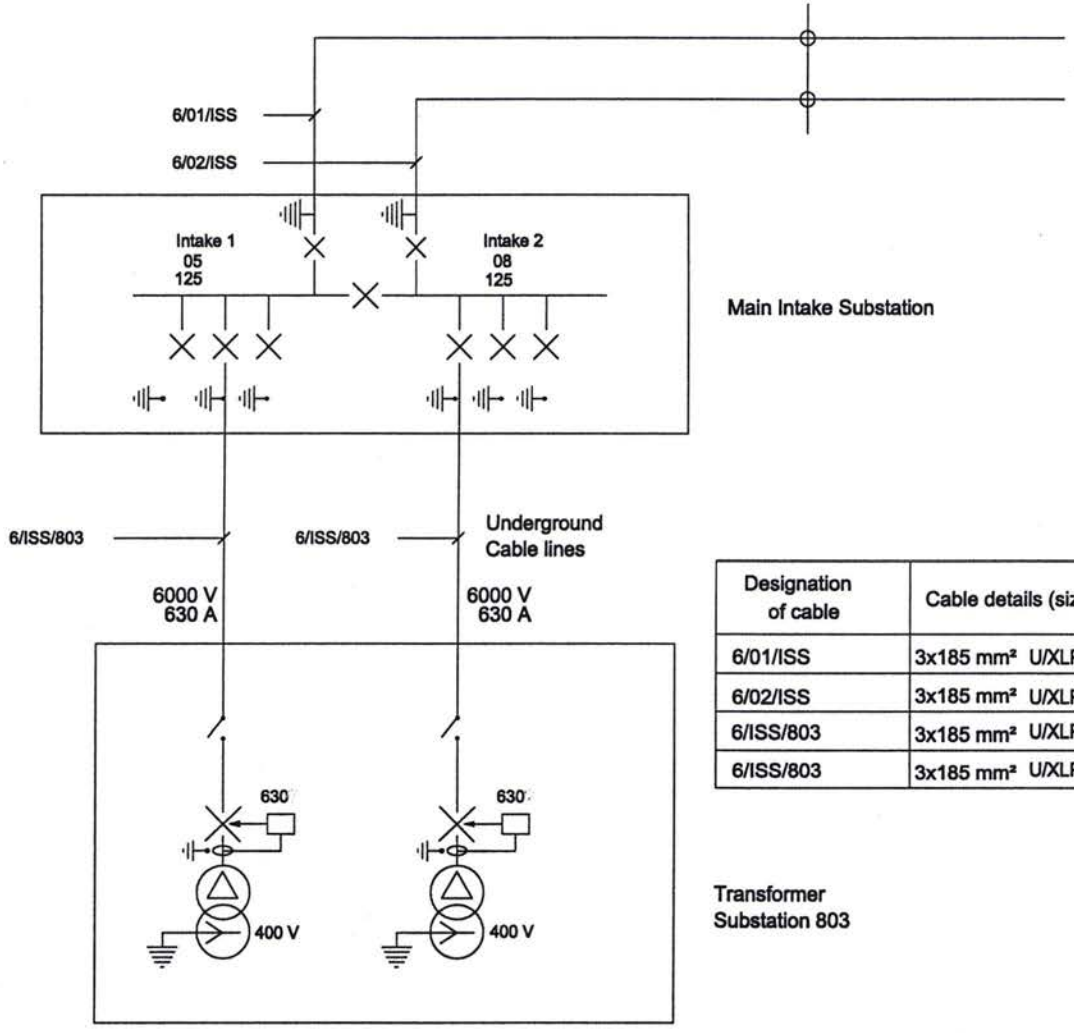
Bloc #	1			2			3	
Panel # (endorsement on low frame)	1	2	3	4	5	6	7	8
# Name of mechanism (sign on upper part of frame)	outer span			inner span	brake control	Signalization and protection of ramp span against bending	Protection of ramp span against breakage	Alternative power

LAYOUT OF PROJECTED 6kV POWER CABLE

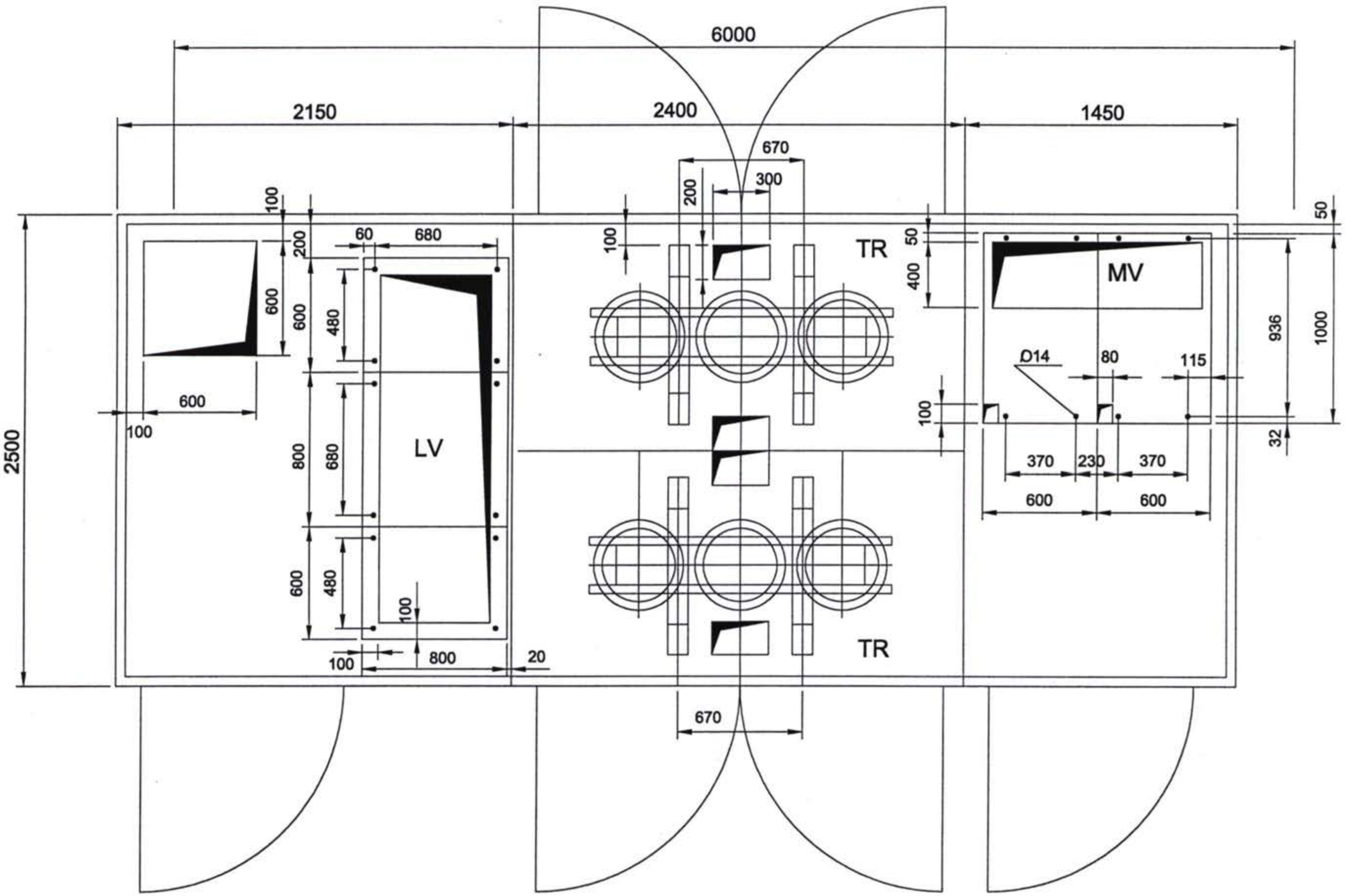


PROJECTED 0,4kV CABLES AT THE FERRY TERMINAL (24)



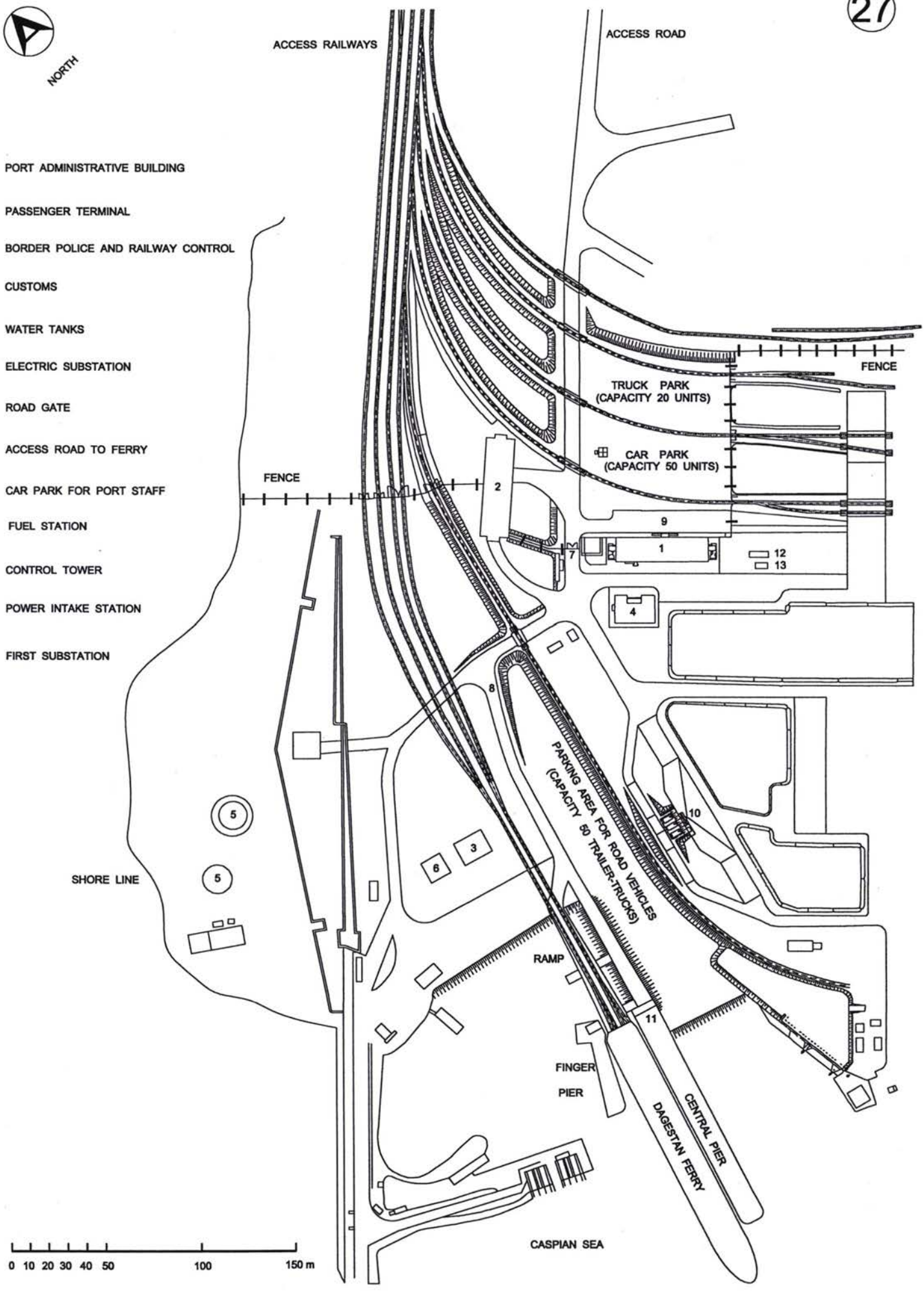


Designation of cable	Cable details (size, cover, type)	Starting	Ending
6/01/ISS	3x185 mm² U/XLPE/SCR/PVC/SWA/PVC-IEC502	Aerial line	Intake substation
6/02/ISS	3x185 mm² U/XLPE/SCR/PVC/SWA/PVC-IEC502	Aerial line	Intake substation
6/ISS/803	3x185 mm² U/XLPE/SCR/PVC/SWA/PVC-IEC502	Intake substation	Substation 803
6/ISS/803	3x185 mm² U/XLPE/SCR/PVC/SWA/PVC-IEC502	Intake substation	Substation 803

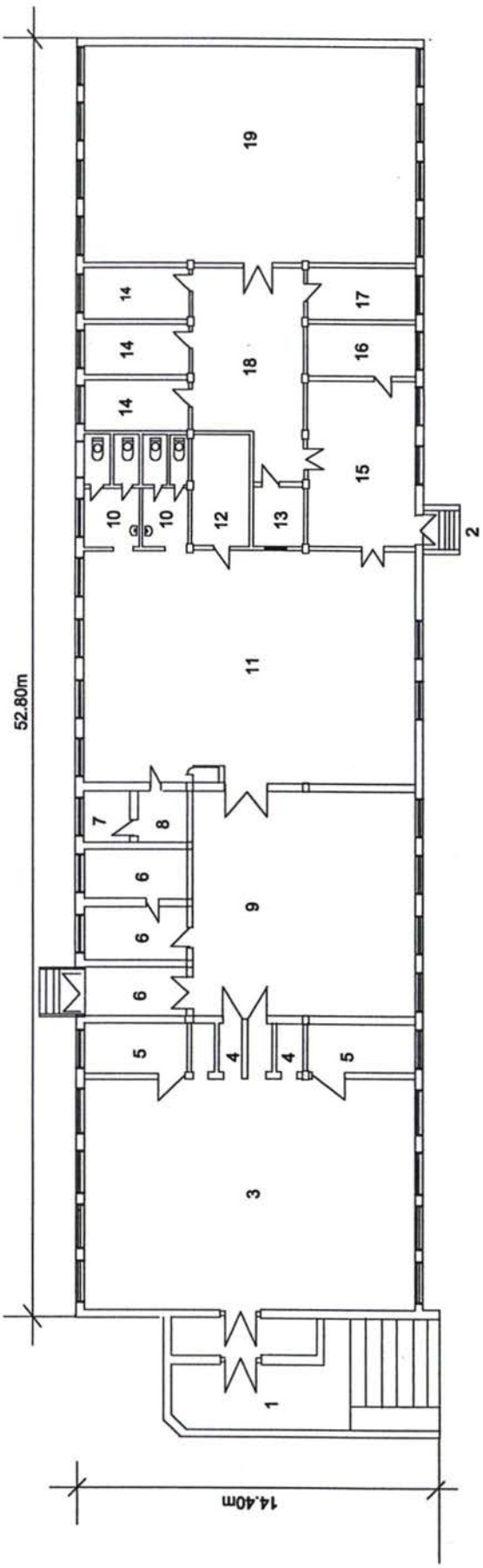


TRANSFORMER SUBSTATION 803

PROJECT LAYOUT



PASSENGER TERMINAL



1. entrance stairway (terminal side)
2. entrance stairway (city side)
3. public hall
4. border police and immigration booth
5. border police inspection room
6. customs room
7. electric station
8. office
9. customs inspection hall
10. restrooms
11. public hall with cafeteria lounge
12. border police office
13. ticketing booth
14. office
15. lobby
16. transport police
17. office
18. hall
19. restaurant

Tender Specifications

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List of abbreviations used in these specifications

Abbreviation	Description
AC	Alternative Current
ACSP	Aktau Commercial Sea Port
AFNOR	Association Française de Normalisation (French Norm Association)
BS	British Standard (issued by British Standard Institution)
BSt 420/500	Reinforcing steel, deformed, with a minimum yield strength β_S = 420 N/mm² and a minimum tensile strength of β_Z = 500 N/mm²
Cascor	Caspian Railway Corporation
CD	Chart Datum
CP	Code of Practice (issued by British Standard Institution)
CPT	Cone Penetrometer Test
DASt	Deutscher Ausschuß für Stahlbau (German Working Group for Steel Structures)
DC	Direct Current
DIN	Deutsches Institut für Normung (German Institute for Standardisation)
DN	Nominal Diameter
EAU	Empfehlung des Arbeitsausschusses Ufereinfassung (Recommendations of the Committee for Waterfront Structures) [6th English edition]
EN	European Norm
EU	European Union
FEM	Fédération Européenne de la Manutention (European Handling Corporation)
FPC	Free Programmable Controller
GG	Grauguss (grey cast iron)
IEC	International Electrotechnical Commission
MSL	Mean Sea Level
NF	Norme Française (French Norm)
O&M	Operation and Maintenance Manuals
PC	Personal Computer
PD	Published Document (by the British Standard Institution)
PE	Polyethylene
PVC	Polyvinyle chloride
RAL	Reichsausschuß für Lieferbedingungen (German Institute for Quality Assurance and Identification Modes)
RC-structures	Reinforced concrete structures
SI-system	Système International d'Unités (International Unit System)
SIGNI	Signs and Signals on Inland Waterways (United Nations, 1982)
SPT	Standard Penetration Test
SSPC	Structural Steel Painting Council
St E 460	High-strength, weldable fine-grained steel with a minimum yield point β_S = 460 N/mm² (t < 12 mm) β_S = 450 N/mm² (t>12<20 mm)
St 52-3	Especially killed structural steel with a minimum yield point of 355 N/mm²
St 37-2	Killed structural steel with a minimum yield point of 235 N/mm²
SWG 22	Standard Wire Gauge (SWG 22 = 0.71 mm)
UHMW-PE	Ultra-high molecular weight polyethylene
UPS	Uniform Power Supply
UTM	Universal Transverse Mercator

1. GENERAL DESCRIPTION OF THE WORKS

In this volume the design criteria for the works, the local site conditions, the works to be executed and the corresponding general planning and time schedule are presented.

The design criteria given in section 2 have formed the basis for the elaboration of the drawings and specifications included in these tender documents. The verification of the project and the preparation of the design (calculations, working drawings and detailed specifications), which shall be done by the Contractor when he takes over the responsibility of the project, shall also include a verification of these criteria.

Site conditions are treated in section 3 by describing topography and bathymetry conditions, access ways and conditions concerning supply of water and electricity.

Information given hereafter is given in good faith but without any responsibility of the Employer. The Bidder shall also satisfy himself regarding local resources of construction materials, supply of power and water, resources of labour and all other conditions that may influence on his bid. No claim from the Contractor due to any error in site information supplied by the Employer will be accepted.

The works and items to be supplied under this Contract are in brief the following:

- **Marine works, comprising :**

  . sea-bed cleaning
  . sheet pile protection
  . repair of concrete walls
  . placement of fenders
  . dismantling of old fenders
  . repair of pier pavements
  . reconstruction of slope protections

- **Ramp works, comprising :**

  . replacement of span decks
  . replacement of span railways
  . replacement of pivot bearings
  . repainting of spans

- **Works in central control tower, comprising :**

  . renovation of roof, walls and stairs
  . replacement of control panels and piloting station
  . supply of furniture

- **Works on lifting towers, comprising :**

  . sealing of counterweight pits
  . supply of permanent pumps
  . replacement of hosting wires
  . dismantling and cleaning of mechanical equipment
  . replacement of electrical parts
  . repair works on steel and glass superstructures

- **Railtrack works on land territory, comprising :**

  . dismantling and cleaning of rail switches
  . renovation of railway control room
  . renovation of railway control panels, piloting equipment and communication cables
  . renovation of traffic lights

- **Electrical works, comprising :**

  . reconstruction of a transformer substation
  . laying a 6 kV feeder cable
  . installing 400 V distribution cables

- **Earthworks and pavement works, comprising :**

  . filling and paving access ramps to the passenger terminal
  . pavement of parking areas

- **Miscellaneous works, comprising :**

  . water supply piping
  . sewage water networks
  . rain water drainage networks
  . floodlighting

- **Passenger facilities, comprising :**

  . refurbishment of passenger terminal
  . supply of border control equipment
  . procurement of a shuttle bus

2. DESIGN CRITERIA

2.1 Standards and codes of practice

Designs and verifications related to the rehabilitation of Aktau Ferry Terminal shall be carried out applying European Union standards such as EN norms, Eurocodes, British Standards, German DIN norms, French AFNOR norms and FEM recommendations. In addition, design documents shall comply with legal obligations of Kazakh technical standards.

2.2 Vessels

The project is based on the assumption of continued use of existing ferries of the Dagestan type. Main features of this vessel type are shown on drawing number 3.

2.3 Design loads

2.3.1 Specific weights

- Reinforced concrete : 25 kN/m^3
- Construction steel : 78.5 kN/m^3
- Sea water : 10.25 kN/m^3

2.3.2 Live standardised loads

- Buildings: offices : 2.0 kN/m^3
  halls : 4.0 kN/m^3
- Road traffic areas : max. axle load 120 kN
- Ramp : 80 kN/m for tracks or 40 kN/m for rails
  82 tonnes per rail-wagon (13.92 m long)
  122.2 tonnes per locomotive (16.97 m long)

2.4 Natural design conditions

2.4.1 Temperature, humidity and precipitation

- Extreme air temperatures : Max. 45°C
  : Min. -15°C
- Extreme water temperatures : Max. 35°C
  : Min. 0°C
- Average yearly precipitation : 200 mm
- Design rainfall for surface drainage : 60 l/second per hectare

2.4.2 Wind loads

Wind pressure : 0.70 kN/m^2

2.4.3 Snow loads

Snow pressure : 0.50 kN/m^2

2.4.4 Ice loads

Considered of minor importance

2.4.5 Seismic loads

The coastal region of Aktau belongs to seismic activity area of 9 degrees (corresponding to Modified Mercalli Scale).

2.4.6 Water levels

Two level systems are used in the Caspian sea : the Baltic system (BSL) and the Caspian system. Zero of Caspian system, which is very close to Caspian surface level, is located 28 metres below zero of Baltic system.

Tides are almost nil, whilst yearly fluctuations range from 30 to 50 cm. Levels are usually higher from May to July, when Volga and Oural rivers discharge large quantities of water in the Caspian sea.

In the past years Caspian sea level reached a maximum of 1.4 m in 1995 (Caspian system), after a sharp raise of 2.5 m in 18 years. Since 1995 Caspian sea level is slightly dropping : from 1.4 m in 1995 to 0.8 m in 1999.

The project doesn't foresee to raise any structure. This entails that the ferry ramp will be able to accommodate ferries provided that sea level doesn't rise by more than 1 m or doesn't drop by more than 2 m, compared to 1999 level.

2.4.7 Waves

Aktau port is properly sheltered by two breakwaters. Maximum wave heights inside the port remain below 1 m (significant height).

2.5 Materials

2.5.1 Concrete (characteristics according to BS 6089)

Building works
- Class B7.5 concrete; design compression strength: 4.5 MN/m^2. Blinding layer for foundations and floors.
- Class B15 concrete; design compression strength: 8.5 MN/m^2 Building works, foundations, lintels, monolithic parts of floors, seismic belts.
- Class B25 concrete; design compressive strength: 14.5 MN/m^2 Roofing works, frames (columns and girders, monolithic floors).

Marine works
- Class A concrete; Characteristic compression strength: 35 MN/m^2
- Class B concrete; Characteristic compression strength: 15 MN/m^2 Blinding layer.

2.5.2 Reinforcement and structural steel

Land works - Reinforcement steel (according to BS 4466)
Class AI, mild steel; yield strength 225 MN/m²
Class AIII, high tension steel; yield strength 365 MN/m²

Structural steel (according to BS 10034)
Yield strength 225 MN/m²

Marine works - Reinforcement steel (according to BS 4466)
Type R, mild steel; yield strength: 220 MN/m²
Type Y, high tension steel; yield strength: 550 MN/m²

- Structural steel (according to BS 10034)
St. 36, yield strength 235 MN/m²
St. 52, yield strength 355 MN/m²

Other materials will be normally available standard materials.

3. GENERAL DESCRIPTION OF THE SITE

3.1 Location of ferry terminal

The sea port of Aktau is the major port of Kazakhstan, located on the eastern shore of the Caspian sea, 10 km south of Aktau city. From Aktau there are road, rail and airline connections with central and eastern Kazakhstan. Besides, there is a ferry link with Baku which is served by Dagestan-type vessels. Similar ferries also operate on the route Baku -Turkmenbashi.

Drawing number 1 shows the location of the ferry terminal in the port of Aktau, between the dry cargo terminal and oil berths 4 & 5. Drawing number 2 shows the whole ferry terminal, from pier ends to port boundary.

3.2 Topography and bathymetry

The ferry terminal is located on a reclaimed land with surface level of -25.5 m BSL near the ramp, i.e. approximately 1.5 m above current sea level. The area of the dry cargo terminal is higher, standing around -24 m BSL. Drawing number 5 shows topographic levels provided by a survey performed in October 1999.

Seabed levels in the vicinity of the ferry terminal are reported on drawing number 4 : around -6.5 m Caspian system, which means that water depths are currently close to 7.5 m, far enough for Dagestan ferries which draught is only 4.5 m. Port entrance channel has a depth of -7 m Caspian system.

3.3 Railway facilities

As shown on drawing number 2, four railway tracks reach the ferry terminal (ferry terminal railway station is called "Morport" station). They belong to Cascor company, which also owns a fleet of locomotives and wagons operating in the area of Aktau. The station was designed for :

- parking of wagons waiting for ferry transfer.
- sorting of wagons arriving in the terminal before shunting to the ferry.
- inspection of wagons for defects.
- forming of trains from wagons arriving from Baku.

Total length of rails at Morport station can accommodate the full capacity a Dagestan vessel (28 rail-cars, each 13.92 m long).

Railways are laid with rails of P-43 and P-50 type, 1600 sleepers per km, on sandy and gravel ballast. Condition of track structure is fair. Switches specification is 1/9, made of rails of P-43 and P-50 type. On the plan the station is located in a straight line mainly, partially in a curve of 300 m radius.

The station of Morport was equipped with electric interlocking systems of switches and signals. Connection devices of electric interlocking system of the station with control sensors and automatic equipment of the ferry terminal were also constructed.

Now on this section shunting order of traffic, enumerated facilities of the station do not function, ground-type equipment (electric drives, control-rods, cables and traffic lights) is completely disassembled and restoration is required. However, switches can be operated by hand.

Building of the electric interlocking system post is temporarily occupied by frontier services, there is indicator board on the first floor which does not work.

Fluorescent lamps hanged up on T-shaped poles as well as projectors installed on masts at the station yard necks are used for the station electric lighting.

There are two railway tracks reaching the ramp, dividing into four spurs on the outer span.

Wooden beams were laid on the whole ramp at the same level as rail heads to enable traffic of road vehicles. Due to the fact that the ramp was never used for wagon transportation, railway tracks and switches were covered with metal plates.

3.4 Road access

Only one access road leads to the ferry terminal, the same one which serves the rest of the port. There is a single road gate, two lane wide. Twenty metres south of the gate the road divides into several branches, one of them leading to the ferry terminal and to oil berths 4 & 5 (see drawing number 2).

3.5 Ramp mechanisms

The following description is that of the equipment which was initially installed. As explained in section 4 part of this equipment is out of order and has to be rehabilitated by the contractor.

3.5.1 Technological principles

The ramp is designed for loading and unloading rail-cars and road vehicles under various sea levels and ferry draughts.

The ramp consists of 2 spans, a 27 m long inner span (140 tonnes dead weight) and a 33 m long outer span (220 tonnes dead weight). These structures are supported by a land base and four towers equipped with lifting mechanisms.

Each span is partially balanced with reinforced-concrete counterweights which are moving in pits arranged inside towers (80 tonnes each in inner towers, 65 tonnes each in outer towers). The unbalanced part of the inner span is 1 tonne whilst that of the outer span is 10 tonnes.

Displacement of the inner span, which is joined by hinges with the outer span, is carried out by two cap screws fixed on inner towers. Lowest ends of screws are hinged with the structure; supporting nuts are fixed to the upper ends of the screws and connected with conic devices which are driven by electric motors. Rotation of the nut and consequent displacement of the structure can only be carried out in the absence of temporary loading on the structure (no rail-car, no road vehicle).

The lifting and pulling down of the outer span is carried out according to a quite different scheme, which is caused by the necessity to enable free displacement of the ramp end, laid on the ferry stern during loading and unloading operations. Tensioning load is arranged on one of the outer towers, supporting the wire running from the drum of the driven winch. The rope of the winch runs from one side to the other one on rollers, fixed under span structure. While taking the ramp structure off the ferry, the tensioning load sets against the spring buffer, after what further winding of the rope on the winch drum leads to lifting of span end.

When structure end is laid on the ferry the tensioning load is hanging freely, keeping the rope in tension. The above mentioned kinematics allows the ramp end to follow freely the changes of the ferry stern during loading or unloading operations.

3.5.2 Electric drive of lifting mechanisms

All lifting mechanisms are driven with alternative current motors (7.5 kW each in inner towers, 1.25 kW each in outer towers). Two regimes of work are possible : with one motor and with two motors. In two-motor regime rotors of both engines are connected. This scheme is realised by introducing common non-switching resistance into the chain of rotors.

Motors of inner span are permanently switched on rotor resistance.

Brakes of electric motors are of dynamic type.

Two kinds of controls are provided : remote control from central control tower and local by push-button panels located within the towers. In normal conditions all mechanisms are operated by remote control system.

3.5.3 Protection, signalling and blocking

Beside ordinary protection of electric engines from working in abnormal regimes, protection of spans against twisting or breakage is also provided. In addition, control systems are able to ensure that span rails are properly connected to vessel rails.

Limitation of ramp movement is controlled by track command devices placed on mechanisms and also by final switches on spans.

3.5.4 Electric power supply

Transformer substation number 803 is the source of electric power for the ferry terminal. From substation 803 two 400 V cable lines reach the central control tower.

3.6 Power, water and sewerage

3.6.1 Power source

Main source of electricity supply is the port main intake substation (ISS), located and described on drawings 23 and 25. ISS substation was recently installed under the reconstruction works of the dry cargo terminal ("phase 1 reconstruction works").

3.6.2 Water Supply

Fresh water is supplied to the port from a sea water desalinisation plant located a few kilometres north of the port. For ferry terminal needs water intake is located in front of the port administrative building.

3.6.3 Sewerage

Sanitary water from the port is pumped towards a waste water treatment plant located along the sea shore, between the port and the city. All port waste water pipes are connected to a central pump station which is next to the administrative building.

4. TECHNICAL SPECIFICATIONS

4.1 Items A1 & A2 : site mobilisation and demobilisation

Mobilisation of the site shall include all Contractor's general obligations according to the Administrative Conditions hereunder :

1. Transport, provision and installation of general plant and equipment including supply of water and power throughout the contract period as required for the execution of the temporary and permanent works.

2. Construction and maintenance of all necessary access roads to and within the port area and the quarries.

3. Establishment of basic set out lines. The Contractor shall also undertake all detailed setting out.

4. Provision of housing and welfare facilities for the Contractor's employees including supply of water, power and all necessary arrangements for the proper discharge of sewage and drainage.

5. Survey Assistance as required from time to time by the Engineer.

6. Site laboratory for testing of concrete, aggregates, sand, bitumen, steel and paint with the necessary moulds, press, sieves and instruments (this lab can be avoided in case a suitable lab is available in the vicinity of ACSP).

7. Provision of marine transport within the port basins.

8. Site signage announcing the project to passers-by. The announcement should include information on the financial contribution to the project of the TACIS TRACECA programme, the TRACECA logo, and the EU flag.

9. Provision of insurances as described in the general and particular conditions of contract.

All arrangements and details in connection with the above items shall be subject to the approval of the Engineer.

Demobilisation shall include removal of all construction plant, temporary works, surplus materials, debris, wastes and clean-up of the site in a satisfactory manner.

4.2 Item A3 : working designs and as-built drawings

The Contractor is responsible for the preparation and adequacy of the detailed design of Permanent Works, Plant and Temporary Works, in accordance with the Contract. The Contractor is obligated to prepare and supply all design calculations, drawings and documents for the Permanent Works, Plant and Temporary Works.

Three copies of the design calculations, drawings and documents are to be initially supplied for the Engineer's approval, whereas another five copies and one reproducible copy are to be furnished to the Engineer for distribution after the Contractor has incorporated all corrections and alterations made by the Engineer on checking.

All design calculations, drawings and documents are to be produced in the English and Russian languages. The engineer may grant exemption from translating non-essential documents, upon he written request of the Contractor. Any exemption granted by the Engineer shall not remove the liability of the Contractor to provide documents in the Russian language, if required for regulatory approvals in Kazakhstan.

The drawings and documents to be provided by the Contractor shall include the following :

(a) Detailed Site layout and installation drawings, to be supplied within 14 days after contract signature;

(b) Work and construction programmes inclusive revisions, to the extend required as per Conditions of Contract;

(c) Detailed work method statements for each category of the Works;

(d) Surveying, sounding and setting-out drawings;

(e) Drawings and calculations for all Temporary Works and construction stages planned by the Contractor, including drawings and calculations for any part of the Permanent Works, which are fully or partially used as Temporary Works or as a support thereof;

(f) Detailed design calculations, justifying the stability and dimensions of the structures, including stability calculation of the ramp spans and its lifting mechanisms according to FEM standards related to hoisting appliances (3rd edition, October 1998);

(g) Analysis, justification and proposals for improvement of subsoil bearing capacity, where required;

(h) Working and layout drawings for all civil engineering works;

(i) Overall and detailed drawings of Plant, including any notes, diagrams and specifications required by the Engineer to assess:

- Compliance of the Plant with the Codes, Standards, Specifications and state of the art;

- Suitability of proposed plant for intended use;

- Suitability for erection, maintenance and repair.

(j) Working drawings for all Plant, electrical and mechanical works, including:

- Drawings of assemblies, parts of assemblies, equipment;

(k) Shop drawings and manufacturing instructions for all materials and steel constructions, taking into account the materials and customary practices of the manufacturing firm;

(l) Shop drawings and specifications for all special equipment items. If required for the preparation of shop drawings, additional statical checks must also be executed beyond the general statical design calculations;

(m) Bar bending schedules for reinforced concrete structures;

(n) Reports and records of all tests and material tests to be carried out by the Contractor or his manufacturers and suppliers;

(o) Drawings, records and reports on specific construction measures to be supplied by the Contractor in accordance with the provisions of the Contract;

(p) Quantity surveys and drawings as required for the measurement and payment of the Works;

(q) As-built drawings, incorporating all changes or amendments made in the course of the construction works, for all Permanent Works and Plants.
As-built drawings shall be supplied to the Engineer immediately after completion of the particular part of the Works;

(r) Brochures and technical literature of all Plant, equipment items and fixtures, which are to be permanently installed in the Works;

(s) All instructions (in the form of lists, manuals and the like), which are required by the Employer for proper operation, as well as for expert maintenance for any part of the Works and repairs of the structures and facilities. These will be provided in 5 Russian and 2 English versions, and formally handed over to the ACSP at the time of the performance tests.

Within fourteen days after award of the Contract, the Contractor shall propose to the Engineer a complete list of design calculations, drawings, sketches, diagrams and notes to be submitted to the Engineer. The Engineer will determine those documents to be submitted by the Contractor for approval and those to be transmitted for information only.

However, the Engineer reserves the right to request any additional detailed drawings at a later stage in order to facilitate proper checking of documents related to the Permanent Works and/or understanding of equipment functions and Temporary Works.

Any original of the drawing or as-built drawing shall be produced by the Contractor only on special drawing foil, of excellent dimensional accuracy and high tear resistance.

Checking of Engineer's Documents by the Contractor

(1) The Contractor is obligated to check thoroughly the Tender Drawings on the basis of the results of Contractor's surveying work, with regard to the correctness of all main dimensions and to inform the Engineer of corrections considered necessary by him.

(2) Before designing, manufacturing, supply and/or execution of any part of the Works, the Contractor must examine and verify the drawings of the Engineer, with regard to the technical feasibility of construction, to the correctness of dimensions, as well as all other aspects, which are of significance for the execution and completion of the Works.

Based on his experience, the Contractor shall call the attention of the Engineer to circumstances, which should involve a change in the design necessary in his opinion.

(3) Discrepancies still existing in dimensions and other data in the drawings so examined and verified by the Contractor, insofar as they have a negative effect on the execution and completion of the Works, are solely at the expense of the Contractor and do not entitle him to any extra claim.

Checking of Contractor's Documents by the Engineer

(1) All design calculations and drawings prepared by the Contractor for the Permanent Works are to be submitted to the Engineer for check and approval.

(2) All drawings and supporting calculations prepared by the Contractor for Temporary Works and construction stages are to be submitted to the Engineer for his information and/or comments.

(3) The formal approval or the comments of the Engineer do not release the Contractor of his sole responsibility and liability for the proper design, execution and completion of the Works or for remedy of any defects therein, in accordance with the Conditions of Contract.

(4) Design calculations shall be sent with the drawings. No working or equipment drawings shall be approved until the Engineer is provided with the design calculations.

For any item of Plant, partial design calculations may be submitted to the Engineer, depending on the various stages of execution of drawings. A complete set of design calculations containing all the partial calculations for each item of the Works or Plant shall be given to the Engineer on completion of the working drawings for the item of work in question.

The Engineer reserves the right, during the Contract period, to request the Contractor for any additional design calculations, which he considers necessary.

4.3 Item A4 : working tests

Working tests include all site-tests to be performed during construction period, in addition to the tests to be carried out on completion and after completion (Conditions of Contract - Sections 9 & 12) :

- sandblasting (according to BS-5121; working tests will aim at adjusting the pressure of the pump machine, tests will be performed on separate pieces of corroded steel in order not to spoil the real structures)
- paint (according to SSCP-SP1; working tests shall be performed on the real structures to be painted, in case of failure the Contractor shall properly clean the test areas and undertake additional working tests)
- projected concrete (according to NF-P-95101 and NF-P-95102; working tests will be carried out on a pier wall, they shall allow the contractor to adjust the pump machine in order to make sure that projected concrete perfectly sticks to the wall surface and that the equipment produces a concrete layer of steady thickness)
- asphalt for pavement (according to BS-2000-223; working tests will be performed on site with the equipment to be use for the real works)
- concrete for pavement (according to the French Code of Practice n°65, including preliminary laboratory concrete tests, site working tests before commencement of concreting and periodic tests during concreting)
- quarry stones (according to BS-6349, allowing to check rock specific weight, block unit weights, block shapes and rock resistance)
- steel wires (according to BS-183, focussing on steel resistance, steel elasticity and steel protection against corrosion)

Before issuance of the Handing Over Certificate for the works or for any section of the works the Contractor will propose to the Engineer for his approval, and carry out a series of performance tests which will completely verify that the works and goods supplied are suitable for the purposes for which they are required, and conform with the requirements of this contract.

The performance test procedures will also serve to instruct the staff of the ACSP in the use of the ramp, as well as its routine and periodic maintenance.

The date proposed for the performance tests will be agreed with the Engineer and the ACSP to allow adequate preparations for attendance by the Engineer and by the required ACSP staff.

4.4 Item B1 : sea-bed cleaning

Some obstacles have to be removed from the sea-bed in the area comprised between the finger pier and the central pier :

- Two rubber tyres of 2 m diameter and 0.5 m thick.
- A metal frame, approximately 5 m wide.

- A stretch of Larssen V sheet piles vertically driven in the subsoil along the finger pier (app. 1 m away from finger pier, parallel to it), about one metre long.

Sheet piles can be either cut along sea bed profile or extracted.
These items will be dumped on land outside the port territory, in an approved dumping site.
After sea-bed cleaning an underwater inspection will be performed simultaneously by the Contractor and the Engineer.

4.5 Items B2, B3 & B4 : sheet pile protection

All sheet pile elements which are located above sea water level are corroded (underwater coating is still in good condition) : eastern side of central pier, western side of finger pier and front part of land base ramp.

Sheet piles will first be cleaned by sandblasting above water level, plus wire-brushing on a 30 cm strip under water surface.

As a second step two layers of coating system will be applied : coal-tar pitch-epoxy paint, minimum thickness 150 micrometer (type Carbokote 356-10 or equivalent). No rust shall be visible before coating.

These works shall be planned during low water periods, i.e. out of April-August period.

4.6 Items B5 & B6 : repair of capping concrete walls

Repair works are to be carried out in areas where reinforcement bars are visible, where rust is leaking or where skin concrete is damaged. This applies to parts of central pier and finger pier capping walls.

First step of repair works will consist in projecting high pressure water on the wall surface, to remove all concrete parts which are about to fall. As a second step all visible steel bars will be cleaned by sandblasting, then steel bars will be cured by use of coating resin mixture such as Sikatop Armatec 108. Last step will consist in projecting a 5 cm layer of class A concrete by dry projection method. Concrete components will comply will following standards :

- cement BS 12
- aggregates BS 882
- water BS 5328
- admixtures BS 5075

Detailed components and procedures will be submitted by the Contractor to the Engineer's approval. Tests will be undertaken on site before starting the works, according to NF-P-95101 and NF-P-95102 Codes.

4.7 Item B8 : placement of fendering tyres on central pier

Fender system of central pier is made of rubber tyres, 2 m diameter and 0.5 m thick. When this fender system was set up the whole pier was covered with two rows of double tyres hung with galvanised chains to steel profiles fixed to the concrete wall. Currently several tyres are missing, as well as their chains and profiles.

Tyres will be supplied by ACSP (item B7).

The Contractor shall supply and fix missing steel profiles and chains, and shall hang the tyres. Steel profiles and chains will be of the same type as existing ones, protected by hot dip galvanisation, 100 micron thick, complying with BS 729.

4.8 Item B9 : removal of wooden fender from finger pier

The wooden fender sheltering the eastern side of the finger pier is in very poor condition (see structure on drawing number 8). The Contractor shall remove the whole panel, its fixing accessories and dump all elements on land within the port territory, at the location that will be indicated by ACSP.

4.9 Item B11 : placement of fendering tyres on finger pier

After removal of the wooden fender the Contractor shall protect the whole eastern side of the finger pier with rubber tyres from the same type as those hung along the central pier. Tyres shall also be hung by similar chains. However, due to the recess at the toe of the concrete wall, thickness of fender layer shall be three tyres (1.5 m), instead of two tyres on central pier (1 m).

ACSP shall supply all tyres (item B10).

The Contractor shall supply and fix steel profiles and chains, and shall hang the tyres. Steel profiles and chains will be protected by hot dip galvanisation, 100 micron thick, complying with BS 729.

4.10 Item B12 : repair of stop fenders

Stop fenders are located and described on drawing number 9. The Contractor shall carry out following repair works :

- Replacement of upper steel arms (5 arms on each stop fender).
- Replacement of lower steel arms (5 arms on each stop fender).
- Replacement of front steel panels (5 mm thick).
- Placement of six rubber tyres on each front panel (same type as for pier fenders, tyres supplied by the Employer).

Steel arms and front panels will be protected by hot dip galvanisation, 100 micron thick, complying with BS 729.

4.11 Item B13 : repair of asphalt pavement on central pier

Asphalt pavement on central pier, from control tower to pier end, is severely cracked. The Contractor shall repair the whole area by double bituminous surface treatment (DBST), complying with the French CCTG 26 Code of Practice :

- Cleaning of existing surface from debris, grease, dust and grass
- Drying the surface
- Applying an asphalt prime coat at the rate of 1.5 kg per square meter
- Applying double bituminous surface treatment (total thickness 2 cm)

4.12 Item B14 : repair of concrete pavement on finger pier

Finger pier is topped with a layer of in-situ cast concrete which is damaged at its head part (several cracks and a hole are visible). The Contractor shall first demolish the whole damaged pavement and remove concrete elements. Then he shall fill the hollow parts with graded material and pour a new layer of concrete on top.

Concrete will be of class A standard.

4.13 Item B15 : rubble mound protections

The Contractor shall build new sea-slope revetments alongside the ramp (55 m long) and on both sides of the land base ramp (35 m long) - see drawing 6 -. First he shall remove the weak existing protection made of limestone blocks. As a second step he will shape the natural soil according to a regular slope of 3/2 (3 m horizontally, 2 m vertically).

New revetment will consist of a layer of geotextile, two layers of 50 kg to 150 kg stones and two layers of armour stones (500 to 1500 kg).

Geotextile shall be unweaved, spun-bonded and made of polyester. Its physical characteristics shall comply with the following (according to BS PD-6533 and BS 6906) :

- specific weight 300 g/m²
- thickness 3 mm
- permeability 0.003 m/s
- pull resistance 9 000 N/m

Rock for armour layer and sublayer will consist of sound angular stones. Ratio between smallest and largest dimension of a single rock boulder shall not be less than 0.5. Humid Deval Coefficient will be higher than 5 and stone specific weight higher than 2.5 t/m3. No crack shall be visible on stones. Applicable standard for rock material shall be BS 6349-7.

Placing shall start at the toe of the slope in horizontal layers, working upwards in a careful manner as to avoid disturbance or misplacement of the previous layer (especially the filter) and mixing up, washing out, disintegration or sliding, in such a way as to ensure maximum interlocking.

4.14 Item C1 : removal of ramp deck

As shown on drawings 11, 12 and 13, ramp deck is made of two layers of wooden beams.

The upper layer is deeply rotten and has to be entirely removed.

At tender stage it is assumed that the lower layer is also rotten and has to be removed too. However, before making the decision lower layer will be thoroughly inspected by the Engineer after removal of upper layer.

All components will be delivered on the port territory at the location decided by ACSP.

4.15 Item C2 : dismantling of ramp rails

The existing ramp was designed in the 60s for ferries of Azerbaijan type fitted with four entrance rail-tracks. As shown on drawing 19 the inner span supports two rail-tracks which divide into four tracks on the outer spans.

Since Dagestan ferries have only two entrance rail-tracks all ramp rails and ramp switches will be completely dismantled and later replaced by two new rail-tracks (see item C9).

Item C2 also includes dismantling and disposal of steel plates which currently cover ramp rails.

4.16 Items C3 & C4 : removal of spans

In order to thoroughly inspect and repaint the steel structure of the ramp both spans have to be removed and laid down on land. The Contractor will submit to the Engineer's approval a relevant procedure taking into account the

span weights (approximately 140 tonnes for inner span and 220 tonnes for outer span) and its lifting equipment. Subject to the Engineer's approval, it may be accepted to dismantle the structures and to remove them piece by piece, in order to reduce weights to be lifted.

Item C3 and C4 also include:

- Levelling of a land area to lay down the spans.
- Construction and placement of bearing devices to safely support the spans.
- Inspection of steel structures and thickness measurements by the use of an ultrasonic digital thickness gauge.

4.17 Items C5 & C6 : replacement of pivot bearings

Four pivot bearings are located at the shore end of the ramp, three others on traverse beam linking the inner span to the outer span (see drawings 10, 11 and 14). These bearings are corroded and blocked, this is the reason why items C5 and C6 foresee complete replacement by new bearings.

However, before being replaced by new units, existing bearings will be thoroughly inspected and, in case it turns out that they can be reused, new units will not be supplied. In such case new unit prices will be decided, covering following operations:

- Dismantling
- Cleaning
- Hot dipped galvanisation according to BS 729
- Refitting

In all cases adequate lubricator devices shall equip the bearings.

4.18 Item C7 : sandblasting of spans and traverse beams

Before being re-coated both spans and both traverse beams will be prepared according to the following process:

- Grease removing with steam and detergent in accordance with SSPC-SP1
- Complete scouring with high pressure water jet in order to remove non-adhesive paint (minimum jet pressure at nozzle shall be 200 bars)
- Blast-cleaning of rusted areas in accordance with SSPC-SP6 or brushing in accordance with SSPC-SP2, ready to receive prime coat.

The Contractor shall submit technical documentation of high pressure pump intended to be used together with technical characteristics and performances. He shall also indicate the proposed operating method.

All pits shall be completely eliminated by scabbing with a chipping hammer or with any other adequate tool.

After preparation surfaces shall be in accordance with the Swedish Standard Scale S15-05-59-00, grade ST3.

4.19 Item C8 : repainting of spans and traverse beams

All parts of spans and traverse beams shall be re-coated according to the following specifications.

Colours of external layers shall be decided by ACSP.

a. Coatings

Paints shall be of high qualities and approved types, obtained from approved manufacturers, suitable for use in Aktau climate.

All paints shall be factory sealed and delivered to site in their original containers and bear the brand, name, formula, colour and instructions. In addition, they shall comply with the following requirements:

- Products shall be thoroughly mixed and ground. It shall not be settled, cared or thickened to such a degree that it cannot be mixed easily with a paddle by stirring to a good uniform brushing consistency.
- Colours shall match approved samples.
- Paints shall show no evidence of cracking, chipping or flaking.
- Paint shall dry to a uniform, smooth, flat or semi-gloss appearance under ordinary conditions of illumination and wearing. There shall be no laps, skips, high-lighted spot or brush marks. Tinted paint shall dry to a uniform colour.

Parts located above water surface

- 1 coat, epoxy primer, two components, formulated to have good bonding, wetting and inhibiting properties.
  Minimum thickness : 80 micrometers.
- 1 undercoat, epoxy, two components on the whole surface.
  Minimum thickness: 80 micrometers.
- 1 finishing coat, polyurethane, two components on the whole surface.

Parts located below water surface

- 1 coat of primer paint, epoxy with high zinc content (more than 90% of zinc in the dry film - minimum thickness 40 micrometer as per NF-T 30-003, type ZINEPOX 452-62 or equivalent).
- 2 coats of protective coal tar pitch-epoxy paint (minimum thickness 150 micrometer as per NF-T 30-003, type CARBOKOTE 356-10 or equivalent).

b. Method of Application

All works shall be performed in accordance with the manufacturer's instructions and the Engineer's approval.

All coatings shall be properly applied, leaving no sag, lap or brush. Each layer shall be perfectly dry before next layer is applied.

No paint shall be applied if the temperature is higher than 115°F (45°C) for priming and 100°F (40°C) for other layers. There shall also be no painting when the outside temperature is below 40°F (5°C) or in rain, snow, mist, storms, dust, or when air humidity is over 85%. No paint shall be applied over wet or damp surfaces.

All tools and equipment shall be maintained in good working order and shall be comparable to that described in the instructions of the coating manufacturer, a copy of which shall be made available to the Engineer. All tools and equipment shall be thoroughly cleaned before and after use, with the appropriate cleaning liquid, as indicated by the coating manufacturers.

Minimum time between coat drying times and final drying or curing cycles as stated in the instructions of the coating manufacturer shall be carefully observed.

Each coat shall be applied in a different tint from the preceding coat, the final coat to be of the colour approved by ACSP. A complete colour schedule shall be provided by the Contractor before commencement of painting operations.

Before application of any paint or finish, all surfaces shall be dried and free from oil, grease, dirt, rust, mill scale, chemicals or other materials and prepared as specified. Particular attention must be paid to this preparatory work and no priming shall be applied until the Engineer has inspected and approved the work.

Paint may be applied by roller and tipped off by brushing. The use of airless-spray is forbidden excepted on surfaces which are not accessible to paint brushes.

No thinning of paint material shall be allowed without the Engineer's approval.

c. Warranty

Warranty of coatings shall be five years starting from laying of external layer (Reference 7-3 index of the European 3-year scale and Reference 5-5 for five-year warranty). A warranty contract shall be signed, designating ACSP as beneficiary thereof.

At the end of coating operations the Contractor shall clearly write on each span the full date of application of final coating.

4.20 Item C9 : placing new rails on spans (2 spurs)

Two new rail-tracks shall be placed on the ramp, to ensure proper connection between land spurs and ferry ones (see drawing 19). New rail-tracks shall follow the axes of land railways reaching the inner span, which are the same ones as those of the inner span (see drawing 11).

Rails shall be of P-50 type, manufactured and placed according to the local SNiP II 39-76 standard.

Item C9 also includes adequate connection devices between rail elements as well as proper placement of rails at both ends of the ramp to ensure accurate connections with adjacent rails on-shore and on board.

4.21 Item C10 & C11 : refitting spans

Following repainting operations both spans shall be accurately refitted on their bearings. Like for removal, the Contractor shall submit to the Engineer a detailed procedure taking into consideration unit weights and lifting means.

After span refitting the Contractor shall proceed to paint touching up. A detailed inspection shall prove that final coatings perfectly cover all parts of the structures.

4.22 Item C12 : coarse steel deck on ramp

The purpose of the ramp deck is to allow safe traffic of rubber-tyred vehicles and pedestrians. New deck shall be made of a steel frame with coarse surface ensuring efficient grip under all weather conditions.

Coarse surfacing will be obtained by a layer of angular aggregates similar to those of the French "Lumicilice" licensed process. The Contractor shall submit to the Engineer's approval the detailed description of surfacing.

The Contractor shall also supply calculation notes proving resistance of steel deck under road traffic loads.

The whole steel structure shall be protected by hot dipped galvanisation according to BS 729 (100 micron thick protection).

Weight of deck shall be carefully taken into account while checking span resistances and overall equilibrium of ramp with regards to lifting equipment (it is not foreseen to modify any counterweight).

Lastly, deck surface shall be at the same level as rail-track heads, whilst empty spaces along rails shall be as narrow as possible according to SNiP standards.

4.23 Item D1 : renovation of building roof on central control tower

The roof of this building is not watertight . In case of rain water leaks through the roof.

The Contractor shall first carefully inspect the roof from both sides in order to locate all cracks. Then he will submit to the Engineer's approval a sealing material and a working methodology.

Sealing material shall be comply with BS 618 (as an example, a suitable material is the French licensed Sikafloor 400 F).

The methodology will include perfect cleaning of the roof before waterproofing.

4.24 Item D2 : renovation of outer stairs on central control tower

Outer stairs are shown on drawings 20 and 21. They are still in use but they are corroded. The Contractor shall:

- Remove all dirt, dust, grease and non-adhesive paint
- Wire-brush corroded parts
- Re-coat stairs with two layers of paint (epoxy primer and polyurethane finishing coat)

Colour of final coating shall be decided by ACSP.

Paints shall comply with NF T-30-0003.

4.25 Item D3 : renovation of internal walls in central control tower

Internal walls mean inner faces of perimeter walls, from floor to ceiling (see drawings 20 and 21). They are made of concrete coated with mortar.

Walls shall be repainted after removal of dirt, dust and non-adhesive mortar or paint. Two layers of oil paint will be applied, conforming with NF T-30-0003 standard. Colour of final layer shall be decided by ACSP.

Before coating the walls the Contractor shall make all surfaces perfectly smooth, by the use of epoxy mortar.

4.26 Item D4 : removal of control panels and piloting station

Existing control panels and piloting station are out of order and shall be completely removed from the tower (see drawings 20, 21 and 22). The Contractor is allowed to break them into pieces and to scrap them.

4.27 Items D5 & D6 : supply and placement of new control panels and new piloting station

New control panels and piloting station shall allow ramp operators to lift and to bring down ramp spans within the level ranges shown on drawing 18.

This equipment will control tower motors according to the principles described in section 3.5. It will also ensure that:

- Span slopes and levels remain within the ranges shown by drawing 18
- Angles remains acceptable with regards to railways standards
- Spans do not twist and do not bend

Piloting station shall be exactly in the same location as the existing one.

The Contractor will submit a full design for this equipment, complying with FEM standards related to control and safety devices for hoisting appliances (3rd edition, October 1998), as well as with IEC 364 recommendations (wiring regulation).

All board writings shall be in Russian and in English languages.

4.28 Item D7 : furniture for central control tower

The Contractor shall first remove all existing old furniture, then supply and place following items:

- 3 desks, 160 x 90 cm2
- 3 tables, 160 x 90 cm2
- 15 ordinary chairs
- two 800 dm3 cupboards for document filing
- a 80 litre refrigerator
- air-conditioning units allowing to maintain highest temperatures below 25°C
- heating units allowing to keep lowest temperatures above 20°C

All items shall be new and from approved manufacturers.

4.29 Items E1 & E2 : removal of counterweights

Ramp spans are partly counterbalanced by two pairs of counterweights made of reinforced concrete and moving in pits (see drawings 10, 16 and 17). In inner towers each counterweight weighs 80 tonnes (3 x 3 x 3.55 m3), whilst outer counterweights weigh 64 tonnes each (2.40 x 3 x 3.55 m3).

To allow complete inspection, cleaning and sealing of pits, the Contractor shall lift each counterweight up to its highest position within its pit (access to pits will be by ladder recesses).

Before lifting any counterweight the Contractor shall submit to the Engineer's approval a detailed lifting methodology taking into consideration the equilibrium of the spans (in case spans are not removed during this phase). The Contractor shall foresee to lift counterweights as long as his programme imposes to do so, i.e. during all operations covered by items E3 to E9 and E12.

Items E1 and E2 also include cleaning of counterweight surfaces.

4.30 Item E3 : emptying water from counterweight pits

Counterweight pits are located within sheet pile boxes which are filled with mass concrete. Pits were initially empty of water. Today pits are flooded up to the sea level, but it is not clear whether water came in from the tops (due to rain or to overtopping waves) or through the sheet piles and concrete structure.

The Contractor shall pump the water down to the bottom of each pit and wait a full calendar week to check whether the pit is watertight or not. For each pit:

- In case sea water comes back to the pit through the structure, the Contractor shall locate leakage areas inside and outside the structure, in order to be able to seal them later on (see item E4).
- Even if water doesn't seem to come back at all, pit shall be equipped with an electric bilge pump with capacity of 0.25 litre per second over 10 m water height, fastened to the bottom of the ladder recess.

4.31 Item E4 : sealing counterweight pits

This item applies to pits which will appear not to be watertight. The Contractor shall seal such pits considering leakage areas located under item E3.

Sealing shall preferably be done from the outer sides of the structures.

Prior to any sealing operation the Contractor shall submit to the Engineer's approval a complete procedure together with a list of equipment and sealing products (for example, a suitable sealing injection product is the French licensed Sikaswell S).

Lastly, each pit shall be equipped with an electric bilge pump with capacity of 0.25 litre per second over 10 m water height, fastened to the bottom of the ladder recess.

4.32 Item E5 : removal of hoisting wires

The Contractor shall remove all hoisting wires from winches and counterweights located in inner and outer towers, in order to replace them by new ones. These wires are made of galvanised steel, DN 33.5 mm for counterweights and DN 28 mm for winches.

Item E5 also includes removal of all fastening devices at wire ends.

4.33 Items E6 & E7 : dismantling, cleaning, lubricating and refitting tower mechanical equipment

In all lifting towers (2 inner towers and 2 outer towers) the Contractor shall dismantle gear boxes, winches, wheels, brakes and spindles. In addition, he shall dismantle lifting screws located in inner towers.

As a second step he shall clean all parts from dirt, dust, grease and rust.

Then he shall lubricate all pieces by the use of lubricants complying with BS 5063.

Lastly the Contractor shall refit the whole mechanical equipment according to its initial position and check that each part is satisfactorily working. Working tests shall comply with FEM Rules for Hoisting Appliances – Booklet 8 (3rd Edition, October 1988).

4.34 Items E8 & E9 : Replacement of electrical motors, control boxes and cables

In all lifting towers (2 inner towers and 2 outer towers) the Contractor shall remove electrical motors, control boxes and electrical cables.

All components shall be scrapped and replaced by new ones, as similar as possible to the old components* and complying with:

- FEM Rules for Hoisting Appliances – Booklet 5 (3rd Edition, October 1988)
- IEC 34, IEC 72, and IEC 72 A (electric motors)
- IEC 364 (wiring regulations)
- The design to be elaborated by the Contractor

* AC motors, class IP 54 protection index, class F insulation index, fed by 380 Volts – 50 Hertz current. Unit motor powers are 7.5 kW in inner towers and 12.5 kW in outer towers.

4.35 Item E10 : repair of glass bricks and windows on towers

A few glass bricks and windows on tower superstructures are broken. The Contractor shall remove all broken elements and replace them by new ones of similar materials and sizes. Waterproof joints are also included in this item.

4.36 Item E11 : repainting outer steel structures on towers

Superstructures of lifting towers are still protected by a fair paint coating. However some slight defects are visible and it is foreseeable that additional ones will result from rehabilitation works.

The Contractor shall cover all defects by a single layer of polyurethane paint of the same colour as the existing light blue one.

4.37 Item E12 : placement of new hoisting wires

The Contractor shall supply and place new hoisting wires on winches and counterweights located in inner and outer towers. New wires shall be made of galvanised steel, DN 33.5 mm for counterweights and DN 28 mm for winches. Steel resistance and elasticity shall result from the design to be elaborated by the Contractor in accordance with FEM Rules for Hoisting Appliances - Booklet 7 (3rd Edition, October 1988).

Item E12 also includes placement of fastening devices at wire ends.

4.38 Items E13 & E14 : refitting counterweights

After sealing of pits and fastening of bilge pumps the Contractor shall refit all counterweights in such a way that:

- Counterweights are safely fastened to hoisting wires
- No obstacle or debris is left at the bottom of the pits
- Counterweights can easily move inside pits along the whole vertical ranges

4.39 Item F1 : dismantling, cleaning, lubricating and refitting of rail switches

The Contractor shall dismantle all 13 rail switches which are located on the railway station of the ferry terminal (the so-called "Morport station"). These switches are of P-43 and P-50 types, manufactured and placed according to local SNiP II-39-76 standard.

Switches also include ancillary devices which shall be considered as part of item F1:

- Hand operating systems
- Control sensors
- Electric operating systems

As a second step the Contractor shall clean all components from dirt, dust, grease and rust.

(Testing of sensors and electric operating systems are not included in this item. It is part of item F3.)

As a third step the Contractor shall lubricate all mechanical parts by the use of lubricants complying with BS 5063.

Lastly the Contractor shall refit all switches and check that mechanical parts are satisfactorily working.

4.40 Item F2 : renovation of railway control room

Railway control room is located on the second floor of the building number 3 on drawing number 2, belonging to Cascor. This room is equipped with control panels and a piloting station which were designed for:

- control of railway traffic at the ferry terminal
- control and operation of railway switches
- control and operation of traffic lights

This control room is approximately 100 m2 large, currently unused.

Item F2 covers refurbishment of the room and includes:

- removal of out-of-use furniture
- floor and ceiling refurbishment
- wall repainting
- supply of 2 desks, 160 x 90 cm2
- supply of 2 tables, 160 x 90 cm2
- supply of 10 ordinary chairs
- supply of two 800 dm3 cupboards for document filing
- supply of a 50 litre refrigerator
- supply and installation of air-conditioning units allowing to maintain highest temperatures below 25°C
- supply and installation of heating units allowing to keep lowest temperatures above 20°C

All items shall be new and from approved manufacturers.

4.41 Items F3 & F4 : renovation of railway control panels, piloting equipment, communication cables and traffic lights

Since the ferry terminal was never used for rail traffic, the Contractor shall first test all control and operating equipment :

- control panels
- piloting station
- communication cables
- electric sensors and electric drives of railway switches
- traffic lights

As a second step the Contractor shall submit to the Engineer's approval a project of renovation covering all defective components, complying with SNiP railway standards (it is foreseeable that at least control panels and piloting station are out of order). All board writings shall be in Russian and in English languages.

The approved design shall then be implemented by the Contractor.

4.42 Item G1 : demolition of old transformer substation

The old transformation substation TP 803 which was built to feed the ferry terminal is almost out of order. Its technology is out-of-date, therefore it shall be demolished and a new transformer shall be built.

Item G1 covers the whole demolition of the transformer, including the building and the equipment, as well as evacuation of all materials to an approved dumping site, out of the port territory.

4.43 Item G2 : feeder cable to new transformer substation

As shown on drawings 23 and 25 the Contractor shall lay two 6000 Volt cables from the port main intake station up to the location of TP 803. Final layout is still to be decided by ACSP, according to that of drawing 23 each cable will be 390 m long. These cables shall be suitable for 630 Amp. current and shall comply with IEC 364 wiring standards.

Cables shall be laid underground on a sand compacted bed, in accordance with BS 3858.

4.44 Item G3 : new transformer station

A new transformer station TP 803 shall be supplied and installed by the Contractor at the same location as the old one. This substation will be fed by the two 6000 Volt cables. It will supply the ferry terminal with 400 Volt cable lines, according to the sketch of drawing 24.

Drawings 25 and 26 provide outlines of this transformer station, the detailed design of which shall be submitted by the Contractor. This station will comply with BS 3938 and BS 7626.

To make operation and maintenance easier the Contractor should propose a substation which is as similar as possible to the new substations recently installed at Aktau port , manufactured by Alstom company.

4.45 Items G4 & G5 : power cables on ferry terminal

The Contractor shall prepare the detailed design of power distribution on the ferry terminal territory, considering that all existing cables are out of order and following requirements of IEC 364 wiring standards.

New power cables shall ensure proper functioning and operation of :

- electric motors inside lifting towers
- lightening of the ramp, the piers and the railway station
- lightening of access road and parking areas (see item I5)

- traffic lights
- central control tower and railway control building

The Contractor shall lay all cables according to BS 3858.

4.46 Items H1 & H2 : pavement of parking areas

Drawing 27 shows two areas which shall be paved by the Contractor to provide parking spaces for road vehicles :

- a 6200 m2 area next to the ferry berth, for trucks and cars
- a 2300 m2 area next to the port entrance, mainly for trucks

These areas are already levelled. The Contractor shall build up pavement structures made of :

- 30 cm crushed stones (20 to 50 mm)
- 15 cm gravel asphalt (0.075 to 37.5 mm)
- 8 cm hot rolled asphaltic concrete

4.47 Item H3 : road accesses to the passenger terminal

Drawing 27 shows two access ways to the passenger terminal, to be built up by the Contractor :

- compaction of fill material* to build up two 1.5 m high ramps (9 m wide, 2 traffic lanes plus sidewalks)
- paving with asphalt concrete (same structure as for items H1 & H2)

* Suitable material for filling shall fulfil the following specifications :

- Ignition loss < 1%
- No content of lumps of silt or clay
- Max. 10% of particles with diameter < 0,075 mm
- Max. 50% of particles with diameter < 0,2 mm
- Coefficient of uniformity shall be U = d60/d10 > 1,75

4.48 Items H4 & H5 : renovation of access roads to the ramp and to the control tower

The road reaching the ferry ramp and the branch leading to the central control tower are covered with old asphalt pavements (new pavement starts at the toe of the slope connecting the ferry terminal to the dry cargo area - see drawing 27, 40 m south of symbol 8 -). Their condition is rather fair, but some cracks are visible.

The Contractor shall repair these two stretches by double bituminous surface treatment (DBST), complying with the French CCTG 26 Code of Practice :

- Cleaning of existing surface from debris, grease, dust and grass
- Drying the surface
- Applying an asphalt prime coat at the rate of 1.5 kg per square meter
- Applying double bituminous surface treatment (total thickness 2 cm)

4.49 Item I1 : water supply piping

The Contractor shall install a complete water supply piping system for the passenger terminal needs. Intake point will be the existing DN 150 mm pipe on the opposite side of the road, in front of the passenger terminal facade.

Pipe length will be 45 m, pipe diameter DN 100 mm.

Pipe shall be made of hot dipped galvanised steel (100 micron thick protection), coated with bitumen and fibre glass.

Item I1 only covers external piping. Internal piping is part of J1 and J2 items.

4.50 Item I2 : sewage water piping

The Contractor shall install a complete sewage water piping system for the passenger terminal needs. Discharge point will be the central pump station located in front of the port administrative building.

Pipe length will be 50 m, pipe diameter DN 300 mm.

Pipe shall be made of PVC and laid on compacted sand bedding.

Item I2 only covers external piping. Internal piping is part of J1 and J2 items.

4.51 Item I3 : rain water drainage networks

The Contractor shall install drainage networks collecting rain water from the following areas:

- access road to the ferry ramp (same stretch as for item H4, 90 m long, 530 m2)
- access road to the central control tower (same stretch as for item H5, 85 m long, 460 m2)
- new parking area next to the ferry ramp (6200 m2)
- access roads to the passenger terminal (760 m2)
- new parking area next to the port entrance (2300 m2)

Rain water from the first three areas shall be directed towards an oil separator, then discharged into the sea.

Rain water from the last two areas shall be discharged into the water drainage pipe located next to the administrative building.

Pipes will DN 100, made of PVC.

4.52 Item I4 : signals at road-rail crossing

The Contractor shall install road signals on both sides of the road-rail crossing located between the port entrance and the ferry terminal, 60 m south of the port gate.

Each signal shall consist of a red flashing light, an alarm bell and a lane barrier.

Signals shall be activated manually on site.

Detailed design shall be submitted by the Contractor to the Engineer's approval.

4.53 Item I5 : floodlighting masts

Part of the ferry terminal is already illuminated by lighting poles: the ramp, the piers and the railway tracks.

The Contractor shall install three new floodlighting masts to light up the areas which are not covered by existing poles:

- the new parking area next to the ramp
- the access road to the ramp (starting from the railway crossing)
- the accesses to the passenger terminal

New poles shall be of a similar type as those recently installed on the dry cargo terminal of ACSP:

- square tower made of hot dip galvanised steel, complete with ladders and rest platforms
- base protected by 1.5 m high concrete block
- tower height 20 m from ground to head platform
- single mass concrete foundation
- eight fittings per tower, each fitting equipped with a 1000 Watt lamp
- one photocell per tower, type Royce Thomson or equivalent, and manual override switch

Detailed characteristics and locations shall be submitted by the Contractor to the Engineer's approval.

4.54 Items J1 & J2 : refurbishing of passenger terminal

ACSP recently started to refurbish the passenger terminal in a basic and temporary way, according to the organisation scheme shown on drawing 28. The Contract shall cover the following additional works:

- renovation of materials covering floors, internal walls and ceilings
- renovation of internal lightening systems
- renovation of internal and external doors
- renovation of windows
- renovation of restrooms
- renovation of internal water supply and water sewage networks
- installation of fire-fighting equipment
- installation of a mechanical ventilation system
- supply and installation of air-conditioning units allowing to maintain highest temperatures below 25°C
- supply and installation of heating units allowing to keep lowest temperatures above 20°C

All colours and characteristics of materials shall be submitted by the Contractor to the Engineer's approval.

All materials and equipment shall comply with BS and BSI Codes of Practice.

4.55 Item J3 : supply of equipment for border control procedures

The Contractor shall supply and install the following equipment in the passenger terminal:

a. An internal computer network connecting the border control booths (symbol 4 on drawing 28), customs offices (symbol 6) and the border police office (symbol 12). Each room or booth shall be fitted with two Pentium II PC computers, one A4 laser printer and one UPS (total 12 computers, 6 printers and 6 UPS). All computers will be connected with the others by computer cables and fitted with an data-exchange software. Detailed specifications shall be submitted by the Contractor to the Engineer's approval.

b. Two baggage x-ray scanning machines comprising a tunnel (65 cm wide and 80 cm high), a conveyor belt (25 cm per second), a 15 inch screen colour monitor and a UPS.

4.56 Item J4 : Procurement of a shuttle bus

The Contractor shall supply a small shuttle bus which shall be used to transport passengers between the ferry and the passenger terminal.

The bus shall also be suitable for running on standard roads outside the port territory.

Capacity of the bus shall be at least 16 seats.

As an example, the Peugeot Boxer 350 LH diesel bus is suitable.

PART 2

TRAFFIC FORECASTS & DEMAND ANALYSIS

Traffic Forecasts & Demand Analysis

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Introduction

The objectives of this part of the study for the rehabilitation of the Aktau Ferry Terminal are to estimate the traffic forecasts for the coming years. The determination of traffic forecasts includes four steps:

First step: analysis of the economical situation and perspectives of the regions served by the port,
identify and estimate the capacity of the hinterland.

Second step : determine the economic perspectives of the region .

Third step: Analyse the modal split that determines the use of the ferry by shippers, taking into account alternative solutions and competitive routes for the main commodities involved.

Fourth step : analyse the present throughput of the port to obtain the level of demand,
determine the traffic forecasts.

1. The regional economic situation

This first step of the study will analyse the economic situation of Kazakhstan and of countries in the region such as Uzbekistan (landlocked), and the relevant Caucasus countries around the Caspian Sea : Azerbaijan, Georgia and Armenia.

1.1 Kazakhstan

Kazakhstan is a lower-middle-income country with a $ 1,310 GNP per capita.

The main export earnings are from oil and oil products, metals and manufactured products.

Kazakhstan has suffered from the collapse of the Russian economy as have the other CIS countries but Russia is still the main exporter provider and importer from/to the country accounting for approximately 85 % of the foreign trade.

The country has been hit by four main crises:

- The Asian crisis that resulted in lower exports of food and lower investments in the country as Asian countries are the first investors in Kazakhstan.
- The decline of oil and ore prices during the last three years as these raw materials are the main export products of the country.
- The crisis in Russia that has made Kazakh traders import Russian products at lower prices than those of the local production. The local industry has accordingly been seriously hit by an overflow of foreign imported goods.
- An exceptional drought in 1998, which reduced the grain production from an average 13 million tonnes to 7,5 million tonnes. From being an exporting country, Kazakhstan has become an importer.

As the export trade represents about 30 % of the GDP, after these crises the GDP decreased by 2,4 % in 1998 and the negative current account balance attained 6% of the GDP. This has resulted in an increase of the level of the external debt to US $ 5.8 billions, i.e. 27 % of the GDP.

In June 1999, the situation changed favourably due to the recovery in the international conjuncture and internal factors :

- oil prices increased and are still increasing;
- the grain crop was exceptionally high.

There are hopes for new investments in spite of the fact that the service of the debt will be high up to 2002. However recent investments in the oil industry and the development of the Tenghiz oil field suggest that Kazakhstan should be in a better situation in the next three years.

1.2 Uzbekistan

Uzbekistan, has a GNP per capita of $ 870 which is about 50 % of the average revenue of the lower-middle-income countries.

The main resource consists of cotton exported to Europe and the rest of the world : an average of 600,000 to 1 million tonnes is exported yearly from September to May.

Another resource is gold.

The level of imports varies and follows the level of exports so that as a result the deficit of the trade balance is limited. Thanks to this policy, the balance of payments is progressively recovering equilibrium after a deficit amounting to 4 % of the GDP.

In the last two years, the GDP increased by 1.9% and 3% respectively. Uzbekistan's economy is now recovering.

1.3 Caucasus Countries

a. Azerbaijan

Azerbaijan has been a producer of oil since the last century. In spite of this, it is classified as a low-income country as it has only a US $ 490 GDP per capita.

Exports comprise mainly oil and oil products and with new oil fields in production, exports were boosted from US $ 16 to 133 million in 1998. Unfortunately, these exports have decreased by 40 % from US $ 464 to 285 million recently and the country's total export values have declined as a result.

The high investment levels for oil production and imports of food have led to an increase of imports. This negative balance of trade has resulted in a balance of payments representing 35 % of the GDP.

The perspectives of recovery depend on oil exports and the international price thereof. The recent increase of oil prices will hopefully have a positive effect on the national economy which is suffering because of the political troubles in Caucasus countries.

b. Georgia

Georgia, located between Europe and Central Asia is turning more and more towards the West by opening up to foreign investments.

After the sharp downturn due to the collapse of the Russian economy (the GDP fell by 45 %, 29 % and 10 % respectively in 1992, 1993 and 1994), the Georgian economy started recovering in 1995. The GDP level is so low that the present 10 % growth rate cannot be considered as a high figure but only as a halt in the recession.

The debt is still 32 % of the GDP and the balance of trade is negative, but essentially, Georgia has entered a recovery period.

The main exports consist of black metals and chemical products. The ports of Poti and Batumi are transit ports for all Caucasus and Central Asia countries which makes Georgia a platform for external trade of oil producing countries thanks to pipelines covering the whole country and a railway network that serves Armenia and Azerbaijan.

c. Armenia

Armenia is also a low-income country with a US $ 480 GDP per capita (the same as in Azerbaijan). It has been hit by the collapse of Russian economy as have the other neighbouring countries and, in addition, by an earthquake and by the war.

External trade is the main component of Armenia's GDP but the dramatic decrease of exports and the high level of food imports and of basic commodities has made the balance of trade negative. The deficit of the current account balance has reached 18 % of the GDP and is becoming an increasing burden. The economy will take some time to recover.

2. The hinterland

The hinterland is that part of the country or region that is essentially dependent on the land-transport network and the geographical position of the port against the major trade routes.

According to previous Traceca studies, characteristics and constraints of land transport are the following:

- the road networks exist but are in bad condition and cannot cope with an intensive long distance traffic of trucks and trailers on an economical basis;
- frequent controls and procedures on roads result in a low road traffic capacity;
- there is a very strong tradition of rail transport which is the most effective and best organised mode of transport in Central Asia in spite of the difficulties resulting from the multiple-border-crossings inherited from the past.

The Regional Traffic Database and Forecasting Model (WS Atkins International – 1997) shows that railways carried 92 % of imports and 97 % of exports to and from Kazakhstan in 1996. The most recent figures for the last 10 months show that the situation has remained the same.

Accordingly, the railway network will be considered as the only reliable mode for long distance transport.

Aktau is linked by railways:

- directly to East Kazakhstan, Uzbekistan and Kyrgyzstan;
- indirectly via Russia to North Kazakhstan, yet a new railway will be built to by-pass Russia in the next few years.

Therefore, according to this criteria, the hinterland of the port of Aktau consists mainly of Kazakhstan, Uzbekistan and Kyrgyzstan.

3. Economic perspectives in the region

3.1 General situation

Most of the countries in the hinterland of Aktau are in the process of economic recovery thanks to external factors such as:

- an increase of oil and raw materials prices;
- an increase in foreign investments;
- the discovery of huge reserves of oil - estimated at 16 to 32 billions barrels (the same level as that of the reserves in the USA and in the North Sea) - and gas in Kazakhstan, Turkmenistan, Uzbekistan and Azerbaijan.
- the present expansion period of the clients of Central Asia countries, Iran, Turkey and South Europe (more particularly Iran with huge reserves of oil and the South European countries in the EU).

In spite of their low purchasing power, the GDP of the countries in the hinterland of Aktau may sharply increase when the new oil fields are exploited.

3.2 Development scenarios

a. Basic assumptions

Most economic observers agree that the main difficulties in increasing the GDP are the level of the debt in the countries and the varying prices of raw materials.

Three development assumptions will be examined to forecast trade and GDP, namely:

- Pessimistic (Low) Assumption A1:

International oil prices decline within the next two years because of a decrease of the growth rate in OECD countries and the opening or reactivation of oil fields (we refer to oil world market: 11 USD per barrel in June 1999, 21 USD in December 1999, 27 USD in February 2000).
Simultaneously, the grain crops are low and Kazakhstan is self-sufficient but has no surplus to export.

There is a recession period and the average yearly growth rates of GDP and external trade are respectively 2 % and 3 % (in developing countries external trade usually grows a bit faster than GDP does).

- Optimistic (High) Assumption A2:

Oil prices go on increasing or stabilising at the present high level.
Prices of other minerals also stay high thanks to the high level of growth in OECD countries in the next 5 years.
This increase solves the problems of the external debt after 2 or 3 years and the capacity of the hinterland countries to import increases likewise.
In this optimistic assumption, the average yearly growth rates of GDP and international trade will respectively be 5 % and 7 %.

- Reasonable (Medium) Assumption A3:

The production of oil and gas increases and boosts the export earnings even though oil prices do not attain very high levels.
Hinterland countries experience difficulties to reimburse their debts and cannot increase their imports as much as their exports. However the increase of GDP per capita leads to new investments and needs for imported consumption goods as has happened in countries where new sources of income have appeared.
In this assumption, the average yearly growth rate of GDP is 2% for the next five years (thanks to important investments from abroad) and 4 % afterwards. Accordingly, the external trade increases by 3% for the next 5 years (mainly import of equipment goods) and 6% afterwards with a higher degree of diversification of import goods.

b. Transport assumptions

The three assumptions have different consequences in terms of tonnages to transport:

- Pessimistic (Low) Assumption A1:

Export tonnages increase thanks to oil exports and imports of equipment goods but the effects of this new wealth do not spread over all economic sectors and other imports will not increase.

Only equipment goods traffic will increase but not that of general cargo.

- Optimistic (High) Assumption A2:

The export tonnages increase manifold thanks to oil, raw materials and metal exports while imports are boosted by equipment goods (machinery, vehicles, building materials) and consumption goods (food, housing equipment, textiles).

This means that the countries will export bulk cargo and import more and more general cargo.

- Reasonable (Medium) Assumption A3:

Export tonnage (mainly oil) increases at a high rate at the very beginning of the period while only imports of equipment goods increase during the next 5 years.

Afterwards, exports increase slowly but imports of consumer goods increase at a fairly high rate after higher incomes have spread to all consumption sectors.

To summarise, the general structure of imports and exports in the hinterland will somewhat change compared to the present situation due to the following factors:

- a geographic diversification of exports and imports (less oriented towards Russia though this trade will still be dominant);
- an increase of oil exports;
- an increase in imports of equipment generated by new investors in the oil production field and of other industries due to the recovery of the economy in a first phase;
- an increase of general cargo imports due to the increase of purchasing power in a second phase;
- the intra-trade : trade between the countries located around the Caspian Sea is not intensive as national productions are not complementary (production was formerly oriented towards providing the Russian industry).

From the transport point of view, this means that containerised traffic could increase because of the opening of the TRACECA countries to the western economy and the development of modern logistic methods and consequently, containerisation of exports could also increase to avoid the return of empty containers. The local traffic (intra-trade) across the Caspian Sea will remain low. Ships sailing in the Caspian Sea will carry more transit international cargo than regional cargo.

3.3 The present potential market

Present trade susceptible to be transported on the TRACECA corridor crossing the Caspian Sea has been estimated based on the trade and land-transport network assumptions above.

It consists mainly of exports and imports between:

- Kazakhstan and Uzbekistan on the one hand (the Aktau hinterland);
- and Azerbaijan, Armenia, Georgia, Iran, Turkey and Southern Europe on the other (the targeted area).

The attached table "feuil 4" shows that the total imports and exports of Kazakhstan and Uzbekistan from and to the targeted area were about 0.4 and 0.8 million tonnes respectively (excluding oil according to the figures of the external trade in 1996).

3.4 New opportunities for the market

New opportunities concern the main commodities transiting through the port of Aktau.

a. Oil, Gas and Mud and Equipment for drilling operations

Oil

There are many changes in the oil sector including:

- the exploitation of new oil fields (Tenghiz);
- the intensive investigations in the regions of Aktau and Atyrau;

- recent decisions to build or complete pipelines:
    - between Kazakhstan and Black Sea (Novorossirsk);
    - between Baku and Supsau;
    - between Baku and Mediterranean Sea in Turkey;
- the capacities of the pipelines are limited by two factors:
    - the Russian pipelines are used by Kazakhstan exporters when Russia does not need them but any increase of Russian exports will limit the availability for additional exports from Kazakhstan;
    - The Baku / Supsau pipeline is limited to 7 million tonnes per year.

An alternative solution, in case of limitation of access to Europe by pipeline, is rail transport to the Black Sea or the Mediterranean Sea via the port of Aktau (a route already exists between Baku and Poti). Crude oil can then be either carried on tankers from Aktau to Baku or carried on rail ferry from Aktau to Baku.

Additional export of oil could reach 2 million tonnes by sea transport using the Caspian Sea.

Gas

Gas has not been exported yet because there is no pipeline. A US company is studying the feasibility to carry liquefied gas in containers.

Mud and equipment for drilling operations

The need of equipment and mud for drilling operations will change the logistic needs of the oil companies. About 100 tonnes of mud are imported per month from the Middle East and containers of equipment are imported from the USA via Rotterdam and the Russian railways but there is a demand from the oil producers for a southern route (TRACECA).

Some of the projects will not be completed within the near future but there is a possibility for sea transport using the Caspian Sea and imports of mud could reach 1,200 tonnes.

b. Sulphur

Sulphur is produced during the process of oil extraction and can be exported to Azerbaijan for its chemical industry; the needs are estimated to 10 / 15,000 tonnes per year.

c. Cotton

Cotton exported from Uzbekistan is carried to the East Asian market through the Iranian road network to the port of Bandar Abbas (400,000 tonnes) and the remaining 200,000 tonnes are exported via the Russian network to Northern European ports. The traders are located in Northern European ports but the factories are situated in Southern European countries (Italy, Spain, Portugal).

New agreements between Traceca countries will facilitate transport and customs procedures and will make the Traceca corridor more attractive.

The transport potential is estimated by the traders and freight-forwarders at a minimum of 50,000 tonnes per year.

The good relationship between the Uzbek and Kazakh railway companies makes the northern corridor of Traceca more attractive than the Southern corridor via Turkmenbashi.

d. Fresh food and foodstuffs

Fresh food and foodstuffs are produced in Azerbaijan, whereas the Aktau region is dry and not favourable for agriculture. The new ferry service organised by the Caspian Shipping Company (CSC) makes Kazakhstan easy to access for the Azeri farmers.

It is expected that about 20,000 tonnes of fresh fruit, vegetables and other food and deep-frozen cargo will be imported. A Swiss exporter of dairy products has recently mentioned that he is willing to enter the Central Asia market as soon as it is possible to containerise cargo and to move it from door to door.

Therefore, there may be a potential trade of about 20,000 to 40,000 tonnes of additional foodstuff and housing equipment if cargo can be containerised and/or carried from door to door in trucks for distribution on short distances.

e. Grain

Volumes of grain exports vary according to the climate. The resulting price fluctuations on the international market determine the countries of origin and destination of the trade.

Kazakhstan has signed agreements with Iran and Azerbaijan to supply up to 100,000 tonnes of grain per month. Aktau is the port best located for this traffic.

3.5 Conclusion

Several new trade opportunities for the port of Aktau will develop very soon, both for exports and imports.

The following table summarises these opportunities in addition to the traditional traffic of minerals, metal and oil.

Traffic opportunities for ACSP

Products	Routes	Yearly Quantities
Oil	Aktau port	Addit. 2,000,000 tonnes *
Oil industry equipment	import via Baku port	10,000 tonnes (40 % containerised)
Mud	import via Baku port	1,200 tonnes
Sulphur for the chemical industry	export to Azerbaijan	10 to 15,000 tonnes
Cotton	export from Uzbekistan to Baku port	50,000 tones
Fresh and deep frozen food	import via Baku port	20 to 40,000 tonnes
Grain	export to Iran and Baku port	up to 1,000,000 tonnes

* Only in exceptional cases

The question is to determine the volume of cargo that could be loaded on the ferry between Aktau and Baku. The modal split in trade helps to analyse the problem.

4. The modal split in transport

After determining the potential market, the modal split will determine the market for the ferry terminal and the opportunity to use it for handling both train and trucks or only trucks.

The answer depends on the type of cargo and packaging (liquid bulk, dry bulk, containerised or not).

The following modal split is mainly a result of discussions with Kazakh freight-forwarders.

4.1 Aktau at the cross-roads

The port of Aktau is at the cross-roads of the following trade routes:

- East-Kazakhstan and Kyrgyzstan / Caucasus Republics and Iran;
- North-Kazakhstan / Caucasus Republics and Iran;
- Uzbekistan / Caucasus Republics and Iran;
- South-west Russia / Iran.

These routes lead to other regions:

- Iran is a land bridge between Central Asia on one hand and the Indian Ocean and the Far East on the other end, where the demand for cotton and metals is high;
- the Caucasus region is the gateway to the Black Sea, Iran, Turkey and Southern European countries where the demand for raw materials such as cotton, grain, and metals is high.

However, the port of Aktau has to compete with other ports as there are competitive routes:

- North Kazakhstan trade can be carried to the Caucasus directly by train via the line following the Caspian Sea coast and Astrakhan. But this route is part of the Russian network and implies multiple border crossings. Nowadays, this link is not working because of the war in Chechnya. Therefore, for the time being, the route via Aktau is the best one;

- the Uzbekistan trade can be transported to the Caucasus via Turkmenistan and Turkmenbashi port, while exports to Iran are carried by road;

- Astrakhan is better situated than Aktau for the trade of South-western Russia to Iran but troubles in this region could be favourable for Aktau.

Considering that, in spite of the inter-States agreements, border crossings will still be a major difficulty as they are now, the natural hinterland or captive hinterland for Aktau consists of:

- the whole of Kazakhstan;
- Uzbekistan.

As far as Uzbekistan is concerned, this land-locked country cannot depend on only one route for its external trade for strategic reasons.

Though the route through Turkmenistan is shorter as regards distance, contrary to other countries, the Turkmen Government has not yet signed the Agreement for the facilitation of procedures for trade along the TRACECA route.

All this information has convinced the transport specialists such as freight-forwarders that Uzbekistan will use the Kazakhstan route for part of their trade to the Caucasus and Southern Europe.

It can therefore be said that, as well as the Caucasus, Iran, Turkey and Southern Europe, Kazakhstan and Uzbekistan are the main providers of trade for the TRACECA route.

4.2 Transport modes

a. Rail transport

The railway is dominant and is traditionally the best mode of transport:

- in spite of the difficulties, it is organised and well suited to the winter conditions and long distances;
- moreover, it reduces the problems encountered when crossing borders and all the way to the point of destination;
- most of the industries and mine fields are directly connected to the railway network thus avoiding double handling;
- it is the best mode of transport for bulk and heavy cargo, which is the case in Kazakhstan.

b. Road transport

Road transport is good over short distances and for small loads but has to cope with many controls all along the roads and at the borders. The only established transport along roads is the trade with Iran because there is so far no easy access to the Iranian railway network.

c. Sea Transport

The Baku to Aktau shipping route is part of the Northern Traceca corridor that is considered nowadays to be one of the best routes for export and import of Central Asia to and from Southern European countries. Therefore, perspectives are favourable for the development of this route provided that improvements are done on bottlenecks such as the Aktau Ferry Terminal.

4.3 Packaging

Containerisation in Kazakhstan is in its infancy with no longstanding tradition or experience. Existing transport equipment is not suitable to containerisation. Most land terminals are obsolete, container wagons are insufficient and the tracking of rail cars and containers is poor.

4.4 Commodities vs. transport modes

a. Oil

Some oil fields are located far from existing pipelines and producers are obliged to use the train (last year 1.5 million tonnes were transferred to Aktau by train).

In winter viscous oil has to be heated to be loaded / unloaded into/from tankers, this increases the logistical costs.

An alternative is to carry oil in rail-cars as it is done in Azerbaijan, Armenia and Georgia and then load the rail-cars on the ferries. This solution could be an alternative in case of a interruption in the pipeline flow or if the export volume of oil exceeds their capacity.

For strategic reasons, this solution should be made possible by Aktau Port and the CSC. Tonnage would be limited by the capacity of the ships and this solution should be considered only in case of emergency.

b. Grain

The handling of bulk cargoes in ports is economical providing the equipment is efficient and the volumes high. For the time being, the port of Aktau is equipped with modern handling facilities but the traffic is low.

For small shiploads, the railway from door to door is a better alternative.

Massive exports should be handled at the dedicated grain terminal in the port.

The capacity of the existing ferry limits the carriage of wagons and therefore the volume of grain exported to between 20,000 and 30,000 tonnes per year.

c. Other bulk commodities (sulphur, ores)

This bulk is subject to the same problems as for grain handling.

The maximum traffic would be 10 to 15,000 tonnes. This quantity could be attained if Azerbaijan develops its chemical industry.

d. Metal

Metal is exported in coils; it is typical cargo for conventional general cargo ships and is not adapted to ferry vessels.

e. Cotton

Cotton creates several problems:

- Importers prefer containerisation while exporters or their freight-forwarders prefer complete rail cars of cotton (any change to this situation will be difficult).
- Most European traders are located in Northern European ports, where cotton is stored before it is sold. Storage implies control of the quality and unstuffing the rail wagons and container-handling is not a convenient alternative in this case.
- The absence of traders in Mediterranean ports makes the Russian route to the Northern Sea and Baltic ports easier than others.

- The Uzbekistan exporters prefer to diversify the ways of transport so that they can adapt to any situation. They will continue to use the Iranian corridor, Turkmenbashi port and ferries to Baku port, the Russian and Baltic ports and at last the Aktau – Baku shipping line.
  From discussions with exporters, approximately 20 % of the export volume is free for other destinations than Bandar Abbas and Northern European ports, i.e. about 120,000 to 200,000 tonnes. A reasonable hypothesis is that 50 % is sent via Traceca and shared evenly between the Aktau and Turkmenbashi corridors (30 to 100,000 tonnes each according to the production).

- If the first experiments of containerisation of cotton in 40 foot containers (23.5 tonnes of cotton each) are cost effective, they might be generalised.
  In this case, the price of handling in Aktau will influence the choice of the ship:
  - either a containership carrying 60 to 80 boxes with transhipment from rail to ship;
  - or the ferry loading the train directly but with a limited capacity of only 28 rail cars (28 forty foot containers).

- If the exporters prefer to continue carrying cotton in specialised 50 tonne wagons, Aktau ferry terminal will be used provided that the ferry terminal and the ferry are equipped to handle rail cars.

f. Mud for drilling operations

The importers prefer train transport to truck transport because the train is safer and easier to control. If the ferry can load the rail cars, the market is estimated to be about 1,200 tonnes per year. However, if trains cannot be loaded trucks could be used.

g. Other goods

Vehicles, small parcels, equipment for the oil industry, food in containers on trucks are typical cargoes for the ferry. This new ferry service will create new traffic as it has in other ports by cumulative effect.

In conclusion, packaging assumptions are as follows:

Packaging assumptions by commodities

Packaging Assumption	General Cargo	Cotton	Oil and Oil Products	Grain
P 1	road + ferry	train + ferry	rail + ferry*	rail + ferry
P 2	road + ferry	container + ferry	pipeline or tankers	rail + ferry
P 3	road + ferry	containership	pipe line or tankers	silos + bulk carrier

* in exceptional cases only

5. Existing traffic in the port of Aktau

5.1 The geographical situation

Aktau is located on the shore of the Caspian Sea at the western end of Kazakhstan, facing the CIS, Azerbaijan and Iran. In this area, the Caspian Sea is the «Mare Nostrum» of Central Asia by its strategic location.

5.2 Present traffic in the port of Aktau

In 1998, the traffic of Port of Aktau was a little less than 2.2 million tonnes and it is anticipated to increase to 2.5 million tonnes in 1999.

The port handles mainly export cargoes and about 30 thousand tonnes of equipment, general cargo and food containers.

The main commodities handled in the port are:

- Crude oil (80 %) = 2.0 million tonnes exported from the oil fields located in North West Kazakhstan;
- Ores (8 %) = 0.2 million tonnes from North Kazakhstan;
- Metals (6%) = 0.15 million tonnes from the Karaganda region;
- General cargo (6%) = 0.15 million tonnes from the industrial regions.

The major destinations of the export goods are Iran, Azerbaijan and further destinations via the port of Baku.

Detailed figures are given in the following table.

Port traffic has increased from 0.7 million to 2.5 million tonnes in the last four years due to the dramatic increase of oil exports, but the traffic volume is still less than in 1992, when it was almost 3 millions tonnes.

Exports of copper ore and metals have averaged respectively 200,000 and 180,000 tonnes for the last five years.

Container and general cargo traffic is low. It consists mainly of imports of goods for the oil industry, along with food and vehicles.

The main function of the port of Aktau is to export bulk cargo.

In 1996 the traffic of the port of Aktau was 25,000 tonnes of imports and 520,000 of exports, excluding oil (see further). This means that the market share of the port of Aktau was 66 % of the exports and only 6 % of the imports of the hinterland comprising Kazakhstan and Uzbekistan.

The port of Aktau can therefore increase its market share and its traffic throughput according to the evolution of the market in the next five to ten years.

Between June 1999 and February 2000 the ferry crossing between Baku and Aktau carried the following cargoes:

- trucks fully loaded (about 4,500 tonnes);
- 3600 passengers.

An average of 90 tonnes of imports, 70 tonnes of exports and 160 passengers were handled in the ferry terminal at each voyage.
Import cargoes consisted of foodstuff originating from Azerbaijan (80%) and equipment from western Europe transported across Caucasus (20%). Exports were empty trucks shipped back to Azerbaijan, construction material from Aktau area and metal from Karaganda factories; all destinations remained within Caucasus.

This traffic is still weak because of two main reasons:

- the ship has been operated for only 7 months (traffic was halted in December and in January) and only the local merchant/truckers know the existence of this new service (no real marketing action has yet be undertaken);

- rail cars cannot be loaded on the ferry (neither the ramp nor the ship can handle rail cars for the time being). This is a major constraint because long haul carriage is essentially performed by train.

Therefore, for the time being, the ferry service between Baku and Aktau ensures traffic between Caucasus countries and the region of Aktau only.

Traffic is accordingly limited to food, household equipment and building materials between two regions in which the purchasing power is very limited.

The traffic analysis of the last few years in the port of Aktau does not mean that the perspectives will follow the same trend as in the past as the economic situation is evolving fast in the hinterland thanks to changes of structure in the economy and the newly discovered or exploited oil and gas fields.

6. Ferry traffic forecasts

6.1 Scenarios

Traffic scenarios will be defined based on combining the three assumptions of economic development in the hinterland and the three packaging assumptions.

Evaluating the feasibility of the investment does not imply analysing all the possible scenarios but to select contrasted scenarios so as to estimate the risk of the investment. Therefore, we have selected the following three scenarios:

a. Scenario 1 (the most pessimistic one : A1 + P3)

- The economic development in the hinterland is low.
- Liquid bulk and dry bulk are carried on tankers (or by pipe line) and bulk carriers.
- Cotton is containerised and loaded aboard containerships.
- Only general cargo and vehicles will use the ferry.

b. Scenario 2 (the most optimistic one : A2 + P1)

- The economic development in the hinterland is high.
- Liquid bulk is carried on tankers or pipelines.
- Grain is carried by train on the ferry.
- Cotton is not containerised and uses the ferry.
- General cargo and vehicles use the ferry.

c. Scenario 3 (the reasonable scenario : A3 + P2)

- The economic development is irregular and not so high.
- Liquid bulk is loaded on tankers and pipelines.
- Small shiploads of grain and dry bulk are transported by ferry.
- Cotton is containerised and loaded on the ferry.
- General cargo and vehicles are loaded on the ferry.

6.2 Capacity constraints

The increase of traffic is limited to the maximum capacity of the shipping line in the three scenarios.

The maximum annual capacity of the line may be estimated as follows:

The ferry can sail twice a week	=	100 round trips a year
Maximum mix shipload 20 rail cars x 50 t	=	1,000 tonnes
5 trucks x 20 t	=	100 tonnes
10 cars	=	10 tonnes
Annual capacity at 70 % utilisation	=	70, 000 tonnes southbound (35, 000 t if one weekly trip only)
	=	70, 000 tonnes northbound (35, 000 t if one weekly trip only)

6.3 Ferry terminal traffic forecasts

The traffic has been estimated for the next 5 and 10 years.

The following table summarises the results of the simulation for 2005 and 2010.

(Detailed figures are in attached tables)

a. Export Traffic Forecast 2005 – 2010

Main Export Commodities	Transport Modes	Traffic in tonnes 2005	Traffic in tonnes 2010
Pessimistic Scenario			
Grain	Rail cars	0	0
Brimstone (Sulphur)	Rail cars or trucks	6 000	7 000
Cotton	Rail cars	0	0
	In 40′ containers	0	0
Other	Trucks	2 400	2 800
	Cars	600	700
Total Exports		**9 000**	**10 500**
Optimistic Scenario			
Grain	Rail cars	22 000	25 000
Brimstone (Sulphur)	Rail cars or trucks	8 000	11 000
Cotton	Rail cars	7 500	10 500
	In 40′containers	0	0
Other	Trucks	12 000	16 800
	Cars	700	1 000
Total Exports		**50 200**	**64 300**
Reasonable scenario			
Grain	Rail cars	3 000	3 000
Brimstone (Sulphur)	Rail cars or trucks	7 500	10 500
Cotton	Rail cars	0	0
	In 40′containers	7 500	10 500
Other	Trucks	2 000	2 500
	Cars	600	800
Total Exports		**20 600**	**27 300**

(figures have been rounded and can be slightly different from those of the detailed tables)

b. Import Traffic Forecasts 2005 – 2010

Main Export Commodities	Transport Modes	Traffic in tonnes 2005	Traffic in tonnes 2010
Pessimistic scenario			
Mud for oil industry	Rail cars or trucks	1 200	1 200
Equipment	Containers on ferry	15 000	21 000
Food & housing	Trucks & rail cars	12 000	13 800
Other	Trucks cars	0 600	0 700
Total Imports		**28 800**	**36 800**
Optimistic Scenario			
Mud for oil industry	Rail cars or trucks	1 200	1 200
Equipment	Containers on ferry	17 800	28 500
Food & housing	Trucks & rail cars	15 000	21 000
Other	Trucks cars	0 800	0 1 000
Total Imports		**34 800**	**51 700**
Reasonable scenario			
Mud for oil industry	Rail cars or trucks	1 200	1 200
Equipment	Containers on ferry	17 800	28 500
Food & housing	Trucks & rail cars	12 300	16 400
Other	Trucks Cars	600 600	800 800
Total Imports		**32 500**	**47 700**

(figures have been rounded and can be slightly different from those of the detailed tables)

c. Global Traffic Forecasts 2005 – 2010

Scenarios **Years**	**2005**	**2010**
Pessimistic scenario	37 800	47 300
Optimistic scenario	85 000	116 000
Reasonable scenario	53 000	75 000

In the optimistic scenario, two weekly crossings are needed to cope with the forecasted traffic

These figures may be compared with recent traffic data of ferry traffic between Baku and Turkmenbashi: 700,000 tonnes per year, both ways (each ferry terminal is fitted with two berths).

d. Passenger Traffic Forecast 2005 – 2010

Total Passengers In and Out	2005	2010
Pessimistic scenario	3 800	4 500
Optimistic scenario	4 800	6 700
Reasonable scenario	4 800	6 700

The ship-owner of the ferry is more concerned by the number of vehicles than the quantities loaded and unloaded. Therefore number of rail cars, trucks and cars that will be carried onboard the ferry, has been estimated assuming that the average shipload is 50 tonnes for a rail car and 20 tonnes for a truck. Accordingly, the following table shows the number of rail cars, trucks and cars loaded aboard the ferry in 2005 and 2010, according to the scenarios.

e. Number of Vehicles in 2005 and 2010

Scenarios / Modes	Rail Cars		Trucks		Cars	
years	2005	2010	2005	2010	2005	2010
Pessimistic	563	722	418	484	1 194	1 384
Optimistic	1 279	1 723	975	1 368	1 500	2 100
Reasonable	858	1 242	430	576	1 230	1 644

The number of vehicles includes loaded vehicles only.

This traffic can be carried on the basis of one trip per week except in the optimistic scenario. However, the imbalance of the trade implies that about 50 % of rail cars and trucks will have to be brought back empty. It is thus relevant to assume that the ferry will sail twice a week in order to cope with the demand for both the fully loaded and the empty vehicles.

The fact that it is impossible to use the same types of rail cars for exports of cotton, of grain and for import of containers contributes to this imbalance.

The shipping aspect of this study will analyse the conditions for the success of the shipping line taking into account this problem of trade imbalance.

Attachments:

- Central Asia Map
- Feuil 4 table
- Feuil 1 table
- Feuil 3 table
- Feuil 5, Feuil 6 and Feuil 7 tables

1996 Potential Market Uzbekistan & Kazakhstan				GRAIN	COTTON TEXTILES	ORES METALS	OIL MINERALS	CONST. MAT.	DRY BULK	VEHICLES	OTHERS
	TOTAL	TOTAL without oil		1	2	3	4	5	6	7	8
TOTAL IMPORT	**560 652**	**421 362**		82 497	18 278	32 206	104 781	19 287	5 779	10 936	210 553
From Traceca	24 884	8 920	O	1 392	85	1 009	15 964	1 878	12	2 792	1 752
From no-Traceca	535 768	412 442	F	81 105	18 545	37 727	123 326	20 462	6 400	8 484	239 719
TOTAL EXPORT	**1 127 787**	**785 573**	W	154 274	97 767	505 889	342 214	3 322	20 717	147	3 457
To Traceca	130 520	40 671	H I C H	32 044	254	6 264	89 849	1 163	184	35	727
To no-Traceca	997 267	744 902		122 230	97 513	499 625	252 365	2 159	20 533	112	2 730
TOTAL POTENTIAL MARKET	**1 688 439**	**1 206 935**		236 771	116 045	538 095	446 995	22 609	26 496	11 083	214 010
TRACECA CAPTIVE	155 404	49 591		33 436	339	7 273	105 813	3 041	196	2 827	2 479
NO TRACECA	1 533 035	1 157 344		203 335	116 058	537 352	375 691	22 621	26 933	8 596	242 449

Source: WS Atkins 1997

Port of Aktau - Past Traffic (tonnes)								
	1992	1993	1994	1995	1996	1997	1998	1999
IMPORT								**est.**
Liquid bulk	0,0	0,0	0,0	5,0	16,7	5,6	15,6	
Edible oil				4,6				
Diesel				0,4	16,7	5,6	15,6	
Dry bulk	0,0	0,0	0,0	0,0	5,2	9,0	0,0	6,3
grain								
Coal; coke					5,2			
ores						9,0		6,3
containers	0,0	0,0	0,0	3,9	1,6	3,1	9,0	0,6
full TEU				70,0	150,0	35,0	90,0	6,0
empty TEU								
tonnage				3,9	1,6	3,1	9,0	0,6
Break bulk gen cargo	0,7	0,0	2,0	7,5	2,3	3,4	7,4	4,6
Equipment & machinery	0,7		2,0	0,6	1,9	0,9	7,4	2,6
Chemicals				6,3	0,4	2,5		
Other				0,6				2,0
TOTAL IMPORT	0,7	0,0	2,0	16,4	25,8	21,1	32,0	11,5
AKTAU PORT								
EXPORT	1992	1993	1994	1995	1996	1997	1998	1999
								est.
Liquid bulk	2 929,9	1 189,0	959,6	184,7	184,7	867,9	1 815,3	2 000,0
Crude oil	2 929,9	1 189,0	959,6	142,0	100,7	867,9	1 815,3	2 000,0
oil products				42,7	84,0			
Dry bulk	0,0	52,1	67,8	191,9	249,7	236,5	165,4	225,0
grain		2,5		2,3	16,4	10,7	27,9	9,0
Copper ore		49,6	67,8	189,6	230,4	225,8	137,5	205,0
Coal, coke					2,9			11,0
containers	0,0	0,0	1,0	3,5	1,7	1,5	0,2	0,2
full TEU (estimate)			100	350	170	150	20	20
empty TEU (estimate)								
tonnage			1,0	3,5	1,7	1,5	0,2	0,2
Break bulk gen cargo	6,3	49,6	72,7	202,2	237,2	262,5	143,1	184,7
Metals	6,3	1,0	10,7	169,2	222,2	224,4	137,0	159,0
Chemicals			4,9	12,6	9,3	35,2	5,6	10,7
Equipment		19,6	0,1	0,1	0,2	0,0	0,1	1,7
Timber					1,5	1,4		0,3
Other		29,0	57,0	20,3	4,0	1,5	0,4	13,0
TOTAL EXPORT	2 936,2	1 290,7	1 101,1	582,3	673,3	1 368,4	2 124,0	2 409,9
GENERAL TOTAL	2 936,9	1 290,7	1 103,1	598,7	699,1	1 389,5	2 156,0	2 421,4

Aktau Ferry Terminal		
	1999	**1999 - 2000**
	5 months	**7 months**
	(June - October)	(June - February)
Liquid bulk		
oil products		
Dry bulk		
grain		
containers		
full TEU		
empty TEU		
Break bulk / gen. cargo		
trucks in	1 520,0	2 120,0
trucks out	1 196,0	1 680,0
rail cars in		
rail cars out		
TOTAL TONNAGE	**2 716,0**	**4 500,0**
ROAD VEHICULES	2 716,0	4 500,0
RAIL CARS		
TOTAL PASSENGERS	**2 283,0**	**3 600,0**
IN	1 280,0	1 900,0
OUT	1 003,0	1 700,0

AKTAU PORT	SCENARIO :		most optimistic			TRAFFIC FORECAST in thousands tonnes								
FERRY TERMINAL	RATE	RATE	BASE	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
TRANSIT	to 2004	after 2004												
Liquid bulk			**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
oil products export only in case of emergency			0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Dry bulk			**26,2**	**27,0**	**27,7**	**28,5**	**29,4**	**30,3**	**31,2**	**32,2**	**33,2**	**34,3**	**35,4**	**36,6**
grain export	2%	2%	20,0	20,4	20,8	21,2	21,6	22,1	22,5	23,0	23,4	23,9	24,4	24,9
mud import	0%	0%	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
sulphur export	7%	7%	5,0	5,4	5,7	6,1	6,6	7,0	7,5	8,0	8,6	9,2	9,8	10,5
Containers			**10,0**	**11,0**	**12,1**	**13,3**	**14,6**	**16,1**	**17,7**	**19,5**	**21,4**	**23,6**	**25,9**	**28,5**
full TEU - equipment import	10%	10%	10,0	11,0	12,1	13,3	14,6	16,1	17,7	19,5	21,4	23,6	25,9	28,5
full TEU - cotton export	7%	7%	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Break bulk / gen. cargo			**23,0**	**24,6**	**26,3**	**28,2**	**30,1**	**32,3**	**34,5**	**36,9**	**39,5**	**42,3**	**45,2**	**48,4**
food/bever/housing equip. (Import)	7%	7%	10,0	10,7	11,4	12,3	13,1	14,0	15,0	16,1	17,2	18,4	19,7	21,0
cotton in rail cars (export)	7%	7%	5,0	5,4	5,7	6,1	6,6	7,0	7,5	8,0	8,6	9,2	9,8	10,5
others	7%	7%	8,0	8,6	9,2	9,8	10,5	11,2	12,0	12,8	13,7	14,7	15,7	16,8
trucks IN			**5,0**	**5,4**	**5,7**	**6,1**	**6,6**	**7,0**	**7,5**	**8,0**	**8,6**	**9,2**	**9,8**	**10,5**
trucks OUT			**8,0**	**8,6**	**9,2**	**9,8**	**10,5**	**11,2**	**12,0**	**12,8**	**13,7**	**14,7**	**15,7**	**16,8**
rail cars IN			**16,2**	**17,6**	**19,0**	**20,6**	**22,4**	**24,3**	**26,4**	**28,7**	**31,2**	**34,0**	**37,0**	**40,3**
rail cars OUT			**30,0**	**31,1**	**32,3**	**33,5**	**34,8**	**36,1**	**37,5**	**39,0**	**40,6**	**42,3**	**44,1**	**45,9**
cars	7%	7%	**1,0**	**1,1**	**1,1**	**1,2**	**1,3**	**1,4**	**1,5**	**1,6**	**1,7**	**1,8**	**2,0**	**2,1**
TOTAL TONNAGE			**60,2**	**63,6**	**67,3**	**71,3**	**75,5**	**80,1**	**85,0**	**90,2**	**95,9**	**102,0**	**108,6**	**115,6**
ROAD VEHICULES			**650**	**696**	**744**	**796**	**852**	**912**	**975**	**1044**	**1117**	**1195**	**1279**	**1368**
RAIL CARS			**924**	**973**	**1026**	**1082**	**1143**	**1208**	**1279**	**1355**	**1437**	**1525**	**1620**	**1723**
CARS	7%	7%	**1000**	**1070**	**1145**	**1225**	**1311**	**1403**	**1501**	**1606**	**1718**	**1838**	**1967**	**2105**
TOTAL PASSENGERS			**3200**	**3424**	**3664**	**3920**	**4195**	**4488**	**4802**	**5139**	**5498**	**5883**	**6295**	**6736**
IN	7%	7%	1600	1 712	1 832	1 960	2 097	2 244	2 401	2 569	2 749	2 942	3 147	3 368
OUT	7%	7%	1600	1 712	1 832	1 960	2 097	2 244	2 401	2 569	2 749	2 942	3 147	3 368

AKTAU PORT	SCENARIO :		most pessimistic			TRAFFIC FORECAST in thousands tonnes								
FERRY TERMINAL	RATE	RATE	BASE	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
TRANSIT	to 2004	after 2004												
Liquid bulk			**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
oil products export only in case of emergency			0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Dry bulk			**6,2**	**6,4**	**6,5**	**6,7**	**6,8**	**7,0**	**7,2**	**7,3**	**7,5**	**7,7**	**7,9**	**8,1**
grain export	2%	2%	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
mud import	0%	0%	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
sulphur export	3%	3%	5,0	5,2	5,3	5,5	5,6	5,8	6,0	6,1	6,3	6,5	6,7	6,9
Containers			**10,0**	**10,7**	**11,4**	**12,3**	**13,1**	**14,0**	**15,0**	**16,1**	**17,2**	**18,4**	**19,7**	**21,0**
full TEU - equipment import	7%	7%	10,0	10,7	11,4	12,3	13,1	14,0	15,0	16,1	17,2	18,4	19,7	21,0
full TEU - cotton export	3%	3%	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Break bulk / gen. cargo			**12,0**	**12,4**	**12,7**	**13,1**	**13,5**	**13,9**	**14,3**	**14,8**	**15,2**	**15,7**	**16,1**	**16,6**
food/bever/housing equip. IMP.	3%	3%	10,0	10,3	10,6	10,9	11,3	11,6	11,9	12,3	12,7	13,0	13,4	13,8
cotton in rail cars EXP.	3%	3%	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
others	3%	3%	2,0	2,1	2,1	2,2	2,3	2,3	2,4	2,5	2,5	2,6	2,7	2,8
trucks IN			**5,0**	**5,2**	**5,3**	**5,5**	**5,6**	**5,8**	**6,0**	**6,1**	**6,3**	**6,5**	**6,7**	**6,9**
trucks OUT			**2,0**	**2,1**	**2,1**	**2,2**	**2,3**	**2,3**	**2,4**	**2,5**	**2,5**	**2,6**	**2,7**	**2,8**
rail cars IN			**16,2**	**17,1**	**18,0**	**18,9**	**19,9**	**21,0**	**22,2**	**23,4**	**24,7**	**26,1**	**27,6**	**29,2**
rail cars OUT			**5,0**	**5,2**	**5,3**	**5,5**	**5,6**	**5,8**	**6,0**	**6,1**	**6,3**	**6,5**	**6,7**	**6,9**
cars	3%	3%	**1,0**	**1,0**	**1,1**	**1,1**	**1,1**	**1,2**	**1,2**	**1,2**	**1,3**	**1,3**	**1,3**	**1,4**
TOTAL TONNAGE			**29,2**	**30,4**	**31,7**	**33,1**	**34,6**	**36,1**	**37,7**	**39,4**	**41,2**	**43,1**	**45,1**	**47,2**
ROAD VEHICULES			**350**	**361**	**371**	**382**	**394**	**406**	**418**	**430**	**443**	**457**	**470**	**484**
RAIL CARS			**424**	**444**	**465**	**488**	**511**	**536**	**563**	**591**	**621**	**653**	**686**	**722**
CARS	3%	3%	**1000**	**1030**	**1061**	**1093**	**1126**	**1159**	**1194**	**1230**	**1267**	**1305**	**1344**	**1384**
TOTAL PASSENGERS			**3200**	**3296**	**3395**	**3497**	**3602**	**3710**	**3821**	**3936**	**4054**	**4175**	**4301**	**4430**
IN	3%	3%	1600	1 648	1 697	1 748	1 801	1 855	1 910	1 968	2 027	2 088	2 150	2 215
OUT	3%	3%	1600	1 648	1 697	1 748	1 801	1 855	1 910	1 968	2 027	2 088	2 150	2 215

AKTAU PORT	SCENARIO :		reasonable			TRAFFIC FORECAST in thousands tonnes								
FERRY TERMINAL	RATE	RATE	BASE	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
TRANSIT	to 2004	after 2004												
Liquid bulk			**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
oil products export only in case of emergency			0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Dry bulk			**16,2**	**16,8**	**17,3**	**17,9**	**18,6**	**19,3**	**20,0**	**20,7**	**21,5**	**22,3**	**23,2**	**24,2**
grain export	2%	2%	10,0	10,2	10,4	10,6	10,8	11,0	11,3	11,5	11,7	12,0	12,2	12,4
mud import	0%	0%	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
sulphur export	7%	7%	5,0	5,4	5,7	6,1	6,6	7,0	7,5	8,0	8,6	9,2	9,8	10,5
Containers			**15,0**	**16,4**	**17,8**	**19,4**	**21,2**	**23,1**	**25,2**	**27,5**	**30,0**	**32,8**	**35,8**	**39,1**
full TEU - equipment import	10%	10%	10,0	11,0	12,1	13,3	14,6	16,1	17,7	19,5	21,4	23,6	25,9	28,5
full TEU - cotton export	7%	7%	5,0	5,4	5,7	6,1	6,6	7,0	7,5	8,0	8,6	9,2	9,8	10,5
Break bulk / gen. cargo			**12,0**	**12,4**	**12,7**	**13,1**	**13,5**	**13,9**	**14,7**	**15,6**	**16,6**	**17,6**	**18,6**	**19,7**
food/bever/housing equip IMP.	3%	6%	10,0	10,3	10,6	10,9	11,3	11,6	12,3	13,0	13,8	14,6	15,5	16,4
cotton in rail cars EXP.	3%	6%	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
others	3%	6%	2,0	2,1	2,1	2,2	2,3	2,3	2,5	2,6	2,8	2,9	3,1	3,3
trucks IN			**5,0**	**5,2**	**5,3**	**5,5**	**5,6**	**5,8**	**6,1**	**6,5**	**6,9**	**7,3**	**7,8**	**8,2**
trucks OUT			**2,0**	**2,1**	**2,1**	**2,2**	**2,3**	**2,3**	**2,5**	**2,6**	**2,8**	**2,9**	**3,1**	**3,3**
rail cars IN			**16,2**	**17,4**	**18,6**	**20,0**	**21,5**	**23,1**	**25,1**	**27,2**	**29,5**	**32,1**	**34,9**	**38,0**
rail cars OUT			**12,5**	**13,3**	**14,1**	**14,9**	**15,8**	**16,8**	**17,8**	**18,9**	**20,1**	**21,4**	**22,7**	**24,2**
cars	3%	6%	**1,0**	**1,0**	**1,1**	**1,1**	**1,1**	**1,2**	**1,2**	**1,3**	**1,4**	**1,5**	**1,6**	**1,6**
TOTAL TONNAGE			**36,7**	**38,8**	**41,1**	**43,6**	**46,3**	**49,2**	**52,7**	**56,5**	**60,7**	**65,2**	**70,0**	**75,3**
ROAD VEHICULES			**350**	**361**	**371**	**382**	**394**	**406**	**430**	**456**	**483**	**512**	**543**	**576**
RAIL CARS			**574**	**612**	**653**	**698**	**746**	**798**	**858**	**923**	**993**	**1069**	**1152**	**1242**
CARS	3%	6%	**1000**	**1030**	**1061**	**1093**	**1126**	**1159**	**1229**	**1303**	**1381**	**1464**	**1551**	**1644**
TOTAL PASSENGERS			**3200**	**3424**	**3664**	**3920**	**4195**	**4488**	**4802**	**5139**	**5498**	**5883**	**6295**	**6736**
IN	7%	7%	1600	1 712	1 832	1 960	2 097	2 244	2 401	2 569	2 749	2 942	3 147	3 368
OUT	7%	7%	1600	1 712	1 832	1 960	2 097	2 244	2 401	2 569	2 749	2 942	3 147	3 368

PART 3

COST ESTIMATES

Cost Estimates

Cost estimates were prepared in November and December 1999, with the aim to elaborate a rehabilitation project remaining close to the budget made available by Tacis-Traceca programme.

Bceom made use of construction prices collected from:

- The works contract for Aktau Phase 1 Programme (Bechtel-Enka contract).
- Tacis and EBRD regional data base (see Annex 5).
- Civil works companies settled in Baku, e.g. Bouygues Offshore.
- Kazakh companies from Almaty (Consolidated Supply Management) or from Aktau (West-East, Motiv, Munaigazkurylys, Mangistau Technological Transport).

Tenders for rehabilitation of Baku and Turkmenbashi ferry terminals were not yet launched, otherwise very relevant references would have been available.

From discussions held with Kazakh companies it appears that, though none of them seems to be technically able to perform the works alone, a consortium of domestic firms may be capable.

The enclosed bill of quantities and cost estimate was attached to the Statement of Endorsement signed by MoTCT 1st Vice Minister on 15 December 1999, following the Memorandum of Understanding of 1st June 1999 which foresaw a maximum Traceca contribution of euro 2 millions and included an outline allocation of the respective contributions of the parties. These provisions were maintained.
Besides, two categories of work items appear. Essential items are indicated in normal type. Generally, though not exclusively, these essential items are related to the safety and speed of operation of the ferry ramp, to the provision for rail traffic. Items shown in the bill of quantities in *italic type* are of lower absolute priority, and generally, though not exclusively, relate to works on land facilities. For tendering purposes they are optional items.

Enclosure: cost estimate attached to the agreement signed in Almaty on 15 December 1999

Redevelopment of Aktau Ferry Terminal - Cost estimate

14 December 1999

Assumption: all costs to be covered by traceca are free of taxes and duties

Notes: "ls" stands for "lump sum" / Italics-typed items are non-essential items / Allocation of costs is provisional

item n°	item description	unit	quantity	unit price (euro)	total price (euro)	traceca (euro)	Aktau Port (euro)
	A. General items						
A1	Site mobilisation	ls	1	120 000	120 000	120 000	0
A2	Site demobilisation	ls	1	60 000	60 000	60 000	0
A3	Working designs & as-built drawings	ls	1	74 000	74 000	74 000	0
A4	Working tests	ls	1	22 000	22 000	22 000	0
	Total A				**276 000**	**276 000**	**0**
	B. Marine works, berthing structures						
B1	Dredging of rubber tyres & debris in front of the ramp	ls	1	2 000	2 000	0	2 000
B2	Sheet pile cleaning & protection on central pier	m2	150	48	7 200	7 200	0
B3	Sheet pile cleaning & protection on finger pier	m2	65	48	3 120	3 120	0
B4	Sheet pile cleaning & protection on base ramp	m2	12	48	576	576	0
B5	Repair of capping concrete walls on central pier	m2	120	90	10 800	10 800	0
B6	Repair of capping concrete walls on finger pier	m2	30	90	2 700	2 700	0
B7	Supply of rubber tyres for central pier	piece	50	90	4 500	0	4 500
B8	Placement of fendering tyres on central pier	piece	50	130	6 500	6 500	0
B9	Removal of wooden fender from finger pier	ls	1	3 800	3 800	3 800	0
B10	Supply of rubber tyres for finger pier	piece	90	90	8 100	0	8 100
B11	Placement of fendering tyres on finger pier	piece	90	130	11 700	11 700	0
B12	Repair of stop fenders	piece	2	4 400	8 800	8 800	0
B13	Repair of asphalt pavement on central pier	m2	1600	20	32 000	32 000	0
B14	Repair of concrete pavement on finger pier	m2	50	15	750	750	0
B15	Rubble mound slope protections	m	90	700	63 000	63 000	0
	Total B				**165 546**	**150 946**	**14 600**
	C. Ramp works						
C1	Removal of wooden deck on outer & inner spans	m2	674	17	11 458	11 458	0
C2	Dismantling of rails on outer & inner spans	m	372	12	4 464	4 464	0
C3	Removal of outer span	tonne	220	80	17 600	17 600	0
C4	Removal of inner span	tonne	140	90	12 600	12 600	0
C5	Replacement of pivot bearings on base ramp	piece	4	2 200	8 800	8 800	0
C6	Replacement of pivot bearings on traverse beam	piece	3	1 800	5 400	5 400	0
C7	Sandblasting of spans & traverse beams	m2	4 100	22	90 200	90 200	0
C8	Repainting of spans & traverse beams	m2	4 100	28	114 800	114 800	0
C9	Placing new rails on spans (2 spurs)	m	240	90	21 600	21 600	0
C10	Refitting inner span	tonne	140	120	16 800	16 800	0
C11	Refitting outer span	tonne	220	100	22 000	22 000	0
C12	Placing a coarse steel deck on outer & inner spans	m2	674	280	188 720	188 720	0
	Total C				**514 442**	**514 442**	**0**

	D. Central control tower						
D1	Renovation of building roof	m2	80	35	2 800	2 800	0
D2	Renovation of outer stairs	ls	1	1 200	1 200	1 200	0
D3	Renovation of internal walls	m2	140	15	2 100	2 100	0
D4	Removal of control panels & piloting station	ls	1	3 000	3 000	3 000	0
D5	Supply & placement of new control panels	ls	1	42 000	42 000	42 000	0
D6	Supply & placement of new piloting station	ls	1	26 000	26 000	26 000	0
D7	Furniture	ls	1	3 000	3 000	3 000	0
	Total D				**80 100**	**80 100**	**0**
	E. Lifting tower structures and machineries						
E1	Removal of two outer counterweights	tonne	128	26	3 328	3 328	0
E2	Removal of two inner counterweights	tonne	160	24	3 840	3 840	0
E3	Emptying water from counterweight pits	piece	4	600	2 400	2 400	0
E4	Sealing counterweight pits to make them watertight	piece	4	7 000	28 000	28 000	0
E5	Removal of all hoisting wires	m	720	4	2 880	2 880	0
E6	Dismantling, cleaning, lubricating and refitting all mechanical equipment in outer towers (gearboxes, winches, wheels, brakes & spindles)	piece	2	20 500	41 000	41 000	0
E7	Dismantling, cleaning, lubricating and refitting all mechanical equipment in inner towers (gearboxes, winches, wheels, brakes & spindles)	piece	2	22 500	45 000	45 000	0
E8	Replacement of electrical engines, control boxes and cables in outer towers	piece	2	6 000	12 000	12 000	0
E9	Replacement of electrical engines, control boxes and cables in inner towers	piece	2	8 000	16 000	16 000	0
E10	Repair of glass bricks and windows on top of all towers	ls	1	4 000	4 000	4 000	0
E11	Repainting outer steel structures on all towers	ls	1	5 000	5 000	5 000	0
E12	Placement of new hoisting wires	m	720	36	25 920	25 920	0
E13	Refitting two outer counterweights	tonne	128	39	4 992	4 992	0
E14	Refitting two inner counterweights	tonne	160	36	5 760	5 760	0
	Total E				**200 120**	**200 120**	**0**
	F. Railtrack works on land territory						
F1	Dismantling, cleaning, lubricating and refitting of rail switches	piece	13	1 300	16 900	0	16 900
F2	*Renovation of railway control room*	*ls*	*1*	*4 000*	*4 000*	*0*	*4 000*
F3	*Renovation of railway control panels, piloting equipment & communication cables*	*ls*	*1*	*52 000*	*52 000*	*0*	*52 000*
F4	*Renovation of traffic lights*	*ls*	*1*	*4 000*	*4 000*	*0*	*4 000*
	Total F				**76 900**	**0**	**76 900**

	G. Electricity supply						
G1	Demolition of old transformer substation	ls	1	7 000	7 000	7 000	0
G2	Feeder cable from main intake station to new transformer substation	ls	1	22 000	22 000	22 000	0
G3	Transformer substation (6 kV to 0.4 kV)	piece	1	140 000	140 000	140 000	0
G4	Feeder cables from substation to control tower	ls	1	12 000	12 000	12 000	0
G5	Distribution cables from control tower to lifting towers	ls	1	16 000	16 000	16 000	0
	Total G				**197 000**	**197 000**	**0**
	H. Earthworks and pavements						
H1	*Pavement of a parking area next to the ramp (only asphalt pavement, already levelled)*	*m2*	*6 200*	*25*	*155 000*	*155 000*	*0*
H2	*Pavement of a parking area out of the port territory*	*m2*	*2 300*	*25*	*57 500*	*0*	*57 500*
H3	Road accesses to the passenger terminal, from both sides (backfilling and asphalt pavement)	m2	760	80	60 800	0	60 800
H4	*Renovation of access road to the ramp (asphalt repairs)*	*m2*	*530*	*20*	*10 600*	*0*	*10 600*
H5	*Renovation of access road to the control tower (asphalt repairs)*	*m2*	*460*	*20*	*9 200*	*0*	*9 200*
	Total H				**293 100**	**155 000**	**138 100**
	I. Miscellaneous						
I1	*Water supply piping*	*ls*	*1*	*9 000*	*9 000*	*9 000*	*0*
I2	*Sewage water networks*	*ls*	*1*	*12 000*	*12 000*	*12 000*	*0*
I3	*Rain water drainage networks*	*ls*	*1*	*8 000*	*8 000*	*8 000*	*0*
I4	*Signals at road-rail crossing*	*piece*	*1*	*10 000*	*10 000*	*10 000*	*0*
I5	*Floodlighting masts*	*piece*	*3*	*45 000*	*135 000*	*135 000*	*0*
	Total I				***174 000***	***174 000***	***0***
	J. Passenger facilities						
J1	*Refurbishing of passenger terminal (border control, immigration and customs areas)*	*m2*	*320*	*200*	*64 000*	*0*	*64 000*
J2	*Refurbishing of passenger terminal (lounge, ticketing, bank and restaurant areas)*	*m2*	*440*	*300*	*132 000*	*0*	*132 000*
J3	*Supply of equipment for border control procedures (computers and x-ray machines)*	*ls*	*1*	*36 000*	*36 000*	*36 000*	*0*
J4	*Procurement of a medium size bus*	*piece*	*1*	*45 000*	*45 000*	*45 000*	*0*
	Total J				***277 000***	***81 000***	***196 000***
	Total essential items				1 510 908	1 418 608	92 300
	Total non-essential items				*743 300*	*410 000*	*333 300*
	Total all works				2 254 208	1 828 608	425 600
	Contingencies				35 792	31 392	4 400
	Total all works with contingencies				2 290 000	1 860 000	430 000
	Work supervision					140 000	
	Total Traceca					2 000 000	
	Total Port of Aktau co-financing						430 000
	Total project				2 430 000		

PART 4

FINANCIAL PROJECTIONS

Financial Projections

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1. Methodology

1.1 Objectives and methodology

The objectives of the financial analysis are to evaluate the capacity of the Aktau Ferry Terminal:

- to be self-supporting,
- to reimburse the loan that the port may contract to complete the rehabilitation of the terminal,
- to estimate the return on investment taking into account the three scenarios of traffic forecasts.

A basic assumption is that rehabilitation works will be carried out according to the agreement of 15 December 1999, which foresees that Tacis will provide a 2 million euro grant for these works. The port of Aktau is supposed to finance the rest of the works, possibly through a loan. The anticipated sharing out of the works is that of Appendix 1.

In this financial analysis, the Ferry Terminal is considered as a cost-centre and all the elements of charges and revenues have been separated from the other activities of the port.

Various financial projections have been made regarding the Ferry Terminal according to the prevailing port conditions. For our calculations, we have made use of the Port of Aktau financial statements and of the 1999 – 2003 Port Business Plan.

All amounts have been converted into euro at the fixed rate of: 1 euro = 1 US $ = 140 Tenge

The study includes three steps:

1. The calculation of the profit and loss statements for the next ten years, which will determine the capacity of the terminal to be self-supporting.
2. The estimate of the projected cash-flow for the same period in order to determine the capacity to refund a potential loan that might be made by the port.
3. The estimate of the return on investment for the port.

1.2 Alternative rehabilitation solutions

Before going in depth into the different projected statements, we will examine the two selected project options.

<u>Alternative 1 : the full project</u>

This alternative covers the full rehabilitation works, including all works foreseen in the agreement of 15 December 1999 (essential and non-essential items). In this case the total amount of the investment is euro 2,430,000 out of which euro 430,000 are supposed to be covered by the port, the remaining being the contribution of Tacis in the framework of the Traceca project.

Alternative 2 : the essential project

In this alternative, rehabilitation is limited to the essential works needed to improve the operations as quickly as possible. In this case the investment amounts to euro 1,686,600 out of which euro 96,700 are to be paid by the port, the remaining being the contribution of Tacis in the framework of the Traceca project.

Investment and financing distribution of the project

(figures in thousands euro)

Works	**Total**		**Traceca**		**Aktau Port**	
Alternatives	***Essential***	**Full**	***Essential***	**Full**	***Essential***	**Full**
A. General items	*276.0*	**276.0**	*276.0*	**276.0**	*0*	**0**
B. Marine works, berthing structures	*165.5*	**165.5**	*150.9*	**150.9**	*14.6*	**14.6**
C. Ramp works	*514.4*	**514.4**	*514.4*	**514.4**	*0*	**0**
D. Central control tower	*80.1*	**80.1**	*80.1*	**80.1**	*0*	**0**
E. Lifting tower structures and machineries	*200.1*	**200.1**	*200.1*	**200.1**	*0*	**0**
F. Railtrack works	*16.9*	**76.9**	*0*	**0**	*16.9*	**7 6.9**
G. Electricity supply	*197.0*	**197.0**	*197.0*	**197.0**	*0*	**0**
H. Earthworks & pavements	*60.8*	**293.1**	*0*	**155.0**	*60.8*	**138.1**
I. Miscellaneous	*0*	**174.0**	*0*	**174.0**	*0*	**0**
J. Passenger facilities	*0*	**277.0**	*0*	**81.0**	*0*	**196.0**
Contingencies	*35.8*	**35.9**	*31.4*	**31.5**	*4.4*	**4.4**
Supervision	*140.0*	**140.0**	*140.0*	**140.0**	*0*	**0**
TOTAL	*1,686.6*	**2,430.0**	*1,589.9*	**2,000.0**	*96.7*	**430.0**

The profit and loss statement will be calculated for each of the alternatives and traffic scenarios.

2. Profit and loss statement

2.1 Income statement

Operating revenues will be estimated taking into account the sole ferry traffic.

Operating revenues are based on the present tariff agreed between the Port Authority of Aktau and the Caspian Shipping Company that owns the ferry.

The port has four sources of income:

- Port dues on ships: US $ 2,800 per call

Taking into account the capacity of the ferry, we will assume that 50 calls per year will be sufficient to cope with the traffic in the pessimistic scenario till 2010.
In the reasonable and optimistic scenarios the projected traffic will lead to an increase in the number of crossings to 60 and 90 respectively before 2010.
However, in 2000, we have limited the number of calls to 37 due to the constraints to operations during the rehabilitation works.

- Port dues on cargo: US $ 1.2 per tonne of cargo

- Fees on freight:

  It is agreed that the port of Aktau receives a fee of 5 % per linear meter on the US $ 30 freight rate.
  Assuming that the average length of trucks is 10 meter and that of rail cars 14 meters, the revenues for the port are respectively US $ 15 per truck and US $ 22.5 per rail car.
  This ratio results in an income of US $ 6 per car.

- Fees on passengers:

  The Port of Aktau sells tickets for passengers on behalf of CSC and is thus commissioned as an agent of the company and receives a 5 % fee on the ticket price. Taking into account a typical distribution of passengers in the different types of cabins, this fee is estimated to be US $ 1 per passenger. To simplify, we will assume that all the passengers going to Baku buy their tickets in Aktau and that there are as many northbound as southbound passengers. According to this assumption Aktau port receives a fee only for the outgoing passengers.

Whichever the development alternative, essential or full, the income is the same, whereas the different traffic scenarios lead to different levels of income as the following table shows:

Income statement in euro *

Sources of income	**2001**	**2005**	**2010**
Pessimistic scenario			
Port dues on ferries	140 000	140 000	140 000
Port dues on cargo	38 000	45 300	56 600
Fees on freight	23 000	26 200	29 700
Fees on pax tickets	1 700	1 900	2 200
TOTAL	**202 700**	**213 400**	**230 500**
Optimistic scenario			
Port dues on ferries	168 000	196 000	252 000
Port dues on cargo	81 000	102 000	139 000
Fees on freight	41 000	52 000	72 000
Fees on pax tickets	1 800	2 400	3 400
TOTAL	291 800	352 400	466 400

Reasonable scenario

Port dues on ferries	140 000	140 000	168 000
Port dues on cargo	49 000	63 000	90 000
Fees on freight	27 000	33 000	47 000
Fees on pax tickets	1 700	2 200	3 100
TOTAL	**217 700**	**238 200**	**308 100**

* Detailed figures are in Appendix 2

The yearly income will vary from euro 230,000 to euro 466,000 in 2010 according to the selected scenario.

The estimate of expenses will show if the Ferry Terminal will be profitable and in which conditions.

2.2 Operating expenses

Charges include labour costs, maintenance of the terminal, financial charges related to the loan that might be asked by the port for its share of works, overheads and depreciation of the equipment:

- Labour costs for operations

  According to our experience in other similar facilities, we have assumed that the terminal could be managed by 9 employees: a tallyman, two dock workers, a driver and two clerks, an engineer, a mechanic and an electrician.

  We have assumed that this personnel will be able to cope with the traffic in all the scenarios as operations are limited to one or two days a week according to the number of calls.

  The average overall cost for workers, drivers and clerks is about euro 124 per month including salary, 10 % pension fund, 20 % social charges and vacation. The overall cost for the engineers, all advantages included, is estimated to euro 500 per month.

  On this basis, the total annual labour cost amounts to euro 29,700.

- Maintenance costs

  The annual maintenance cost is usually estimated as 1.5 % of the value of the investment on average. This is a yearly amount and it may not be spent regularly on an annual basis but to simplify, we have used this average figure because the Port Authority should make a provision for the maintenance.

  On this basis, the annual maintenance cost is estimated to:
  euro 36,500 in alternative 1 (full project)
  euro 25,300 in alternative 2 (essential project)

- Overhead expenses

  We have allocated a part of the administrative and management expenses of the port to the Aktau Ferry Terminal, taking the turnover as the key for this allocation.

Over the past recent years, and according to the port business plan, the administrative expenses of the port represent between 10.5 and 15.2 % of the turnover. We have adopted the rate of 12 % of the annual projected turnover of the Ferry Terminal to evaluate the contribution of the ferry terminal to the overall overhead of the whole port. The related amount varies according to traffic.

- Financial charges

We have assumed that the local part of the investment would be borrowed under the following EBRD standard conditions:

Repayment in 10 years with a grace delay of 4 years

Interest rate	:	Libor + 1 %
Commitment fee	:	0.5 %
Fixed fee on value	:	1.0 %

Finally, the financial charges have been calculated with an overall 8% interest rate.

Financial charges in euro

Alternatives / Years	2001	2005	2010
Full project	34,400	34,400	17,200
Essential project	7,700	7,700	3,900

- Depreciation

According to the present statements, the depreciation of the existing equipment amounts to euro 13,100.

Assuming that rehabilitation works will be amortised in 20 years, the depreciation value will amount to euro 121,500 (full project) or euro 84,300 (essential project).

- Total expenses

The following table shows the overall expenses for the different scenarios.

Projected yearly expenses *

(in thousands euro)

Alternatives	**2001**	**2005**	**2010**
Pessimistic scenario			
Full project (Alter. 1)	259.4	260.7	245.6
Essential project (Alter. 2)	184.4	185.7	184.0
Optimistic scenario			
Full project (Alter. 1)	270.1	277.5	273.8
Essential project (Alter. 2)	195.2	202.5	212.2
Reasonable scenario			
Full project (Alter. 1)	261.3	263.8	254.9
Essential project (Alter. 2)	186.3	188.8	193.2

* Detailed figures are in Appendix 2

Though evolving with the traffic, expenses are relatively stable. The difference of expenses between the essential project and the full project is mainly due to depreciation and interest charges.

2.3 Gross operating profit

The following table compares the delays in the recovery of a positive balance between income and expenses according to the different scenarios and alternatives:

Gross operating profit & first year of positive results *

(in thousands euro)

Years	**2001**		**2005**		**2010**	
Scenarios	**Full**	***Essential***	**Full**	***Essential***	**Full**	***Essential***
Pessimistic	- 57.2	+ *17.8*	- 47.4	+ *27.6*	- 14.9	+ *46.7*
Optimistic	+ 21.7	+ *96.7*	+ 75.3	+ *150.2*	+ 192.1	+ *253.8*
Reasonable	- 43.5	+ *31.5*	- 25.1	+ *49.8*	+ 53.1	+ *114.8*
1st Year of profit						
Pessimistic		*2001*			**after 2010**	
Optimistic	**2001**	*2001*				
Reasonable		*2001*			**2008**	

* Detailed figures are in Appendix 2

This table clearly demonstrates that the full project can only entail fast profit in the optimistic traffic scenario. The Aktau Ferry Terminal will be in deficit up to 2007 in the reasonable scenario and beyond 2010 in the pessimistic one.

As far as the essential project is concerned, the result will be positive as soon as 2001 in any scenario.

2.4 Sensitivity test

As a sensitivity test we have assumed that the traffic growth might be slow during the first five years, up to 2004. We have tested the effects of such a slowdown on the gross profit in the pessimistic, optimistic and reasonable scenarios assuming that the traffic will only reach:

50 % of the projected traffic in 2000 and 2001
66 % of the projected traffic in 2002 and 2003
75 % of the projected traffic in 2004

In this assumption the result is less favourable as the following table shows:

First year of gross operating profit in case of a slow increase of traffic before 2005

Scenarios	**Full project**	***Essential project***
Pessimistic scenario	**after 2010**	*2004*
Optimistic scenario	**2004**	*2002*
Reasonable scenario	**2008**	*2004*

The analysis of the projected cash-flow for the next ten years will show the capacity of the Ferry Terminal to pay back the potential loan and to get a sufficient return on investment.

3. Projected cash-flow

We have computed the projected yearly cash-flow for each traffic scenario and each project alternative.

3.1 Gross potential cash-flow

The gross potential cash-flow before taxes is the sum of the gross operating profit and of depreciation. It is positive in any scenario and alternative.
From this gross potential cash-flow we deduct taxes on profit and the loan repayments in order to get the net potential cash-flow.

3.2 Taxes on profits

Taxes on profit have been computed according to the existing fiscal rules that set the taxes to 30 % of the profit if any.

For the time being, no agreement has been reached between the Port Authority and the Government about this tax and we assume that this situation prevails during the project period.

In fact, this allocation of taxes to the Ferry Terminal will depend on the overall financial condition of the port. Calculating this tax amount resulting from the ferry terminal operations, we have assumed that other activities of the port are profitable.

3.3 Foreign loan refunding

As already mentioned, we have assumed that the local expenses for the works taken in charge by the port would be financed 100 % by a foreign loan.

This loan would be paid back in 10 years with a grace delay of 4 years. We have assumed that the works are carried out in 2000 and that the first payment will occur in 2005.

Therefore, the amount to be yearly refunded is :

- euro 43,000 for the full project
- euro 9,700 for the essential project

3.4 Net potential cash-flow

We have calculated the net potential cash flow. Thanks to the grace delay of 4 years, the cash-flow is positive in all scenarios in spite of the negative operating result.

Net potential cash flow (in euro)

Cash flow elements	2001		2005		2010	
	Full	***Essential***	**Full**	***Essential***	**Full**	***Essential***
Pessimistic scenario						
Gross cash flow	77,400	*115,200*	87,200	*125,000*	119,600	*144,100*
Taxes on profit	0	*5,300*	0	*8,300*	0	*14,000*
Foreign loan refunding	0	*0*	43,000	*9,700*	43,000	*9,700*
Net cash flow	77,400	***109,900***	44,200	***107,000***	76,600	***120,400***
Optimistic scenario						
Gross cash flow	156,300	*194,100*	209,800	*247,600*	326,700	*351,200*
Taxes on profit	6,500	*29,000*	22,600	*45,100*	57,600	*76,100*
Foreign loan refunding	0	*0*	43,000	*9,700*	43,000	*9,700*
Net cash flow	149,800	***165,100***	144,300	***192,800***	226,100	***265,400***
Reasonable scenario						
Gross cash flow	91,100	*128,900*	109,400	*147,200*	187,700	*212,200*
Taxes on profit	0	*9,500*	0	*15,000*	15,900	*34,400*
Foreign loan refunding	0	*0*	43,000	*9,700*	43,000	*9,700*
Net cash flow	91,100	***119,400***	66,400	***122,500***	128,700	***168,100***

* Detailed figures are in Appendix 2

The above table shows that the net cash-flow is fairly high, thanks to the contribution of the Tacis programme and to the assumed loan parameters.

A simulation assuming that the port borrows 80 % of the total investment shows that the cash-flow is negative over the next 10 years except in the most optimistic traffic option (essential project, optimistic traffic option) where the cumulative net cash-flow becomes positive in 2009.

3.5 Sensitivity test

As a sensitivity test, as previously mentioned, we have evaluated the net cash-flow in the case of a slow increase of the traffic during the next 5 years. Net cash-flow is slightly positive except during the first three years in the pessimistic scenario. All other scenarios show a positive result.

4. Return on investment

The part of the investment to be covered by the Port of Aktau is either euro 430,000 or euro 96,700, according to the project to be executed.

As this is a relatively low amount compared with the potentially positive effects on the ferry traffic, the rate of return is fairly high in the most optimistic scenarios. However the rate of return is low in the most pessimistic ones.

Results are summarised in the following table.

Internal Rates of Return *

Traffic scenarios	Full	Essential
Pessimistic	10 %	115 %
Optimistic	36 %	174 %
Reasonable	18 %	126 %
Low increase / pessimistic	- 0.4 %	53 %
Low increase / optimistic	23 %	100 %
Low increase / reasonable	7 %	64%

* Detailed figures are in Appendix 2

- As far as the optimistic traffic scenario is concerned, high rates of return do not mean that the investment is profitable itself, as they are due to the contribution of the Tacis Programme that represents 83 % of the total cost of the rehabilitation works in the full project and 95 % in the essential project. We cannot consider the rate for the essential project as meaningful because of the very low investment covered by the Port of Aktau.

- As to the pessimistic and reasonable scenarios, rates of return are still acceptable in the case of the full project. They are very high if only the essential project is implemented, but these figures are not really meaningful, as already explained.

- The risk analysis in the case of a low increase of traffic during the first five years show that the rates of return are weak or even negative for the full project and fairly good in the case of the essential project.

- Only the essential project entails high or acceptable rates of return for all traffic assumptions, since it reduces investment without significantly affecting the efficiency of the ferry terminal.

Appendix 1: Cost estimate attached to the agreement of 15 December 1999

Appendix 2: Financial tables (Feuil 1 to Feuil 9)

Appendix 1

Cost estimate attached to the agreement of 15 December 1999

Redevelopment of Aktau Ferry Terminal - Cost estimate

14 December 1999

Assumption: all costs to be covered by traceca are free of taxes and duties

Notes: "ls" stands for "lump sum" / Italics-typed items are non-essential items / Allocation of costs is provisional

item n°	item description	unit	quantity	unit price (euro)	total price (euro)	traceca (euro)	Aktau Port (euro)
	A. General items						
A1	Site mobilisation	ls	1	120 000	120 000	120 000	0
A2	Site demobilisation	ls	1	60 000	60 000	60 000	0
A3	Working designs & as-built drawings	ls	1	74 000	74 000	74 000	0
A4	Working tests	ls	1	22 000	22 000	22 000	0
	Total A				**276 000**	**276 000**	**0**
	B. Marine works, berthing structures						
B1	Dredging of rubber tyres & debris in front of the ramp	ls	1	2 000	2 000	0	2 000
B2	Sheet pile cleaning & protection on central pier	m2	150	48	7 200	7 200	0
B3	Sheet pile cleaning & protection on finger pier	m2	65	48	3 120	3 120	0
B4	Sheet pile cleaning & protection on base ramp	m2	12	48	576	576	0
B5	Repair of capping concrete walls on central pier	m2	120	90	10 800	10 800	0
B6	Repair of capping concrete walls on finger pier	m2	30	90	2 700	2 700	0
B7	Supply of rubber tyres for central pier	piece	50	90	4 500	0	4 500
B8	Placement of fendering tyres on central pier	piece	50	130	6 500	6 500	0
B9	Removal of wooden fender from finger pier	ls	1	3 800	3 800	3 800	0
B10	Supply of rubber tyres for finger pier	piece	90	90	8 100	0	8 100
B11	Placement of fendering tyres on finger pier	piece	90	130	11 700	11 700	0
B12	Repair of stop fenders	piece	2	4 400	8 800	8 800	0
B13	Repair of asphalt pavement on central pier	m2	1600	20	32 000	32 000	0
B14	Repair of concrete pavement on finger pier	m2	50	15	750	750	0
B15	Rubble mound slope protections	m	90	700	63 000	63 000	0
	Total B				**165 546**	**150 946**	**14 600**
	C. Ramp works						
C1	Removal of wooden deck on outer & inner spans	m2	674	17	11 458	11 458	0
C2	Dismantling of rails on outer & inner spans	m	372	12	4 464	4 464	0
C3	Removal of outer span	tonne	220	80	17 600	17 600	0
C4	Removal of inner span	tonne	140	90	12 600	12 600	0
C5	Replacement of pivot bearings on base ramp	piece	4	2 200	8 800	8 800	0
C6	Replacement of pivot bearings on traverse beam	piece	3	1 800	5 400	5 400	0
C7	Sandblasting of spans & traverse beams	m2	4 100	22	90 200	90 200	0
C8	Repainting of spans & traverse beams	m2	4 100	28	114 800	114 800	0
C9	Placing new rails on spans (2 spurs)	m	240	90	21 600	21 600	0
C10	Refitting inner span	tonne	140	120	16 800	16 800	0
C11	Refitting outer span	tonne	220	100	22 000	22 000	0
C12	Placing a coarse steel deck on outer & inner spans	m2	674	280	188 720	188 720	0
	Total C				**514 442**	**514 442**	**0**

	D. Central control tower						
D1	Renovation of building roof	m2	80	35	2 800	2 800	0
D2	Renovation of outer stairs	ls	1	1 200	1 200	1 200	0
D3	Renovation of internal walls	m2	140	15	2 100	2 100	0
D4	Removal of control panels & piloting station	ls	1	3 000	3 000	3 000	0
D5	Supply & placement of new control panels	ls	1	42 000	42 000	42 000	0
D6	Supply & placement of new piloting station	ls	1	26 000	26 000	26 000	0
D7	Furniture	ls	1	3 000	3 000	3 000	0
	Total D				**80 100**	**80 100**	**0**
	E. Lifting tower structures and machineries						
E1	Removal of two outer counterweights	tonne	128	26	3 328	3 328	0
E2	Removal of two inner counterweights	tonne	160	24	3 840	3 840	0
E3	Emptying water from counterweight pits	piece	4	600	2 400	2 400	0
E4	Sealing counterweight pits to make them watertight	piece	4	7 000	28 000	28 000	0
E5	Removal of all hoisting wires	m	720	4	2 880	2 880	0
E6	Dismantling, cleaning, lubricating and refitting all mechanical equipment in outer towers (gearboxes, winches, wheels, brakes & spindles)	piece	2	20 500	41 000	41 000	0
E7	Dismantling, cleaning, lubricating and refitting all mechanical equipment in inner towers (gearboxes, winches, wheels, brakes & spindles)	piece	2	22 500	45 000	45 000	0
E8	Replacement of electrical engines, control boxes and cables in outer towers	piece	2	6 000	12 000	12 000	0
E9	Replacement of electrical engines, control boxes and cables in inner towers	piece	2	8 000	16 000	16 000	0
E10	Repair of glass bricks and windows on top of all towers	ls	1	4 000	4 000	4 000	0
E11	Repainting outer steel structures on all towers	ls	1	5 000	5 000	5 000	0
E12	Placement of new hoisting wires	m	720	36	25 920	25 920	0
E13	Refitting two outer counterweights	tonne	128	39	4 992	4 992	0
E14	Refitting two inner counterweights	tonne	160	36	5 760	5 760	0
	Total E				**200 120**	**200 120**	**0**
	F. Railtrack works on land territory						
F1	Dismantling, cleaning, lubricating and refitting of rail switches	piece	13	1 300	16 900	0	16 900
F2	*Renovation of railway control room*	*ls*	*1*	*4 000*	*4 000*	*0*	*4 000*
F3	*Renovation of railway control panels, piloting equipment & communication cables*	*ls*	*1*	*52 000*	*52 000*	*0*	*52 000*
F4	*Renovation of traffic lights*	*ls*	*1*	*4 000*	*4 000*	*0*	*4 000*
	Total F				**76 900**	**0**	**76 900**

	G. Electricity supply						
G1	Demolition of old transformer substation	ls	1	7 000	7 000	7 000	0
G2	Feeder cable from main intake station to new transformer substation	ls	1	22 000	22 000	22 000	0
G3	Transformer substation (6 kV to 0.4 kV)	piece	1	140 000	140 000	140 000	0
G4	Feeder cables from substation to control tower	ls	1	12 000	12 000	12 000	0
G5	Distribution cables from control tower to lifting towers	ls	1	16 000	16 000	16 000	0
	Total G				**197 000**	**197 000**	**0**
	H. Earthworks and pavements						
H1	*Pavement of a parking area next to the ramp (only asphalt pavement, already levelled)*	*m2*	*6 200*	*25*	*155 000*	*155 000*	*0*
H2	*Pavement of a parking area out of the port territory*	*m2*	*2 300*	*25*	*57 500*	*0*	*57 500*
H3	Road accesses to the passenger terminal, from both sides (backfilling and asphalt pavement)	m2	760	80	60 800	0	60 800
H4	*Renovation of access road to the ramp (asphalt repairs)*	*m2*	*530*	*20*	*10 600*	*0*	*10 600*
H5	*Renovation of access road to the control tower (asphalt repairs)*	*m2*	*460*	*20*	*9 200*	*0*	*9 200*
	Total H				**293 100**	**155 000**	**138 100**
	I. Miscellaneous						
I1	*Water supply piping*	*ls*	*1*	*9 000*	*9 000*	*9 000*	*0*
I2	*Sewage water networks*	*ls*	*1*	*12 000*	*12 000*	*12 000*	*0*
I3	*Rain water drainage networks*	*ls*	*1*	*8 000*	*8 000*	*8 000*	*0*
I4	*Signals at road-rail crossing*	*piece*	*1*	*10 000*	*10 000*	*10 000*	*0*
I5	*Floodlighting masts*	*piece*	*3*	*45 000*	*135 000*	*135 000*	*0*
	Total I				***174 000***	***174 000***	***0***
	J. Passenger facilities						
J1	*Refurbishing of passenger terminal (border control, immigration and customs areas)*	*m2*	*320*	*200*	*64 000*	*0*	*64 000*
J2	*Refurbishing of passenger terminal (lounge, ticketing, bank and restaurant areas)*	*m2*	*440*	*300*	*132 000*	*0*	*132 000*
J3	*Supply of equipment for border control procedures (computers and x-ray machines)*	*ls*	*1*	*36 000*	*36 000*	*36 000*	*0*
J4	*Procurement of a medium size bus*	*piece*	*1*	*45 000*	*45 000*	*45 000*	*0*
	Total J				***277 000***	***81 000***	***196 000***
	Total essential items				1 510 908	1 418 608	92 300
	Total non-essential items				*743 300*	*410 000*	*333 300*
	Total all works				2 254 208	1 828 608	425 600
	Contingencies				35 792	31 392	4 400
	Total all works with contingencies				2 290 000	1 860 000	430 000
	Work supervision					140 000	
	Total Traceca					2 000 000	
	Total Port of Aktau co-financing						430 000
	Total project				2 430 000		

Appendix 2

Financial tables

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

OPTIMISTIC TRAFFIC **FULL PROJECT**

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		coef.		1	1	1	1	1	1	1	1	1	1	1
aboard trucks IN	1000 t			5,4	5,7	6,1	6,6	7,0	7,5	8,0	8,6	9,2	9,8	10,5
aboard trucks OUT	1000 t			8,6	9,2	9,8	10,5	11,2	12,0	12,8	13,7	14,7	15,7	16,8
aboard rail cars IN	1000 t			17,6	19,0	20,6	22,4	24,3	26,4	28,7	31,2	34,0	37,0	40,3
aboard rail cars OUT	1000 t			31,1	32,3	33,5	34,8	36,1	37,5	39,0	40,6	42,3	44,1	45,9
cars	1000 t			1,1	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	2,0	2,1
TOTAL TONNAGE	**1000 t**			**63,7**	**67,4**	**71,3**	**75,6**	**80,0**	**84,9**	**90,2**	**95,8**	**102,0**	**108,6**	**115,6**
NUMBER OF TRUCKS	unit			698	746	796	853	911	975	1 041	1 115	1 195	1 277	1 366
NUMBER RAIL CARS	unit			973	1 026	1 083	1 144	1 208	1 278	1 354	1 437	1 525	1 621	1 723
CARS	unit			1 070	1 145	1 225	1 311	1 403	1 501	1 606	1 718	1 838	1 967	2 105
TOTAL PASSENGERS	**unit**			**3 424**	**3 664**	**3 920**	**4 195**	**4 488**	**4 802**	**5 139**	**5 498**	**5 883**	**6 295**	**6 736**
of which: outgoing	unit			1 712	1 832	1 960	2 097	2 244	2 401	2 569	2 749	2 942	3 147	3 368
NUMBER OF CALLS	**unit**			**36**	**60**	**60**	**60**	**70**	**70**	**70**	**80**	**80**	**90**	**90**

	UNIT	TARIFF ($)	K	PROJECTED PROFIT AND LOSS STATEMENT						in 1000 $				
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	168,0	168,0	168,0	196,0	196,0	196,0	224,0	224,0	252,0	252,0
port dues on cargos	$/TON	1,2	1,0	0,0	80,9	85,5	90,7	96,0	101,9	108,2	115,0	122,4	130,3	138,7
port dues on trucks	$/Truck	15,0	1,0	0,0	11,2	11,9	12,8	13,7	14,6	15,6	16,7	17,9	19,2	20,5
port dues on rail cars	$/rail car	22,5	1,0	0,0	23,1	24,4	25,7	27,2	28,8	30,5	32,3	34,3	36,5	38,8
port dues on cars	$/cars	6,0	1,0	0,0	6,9	7,4	7,9	8,4	9,0	9,6	10,3	11,0	11,8	12,6
port dues on passengers	$/Pax out	1,0	1,0	0,0	1,8	2,0	2,1	2,2	2,4	2,6	2,7	2,9	3,1	3,4
TOTAL REVENUES				**0,0**	**291,9**	**299,2**	**307,2**	**343,5**	**352,7**	**362,5**	**401,1**	**412,6**	**452,9**	**466,0**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	2430	1,5%			36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5
Overheads	Op. Rev	12%		0,0	35,0	35,9	36,9	41,2	42,3	43,5	48,1	49,5	54,3	55,9
Financial charges			1,0	0,0	34,4	34,4	34,4	34,4	34,4	31,0	27,5	24,1	20,6	17,2
Former Amortization				13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	2430	5%			121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5
TOTAL EXPENSES				**13,1**	**270,1**	**271,0**	**272,0**	**276,4**	**277,5**	**275,2**	**276,4**	**274,3**	**275,7**	**273,8**
GROSS OPERATING PROFIT				**-13,1**	**21,7**	**28,1**	**35,2**	**67,2**	**75,3**	**87,3**	**124,7**	**138,3**	**177,2**	**192,1**

OPTIMISTIC TRAFFIC **FULL PROJECT** **PROJECTED CASH-FLOW** **in 1000 $**

GROSS POTENTIAL CASH-FLOW				0,0	156,3	162,7	169,8	201,8	209,8	221,9	259,3	272,9	311,7	326,7
Taxes on profit	Gross prof.	30%		0,0	6,5	8,4	10,6	20,2	22,6	26,2	37,4	41,5	53,1	57,6
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	43,0	43,0	43,0	43,0	43,0	43,0
Local expenses for project	430		1	430,0										
NET POTENTIAL CASHFLOW			INV.	-430,0	149,8	154,3	159,2	181,6	144,3	152,7	178,9	188,4	215,6	226,1
(Cumulative)					149,8	304,0	463,2	644,9	789,1	941,8	1120,7	1309,1	1524,7	1750,7

RETURN ON INVESTMENT **IRR= 36%**

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

PESSIMISTIC TRAFFIC **FULL PROJECT**

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		coef.		1	1	1	1	1	1	1	1	1	1	1
aboard trucks IN	1000 t			5,2	5,3	5,5	5,6	5,8	6,0	6,1	6,3	6,5	6,7	6,9
aboard trucks OUT	1000 t			2,1	2,1	2,2	2,3	2,3	2,4	2,5	2,5	2,6	2,7	2,8
aboard rail cars IN	1000 t			17,1	18,0	18,9	19,9	21,0	22,2	23,4	24,7	26,1	27,6	29,2
aboard rail cars OUT	1000 t			5,2	5,3	5,5	5,6	5,8	6,0	6,1	6,3	6,5	6,7	6,9
cars	1000 t			1,0	1,0	1,1	1,1	1,1	1,2	1,2	1,2	1,3	1,3	1,4
TOTAL TONNAGE	**1000 t**			**30,6**	**31,7**	**33,2**	**34,5**	**36,0**	**37,8**	**39,3**	**41,0**	**43,0**	**45,0**	**47,2**
NUMBER OF TRUCKS	unit			365	370	385	395	405	420	430	440	455	470	485
NUMBER RAIL CARS	unit			446	466	488	510	536	564	590	620	652	686	722
CARS	unit			1 030	1 061	1 093	1 126	1 159	1 194	1 230	1 267	1 305	1 344	1 384
TOTAL PASSENGERS	**unit**			**3 296**	**3 395**	**3 497**	**3 602**	**3 710**	**3 821**	**3 936**	**4 054**	**4 175**	**4 301**	**4 430**
of which: outgoing	unit			1 648	1 697	1 748	1 801	1 855	1 910	1 968	2 027	2 088	2 150	2 215
NUMBER OF CALLS	**unit**			**36**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**
	UNIT	**TARIF ($)**	**K**	**PROJECTED PROFIT AND LOSS STATEMENT**						**in 1000 $**				
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0
port dues on cargos	$/TON	1,2	1,0	0,0	38,1	39,8	41,4	43,2	45,3	47,2	49,2	51,6	54,0	56,6
port dues on trucks	$/Truck	15,0	1,0	0,0	5,6	5,8	5,9	6,1	6,3	6,5	6,6	6,8	7,1	7,3
port dues on rail cars	$/rail car	22,5	1,0	0,0	10,5	11,0	11,5	12,1	12,7	13,3	14,0	14,7	15,4	16,2
port dues on cars	$/cars	6,0	1,0	0,0	6,4	6,6	6,8	7,0	7,2	7,4	7,6	7,8	8,1	8,3
port dues on passengers	$/Pax out	1,0	1,0	0,0	1,7	1,7	1,8	1,9	1,9	2,0	2,0	2,1	2,2	2,2
TOTAL REVENUES				**0,0**	**202,2**	**204,9**	**207,3**	**210,2**	**213,4**	**216,2**	**219,4**	**223,0**	**226,7**	**230,7**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	2430	1,5%			36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5
Overheads	Op. Rev	12%		0,0	24,3	24,6	24,9	25,2	25,6	25,9	26,3	26,8	27,2	27,7
Financial charges			1,0	0,0	34,4	34,4	34,4	34,4	34,4	31,0	27,5	24,1	20,6	17,2
Former Amortization				13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	2430	5%			121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5
TOTAL EXPENSES				**13,1**	**259,4**	**259,7**	**260,0**	**260,3**	**260,7**	**257,6**	**254,6**	**251,6**	**248,6**	**245,6**
GROSS OPERATING PROFIT				**-13,1**	**-57,2**	**-54,9**	**-52,7**	**-50,2**	**-47,4**	**-41,4**	**-35,2**	**-28,6**	**-21,9**	**-14,9**

PESSIMISTIC TRAFFIC **FULL PROJECT** **PROJECTED CASH-FLOW** **in 1000 $**

GROSS POTENTIAL CASH-FLOW				0,0	77,4	79,7	81,9	84,4	87,2	93,2	99,4	106,0	112,7	119,6
Taxes on profit	Gross prof.	30%		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	43,0	43,0	43,0	43,0	43,0	43,0
Local expenses for project	430		1	430,0										
NET POTENTIAL CASHFLOW			INV.	-430,0	77,4	79,7	81,9	84,4	44,2	50,2	56,4	63,0	69,7	76,6
(Cumulative)					77,4	157,1	239,0	323,4	367,6	417,8	474,2	537,2	606,9	683,6

RETURN ON INVESTMENT **IRR= 10%**

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

REASONABLE TRAFFIC **FULL PROJECT**

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		coef.		1	1	1	1	1	1	1	1	1	1	1
aboard trucks IN	1000 t			5,2	5,3	5,5	5,6	5,8	6,1	6,5	6,9	7,3	7,8	8,2
aboard trucks OUT	1000 t			2,1	2,1	2,2	2,3	2,3	2,5	2,6	2,8	2,9	3,1	3,3
aboard rail cars IN	1000 t			17,4	18,6	20,0	21,5	23,1	25,1	27,2	29,5	32,1	34,9	38,0
aboard rail cars OUT	1000 t			13,3	14,1	14,9	15,8	16,8	17,8	18,9	20,1	21,4	22,7	24,2
cars	1000 t			1,0	1,1	1,1	1,1	1,2	1,2	1,3	1,4	1,5	1,6	1,6
TOTAL TONNAGE	**1000 t**			**39,0**	**41,2**	**43,7**	**46,3**	**49,2**	**52,7**	**56,5**	**60,7**	**65,2**	**70,1**	**75,3**
NUMBER OF TRUCKS	unit			365	370	385	395	405	430	455	485	510	545	575
NUMBER RAIL CARS	unit			614	654	698	746	798	858	922	992	1 070	1 152	1 244
CARS	unit			1 030	1 061	1 093	1 126	1 159	1 229	1 303	1 381	1 464	1 551	1 644
TOTAL PASSENGERS	**unit**			**3 200**	**3 424**	**3 664**	**3 920**	**4 195**	**4 488**	**4 802**	**5 139**	**5 498**	**5 883**	**6 295**
of which: outgoing	unit			1 600	1 712	1 832	1 960	2 097	2 244	2 401	2 569	2 749	2 942	3 147
NUMBER OF CALLS	**unit**			**36**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**60**	**60**	**60**
	UNIT	**TARIFF ($)**	**K**	**PROJECTED PROFIT AND LOSS STATEMENT**							**in 1000 $**			
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0	168,0	168,0	168,0
port dues on cargos	$/TON	1,2	1,0	0,0	49,4	52,4	55,6	59,0	63,2	67,8	72,8	78,2	84,1	90,4
port dues on trucks	$/Truck	15,0	1,0	0,0	5,6	5,8	5,9	6,1	6,5	6,8	7,3	7,7	8,2	8,6
port dues on rail cars	$/rail car	22,5	1,0	0,0	14,7	15,7	16,8	18,0	19,3	20,7	22,3	24,1	25,9	28,0
port dues on cars	$/cars	6,0	1,0	0,0	6,4	6,6	6,8	7,0	7,4	7,8	8,3	8,8	9,3	9,9
port dues on passengers	$/Pax out	1,0	1,0	0,0	1,7	1,8	2,0	2,1	2,2	2,4	2,6	2,7	2,9	3,1
TOTAL REVENUES				**0,0**	**217,8**	**222,3**	**227,0**	**232,1**	**238,6**	**245,6**	**253,3**	**289,5**	**298,5**	**308,0**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	2430	1,5%			36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5
Overheads	Op. Rev	12%		0,0	26,1	26,7	27,2	27,9	28,6	29,5	30,4	34,7	35,8	37,0
Financial charges			1,0	0,0	34,4	34,4	34,4	34,4	34,4	31,0	27,5	24,1	20,6	17,2
Former Amortization			Overhead	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	2430	5%			121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5
TOTAL EXPENSES				**13,1**	**261,3**	**261,8**	**262,4**	**263,0**	**263,8**	**261,2**	**258,6**	**259,5**	**257,2**	**254,9**
GROSS OPERATING PROFIT				**-13,1**	**-43,5**	**-39,5**	**-35,4**	**-30,9**	**-25,1**	**-15,6**	**-5,4**	**30,0**	**41,3**	**53,1**

REASONABLE TRAFFIC **FULL PROJECT** **PROJECTED CASH-FLOW** **in 1000 $**

GROSS POTENTIAL CASH-FLOW				0,0	91,1	95,1	99,2	103,7	109,4	119,0	129,2	164,5	175,9	187,7
Taxes on profit	Gross prof.	30%		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	9,0	12,4	15,9
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	43,0	43,0	43,0	43,0	43,0	43,0
Local expenses for project	430		1	430,0										
NET POTENTIAL CASHFLOW			INV.	-430,0	91,1	95,1	99,2	103,7	66,4	76,0	86,2	112,5	120,5	128,7
(Cumulative)					91,1	186,2	285,4	389,1	455,5	531,5	617,8	730,3	850,8	979,5

RETURN ON INVESTMENT **IRR= 18%**

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

REASONABLE TRAFFIC **Essential Project**

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
aboard trucks IN	1000 t			5,2	5,3	5,5	5,6	5,8	6,1	6,5	6,9	7,3	7,8	8,2
aboard trucks OUT	1000 t			2,1	2,1	2,2	2,3	2,3	2,5	2,6	2,8	2,9	3,1	3,3
aboard rail cars IN	1000 t			17,4	18,6	20,0	21,5	23,1	25,1	27,2	29,5	32,1	34,9	38,0
aboard rail cars OUT	1000 t			13,3	14,1	14,9	15,8	16,8	17,8	18,9	20,1	21,4	22,7	24,2
cars	1000 t			1,0	1,1	1,1	1,1	1,2	1,2	1,3	1,4	1,5	1,6	1,6
TOTAL TONNAGE	**1000 t**			**39,0**	**41,2**	**43,7**	**46,3**	**49,2**	**52,7**	**56,5**	**60,7**	**65,2**	**70,1**	**75,3**
NUMBER OF TRUCKS	unit			365	370	385	395	405	430	455	485	510	545	575
NUMBER RAIL CARS	unit			614	654	698	746	798	858	922	992	1 070	1 152	1 244
CARS	unit			1 030	1 061	1 093	1 126	1 159	1 229	1 303	1 381	1 464	1 551	1 644
TOTAL PASSENGERS	**unit**		**7%**	**3200**	**3424**	**3664**	**3920**	**4195**	**4488**	**4802**	**5139**	**5498**	**5883**	**6295**
of which: outgoing	unit			1 600	1 712	1 832	1 960	2 097	2 244	2 401	2 569	2 749	2 942	3 147
NUMBER OF CALLS	**unit**			**36**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**60**	**60**	**60**
	UNIT	**TARIFF ($)**	**K**	**PROJECTED PROFIT AND LOSS STATEMENT**						**in 1000 $**				
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0	168,0	168,0	168,0
port dues on cargos	$/TON	1,2	1,0	0,0	49,4	52,4	55,6	59,0	63,2	67,8	72,8	78,2	84,1	90,4
port dues on trucks	$/Truck	15,0	1,0	0,0	5,6	5,8	5,9	6,1	6,5	6,8	7,3	7,7	8,2	8,6
port dues on rail cars	$/rail car	22,5	1,0	0,0	14,7	15,7	16,8	18,0	19,3	20,7	22,3	24,1	25,9	28,0
port dues on cars	$/cars	6,0	1,0	0,0	6,4	6,6	6,8	7,0	7,4	7,8	8,3	8,8	9,3	9,9
port dues on passengers	$/Pax out	1,0	1,0	0,0	1,7	1,8	2,0	2,1	2,2	2,4	2,6	2,7	2,9	3,1
TOTAL REVENUES				**0,0**	**217,8**	**222,3**	**227,0**	**232,1**	**238,6**	**245,6**	**253,3**	**289,5**	**298,5**	**308,0**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	1686,6	1,5%			25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3
Overheads	Op. Rev	12%		0,0	26,1	26,7	27,2	27,9	28,6	29,5	30,4	34,7	35,8	37,0
Financial charges			1,0	0,0	7,7	7,7	7,7	7,7	7,7	7,0	6,2	5,4	4,6	3,9
Former Amortization				13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	1686,6	5%			84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3
TOTAL EXPENSES				**13,1**	**186,3**	**186,8**	**187,4**	**188,0**	**188,8**	**188,8**	**189,0**	**192,6**	**192,9**	**193,2**
GROSS OPERATING PROFIT				**-13,1**	**31,5**	**35,5**	**39,6**	**44,1**	**49,8**	**56,8**	**64,3**	**96,9**	**105,6**	**114,8**

PROJECTED CASH-FLOW **in 1000 $**

GROSS POTENTIAL CASHFLOW				0,0	128,9	132,9	137,0	141,5	147,2	154,2	161,7	194,3	203,0	212,2
Taxes on profit	Gross prof.	30%		0,0	9,5	10,6	11,9	13,2	15,0	17,0	19,3	29,1	31,7	34,4
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	9,7	9,7	9,7	9,7	9,7	9,7
Local expenses for project	96,7		1	96,7										
NET POTENTIAL CASHFLOW			INV.	-96,7	119,5	122,3	125,1	128,3	122,6	127,5	132,7	155,6	161,7	168,1
(Cumulative)					119,5	241,7	366,8	495,1	617,8	745,2	878,0	1033,6	1195,2	1363,3

RETURN ON INVESTMENT **IRR= 126%**

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

Pessimistic Traffic **Essential Project**

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
aboard trucks IN	1000 t			5,2	5,3	5,5	5,6	5,8	6,0	6,1	6,3	6,5	6,7	6,9
aboard trucks OUT	1000 t			2,1	2,1	2,2	2,3	2,3	2,4	2,5	2,5	2,6	2,7	2,8
aboard rail cars IN	1000 t			17,1	18,0	18,9	19,9	21,0	22,2	23,4	24,7	26,1	27,6	29,2
aboard rail cars OUT	1000 t			5,2	5,3	5,5	5,6	5,8	6,0	6,1	6,3	6,5	6,7	6,9
cars	1000 t			1,0	1,0	1,1	1,1	1,1	1,2	1,2	1,2	1,3	1,3	1,4
TOTAL TONNAGE	**1000 t**			**30,6**	**31,7**	**33,2**	**34,5**	**36,0**	**37,8**	**39,3**	**41,0**	**43,0**	**45,0**	**47,2**
NUMBER OF TRUCKS	unit			365	370	385	395	405	420	430	440	455	470	485
NUMBER RAIL CARS	unit			446	466	488	510	536	564	590	620	652	686	722
CARS	unit			1 030	1 061	1 093	1 126	1 159	1 194	1 230	1 267	1 305	1 344	1 384
TOTAL PASSENGERS	**unit**		**3%**	**3 296**	**3 395**	**3 497**	**3 602**	**3 710**	**3 821**	**3 936**	**4 054**	**4 175**	**4 301**	**4 430**
of which: outgoing	unit			1 648	1 697	1 748	1 801	1 855	1 910	1 968	2 027	2 088	2 150	2 215
NUMBER OF CALLS	**unit**			**36**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**

	UNIT	TARIF ($)	K	PROJECTED PROFIT AND LOSS STATEMENT						in 1000 $				
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0
port dues on cargos	$/TON	1,2	1,0	0,0	38,1	39,8	41,4	43,2	45,3	47,2	49,2	51,6	54,0	56,6
port dues on trucks	$/Truck	15,0	1,0	0,0	5,6	5,8	5,9	6,1	6,3	6,5	6,6	6,8	7,1	7,3
port dues on rail cars	$/rail car	22,5	1,0	0,0	10,5	11,0	11,5	12,1	12,7	13,3	14,0	14,7	15,4	16,2
port dues on cars	$/cars	6,0	1,0	0,0	6,4	6,6	6,8	7,0	7,2	7,4	7,6	7,8	8,1	8,3
port dues on passengers	$/Pax out	1,0	1,0	0,0	1,7	1,7	1,8	1,9	1,9	2,0	2,0	2,1	2,2	2,2
TOTAL REVENUES				**0,0**	**202,2**	**204,9**	**207,3**	**210,2**	**213,4**	**216,2**	**219,4**	**223,0**	**226,7**	**230,7**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	1686,6	1,5%			25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3
Overheads	Op. Rev	12%		0,0	24,3	24,6	24,9	25,2	25,6	25,9	26,3	26,8	27,2	27,7
Financial charges			1,0	0,0	7,7	7,7	7,7	7,7	7,7	7,0	6,2	5,4	4,6	3,9
Former Amortization				13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	1686,6	5%			84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3
TOTAL EXPENSES				**13,1**	**184,4**	**184,7**	**185,0**	**185,4**	**185,7**	**185,3**	**184,9**	**184,6**	**184,3**	**184,0**
GROSS OPERATING PROFIT				**-13,1**	**17,8**	**20,1**	**22,3**	**24,8**	**27,6**	**30,9**	**34,5**	**38,4**	**42,5**	**46,7**

PROJECTED CASH-FLOW **in 1000 $**

GROSS POTENTIAL CASH-FLOW				0,0	115,2	117,5	119,7	122,2	125,0	128,3	131,9	135,8	139,9	144,1
Taxes on profit	Gross prof.	30%		0,0	5,3	6,0	6,7	7,4	8,3	9,3	10,3	11,5	12,7	14,0
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	9,7	9,7	9,7	9,7	9,7	9,7
Local expenses for project	96,7		1	96,7										
NET POTENTIAL CASHFLOW			INV.	-96,7	109,8	111,5	113,0	114,8	107,1	109,4	111,9	114,6	117,5	120,4
(Cumulative)					109,8	221,3	334,4	449,2	556,2	665,6	777,5	892,1	1009,5	1130,0

RETURN ON INVESTMENT **IRR= 115%**

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

Optimistic Traffic **Essential Project**

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
aboard trucks IN	1000 t			5,4	5,7	6,1	6,6	7,0	7,5	8,0	8,6	9,2	9,8	10,5
aboard trucks OUT	1000 t			8,6	9,2	9,8	10,5	11,2	12,0	12,8	13,7	14,7	15,7	16,8
aboard rail cars IN	1000 t			17,6	19,0	20,6	22,4	24,3	26,4	28,7	31,2	34,0	37,0	40,3
aboard rail cars OUT	1000 t			31,1	32,3	33,5	34,8	36,1	37,5	39,0	40,6	42,3	44,1	45,9
cars	1000 t			1,1	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	2,0	2,1
TOTAL TONNAGE	**1000 t**			**63,7**	**67,4**	**71,3**	**75,6**	**80,0**	**84,9**	**90,2**	**95,8**	**102,0**	**108,6**	**115,6**
NUMBER OF TRUCKS	unit			698	746	796	853	911	975	1 041	1 115	1 195	1 277	1 366
NUMBER RAIL CARS	unit			973	1 026	1 083	1 144	1 208	1 278	1 354	1 437	1 525	1 621	1 723
CARS	unit			1 070	1 145	1 225	1 311	1 403	1 501	1 606	1 718	1 838	1 967	2 105
TOTAL PASSENGERS	**unit**			**3 424**	**3 664**	**3 920**	**4 195**	**4 488**	**4 802**	**5 139**	**5 498**	**5 883**	**6 295**	**6 736**
of which: outgoing	unit			1 712	1 832	1 960	2 097	2 244	2 401	2 569	2 749	2 942	3 147	3 368
NUMBER OF CALLS	**unit**			**36**	**60**	**60**	**60**	**70**	**70**	**70**	**80**	**80**	**90**	**90**

	UNIT	TARIFF ($)	K	PROJECTED PROFIT AND LOSS STATEMENT						in 1000 $				
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	168,0	168,0	168,0	196,0	196,0	196,0	224,0	224,0	252,0	252,0
port dues on cargos	$/TON	1,2	1,0	0,0	80,9	85,5	90,7	96,0	101,9	108,2	115,0	122,4	130,3	138,7
port dues on trucks	$/Truck	15,0	1,0	0,0	11,2	11,9	12,8	13,7	14,6	15,6	16,7	17,9	19,2	20,5
port dues on rail cars	$/rail car	22,5	1,0	0,0	23,1	24,4	25,7	27,2	28,8	30,5	32,3	34,3	36,5	38,8
port dues on cars	$/cars	6,0	1,0	0,0	6,9	7,4	7,9	8,4	9,0	9,6	10,3	11,0	11,8	12,6
port dues on passengers	$/Pax out	1,0	1,0	0,0	1,8	2,0	2,1	2,2	2,4	2,6	2,7	2,9	3,1	3,4
TOTAL REVENUES				**0,0**	**291,9**	**299,2**	**307,2**	**343,5**	**352,7**	**362,5**	**401,1**	**412,6**	**452,9**	**466,0**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	1686,6	1,5%			25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3	25,3
Overheads	Op. Rev	12%		0,0	35,0	35,9	36,9	41,2	42,3	43,5	48,1	49,5	54,3	55,9
Financial charges			1,0	0,0	7,7	7,7	7,7	7,7	7,7	7,0	6,2	5,4	4,6	3,9
Former Amortization				13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	1686,6	5%			84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3	84,3
TOTAL EXPENSES				**13,1**	**195,2**	**196,0**	**197,0**	**201,4**	**202,5**	**202,9**	**206,7**	**207,3**	**211,4**	**212,2**
GROSS OPERATING PROFIT				**-13,1**	**96,7**	**103,1**	**110,2**	**142,2**	**150,2**	**159,6**	**194,4**	**205,3**	**241,5**	**253,8**

PROJECTED CASH-FLOW **in 1000 $**

GROSS POTENTIAL CASH-FLOW				0,0	194,1	200,5	207,6	239,6	247,6	257,0	291,8	302,7	338,9	351,2
Taxes on profit	Gross prof	30%		0,0	29,0	30,9	33,0	42,7	45,1	47,9	58,3	61,6	72,4	76,1
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	9,7	9,7	9,7	9,7	9,7	9,7
Local expenses for project	96,7		1	96,7										
NET POTENTIAL CASHFLOW			INV.	-96,7	165,1	169,6	174,5	196,9	192,9	199,5	223,8	231,4	256,8	265,4
(Cumulative)					165,1	334,7	509,2	706,1	899,0	1098,5	1322,3	1553,7	1810,5	2075,9

RETURN ON INVESTMENT **IRR= 174%**

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

OPTIMISTIC TRAFFIC **FULL PROJECT** Slow increase of traffic over the first 5 years

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		coef.		0,5	0,5	0,67	0,67	0,75	1	1	1	1	1	1
aboard trucks IN	1000 t			2,7	2,9	4,1	4,4	5,3	7,5	8,0	8,6	9,2	9,8	10,5
aboard trucks OUT	1000 t			4,3	4,6	6,5	7,0	8,4	12,0	12,8	13,7	14,7	15,7	16,8
aboard rail cars IN	1000 t			8,8	9,5	13,8	14,9	18,2	26,4	28,7	31,2	34,0	37,0	40,3
aboard rail cars OUT	1000 t			15,6	16,2	22,3	23,2	27,1	37,5	39,0	40,6	42,3	44,1	45,9
cars	1000 t			0,5	0,6	0,8	0,9	1,1	1,5	1,6	1,7	1,8	2,0	2,1
TOTAL TONNAGE	**1000 t**			**31,8**	**33,7**	**47,5**	**50,4**	**60,0**	**84,9**	**90,2**	**95,8**	**102,0**	**108,6**	**115,6**
NUMBER OF TRUCKS	unit			349	373	531	568	683	975	1 041	1 115	1 195	1 277	1 366
NUMBER RAIL CARS	unit			487	513	722	763	906	1 278	1 354	1 437	1 525	1 621	1 723
CARS	unit			535	572	817	874	1 052	1 501	1 606	1 718	1 838	1 967	2 105
TOTAL PASSENGERS	**unit**			**1 712**	**1 832**	**2 613**	**2 796**	**3 366**	**4 802**	**5 139**	**5 498**	**5 883**	**6 295**	**6 736**
of which: outgoing	unit			856	916	1 307	1 398	1 683	2 401	2 569	2 749	2 942	3 147	3 368
NUMBER OF CALLS	**unit**			**25**	**25**	**50**	**50**	**60**	**70**	**70**	**80**	**80**	**90**	**90**

	UNIT	TARIFF ($)	K	PROJECTED PROFIT AND LOSS STATEMENT						in 1000 $				
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	70,0	140,0	140,0	168,0	196,0	196,0	224,0	224,0	252,0	252,0
port dues on cargos	$/TON	1,2	1,0	0,0	40,4	57,0	60,4	72,0	101,9	108,2	115,0	122,4	130,3	138,7
port dues on trucks	$/Truck	15,0	1,0	0,0	5,6	8,0	8,5	10,2	14,6	15,6	16,7	17,9	19,2	20,5
port dues on rail cars	$/rail car	22,5	1,0	0,0	11,5	16,2	17,2	20,4	28,8	30,5	32,3	34,3	36,5	38,8
port dues on cars	$/cars	6,0	1,0	0,0	3,4	4,9	5,2	6,3	9,0	9,6	10,3	11,0	11,8	12,6
port dues on passengers	$/Pax out	1,0	1,0	0,0	0,9	1,3	1,4	1,7	2,4	2,6	2,7	2,9	3,1	3,4
TOTAL REVENUES				**0,0**	**131,9**	**227,4**	**232,8**	**278,7**	**352,7**	**362,5**	**401,1**	**412,6**	**452,9**	**466,0**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	2430	1,5%			36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5
Overheads	Op. Rev	12%		0,0	15,8	27,3	27,9	33,4	42,3	43,5	48,1	49,5	54,3	55,9
Financial charges			1,0	0,0	34,4	34,4	34,4	34,4	34,4	31,0	27,5	24,1	20,6	17,2
Former Amortization				13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	2430	5%			121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5
TOTAL EXPENSES				**13,1**	**251,0**	**262,4**	**263,1**	**268,6**	**277,5**	**275,2**	**276,4**	**274,3**	**275,7**	**273,8**
GROSS OPERATING PROFIT				**-13,1**	**-119,0**	**-35,0**	**-30,3**	**10,1**	**75,3**	**87,3**	**124,7**	**138,3**	**177,2**	**192,1**

PROJECTED CASH-FLOW **in 1000 $**

GROSS POTENTIAL CASH-FLOW				0,0	15,5	99,6	104,3	144,7	209,8	221,9	259,3	272,9	311,7	326,7
Taxes on profit	Gross prof	30%		0,0	0,0	0,0	0,0	3,0	22,6	26,2	37,4	41,5	53,1	57,6
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	43,0	43,0	43,0	43,0	43,0	43,0
Local expenses for project	430		1	430,0										
NET POTENTIAL CASHFLOW			INV.	-430,0	15,5	99,6	104,3	141,6	144,3	152,7	178,9	188,4	215,6	226,1
(Cumulative)					15,5	115,1	219,4	361,1	505,3	658,0	836,9	1025,3	1240,9	1466,9

RETURN ON INVESTMENT **IRR= 23%**

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

PESSIMISTIC TRAFFIC **FULL PROJECT** Slow increase of traffic over the first 5 years

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		coef.		0,5	0,5	0,67	0,67	0,75	1	1	1	1	1	1
aboard trucks IN	1000 t			2,6	2,7	3,7	3,7	4,4	6,0	6,1	6,3	6,5	6,7	6,9
aboard trucks OUT	1000 t			1,1	1,1	1,5	1,5	1,7	2,4	2,5	2,5	2,6	2,7	2,8
aboard rail cars IN	1000 t			8,6	9,0	12,6	13,3	15,8	22,2	23,4	24,7	26,1	27,6	29,2
aboard rail cars OUT	1000 t			2,6	2,7	3,7	3,7	4,4	6,0	6,1	6,3	6,5	6,7	6,9
cars	1000 t			0,5	0,5	0,7	0,7	0,8	1,2	1,2	1,2	1,3	1,3	1,4
TOTAL TONNAGE	**1000 t**			**15,3**	**15,9**	**22,1**	**23,0**	**27,0**	**37,8**	**39,3**	**41,0**	**43,0**	**45,0**	**47,2**
NUMBER OF TRUCKS	unit			183	185	257	263	304	420	430	440	455	470	485
NUMBER RAIL CARS	unit			223	233	325	340	402	564	590	620	652	686	722
CARS	unit			515	531	729	751	869	1 194	1 230	1 267	1 305	1 344	1 384
TOTAL PASSENGERS	**unit**			**1 648**	**1 697**	**2 331**	**2 401**	**2 782**	**3 821**	**3 936**	**4 054**	**4 175**	**4 301**	**4 430**
of which: outgoing	unit			824	849	1 166	1 201	1 391	1 910	1 968	2 027	2 088	2 150	2 215
NUMBER OF CALLS	**unit**			**25**	**25**	**25**	**25**	**50**	**50**	**50**	**50**	**50**	**50**	**50**
	UNIT	**TARIFF ($)**	**K**	**PROJECTED PROFIT AND LOSS STATEMENT**						**in 1000 $**				
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	70,0	70,0	70,0	140,0	140,0	140,0	140,0	140,0	140,0	140,0
port dues on cargos	$/TON	1,2	1,0	0,0	19,0	26,5	27,6	32,4	45,3	47,2	49,2	51,6	54,0	56,6
port dues on trucks	$/Truck	15,0	1,0	0,0	2,8	3,9	4,0	4,6	6,3	6,5	6,6	6,8	7,1	7,3
port dues on rail cars	$/rail car	22,5	1,0	0,0	5,2	7,3	7,7	9,0	12,7	13,3	14,0	14,7	15,4	16,2
port dues on cars	$/cars	6,0	1,0	0,0	3,2	4,4	4,5	5,2	7,2	7,4	7,6	7,8	8,1	8,3
port dues on passengers	$/Pax out	1,0	1,0	0,0	0,8	1,2	1,2	1,4	1,9	2,0	2,0	2,1	2,2	2,2
TOTAL REVENUES				**0,0**	**101,1**	**113,2**	**114,9**	**192,6**	**213,4**	**216,2**	**219,4**	**223,0**	**226,7**	**230,7**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	2430	1,5%		0,0	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5
Overheads	Op. Rev	12%		0,0	12,1	13,6	13,8	23,1	25,6	25,9	26,3	26,8	27,2	27,7
Financial charges			1,0	0,0	34,4	34,4	34,4	34,4	34,4	31,0	27,5	24,1	20,6	17,2
Former Amortization				13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	2430	5%			121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5
TOTAL EXPENSES				**13,1**	**247,3**	**248,7**	**248,9**	**258,2**	**260,7**	**257,6**	**254,6**	**251,6**	**248,6**	**245,6**
GROSS OPERATING PROFIT				**-13,1**	**-146,2**	**-135,5**	**-134,0**	**-65,6**	**-47,4**	**-41,4**	**-35,2**	**-28,6**	**-21,9**	**-14,9**

PROJECTED CASH-FLOW **in 1000 $**

GROSS POTENTIAL CASH-FLOW				0,0	-11,6	-0,9	0,6	69,0	87,2	93,2	99,4	106,0	112,7	119,6
Taxes on profit	Gross prof.	30%		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	43,0	43,0	43,0	43,0	43,0	43,0
Local expenses for project	430		1	430,0										
NET POTENTIAL CASH-FLOW			INV.	-430,0	-11,6	-0,9	0,6	69,0	44,2	50,2	56,4	63,0	69,7	76,6
(Cumulative)					-11,6	-12,5	-11,9	57,0	101,3	151,4	207,8	270,8	340,5	417,2

RETURN ON INVESTMENT **IRR= -0,4%**

AKTAU FERRY TERMINAL **PROJECTED PROFIT & LOSS STATEMENT AND CASH-FLOW**

REASONABLE TRAFFIC **FULL PROJECT** Slow increase of traffic over the first 5 years

TRAFFIC FORECAST

	UNIT			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		coef.		0,5	0,5	0,67	0,67	0,75	1	1	1	1	1	1
aboard trucks IN	1000 t			2,6	2,7	3,7	3,7	4,4	6,1	6,5	6,9	7,3	7,8	8,2
aboard trucks OUT	1000 t			1,1	1,1	1,5	1,5	1,7	2,5	2,6	2,8	2,9	3,1	3,3
aboard rail cars IN	1000 t			8,7	9,3	13,3	14,3	17,3	25,1	27,2	29,5	32,1	34,9	38,0
aboard rail cars OUT	1000 t			6,7	7,1	9,9	10,5	12,6	17,8	18,9	20,1	21,4	22,7	24,2
cars	1000 t			0,5	0,6	0,7	0,7	0,9	1,2	1,3	1,4	1,5	1,6	1,6
TOTAL TONNAGE	**1000 t**			**19,5**	**20,6**	**29,1**	**30,9**	**36,9**	**52,7**	**56,5**	**60,7**	**65,2**	**70,1**	**75,3**
NUMBER OF TRUCKS	unit			180	185	382	394	406	430	456	483	512	543	576
NUMBER RAIL CARS	unit			306	327	698	710	767	829	895	968	1 047	1 133	1 226
CARS	unit			515	531	729	751	869	1 229	1 303	1 381	1 464	1 551	1 644
TOTAL PASSENGERS	**unit**			**1 600**	**1 712**	**2 442**	**2 613**	**3 146**	**4 488**	**4 802**	**5 139**	**5 498**	**5 883**	**6 295**
of which: outgoing	unit			800	856	1 221	1 307	1 573	2 244	2 401	2 569	2 749	2 942	3 147
NUMBER OF CALLS	**unit**			**25**	**25**	**25**	**25**	**50**	**50**	**50**	**50**	**60**	**60**	**60**
	UNIT	**TARIFF ($)**	**K**	**PROJECTED PROFIT AND LOSS STATEMENT**						**in 1000 $**				
OPERATING REVENUES														
port dues on vessels	$/CALL	2 800,0	1,0	0,0	70,0	70,0	70,0	140,0	140,0	140,0	140,0	168,0	168,0	168,0
port dues on cargos	$/TON	1,2	1,0	0,0	24,7	35,0	37,0	44,3	63,2	67,8	72,8	78,2	84,1	90,4
port dues on trucks	$/Truck	15,0	1,0	0,0	2,8	5,7	5,9	6,1	6,5	6,8	7,2	7,7	8,1	8,6
port dues on rail cars	$/rail car	22,5	1,0	0,0	7,4	15,7	16,0	17,3	18,6	20,1	21,8	23,6	25,5	27,6
port dues on cars	$/cars	6,0	1,0	0,0	3,2	4,4	4,5	5,2	7,4	7,8	8,3	8,8	9,3	9,9
port dues on passengers	$/Pax out	1,0	1,0	0,0	0,9	1,2	1,3	1,6	2,2	2,4	2,6	2,7	2,9	3,1
TOTAL REVENUES				**0,0**	**108,9**	**132,0**	**134,7**	**214,4**	**238,0**	**245,0**	**252,7**	**289,0**	**298,0**	**307,6**
OPERATING EXPENSES	Base	Rate												
Salaries	9	3300	1,0	0,0	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7	29,7
Maintenance	2430	1,5%			36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5	36,5
Overheads	Op. Rev	12%		0,0	13,1	15,8	16,2	25,7	28,6	29,4	30,3	34,7	35,8	36,9
Financial charges			1,0	0,0	34,4	34,4	34,4	34,4	34,4	31,0	27,5	24,1	20,6	17,2
Former Amortization				13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1	13,1
New Amortization	2430	5%		0	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5	121,5
TOTAL EXPENSES				**13,1**	**248,2**	**251,0**	**251,3**	**260,9**	**263,7**	**261,1**	**258,6**	**259,5**	**257,1**	**254,8**
GROSS OPERATING PROFIT				**-13,1**	**-139,3**	**-119,0**	**-116,6**	**-46,4**	**-25,7**	**-16,1**	**-5,8**	**29,5**	**40,9**	**52,8**

PROJECTED CASH-FLOW **in 1000 $**

GROSS POTENTIAL CASH-FLOW				0,0	-4,7	15,6	18,0	88,1	108,8	118,5	128,7	164,1	175,5	187,3
Taxes on profit	Gross prof.	30%		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	8,9	12,3	15,8
Foreign loan refunding			1,0	0,0	0,0	0,0	0,0	0,0	43,0	43,0	43,0	43,0	43,0	43,0
Local expenses for project	430		1	430,0										
NET POTENTIAL CASHFLOW			INV.	-430,0	-4,7	15,6	18,0	88,1	65,8	75,5	85,7	112,2	120,2	128,5
(Cumulative)						15,6	33,6	121,8	187,6	263,1	348,8	461,1	581,3	709,8

RETURN ON INVESTMENT **IRR= 7%**

PART 5

ENVIRONMENTAL DUE DILIGENCE

Environmental Due Diligence

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1. Introduction

Transport Corridor Europe Caucasus Asia (Traceca) was created as a component of the EC Tacis interstate programme to promote improved commerce in this region through identification of problems and deficiencies, and development of solutions, in trade and transport. Module C of the Traceca Traffic and Feasibility Studies, TNREG 9803 Project, is the Rehabilitation of Aktau Ferry Terminal.

This environmental assessment is part of a feasibility study of the economic and financial potential of the ferry terminal in Aktau. This technical assistance effort will also result in development of the relevant technical documentation required for the works tender. This package will be the basis for the proposed Tacis grant and EBRD potential investment for renovation of the ferry terminal.

This constitutes a preliminary environmental assessment, and follows the environmental directives, statutes and regulations of the EBRD and the Government of Kazakhstan. Tacis has specified that the implementation and operations of the proposed investment project must also comply with MARPOL and IPMG guidelines.

The main goals of this environmental assessment are as follows:

- to ensure that the rehabilitation project for the Aktau ferry terminal is environmentally sound, and
- to ensure public participation by informing the stakeholders regarding the project and incorporating their comments concerning environmental impacts, as appropriate, into the project plan.

Where applicable, the consultant was required to take into account the environmental guidelines of MARPOL and the IMDG code. The latter depends, of course, on the goods to be shipped by the ferries. Environmental considerations outlined in this assessment must be taken into account at all stages of this investment project.

There are a number of precedents to this project, particularly concerning an Environmental Impact Assessment (EIA) carried out within the context of the first phase of the Aktau port rehabilitation (development of a dry goods docking area) in 1994. This was followed by development of an Environmental Health & Safety Action Plan, implemented by Scott Wilson Kirkpatrick and completed in July 1997.

Furthermore, an assessment of the proposed AFT renovation project, including a preliminary evaluation of possible environmental impacts, was carried out by Ramboll in 1997.

2. Background

The northern branch of the Traceca corridor passes through the port of Aktau, the principal port of Kazakhstan. This is the preferred route for Kazakhstan over more southerly route passing through Uzbekistan and Turkmenistan, as the route passing through Aktau increases shipping revenues for Kazakh railways and the port of Aktau itself. Furthermore, there are tariff disputes between Turkmenistan and the other countries served by the ferries.

Between 1986 and 1992 the port of Aktau operated a ro-ro ferry service with other ports, principally the port of Baku. This service was halted after 1992, due principally to political conflicts in the Caucasus countries, but has recently resumed. Although the Aktau Ferry Terminal (AFT) was designed for loading rail cars onto the ferries, since it began service it has only processed passengers, cars and trucks.

The port of Aktau is presently recovering from a decline in traffic. This recovery is largely due to the port's ideal position for servicing the Tenghiz oil fields, especially over the last two years, when constraints arose for shipping goods through Russia. The port of Aktau (officially called the Aktau Commercial Sea Port, or ACSP) negotiated a loan with the EBRD for US$ 50 million in 1997 for rehabilitation of the general cargo facilities, not including the AFT. This so-called Phase I of the port rehabilitation was completed in October 1999. It included a major dry goods harbour facility. Servicing of oil tankers was not improved. At present, oil tank cars from the Tenghiz oil fields is delivered to the port and loaded onto tankers.

The annual capacity of the ACSP for dry cargo is estimated at 700,000 tonnes. The port can handle 6 million tonnes of crude oil annually. Renovation and rehabilitation of the ferry terminal would provide additional capacity to the port in terms of railway transport. The port actually handled almost 1.7 million tonnes of crude oil and 9,900 tonnes of petroleum products in 1998, higher than the volumes handled in the early 1990's, but lower than the average of 5 million tonnes of crude oil handled annually in the late 1980's. The port objectives include achieving a capacity of 5 million tonnes of crude oil throughput and 315,000 tonnes of dry cargo by 2001. The maximum size of oil tankers serving the port is 7,000 tonnes of crude oil.

3. Operational context

3.1 Purpose, need and development timetable of the project

The management of the Port of Aktau desired a quick and relatively inexpensive way to adapt the existing ferry terminal to permit roll-on/roll-off operations for road traffic. However, various experts have expressed concerns regarding the safety of such an initiative. Other options include road and rail traffic, variations on shoreside facilities.

Major issues related to the options for AFT redevelopment concern the layout of access roads, holding areas and facilities for customs and immigration procedures. These issues will be addressed to allow quick ferry service and efficient unloading-loading operations. Previous studies resulted in a determination that further work is required, particularly regarding:

- mechanical-electrical installations,
- the ramp structure,
- civil works,
- other facilities (ticketing, administration, specific customs and immigration facilities).

Development of these facilities must be implemented within the context of:

- the full range of vessels which could dock at Aktau (corresponding to the vessels that service Baku and Turkmenbashi),
- similar loading and off-loading conditions for vehicles (permissible vehicle weights, profiles, etc.) to those expected for Baku and Turkmenbashi,
- possible future variations in the level of the Caspian Sea.

AFT shall accommodate road vehicles (trucks, trailers and cars), passengers as well as rail-cars (at the moment only road vehicles and passengers can be transported on board but ACSP is strongly convinced about the demand for rail cargo at AFT). It will be designed for the ferries belonging the Caspian Shipping Company which are currently calling at AFT (Dagestan type vessels). Rail might be used for export of oil, especially oil produced at the on-shore Tenghiz field located north of Aktau,

operated by Chevron. Other potential users of AFT are forwarders of grain, uranium, fertilisers, sulphur and cotton (Uzbek cotton), as well as importers of miscellaneous equipment for oil companies.

The Ministry of Transport, Communications and Tourism of Kazakhstan called for tenders for re-development and operation of the ferry ramp on a concession basis on a number of occasions, first in 1997, and most lately in early 1998. However, there have been no serious responses to these tenders, although oil companies operating in Kazakhstan may be interested in operating the ferry terminal.

The results of the feasibility study for the AFT will be presented to the MoTCT, the Port of Aktau, Tacis and the EBRD. It will be suitable for inclusion in a Design and Build tender. The draft Feasibility Study will be completed in March 2000. Financing of the investment is expected to be provided through a Tacis grant and possibly through an EBRD loan.

3.2 Legal and institutional framework

This section summarises the various legal and institutional issues that are relevant to establishing the framework for the environmental assessment of the planned renovation of the AFT.

Government Institutions

The main agencies responsible for environmental management and protection at the national level in Kazakhstan are the following:

- Ministry of Ecology & Bioresources (MoEB)
- State Committee for Water Resources
- State Sanitary & Epidemiological Inspectorate (under the Ministry of Public Health)

The MoEB is the principal environmental agency in Kazakhstan, and has a range of functions and responsibilities, including development and implementation of environmental policy and legislation, setting environmental standards, issuance of permits and licenses, environmental monitoring, state control and enforcement, and waste management. The MoEB also sets guidelines for implementing environmental impact assessments (EIAs), and is responsible for conducting the State Ecological Expertise required for review of EIAs. The Fisheries Protection Inspectorate, an executive agency of the MoEB, is responsible for protecting and managing all fisheries within Kazakhstan.

The State Committee for Water Resources (Goskomresursy) is responsible for managing Kazakh water resources and co-ordinating the water management activities of other agencies. It is responsible for developing and implementing a programme for the use and protection of water resources, while pursuing an integrated technical policy of regulated use and protection of water resources. The SCWR establishes limits and technical standards for water uses and discharges into sewerage and drainage systems.

The State Sanitary and Epidemiological Inspectorate is an agency of the Ministry of Public Health. Its main responsibility is monitoring the sanitary and bacteriological condition of water resources.

Relevant Environmental Laws and Regulations

The main national environmental laws relevant to the proposed renovation of the AFT are as follows:

- The Environmental Protection Act of 1991
- The Water Code of Kazakhstan of 1993
- Sanitary Rules and Norms for Protecting Coastal Waters from Pollution of 1988

- Rules of Surface Water Protection of 1994

Section V of the Environmental Protection Act prescribes the maximum permissible limits of harmful substances in air, water, soil and below the ground. The MoEB, the Mininstry of Public Health, and the State Committee for the Supervision of Safe Working Practices are responsible for compliance and enforcement of all previsions of the act and corresponding regulatory framework. Two sets of standards apply: the SNIP (construction) standards, applying to all relevant construction activities, and PEDECAR standards, which set maximum permissible limits for pollutant emissions from operating facilities (the Department of Ecological Control is responsible for the latter).

Section VII of the act requires that standards of ecological safety and protection of public health must be met during construction and operation of 'installations'. This section also calls for proper management of wastes 'removed from industries'.

The Water Code is the main statute concerning sustainable management and protection of water resources (including surface and groundwater, lakes and the Caspian and Aral Seas). It gives the oblast branch of the Committee of Water Resources approval power over 'operation of enterprises, installations and other facilities which affect the status of water and may set conditions as regards the construction, bottom deepening and other operations' near bodies of water and in water protection zones. The MoEB must give approval for construction works in Water Protection Zones and Strips (including the Caspian), including dredging and the use of explosives, cable and pipeline installations and felling of trees, and other activities that have the potential to affect water quality.

The Sanitary Rules and Norms of Protection of Offshore (Coastal) Waters from Contamination sets out requirements in the Sanitary Protection Zones (including, in the Caspian Region, sea water areas and a 2-kilometer coastal strip of land measured from the shore). Among other provisions these rules call for an Emergency Response Plan, and prohibits disposal or burial, as well as storage, of various substances.

The MoEB issued *Instructions for Carrying Out the State Environmental Expertise of Pre-design and Design Materials in the Republic of Kazakhstan* in March1997 (see Appendix 2). This directive states that financing and construction of a project may not begin without a positive State Ecological Expertise (SEE), which must be conducted by the MoEB and its local agencies. Within this context the MoEB must select an expert commission, which will review various documents, including the project feasibility study. The directive provides for public participation to a much greater extent than previous laws and directives. The evaluation of the project's environmental impact includes an analysis of the kind and level of impact, ecological risk and alternative means of achieving the project goals. The results of the SEE remains valid for two years for new projects and five years for projects involving expansion of existing facilities.

4. Description of the proposed project

The first phase of renovation of the AFT (to be funded under a grant from EC Tacis) is likely to include the following:

1. Marine works and berthing

- Renovation of central pier (including sheet wall protection, improvement of fenders and upgraded pavement)
- Renovation of finger pier (including new fender system, sheet wall protection and upgraded pavement)
- Sea bed cleaning

2. Ferry ramp rehabilitation (structural, electrical and mechanical)

- Renovation of the two link-spans (including new deck, review of structure, replacement of damaged parts, new surface protection, omission of railway switches)
- Renovation of machinery (including spindles, wiring, counterweights pits)
- Procurement and installation of a new control system for lifting operations
- Renovation of tower superstructures

3. Others

- Railway track renovation on approach to the ferry ramp
- Renovation of electricity supply
- Paving works
- Miscellaneous (including water supply piping, sewage works, rainwater drainage, signals at the railway crossings and floodlight masts)
- Passenger terminal

5. Description of existing environment

Aktau is located on the northeastern coast of the Caspian Sea. The port of Aktau is located approximately five kilometres to the east of the populated area of the city of Aktau. The port is protected to the west by a breakwater that extends from the south to the north, 100 meters beyond the entrance to the port. The main channel to the port parallels the coast, passing to the northwest (toward the promontory on which the upper part of the city of Aktau is located).

The coastal area between the port and the city (see drawings in Appendix 1) consists of a narrow strip of beach and lagoons (wetlands). Inland from the wetlands are isolated dwellings and grassy areas frequently inhabited by cows and horses from nearby farms during the time of the consultant's visit. The area to the east of the port appears to be deserted coastline, with no apparent human concentrations, human activity or sensitive ecological zones.

Directly across a small inlet from the port (towards the city) is the intake for the Energo district heating system, as well as the city potable water supply. The municipal waste water treatment plant (MWWTP) and the outfall from the same are in the same area.

Other notable features of the area containing the port of Aktau are described in the following sections.

5.1 Physical environment

The sea bottom at the AFT appears to be limestone, with a thin covering of silt. ACSP periodically dredges the AFT docking area (the last such occasion was in June of 1999). No information was available regarding the zoobenthos. Most of the port itself is built on reclaimed land. Pollutants are likely to be oil and other substances from port operations (largely from vehicles and cranes).

Wind in the Port of Aktau area are normally north-westerlies, and occur most frequently during winter storms. They would tend to drive oil slicks toward the land, thus possibly threatening the main desalination and Aktau thermal energy (district heating) plant water intakes to the north of the port and the nuclear and fossil fuel power station water intakes to the south of the port. The ferry docking area

itself appears to be well-protected from Caspian wave activity, which appears to be limited, in any case. Currents appear to be insignificant.

5.2 Natural environment

The ACSP Oil Spill Contingency Plan report refers to the seasonal presence of fauna in the general area of the port. This include, especially in winter, wildfowl (ducks, pelicans and gulls), and swans, particularly in the area of Lake Karacol, a Protected Area under the responsibility of the Office of Environmental Protection. The various lagoons along the coast are also important habitats for wildfowl and swans, although these wetlands have not been designated as Protected Areas. The report also noted the presence of the white-tailed eagle, marsh harrier, and various owl species in the coastal wetlands.

Seals are frequently seen in and around the port, although there appears to be no breeding areas for seals in the immediate vicinity of the port. Fish in this part of the Caspian include sturgeon and related species, herring and grey mullet (see additional description in Section 5.4).

5.3 Human population and activities

The current population of Aktau is about 140,000, down from 180,000 ten years ago. No growth is expected over the next ten years. Consequently housing construction has halted. The city has been a resort area since before the port was expanded, about 30 years ago. There are various hotels along the beach to the west of the city. Summer brings crowds to the beach areas in and around Aktau, including to the east and west of the port. There is recreational fishing in the lagoons to the east and west of the port.

There is an industrial zone several kilometres to the north of the port and inland. This consists of the Energo district heating plant, a water purification plant, a small refinery and several petrochemical plants. A now closed nuclear power plant and an operating fossil fuel power plant are located just to the east of this industrial zone. Some 20 to 30 kilometres to the east of the power plant complex is a uranium mine and ore processing unit.

5.4 Fish and fishing activities

There are yearly migrations of Caspian Sea fish on a north-south axis. Species consist primarily of Caspian sturgeon and related species, which breed in the northern part of the Caspian and Volga River. In the coastal area of the northern part of the Caspian, no manufacturing activities, in principle, are permitted, although an exception has been made for the Akioke and Caspishelf oil production activities on the coastal shelf (ref. discussions with the Fisheries Protection Inspectorate in Aktau).

Commercial fishing is also limited in the northern part of the Caspian. Quotas exist on a number of species. The catfish has been over-fished, which resulted in a ban on catfish fishing that has been in effect for about five years. However, the Fisheries Protection Inspectorate in Aktau does not have any evidence of damage to fish species due to human activities other than fishing.

The critical south-to-north migration occurs from early spring through June and July. The main fish migrations pass normally within two kilometres of the port, but pass closer during some migration

seasons. According to the Fisheries Protection Inspectorate, marine species do not appear to breed or feed in the coastal areas near the port.

Commercial fishing activities do not occur near the port. The main fishing fleet in this part of the Caspian sails from the port of Bautino, some 140 kilometres up the coast from Aktau.

5.5 Water resource management

Drinking water supply for the city of Aktau comes from the Caspian Sea and a groundwater sources 40 to 50 kilometres from the city (ref. to discussions with the Mangistau Regional Environmental Agency, MREA). Caspian Sea water is desalinised through distillation by Energo. ACSP receives its potable water supply, for use by the port itself and ships, from the city.

The MWWTP only receives sewerage from the lower part of the city. Domestic waste water from the upper part of the city, on a plateau, disposes of waste water on the land. The MWWTP contains both primary (physical/chemical) and secondary (biological) treatment. The design capacity of the plant is 72,000 m^3 per day. However, current throughput is between 35,000 and 37,000 m^3 per day, or about 50 % of design capacity.

In the summer 70 to 80 % of the treated waste water is used to irrigate agricultural land. The remaining 20 to 30 % of the treated waste water (100 % of the treated waste water in the winter) is discharged to a channel, which empties to the sea approximately 250 meters from the beach. According to the MREA, 100 % of the inhabitants of the lower city are connected to the sewer system that serves the MWWTP.

ACSP discharges sanitary waste water from the port itself and from ships docked at the port to the MMWTP. According to the ACSP environmental expert, oily water (including bilge water) is delivered to the oil companies, who separate the oil from the water and return the water to the ground through injection wells.

Although the MREA is concerned that the MWWTP will not be able to handle all of the future waste water from the port in the event of significant increases in shipping traffic, the ACSP believes that adequate capacity exists. The MREA has urged the ACSP to develop their own waste water treatment unit.

Water quality measurements are taken by the MREA once every week at five coastal locations near the city and the port (measurements are taken every day in the case of oil spills). Twenty parameters are measured.

5.6 Environmental management

ACSP has designated a specialist primarily responsible for environmental management and environmental issues concerning the port. It is the responsibility of this person to ensure that all construction activities and all operations conform with the laws and regulations of the Republic of Kazakhstan, and that all appropriate permits are obtained for these activities.

The person responsible for environment at ACSP must manage all issues related to emergency response. The latter particularly concerns oil spills in the Port of Aktau. As petroleum crude and, particularly, petroleum products may be transported by the ferries once the AFT is renovated, the possibility of oil spills must be a consideration for this investment.

Oil spills in the port

There have been only 3 or 4 recorded minor spills of oil (between 150 and 400 kilograms), and two significant oil spills at the port of Aktau. The latter occurred in 1993 and 1996, with, respectively spills of 12 tons and 200 kilograms.

Emergency response plan

The Port of Aktau has an Oil Spill Contingency Plan that outlines the risks of an oil spill, defines strategies, defines the responsibilities of the various port personnel in the event of a spill, defines notification obligations, and provides for restoration of affected areas (particularly . Under the plan, the Port should be able to deal with anything up to and including a Tier 2 'worst case' scenario. Tier 3 spills are possible, and would require external assistance.

The Port maintains some oil spill containment equipment. ACSP expects to purchase further equipment through an expected loan from the EBRD in 2000. The Port has conducted various practice exercises regarding oil spill response.

6. Assessment of significant environmental impacts

6.1 Impact related to construction phase

The consultant finds that the impacts on the environment related to water during the construction phase of the project will come largely through removal of debris and old sheet walls, and installation of new sheet wall protection and fenders, on the central pier and finger pier. However, the harbour is well-protected from Caspian waves and currents, and there appears to be little in the way of zoobenthos in the sediment or other marine life in and around the ferry dock that would be at risk.

Land-based sources of risk include safety related to the transport of materials to and from the site, and release of dust (particularly concerning the transport of landfill). The intended demolition of the old transformer station could result in the escape of polychlorinated bi-phenyls or other toxic substances. Sandblasting and re-painting activities also pose risks for the soil as well as the water.

Pipelines that overspan the access route to the ferry ramp, currently not used, may need to be removed should the access route need to be raised to compensate for expected seal level rise. However, this action will not be part of the phase 1 investment.

6.2 Impact related to the future operation of the ferry terminal

Although the current nature of cargo to be transported by the ferries once the AFT is renovated is uncertain, there is likely to be shipment of petroleum crude and/or petroleum products. These pose the greatest risk to the environment in and around the port. However, given that there is an existing offloading and onloading facility for petroleum crude and petroleum products at the port, the consultant finds that any impacts posed by the ferry cargo are limited.

Other risks to the environment involve the expected increase in ferry traffic. This normally might be expected to be of concern for the port waste management facility (concerning both waste water and solid waste). Although the ferries do not currently offload sanitary waste water at the port, discussions

with a ferry captain indicated that they would like to do so. Solid waste is offloaded at the port. The ferry captain stated that bilge water is not generated on the ferries, and the ballast water, which consists of sea water, need not be (and is usually not) disposed at the port.

7. Mitigation measures

7.1 Construction phase

The contractor should ensure that this is the case, and that no impacts of this part of the construction will reach outside of the port. The contractor must, of course, ensure that no debris, prescribed substances or other materials will be disposed in the water during the construction phase. In particular rubber tyres, steel frames and other debris from the seabed in the ferry docking area should be removed by the contractor from the seabed in the ferry docking area without disturbing water or seabed regimes outside of the ferry docking area.

The contractor will similarly ensure that any road traffic due to construction entering the port will not interfere with existing traffic patterns. All incoming vehicles concerning this construction must take any necessary safeguards to avoid releases of materials (including dust) over the route. This includes any materials required for landfill. The contractor shall ensure that any required excavation of any required landfill materials minimise negative impacts on the environment (including risk to surface or groundwater resources, and/or release of dust to the atmosphere).

The contractor must comply with Kazakh laws and regulations related to storage and disposal of materials in a Sanitary Protection Zone. This will include any toxic or other substances stored at the site during the construction activities, and any debris or hazardous or other substances accumulated at the site. The possible need to remove existing petroleum from equipment to be demolished (not anticipated under phase 1 works) must be planned well in advance with the ACSP. Proper dismantling and disposal of materials shall be observed to prevent any contamination of soil or water in and around the ferry terminal. All materials shall be disposed as appropriate to the materials. Two disposal sites for, respectively, non-hazardous and hazardous materials, managed by the City of Aktau, are located near the port. The consultant could not verify independently that the hazardous disposal site conforms to international standards for the same.

Other specific measures related to activities to be financed by the preliminary grant from EC Tacis (phase 1 works) include the following:

- The uncontrolled discharge, dumping and tipping of PCBs and of objects and equipment containing PCBs or related substances is prohibited by EU directives. Demolition of the old transformer station must be done such that such wastes are properly managed, without endangering or harming the environment. This particularly concerns any PCBs or other transformer fluids, which should be removed and properly disposed (as per any national and/or local standards) before demolition of the substation commences.

- Sandblasting and repainting (to be undertaken within the context of marine works, berthing structures, ramp works, and lifting tower structure and machinery rehabilitation) must be implemented with due regard to possible environmental consequences. Care must be taken to avoid release of spent sand (containing wastes) to the atmosphere and to the water. Removal of paint is of particular concern, as this can be quite toxic to the environment. Adequate precautions must be taken for worker safety. Toxic paints must be stored and applied with care to avoid contamination of the atmosphere and the sea. Adequate precautions must be taken for worker safety.

- Cleaning and lubricating of mechanical equipment (to be undertaken within the context of lifting tower structure and machinery rehabilitation) must be done in a way that limits or avoids contamination of the water.

- Any wastes generated by repair of asphalt pavement on the central pier and dismantling of rails on the outer and inner spans of the ferry ramp, must be minimised. This includes possibly release of dust to the atmosphere. Any solid wastes from these repairs must be properly disposed.

7.2 Operational phase

Port facilities exist to handle the eventuality of oil spills. However, a specific plan must be developed for the AFT, and the ACSP must ensure that any additional required equipment is present. Also, ACSP must involve the AFT in any practice events. ACSP must ensure that waste reception facilities are adequate for handling the expected quantity of wastes.

8. Required approvals and consents

The main approvals and consents with this project rest with the local agency of the MoEP and the local agency of the State Committee for Water Resources. The person responsible for obtaining these approvals and consents at ACSP is familiar with the requirements and has implemented these before for other investments at the port.

In particular, pre-construction approvals are required from the State Ecological Expertise (responsibility of the MoEB), and the State Sanitary Expertise (responsibility of the Sanitary and Epidemiological Inspectorate under the Ministry of Health). Both agencies are authorised to suspend construction works if carried out without a permit.

Separate approvals may be required for carrying out certain activities, including the following:

- Dredging and disposal of dredged materials
- Disposal of construction wastes other than at approved disposal sites
- Use of untested fill materials for raising ground level
- Use of underwater explosives

The contractor must determine if any of these will apply to the proposed construction works. The contractor must also inspect or arrange for inspection of all buildings and above-ground structures that are to be demolished at the ferry site in order to identify any materials or substances present that require special removal, handling, storage and/or disposal. Hazardous or 'special' materials are of particular concern (for example, the possible presence of PCBs). The contractor should also determine whether a soil contamination investigation must be initiated at the ferry site, to determine whether there may be any environmental and health and safety risks during construction. This study, if required, should be carried out prior to any demolition and construction works.

9. Conclusion

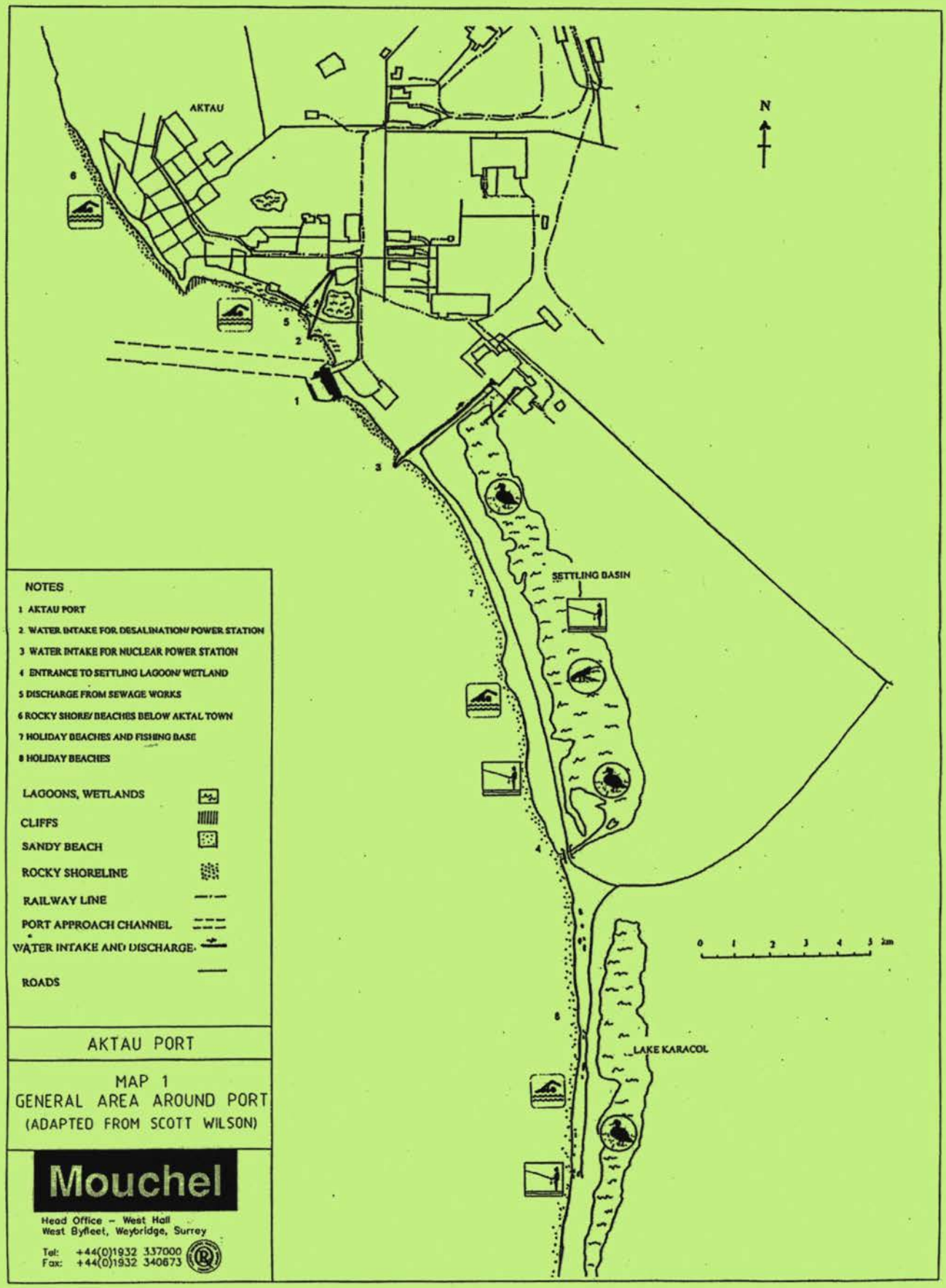
The Port of Aktau is not currently considered very polluted, there are relatively few impacts that are expected from development activities, in particular the relatively small-scale development of the AFT. As there is already a petroleum loading and unloading facility at the port, measures for mitigating the risk related to petroleum products or products transported by the ferries should be already implemented or will soon be implemented in the port, although specific measures relative to the AFT and the peculiarities of shipment by the ferries must be developed.

A major port development project has recently been completed, so the port appears to be well prepared for the relatively small impacts that would derive from the AFT construction activities.

Particular references

1. *Package "B" – Environmental, Health & Safety Action Plan*, Aktau Port Institutional Development Project, Scott Wilson Kirkpatrick (July 1997)
2. *The Consequences of New Developments of Multi-Purpose Seagoing RO/RO Ferries on Ports*, Report of Working Group n° 11 of the Permanent Technical Committee II, Permanent International Association of Navigation Congresses (11 May 1994)
3. *Port Network Plan and Improvement Programme: Renovation of the Ferry Terminal at Aktau Port – Initial Appraisal Report*, Ramboll (November 1997)
4. *Aktau Commercial Sea Port Oil Spill Contingency Plan*, Mouchel Consulting Limited (March 1999)

Appendix 1 - Area around the port of Aktau



Appendix 2

Instructions for carrying-out State Environmental Expertise

of Pre-design and Design Materials in the Republic of Kazakhstan

Ministry of Ecology and Bioresources of the Republic of Kazakhstan

Instructions for carrying-out State Environmental Expertise of Predesign and Design Materials in the Republic of Kazakhstan

Almaty 1997

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1. General Provisions

...

2. Status and Objectives of the State Environmental Expertise

2.1. The state environmental expertise is the type of expert activity of the state administrative bodies the purpose of which shall be implementation of the requirements of legislation concerning nature protection, ensuring terms of rational nature use in the course of taking decisions on social and economic development of the republic, its separate regions, sectors of national economy, activities of certain enterprises.

2.2. The state environmental expertise shall have obligatory nature and must precede taking all economic and administrative decisions.

2.3. The main objective of the state environmental expertise shall be determining environmental substantiation of measures to be planned implementation of which impacts directly or indirectly state of natural environment and natural resources.

Objectives of the state environmental expertise shall be also as follows:

- supervision for fullness and correctness of impact assessment of economic activities or other activities on natural environment, as well as determining level of environment risk and danger by a manufacturer;
- analysis of environmental harmful impact of units which are subject to expert evaluation on population health, natural resources, natural environment, as well as possibility of social, economic and environmental consequences;

- assessment of efficiency of fullness and sufficiency of proposed measures connected with population health protection, rational use of national resources, protection of natural environment on the units to be subject to expertise;
- ...

3. Bodies Carrying Out the State Environmental Expertise

3.1. The state environmental expertise shall be carried out by the bodies specially authorised thereto in the system of the Ministry of Ecology and Bioresources of the Republic of Kazakhstan to which organisation and carrying out the state environmental expertise of the units established by current legislation is entrusted.

3.2. Department of the State Environmental Expertise and Radiation Ecology of the Ministry of Ecology and Bioresources of the Republic of Kazakhstan (Glavgosekspertiza) shall be the central body of the state environmental expertise.

3.3. Divisions of Expertise of the province and Almaty municipal Departments of Ecology and Bioresources shall be the bodies, which carry out the state expertise locally.

...

4. Documentation That Is Subject to the State Environmental Expertise, It's Planning

4.1. The following shall be subject to the state environmental expertise:

- ...
- feasibility studies (calculations) and projects of placement, construction, reconstruction, development, technical re-equipment, liquidation of enterprises, units and complexes including feasibility studies and projects of joint ventures and enterprises using foreign investments;
- ...

5. Volume and Composition of Materials To Be Submitted to the State Environmental Expertise

5.1. Materials to be submitted to the bodies of the state environmental expertise for their consideration must cover full composition of the project and contain as follows:

- consolidated explanatory note;
- project volumes containing description of a unit to be subject to expertise and technological processes of production planned which impact on natural environment state directly or indirectly. Contents of the projects materials architectural and town-planning, planning, forecasting nature, environmental and other programs, nature protecting schemes and other preplanned and predesign documentation must provide full picture of the planned economic, production, scientific and other activities as well as substantiation of necessity and expediency of its development and impact on natural environment;

- materials of environmental impact assessment (EIA) formulated in the form of a document which corresponds to the stage of its carrying out according to РНД-03.02.01-93 "Temporary Instructions Concerning the Procedure for Carrying Out Assessment of Impact of the Planned Economic Activities on Natural Environment (EIA)".

5.2. Impact assessment materials and design elaboration of planning or implementation activity on natural environment shall be submitted by the initiator (client) of an expertise and must include as follow:

- possible alternative solutions of the planned activity;
- description of the natural environment state;
- types and levels of impact on natural environment and health of people under the normal conditions and in the case of emergency situations;
- forecast of possible changes of qualitative state of habitat;
- social, economic and environmental consequences;
- measures connected with reducing the level of environmental risk and prevention of environmental danger.

A statement concerning environmental consequences of the activities being planned or implemented which contains guarantees of taking and substantiation of measures connected with ensuring environmental safety of this activity for the whole period of its implementation shall be a conclusion of environmental impact assessment materials.

Availability of EIA in all types and stages of elaboration of design documentation shall be obligatory and serves as a base for taking a final decision of environmental expertise with regard to possibility of placement and development of an activity which is stipulated in a presented project.

When elaborating a project (working project) of a new enterprise construction, reconstruction, technical re-equipment or expansion of operating enterprise, separate workshop or production, EIA shall be carried out in those cases when elaboration of feasibility study of a construction of these units was carried out before implementation of appropriate instructions (without carrying out environmental impact assessment) or if project decisions on this stage differ materially from those which were approved previously in feasibility study.

As a whole use of materials of EIA in the process of carrying out the state environmental expertise was defined by Supplements 1 and 2 of "Temporary Instructions Concerning the Procedure for Carrying Out Assessment of Impact of the Planned Economic Activities on Natural Environment (EIA)". Copies of these materials are attached (Supplement 1 of these Instructions).

5.3. Documentation to be submitted to the state environmental expertise must be agreed with all bodies of the state control and supervision, owner, user of natural resources, other interested organisations. These data shall be submitted within the limits of a project in a form of a concordance sheet of the state supervisory bodies and copies of documents (resolutions of these organisations) which contain notes and proposals.

List of supervisory and co-ordinating organisations is attached (Supplement 2).

5.4. The following copies must be attached to documentation:

- results of discussion of impact assessment of economic activity on natural environment with the population of a region and the public;
- resolutions of previous considerations in the case of carrying out the state environmental expertise of this project repeatedly;

- resolution of departmental (of a branch of industry) expertise if such expertise took place;
- proposals and notes of resolution of experts of the Department of Ecoboiresources of the province (city), in the territory of which development of the projected production is planned, in the case of consideration of project documentation at the central body of the state environmental expertise of the Ministry (Glavgosekspertiza).

...

6. Organisation of the State Environmental Expertise

...

6.2. Procedure for the state environmental expertise shall consist of successive stages in the course of which bodies of expertise shall carry out research and assessment of a unit, which is subject to expertise, and formulate grounded and objective resolution of experts.

6.2.1. The procedure for the state environmental expertise shall include the following:

- registration of applications for carrying out the state environmental expertise;
- preliminary expertise which consists of check of availability and fullness of materials submitted to the expertise including assessment of environmental impact of the planned economic activity and determining their compliance with current legislation and regulatory requirements;
- principle stage of the expertise which envisages determining appropriate level of the expertise, analytical processing of materials, determining the stage of environmental danger of activities being planned or carried out, sufficiency of authenticity of substantiation of units construction;
- conclusive stage of expertise, which includes generalisation of, separate evaluations of experts and results of the environmental expertise, preparation of experts' resolution with conclusions concerning concordance of materials or their refusal.

6.2.2. Project documentation, which was received, shall be subject to registration only if covering letter concerning forwarding this documentation to the state environmental expertise is attached.

Covering letter containing consent to experts work payment (in accordance with the Decree of the Cabinet of Ministers of the Republic of Kazakshtan dated 29th June 1993, No. 549) must be certified by the first manager of an organisation – client (designer). The fact of project materials receipt shall be registered in the special registration journal of Glavgosekspertiza or province Department of Ecology and Bioresources, and then in the Department of expertise of oblecobioresources or at one of the Departments of Glavgosexpertise, which will organise expertise of the project in accordance with specificity of its activity.

Taking out or transfer to other persons of all types of documentation received for the state environment expertise beyond the service premises without special permission of manager shall be prohibited.

6.2.3. Evaluation of completeness and substantiation of project materials to be submitted to the state environmental expertise within preliminary stage of the expertise

shall be carried out in accordance with the requirements of Chapter 5 of these Instructions. Materials, which meet requirements of the preliminary expertise, shall be sent for the further consideration. Documentation, which does not meet requirements of this stage, shall not be considered further and shall be returned to an applicant with notification concerning reasons of consideration refusal.

...

6.3.8. Term of carrying out the state environmental expertise must not exceed three months, especially complicated documentation – six months. Carrying out environmental expertise repeatedly must not exceed two months.

Beginning of the period for carrying out the state environmental expertise shall be established from the moment of submission of all necessary documentation that passed preliminary expertise to the bodies for carrying out expertise and submission of a copy of payment document for experts' work by a client.

...

8. The State Environmental Expertise of Project Documentation of Joint Ventures, Enterprises Using Foreign Technologies and Investments and Foreign Firms

8.1. In accordance with legislation of the Republic of Kazakhstan concerning nature protection the state environmental expertise must precede the beginning of economic activity in the territory of the republic of joint ventures, enterprises using foreign technologies and investments and foreign firms.

The procedure for carrying out process of the state environmental expertise in this case shall be as follows:

8.2. An applicant of economic activity shall submit "Declaration Concerning Intentions" to the Department of the State Environmental Expertise for consideration that was agreed with the local bodies in the territory of which carrying out economic activity is planed (for units of the republican designation it is necessary to co-ordinate it with the Cabinet of Ministers of the Republic of Kazakhstan).

At the stage of "Declaration Concerning Intentions" (Supplement 15) brief review of the natural environment state shall be given with an indication of the main possible environmental, economic and social consequences of the planned activity.

8.3. In the case of a positive resolution of the environmental expertise with regard to "Declaration Concerning Intention" initiator of economic activity shall elaborate the following stage of the project documentation – co-ordination of the unit construction location (site selection) or feasibility study of its construction alternatives. Section "Preliminary Assessment of Impact of Planned Economic Activity on Natural Environment (PreEIA)" shall be included into the materials that is formulated in accordance with "Temporary Instructions Concerning the Procedure for Carrying Out Assessment of Impact of Planned Activities on Natural Environment (EIA) in the Republic of Kazakhstan".

At this stage initiator of economic activity shall carry out analysis of the proposed alternatives of the planned activity including alternative of refusal of its implementation – "zero alternative", shall organise notification in the mass media at the commissions on environment of the local representative bodies concerning planned construction.

PreEIA stage shall not be obligatory and was introduced for the purposes of reducing financial risk of an investor when taking a decision concerning possibility of the planned activity implementation. At the discretion of an investor he has the right to carry out impact assessment in the full volume without PreEIA.

Beginning from the stage of the site selection project materials, before submission to Glavgosekspertisa, shall be sent to the appropriate province (Almaty municipal) Department of Ecology and Bioresources for proposals and notes (formulated in the written form), about that special notification shall be prepared for the Ministry.

Then all documents of this stage shall be sent to the Ministry, where necessity of carrying out impact assessment (EIA) in the full volume shall be determined by the Department of the State Environmental Expertise in accordance with paragraph 5.2. and Supplement 1 "Procedure for Specific Impact Assessment of Planned Economic Activity on Natural Environment during Different Stages of Design of Certain Units and Complexes" of these Instructions. In that case the scope of additional scientific, research, prospecting work shall be specified as well as a level of carrying out environmental expertise of the next stage shall be planned (republican, international) in accordance with a unit significance. In the case of a positive agreement of this stage at the Ministry of Ecobioresources the place of a unit construction location shall be preliminary agreed by the authorised bodies and permission for carrying out design and prospecting work shall be issued.

8.4. The next stage of design documentation elaboration shall be feasibility study of a unit construction on a selected site. SNiP (construction standards and rules) A.2.2-1-96 "Instructions Concerning the Procedure for Elaboration, Co-ordination, Approval and Composition of Design Documentation for Construction of Enterprises, Buildings and Structures" can be used as a basis with regard to structure and extent of study of design documentation during Feasibility Study Phase, which were elaborated by the Ministry of Construction of the Republic of Kazakhstan instead of Snip 1.02.01-85 – USSR Gosstroy document.

In the case if a foreign company elaborates design documentation that company shall carry out elaboration of such documentation in accordance with requirements established in the Republic of Kazakhstan.

Simultaneously with carrying out Feasibility Study formation of "EIA" Section shall be carried out which composition must correspond to the requirements of "Temporary Instructions Concerning the Procedure for Carrying Out Assessment of Impact of the Planned Economic Activities on Natural Environment (EIA) in the Republic of Kazakhstan".

An initiator of economic activity on the basis of EIA materials shall prepare "Statement of Environmental Consequences". That is a document containing guarantees of the initiator of economic activity concerning prevention of negative environmental and connected with them social, economic and other consequences in the case of implementation of the planned activity.

An initiator of economic activity shall hand over Statement of Environmental Consequences to the state bodies of authority, management and supervision as well as the public.

Materials of public hearings shall be formulated as a separate document (minutes) in Statement of Environmental Consequences. Later on these materials shall be submitted to the state environmental expertise as supplement to EIA.

Upon termination of work connected with EIA these documents shall be submitted to Glavgosekspertiza (General State Environmental Expertise) for consideration. Approvals of the principle supervisory bodies (Supplement 2), resolutions of the departmental expertise (if any) and proposals and notes of the appropriate province Department of Ecology and Bioresources shall be attached to these documents.

Terms of design documentation consideration by experts (including EIA Section) shall be regulated by nature and extent of impact of the planned economic activity as well as by special considerations of natural conditions of units' locations, but, as a rule shall not be more than 6 calendar months.

General State Environmental Expertise shall issue resolution of the state environmental expertise on the basis of results of Feasibility Study and EIA consideration. In the case of a negative resolution of the state environmental expertise Feasibility Study and EIA materials shall be returned for revision.

...

8.6. The procedure for carrying out the state environmental expertise stated above shall be retained also when considering design materials at the province (Almaty municipal) Departments of Ecology and Bioresources.

9. Principal Criteria for Taking Decisions

9.1. Principal criteria when preparing experts' resolutions in which final conclusions concerning approval (disapproval) of pre-design and design documentation are formulated shall be fullness and quality of study of the following items in materials being considered:

- state of natural environment up to the beginning of carrying out planned activity;
- description of the planned activity;
- assessment of impact of the planned activity on natural environment;
- state of natural environment as a result of the planned activity implementation;
- sufficiency of measures including technological solutions connected with exclusion, prevention and mitigation of volume (extent) of impact;
- practical possibility of implementation of planned measures connected with nature protection from the point of view of their technical implementation;
- notification of the public concerning planned activity and availability of the documents confirming that public opinion was taken into account.

9.2. When considering materials that characterise the state of natural environment up to the beginning of the planned activity attention shall be paid to submission of detailed information concerning the following:

- natural features of the territory;
- state of the components of natural environment (air basin, surface and ground water, soils, subsurface, flora, fauna, social environment;
- quantitative indices of pollution of natural environment components;
- up-to-date economic use of the territory;
- nature protective (availability of specially protected natural units), cultural (historical and cultural monuments), recreational value of the territory.

Fullness of information inclusion, discovering all missing information and indication of certain spheres where additional researches and prospecting are required shall be the principal requirement that is laid to this Section (Chapter).

9.3. Materials giving description of the planned activity must include:

- purpose and substantiation of social and economic necessity of the planned activity for area of a unit location and for the republic as a whole;
- description of technological processes, sources of discharge and sewage;
- level of environmental danger of product produced and formed wastes as well as possibility of their processing into final product;
- energy consumption, specific consumption of materials and labour intensity of the planned production;
- correspondence of the level of technology used to the best local and foreign analogues;
- degree of environmental risk of the planned activity during periods of normal regime of operation and in emergency situations.

9.4. When considering EIA Section attention shall be paid to correspondence of this material study to the requirements of "Temporary Instructions Concerning the Procedure for Carrying Out Assessment of Impact of the Planned Economic Activity on Natural Environment (EIA).

9.5. The following information shall be given in documentation describing state of environment after implementation of the planned activity:

- analysis of changes by components (degradation, stabilisation) of natural environment and living conditions of population (it is possible to use data of enterprises – analogues);
- substantiation of complex of measures connected with restoration of natural environment and creation favourable conditions for living conditions of population.

9.6. Complex of measures must ensure sufficient and reliable level of protection from anthropogenic impact of the planned economic activity and include as follows:

- qualitative and quantitative descriptions of measures connected with natural protection (method, modes, plants, equipment), regime of their operation;
- methods and means of supervision for functioning and efficiency of measures;
- capital investments and operational expenditures for measures implementation;
- residual impact of a unit after implementation of the planned measures connected with nature protection and possibilities of its additional reduction.

...

Supplement 1

EIA Materials Application in the Course of Carrying Out the State Environmental Expertise

Procedure for Regional Assessment of Impact of the Planned Economic Activity on Natural Environment at Different Stages of Elaboration of Architectural and Town-Planning Documentation

Stage and phase of documentation on assessment of impact of the planned economic activity on natural environment and complex of measures connected with its protection	**Stage of preparation and elaboration of design documentation in the course of town-planning and sectoral planning and designing**	**Procedure for documentation processing**					
		Public hearing		**Environmental expertise**		**Taking decisions**	
		Procedure for obtaining information by the public concerning documentation	**Conclusions and response of client and elaborator of a project**	**Level of carrying out environmental expertise**	**Conclusions and response of client and elaborator of a project**	**Level and bodies of authority and management which take decisions**	**Decisions and recom-mendations**
…	…	…	…	…	…	…	…
Preliminary assessment of impact of the planned economic activity on natural environment (Pre EIA)	Schemes of regional planning of a province, schemes of development of productive forces of territorial and production	Publication of principal provisions in mass media, discussion at the Commission on Ecology of the province	Correction of materials according to received proposals and remarks	The state environmental expertise of the Province Department of Ecology and Bioresources	Correction and supplementing materials according to remarks of the state environmental expertise	Province administration The Ministry of Economy, the Ministry of Construction of the Republic of	Approval Co-ordination of economic and technical indices

	complex, region, of conception (Feasibility Study) of general plans of cities, schemes of regional plans of industrial centres	representative bodies			resolution. Repeated consideration after correction and introduction for approval	Kazakhstan For cities of the republican subordination and province centres, documentation of national, intergovernmental, inter-regional significance	Approval
Assessment of impact of the planned economic activity on natural environment (EIA)	General plan of a city, settlement, project of planning of industrial zone (district), city; scheme of development of engineering infrastructure (heat supply, water-supply and sewerage system, transport etc.)	Publication of principal provisions in mass media, discussion at the Commissions of representative bodies, at the meetings and conferences of the scientific and ecological public	Generalisation of received remarks and proposals, estimation of possibility of their acceptance in the course of a project correction	The State Environmental Expertise on unit significance	Correction of materials according to the State Environmental Expertise resolution. Repeated consideration after correction and introduction for approval	Municipal administration Province administration and district administration General plans of cities of the republican subordination and province centres, documentation having national, intergovernmental and regional significance	Approval Approval Approval

Instructions

"Protection of Natural Environment" Section (complex of measures connected with nature protection). It shall be implemented taking recommendations into consideration, which preceded EIA.	Project of district planning of administrative district, project of detailed planning	Publication of principal provisions in mass media. Reports at the sittings of the local representative bodies, at the meetings of the public	Revision according to received remarks and proposals	The State Environmental Expertise at the level of the Province Departments of Ecology and Bioresources	Revision according to remarks of the State Environmental Expertise and repeated information in mass media	Local representative bodies (according to significance of a unit) Local administrations (according to significance of a unit)	Approval Approval

Supplement 2

List of the State Co-ordinating Organisations

1. Land user, landowner *.
2. Bodies of the state sanitary supervision *.
3. Basin Department of Water Economy *.
4. Bodies of the state service on organisation of the use of land *.
5. Bodies of the Ministry of Geology and Subsurface Protection (for enterprises using mineral and raw materials resources or located at the places of possible bedding of useful minerals) as well as when using ground water and availability of sources of their possible pollution.
6. Forestry association (for enterprises located beyond populated area).
7. Glavbioresursy (General Bioresources) (in the sphere of fauna protection – for enterprises located beyond populated area; in the sphere of protection of fish resources – for enterprises having water diversion and discharge of sewage to open water reservoirs and drains, which carry out different types of activities in fish economy reservoirs).

* - for all types and stages of designing.

Note:

1. The list of organisations shall be established depending on objects of natural environment being in a zone of impact of the planned activity.
2. In the case of changes of terms of nature use in the course of designing at the stage of selection of a site and Feasibility Study or in the case of expiry of the period of validity of approvals it is necessary to carry out additional co-ordinations of these changes before submission of the materials to the territorial bodies of the State Environmental Expertise.

PART 6

RECOMMENDATIONS FOR REDEVELOPMENT

Recommendations for redevelopment

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6.2 Recommendations regarding the ferry terminal 4

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1. INTRODUCTION

After a seven-year break Aktau Ferry Terminal started operating again in June 1999; however the terminal is not yet able to efficiently cope with the potential demand:

- Technical condition of the terminal is very poor (berthing structures, ramp and associated facilities, passenger terminal).
- Rail traffic cannot be accommodated.
- Dagestan ferries are not flexible enough with regard to modern ferry service requirements.
- Border crossing procedures are still very slow.
- ACSP is in need of recommendations to set up a plan for management and operation of the terminal.
- There is also a need of marketing actions to promote the ferry service.

2. IMPROVEMENT OF TECHNICAL CONDITION OF AFT

As explained in Part 1, the condition of the ferry ramp and ferry berth has deteriorated due to age and lack of maintenance. At present the ferry service is operated under arduous conditions, therefore the proposed project has to be quickly implemented (ACSP already started some works, the passenger terminal is almost completed).

This project is a short term one, with fairly modest investment. In case traffic significantly rises (say over 100,000 tonnes per year) and provided that first investment proves to be profitable, then further developments might be needed, such as:

- Extend parking and holding areas, including special slots for dangerous cargoes.
- Widen access roads.
- Supply handling equipment, such as forklifts or flat trailers.
- Allow transfer of containers to/from rail-cars.
- Provide premises for shipping agents and freight forwarders.
- Raise the land territory in case the Caspian sea level increases by more than one meter (compared to its existing level).

3. RAIL TRAFFIC

The section regarding traffic forecasts and demand (Part 2) proves that AFT must be able to accommodate rail traffic. For this reason the proposed project includes provision for rail traffic, with a low marginal cost over the rehabilitation to ensure safe operation of road traffic: only 4 % of the total amount is for railway facilities.

4. DAGESTAN FERRIES

Dagestan ferries were designed during the Soviet time, to mainly serve rail traffic. Therefore sophisticated ramps were built in the ports of call (since tide is almost nil, road traffic would have simply required fixed berths). Dagestan ferries do accommodate road vehicles but the ferries can only berth at their special port ramps; moreover, as Dagestan bows cannot be opened, unloading of road vehicles are always slow. On the other hand, carrying rail-cars onboard vessels is not really

economical: dead weight of cars is approximately 30% of total cargo weight, whereas much space is wasted.

As a first step, if traffic demand sharply grows carrying capacity of Dagestan ferries could be increased by avoiding the use of rail-cars onboard. The most flexible way would consist in using containers, which can be transported on flat trailers (ACSP and Baku port already own such container trailers).

So far, like in the rehabilitation studies regarding Baku and Turkmenbashi Ferry Terminals, the analysis has been limited to the existing Dagestan vessels, since these ferries exist, are still in good condition and are operated on a positive cash-flow basis (a total of eight Dagestan ferries were built in the 80s; five are currently operating the Baku-Turkmenbashi line, two are sailing out of the Caspian sea whilst one operates between Baku and Aktau).

However, in the long term more flexible ferries may be considered, able to operate also along an ordinary quay wall (quarter-ramp type ferries). Such ro-ro vessels would enable calls at any port, for instance in Iran (Bandar Anzali) or in Russia (Astrakhan), allowing triangular ferry routes like Baku-Astrakhan-Aktau or Baku-Bandar Anzali-Aktau.

5. BORDER-CROSSING PROCEDURES

AFT was not initially designed for border-crossings since Azerbaijan, Kazakhstan and Turkmenistan belonged to the Soviet Union. When AFT re-started to operate, passenger border-crossing procedures were first carried out in the open air; it used to take several hours to check twenty to thirty passengers. Vehicles were checked inside the vessel. In February 2000 the passenger terminal opened and passenger control became faster (however, the building still needs to be equipped with luggage x-ray machines and a computer network). Vehicle documents are still checked inside the vessel after berthing, which is not efficient, whilst cargo control takes place on the dry cargo part of the port, near the customs building.

Customs now benefit from new premises on the dry cargo port, but border policemen are still temporarily settled in containers, whereas immigration officers are in Aktau city (they move to the port each time a ferry arrives or leaves). All of them should have permanent rooms in the ferry terminal building.

Apart from premises and equipment purposes, improvement of border-crossing procedures at AFT will require enforcement of recommendations resulting from:

- The Basic Traceca Multi-Lateral Agreement on International Transport, signed in Baku on 08 September 1998, together with its technical annexes on international rail transport, international road transport, international commercial maritime navigation, customs procedures and documentation handling.

- Works of the Permanent Inter-Governmental Commission which is being set up in Baku to help implement the above Multi-Lateral Agreement.

- The soon-to-commence Tacis project "Customs Facilities at Central Asian Road Border Crossings".

6. MANAGEMENT AND OPERATION OF AFT

6.1 Recommendations regarding the whole port

Since 1996 EBRD is financing an Institutional Development Programme (IDP) for ACSP, including three pre-determined packages (Policy and Regulation; Operation Support; Accounting Systems and Business Planning) and three contingent packages (Procurement, Management Training, Privatisation). Antwerp Port Consultants and Scott-Wilson are in charge of implementing this IDP.

Although the Institutional Development Programme already produced tangible impacts, further technical assistance is needed to improve:

- Port operation planning
- Cargo handling productivity
- Maintenance of handling equipment
- Commercial documentation procedures
- Marketing strategy

Moreover, since AFT is a new terminal, ACSP should benefit from tools likely to help select the share of port traffic that may be directed towards the ferry terminal. For instance, records of parameters regarding occupancy of berths, occupancy of handling equipment and of manpower would be quite helpful. Such records would also allow to compute productivity and profitability of various terminals and various gangs.

6.2 Recommendations regarding the ferry terminal

The MoTCT called for tenders in 1997 and 1998 to propose redevelopment of AFT on a concession basis. So far there have been no serious proposal, this is one of the reasons why Tacis decided to grant a budget for AFT rehabilitation.

Oil companies, which were rumoured to be interested, were interviewed by Bceom. They didn't show any interest in investing or operating, although they strongly appreciate the possibility to use the ferry to import equipment to Kazakhstan.

In November and December 1999 Bceom also had the opportunity to liaise with two potential investors/operators: Temirtrans, a branch of the Transrail railway freight-forwarder, on the other hand AK-Biday LLC, a Kazakh grain company. None of them was ready to invest, however they both expressed the will to operate the ferry terminal.

In such a context the opinion of Bceom is that the Port Authority should operate the terminal itself. A concession might be granted later on, preferably to a candidate which would invest funds to improve or to extend the terminal.

In order to efficiently operate AFT, ACSP should get ready to select and to train a team of employees for the ferry terminal:

- a tally-man
- 2 dockers
- a pilot for the central control tower
- 2 clerks

- a mechanic
- an electrician

These people will not be permanently busy on the ferry terminal, they will have to share their working time among several port terminals. Their work-load at AFT will increase together with the ferry traffic.

Lastly, as far as accounting issues are concerned, there should be a specific profit centre for AFT, within ACSP. This is the only way to keep the management aware of real costs, to compute and follow up the terminal profitability.

7. MARKETING ACTIONS

Many relevant port marketing actions were already developed in the framework of the Institutional Development Programme.

However, so far almost no specific marketing action was undertaken regarding AFT. Even in Aktau most of the companies interviewed by Bceom were not aware of the new ferry link. An essential action group deals with information about the ferry link:

- Information of local and national companies in Kazakhstan, Uzbekistan and Caucasus (exporters, importers, freight-forwarders). National and regional newspapers are efficient media for such purposes.
- Information to European companies, through announcements in specialised magazines such as International Association of Ports and Harbours, Port Development International, Permanent International Association of Ports and Harbours.

Besides, in order to target the right customers, ACSP should be able to work out complete transport chains (existing ones, firstly), from real origins to final destinations (most of available statistics only provide ports of origin and ports of destination on the Caspian sea, which is not helpful enough). This task must be carried out for each type of commodity and should cover the whole port traffic.

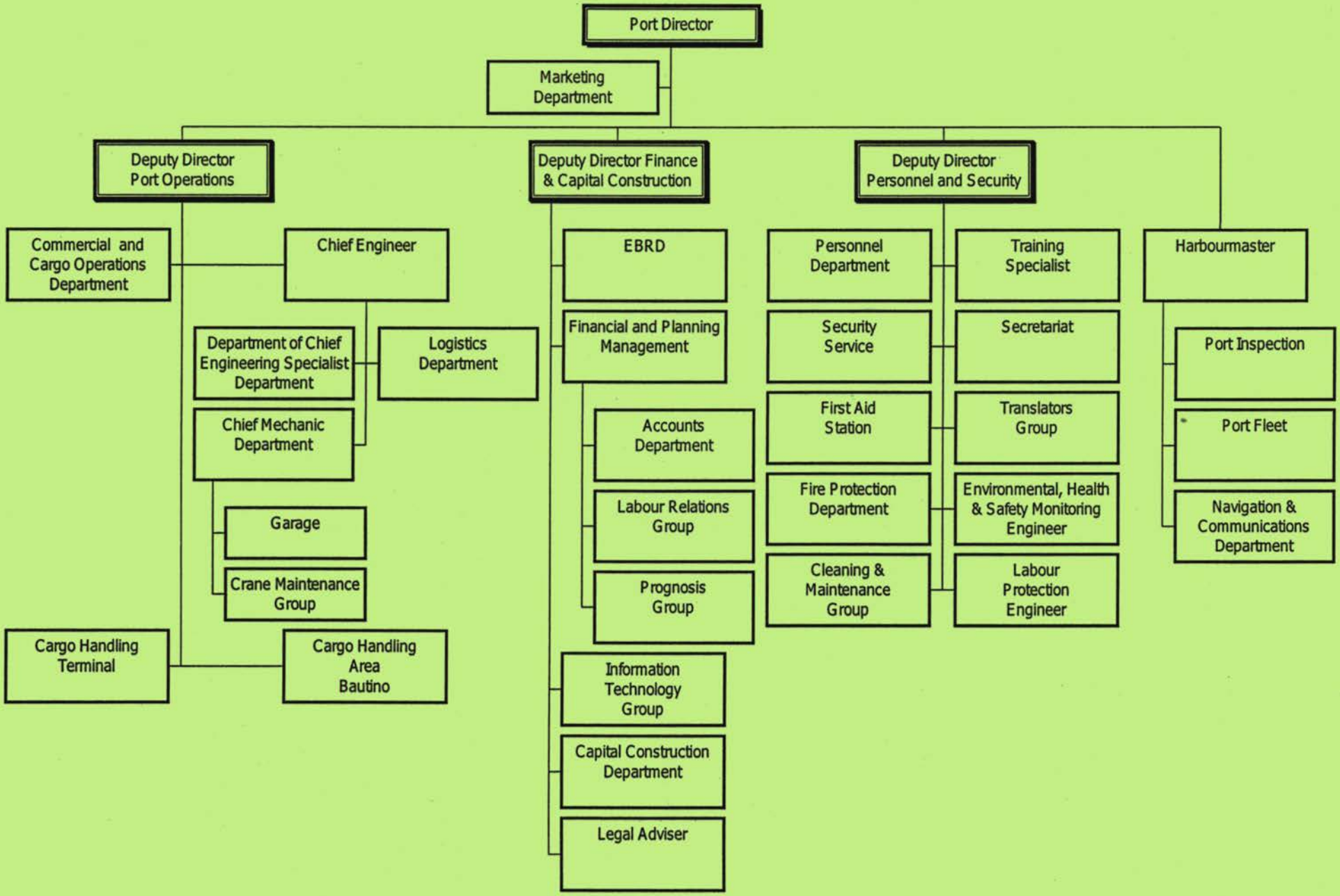
On the other hand, as already mentioned, even if Baku remains the key partner port, other ports should be targeted for medium and long term ferry links, in Iran and in Russia. Where properly managed triangular routes enable to increase vessel loading rates.

Lastly, any marketing action aiming at promoting the ferry service should be carried out in close cooperation with the shipping company, CSC (CSC already announced their wish to divert part of Baku-Turkmenbashi traffic as soon as AFT is rehabilitated).

Attachments

- ACSP Management Organisation Chart (July 1999)

- Traceca project fiche regarding the Inter-Governmental Commission for the Implementation of the Multi-Lateral Agreement on Transport



ACSP Management Organisation Chart (July 1999)

INTER - GOVERNMENTAL COMMISSION FOR THE IMPLEMENTATION

OF THE MULTI – LATERAL AGREEMENT ON TRANSPORT

Traceca Project Fiche

Geographic Focus: Signatory States to the TRACECA Multi-Lateral Agreement (MLA)

Project Budget: euro 1,100,000

Contractor: AXIS

Implementation timetable: 14 months

Background

On September 8, 1998 a Multi-Lateral Agreement (MLA) on International Transport was signed in Baku by 12 States : Armenia, Azerbaijan, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Romania, Tajikistan, Turkey, Ukraine and Uzbekistan. The MLA consists of the "Basic Multilateral Agreement on International Transport for the Development of the Transport Corridor Europe-Caucasus-Asia" and Technical Annexes on : international rail transport, international road transport, international commercial maritime navigation, customs procedures and documentation handling.

The goals of the Basic Agreement and its Technical Annexes are as follows: development of economic relations, trade and transport communication in Europe, the Black Sea region, the Caucasus, the Caspian Sea region and Asia; ensuring access to the world market of road, rail transport and commercial navigation; ensuring traffic security, cargo safety and environment protection; harmonisation of transport policy and legal structure in the field of transport; creation of equal conditions of competition for transport operations.

Objectives

The basic agreement calls for the establishment of an Inter-Governmental Commission and Permanent Secretariat to administer and promote the agreement and its Technical Annexes. The permanent establishment of the secretariat should be conditional on the ratification of the agreement by sufficient states to give it realistic chances of success. So far, eight of the twelve signatory States have ratified the Agreement.

The objective of the present consultancy mission is to establish and to support the activities of such an Intergovernmental Commission and Permanent Secretariat for one year. The role of the Consultant for this project is to provide the initial organisational support to establish the Intergovernmental

Commission and to provide expert professional assistance in the domain. A first meeting of the Intergovernmental Commission is planned in March 2000.

This assignment will be followed by a similar 12 months project to ensure continuity.

Key Issues

According to the MLA, the IGC shall formulate decisions for adoption by the contracting Parties and appropriate recommendations on questions within the Basic Agreement, including the following subjects : co-ordination of transport policies; ensuring the enforcement of the provisions of the Basic Agreement; collection and free exchange of relevant information; harmonious development of transport between the Parties, taking into account primarily traffic safety, goods security and environmental aspects involved; promotion of co-operation between transport enterprises and institutions; promotion of multi-modal transport; simplifying customs procedures and practices which are to be applied at established crossing points.

While the principal role of the Intergovernmental Commission will be to administer the basic agreement, it should also serve as a regional consultative body for trade and transport issues. The opportunity should be taken to create parallel National Facilitation Commissions in each of the participating states to reinforce the work of the Intergovernmental Commission at a local level and to facilitate local consultation.

The Intergovernmental Commission will require a permanent secretariat and also representation in each participating state at a high level in government. The Intergovernmental Commission will comprise the Chairmen of National Commissions and specialised Working Groups for the technical annexes on road, rail, maritime and customs issues.

ANNEX 1

ABBREVIATIONS & ACRONYMS

GENERAL REFERENCES

ABBREVIATIONS & ACRONYMS

GENERAL REFERENCES

ABBREVIATIONS AND ACRONYMS

- ACSP Aktau Commercial Sea Port
- AFT Aktau Ferry Terminal
- Bceom French Consulting Company, appointed by Tacis for TNREG 9803 Project
- BOT Build Operate Transfer
- BSL Baltic Sea Level (Elevation Reference)
- CSC Caspian Shipping Company
- Cascor Caspian Corporation (Kazakh Railway Company)
- EA Environmental Assessment
- EIA Environmental Impact Assessment
- EBRD European Bank for Reconstruction and Development
- EC European Commission
- EU European Union
- IMDG International Maritime Dangerous Goods Code
- MARPOL International Convention for Prevention of Marine Pollution
- MoEB Ministry of Ecology and Bio-resources
- MoTCT Ministry of Transport, Communications and Tourism of the Kazakh Republic
- MREA Mangistau Regional Environmental Agency
- MWWTP Municipal Waste Water Treatment Plant
- PCB Poly-Chlorinated-Biphenyl (dangerous pollutant)
- SCWR State Committee for Water Resources
- SEE State Ecological Expertise
- Tacis Technical Assistance to CIS (a EC Programme)
- TEN Trans-European Transport Network
- ToR Terms of Reference
- Traceca Transport Corridor Europe-Caucasus-Asia
- USD United States dollar

GENERAL REFERENCES

1. Port of Aktau Master Plan Study, Final Report, 1994 - MERC Rotterdam
2. Design water levels for Baku and Turkmenbashi Ferry Terminals, August 1996 - DHI / Ramboll
3. Renovation of Aktau Ferry Terminal, Initial Appraisal Report, November 1997 - Ramboll
4. Business Plan 1999 - 2003 for Aktau Commercial Sea Port, 1999 - ACSP
5. Renovation of Ferry Terminals of Baku and Turkmenbashi, Design Basis, January 1997 - Ramboll
6. Renovation of Ferry Terminal of Baku, Detailed Design, March 1997 - Ramboll
7. Renovation of Ferry Terminal of Turkmenbashi, Detailed Design, March 1997 - Ramboll
8. Renovation of Ferry Terminal of Turkmenbashi, Economic and Financial Evaluation, March 1997 - Ramboll
9. Renovation of Ferry Terminal of Baku, Economic and Financial Evaluation, March 1997 - Ramboll
10. Renovation of Ferry Terminal of Baku, Environmental Analysis, September 1997 - Ramboll
11. Renovation of Ferry Terminal of Turkmenbashi, Environmental Analysis, September 1997 - Ramboll
12. Renovation of Ferry Terminal of Turkmenbashi, Draft Tender Documents, September 1997 - Ramboll
13. Renovation of Ferry Terminal of Baku, Draft Tender Documents, September 1997 - Ramboll
14. Forwarding Multimodal Transport Systems on Traceca Route, May 1997 - BCEOM
15. Regional traffic database and forecasting model, September 1997 – WS Atkins

ANNEX 2 : STAFF LIST

STAFF LIST

1. BENEFICIARIES & COUNTERPARTS

MoTCT

Mr. Karibzhanov, First Vice-Minister
Mr. Kovalenko, Head of Maritime Section

ACSP

Mr. Abylgazin, General Director
Mr. Glock, Financial Director
Mr. Konstantinov, Chief Engineer

2. TACIS - TRACECA

Coordinators

Mr. Benjamin Beddegenoots - Brussels, Europe
Mr. Michael Sims - Tashkent, Central Asia
Mr. Marc Graille - Tbilisi, Caucasus

Monitors

Mr. Pieter Melissen - Tashkent, Central Asia
Mr. Hennie Maters - Tbilisi, Caucasus

Task Manager

Mr. Raimo Niemi – Brussels, Belgium

3. CONSULTANT & KAZAKH SUB-CONSULTANT

BCEOM

Mr. Philippe Delaporte, General Team-Leader
Mr. Paul Pezant, Transport Economist
Mr. José Cacérès, Transport Economist
Mr. André Merrien, Port Engineer, Team-Leader for Module C
Mr. Georges Chaumaz, Mechanical Engineer
Mr. Bernard Francou, Port Economist
Mr. Robert Gould, Environmentalist

NIIT

Mr. Murat Bekmagambetov, NIIT President
Mr. Alexander Bogdanchikov, Transport and Environmental Expert
Mrs. Svetlana Smirnova, Rail Traffic Expert
Mrs. Violetta Kurchenkova, Maritime Traffic Expert
Mr. Vladislav Shirbaev, Mechanical & Electrical Engineer
Mr. Valery Grechuhin, Railway Engineer

4. OTHER STAFF MET

In Almaty

• European Commission Delegation	Mr. Michael B. Humphreys, Ambassador Mrs. Charlotte Adriaen, Programme Officer Mrs. Pauline Gavrilov, Transport Officer Mrs. Alia Baidebekova, Energy Programme Officer
• EBRD	Mr. Kanat Aubakirov, Investment Officer
• Transsystem (Freight Forwarder)	Mr. Eduard Kaplan, Director Mrs. Tatjana Bogdanchikova, Manager
• AK-Biday LLC (Potential Operator)	Mr. Nurkhaidarov, President Mr. Zhanseitov, Construction Manager

In Aktau

• Aktau Commercial Sea Port	Captain Lamzin, Harbour Master Mr. Bulat Zhansvgurov, Marketing Manager Mr. Sergey Ustenco, Commercial Manager Mr. Soloviev, Head of Capital Construction Dept. Mr. Evgeni Suhskov, Electrical Engineer Mrs. Shadrina, Engineer (Capital Construction Dept.) Mrs. Demko, Environmentalist Mr. E. Kalpin, Head of Statistics and Planning Dept. Mr. Vinnikov, Head of Personnel and Security Dept. Mr. Darhan Umirbekovich, Interpreter
• Cascor	Mr. Alexander Grusdev, Head of Railway Division
• Customs	Mr. Amir Atambayev, Head of Aktau Port Customs
• Border Police (Frontier Guards)	Mr. Shirokov Konstantin, Head Officer Mr. Matrosov Denis, Deputy Head Officer
• Texaco	Mr. Jack Todd, Facilities Engineer
• Orix	Mr. Goruk, Logistics Manager
• Partex	Mr. Rui Carvalho, Operation Manager
• Arman	Mr. Edger Folmar, Operation Manager
• Carl Tiedermann GmbH	Mr. Rolf Spangenberg, Marketing Manager
• Posford Duvivier	Mr. Keith Bunning, Resident Engineer Mr. David Watkins, Deputy Resident Engineer
• Scott Wilson & Kirkpatrick	Mrs. Nurzhamal Daulenova, Resident Manager
• Bechtel - Enka Joint-Venture	Mr. Sezgin Ogul, Project Manager
• West-East Building Company	Mr. Genadiy & Mr. Boris
• KKM (oil company)	Mr. Jon Quixley, Logistics Manager
• Desko (Turkish grain carrier)	Mr. Mustafa Dirik

ANNEX 3

Memorandum of Understanding of 01 June 1999

Statement of Endorsement signed on 15 December 1999

MEMORANDUM OF UNDERSTANDING

BETWEEN

THE TRACECA PROGRAMME, AND THE MINISTRY OF TRANSPORT, COMMUNICATIONS AND TOURISM OF THE KAZAK REPUBLIC, AND THE GOVERNMENT OF THE AZERI REPUBLIC

CONCERNING THE REHABILITATION OF THE RAIL FERRY RAMP AT THE PORT OF AKTAU

1) The TRACECA programme will:

- Finance a feasibility study and the preparation of detailed designs for the rehabilitation of the ferry terminal, to service rail and road traffic, on ferries such as are utilised by the Caspian Sea Shipping Company
- Finance reconstruction of the ferry ramp, and such other rehabilitation works as may be necessary, up to a maximum amount of 2 MEURO

2) The Port of Aktau acting for the Ministry of Transport, Communications and Tourism will

- Carry out rehabilitation of the rail tracks, all other on-shore infrastructure, and procure or liberate terrain such as may be necessary for the ferry terminal to operate
- Provide ancilliary buildings such as customs facilities, ticketing offices, waiting rooms etc. for ferry traffic
- Advise the designers and constructors of the ferry terminal on all requirements for permits such as environmental, safety, construction, etc, obtain such permits, and generally facilitate the speedy conclusion of the project from beginning to end

3) Subject to negotiation, either party, TRACECA or the Port of Aktau, will contribute to shore-side or ferry ramp-side costs depending on the budget ceilings set (which is 2 MEURO in the case of the TRACECA programme).

5) All procurement with EC finance will be done in accordance with the TACIS procurement rules

6) The support of the TRACECA programme for the project is dependent on the Republic of Azerbaijan placing a tug-boat at the disposal of the Port of Aktau for a minimum period of one year, on terms agreeable to the Republic of Kazakhstan and to the Republic of Azerbaijan.

This Memorandum will be consolidated into a formal agreement when the detailed design and tender documents for the ferry ramp are prepared.

For the Ministry of Transport, Telecommunications and Tourism of the Republic of Kazakhstan

Signed by the Minister of Transport

For the Republic of Azerbaijan (witnessed)

Awaiting signature by the Vice-Prime Minister for Transport

For the TRACECA Programme

Signed by M.Sims

Aktau, 1st June 1999

STATEMENT OF ENDORSEMENT

Project Title: **Aktau Ferry Terminal Rehabilitation**

Recipient Institution: Ministry of Transport, Communications and Tourism of the Republic of Kazakhstan

I, the undersigned, hereby declare that I,

1. have carefully read the outline Terms of Reference (TORs) of the Project, which are attached to the present Statement of Endorsement;
2. agree that the outline TORs appended to hereto will serve as the basis for the development of the full Contract for the works;
3. accept that this Statement of Endorsement is also applicable to the full Contract for the Works and that no further endorsement will be necessary for project implementation to commence;
4. approve the TOR, and are prepared to accept the technical assistance therein described;
5. accept that the experts and contractors in charge of rendering the technical assistance according to the outline TORs be selected according to the procedures of the Commission of the European Communities;
6. undertake to exert all our best efforts in order to make the rendering of the experts' technical assistance and contractors operations, possible and to extend said experts our fullest co-operation. In particular, we undertake to put at the experts' disposal, free of charges, our facilities and staff, as they may be necessary;
7. undertake to acquire, free of charges, the ownership of the works and equipment purchased for the implementation of the Projects, as and when the transfer of property of said equipment is provided for under the outline TORs or the contract between the Commission of the European Communities and the experts, and to provide said experts with separate official statements certifying the receipt of the equipment;
8. shall allow, upon reasonable notice, independent inspectors, appointed by the Commission of the European Communities, and/or the Court of Auditors of the European Communities, to monitor the development of the Project and undertake to give said inspectors and/or the Court of Auditors the necessary assistance.

For and on behalf of:

	Name, Title	Place	Date	Signature
Ministry of Transport, Communications and Tourism of the Republic of Kazakhstan	Mr. K. Kharibjanov, First Vice Minister			

(signed in Almaty on 15 December 1999)

TERMS OF REFERENCE FOR AKTAU FERRY TERMINAL REHABILITATION

Abbreviations and acronyms

- ACSP Aktau Commercial Sea Port
- AFT Aktau Ferry Terminal
- BSL Baltic Sea Level
- CSC Caspian Shipping Company
- Cascor Caspian Corporation
- MOTCT Ministry of Transport, Communications and Tourism of the Kazakh Republic
- Tacis Technical Assistance Programme to CIS Countries
- Traceca Transport Corridor Europe-Caucasus-Asia
- USD United States dollar

1. Introduction

AFT was designed in Baku by Caspmorniiproject in the 60s and constructed from 1966 to 1976. AFT was used from 1986 till 1992, for passengers and for road traffic. Since June 1999 a ferry vessel belonging to CSC (M.S. Mercuri 2, Dagestan type) is again serving the route Baku-Aktau, on the basis of one call per week. Until now only road vehicles and passengers were transported. Total cargo flows are around 500 tonnes per month.

Currently loading and unloading operations are slow and less safe than desirable. Furthermore rail wagons cannot be handled. This is due to the of the following reasons:

- The ramp cannot move, therefore the ferry has to use its water ballasts to adjust deck level (ferry stern is fitted with short flaps, the ramp has to sit on the ferry structure).
- Since the ferry vessel is longer than central pier she has to drop a bow anchor to secure mooring conditions.
- No proper border crossing facility is available, thus passengers are controlled in the open air at the toe of the ferry.

Regarding Caspian sea levels, a study predicts that until year 2050 the sea level should remain within the -25 meters to -30 meters BSL range. The latest steep rise of the Caspian sea level started in 1977 (-29.10 m BSL) and stopped in 1995 (-26.6 m BSL), i.e. a 2.5 m raise in 18 years. Since 1995 sea levels are fortunately almost stable, even slightly dropping: from -26.6 m in 1995 down to -27.2 m BSL in 1999.

Tides are negligible, whilst waves almost do not affect AFT.

2. Phase 1 programme

The objectives of this Phase 1 programme are to better allow AFT to cope with a basic traffic level, and under improved conditions of safety. Phase 1 also includes provision for rail traffic.

The rehabilitated ramp should be able to accommodate ferries provided that sea level doesn't rise above -26 meters BSL. The sea level could fall by more than 2 metres from present levels before operations were hindered.

Phase 1 works are described in the following chapters 2.1 to 2.9, together with the attached drawings. Work quantities can be found in the enclosed cost estimate.

2.1 Marine works, berthing structures

Some rubber tyres and steel frames are lying on the sea-bed at short distance from the ramp end. This area has to be cleaned to avoid any damage to ferry propellers.

All sheet pile stretches which are located above water level are corroded: eastern part of central pier, western side of finger pier, upper part of base ramp. Sandblasting and repainting works are to be carried out.

Reinforced concrete walls capping the upper parts of central pier and finger pier need some local repairs in areas where steel bars appear at the surface of the walls.

Regarding fenders, some rubber tyres are to be added on the western side of central pier, whilst the rotten wooden panel on finger pier has to be replaced by rubber tyres (it would be more suitable to use flat panels made of steel and coated with polyethylene, but much more expensive). Besides, both stop fenders need repair works, their upper arms are broken and their front panels need to be reinforced.

Whole pavement of central pier is cracked and will be upgraded, this is a walkway for passengers. Pavement of finger pier needs a local repair at pier head.

The central pier is a bit short for Dagestan ferries but it would be very expensive to extend it or to build a dolphin at the head. Extension of the pier is not foreseen in Phase 1. It could be provided for in an eventual Phase 2 project.

Lastly, shore slopes surrounding the ramp are in very poor condition. It is foreseen to protect them with hard stone rubble mound armour.

2.2 Ramp works

Ramp wooden deck is rotten and has to be replaced. For road vehicles a more suitable deck structure is steel cover coated with coarse aggregates.

Dagestan ferries have only two entrance rail spurs, whereas the ramp has four. Ramp rail tracks and switches will be dismantled and replaced by new rails.

Ramp spans and traverse beams are corroded. They will be sandblasted and repainted. In addition, all pivot bearings will be replaced (four units on base ramp and three units on central traverse beam).

2.3 Central control tower

The central control tower allows to lift and to bring down ramp spans according to vessel deck level. Main works are to replace old control panels and piloting station, which are out of order. Ancillary works are to make the tower roof watertight, to renovate outer stairs and to supply new furniture.

2.4 Lifting tower structures and machineries

First group of tasks aims at making tower pits watertight, to avoid sea water to flood counterweights. Counterweights will first be removed, then pits will be pumped dry, cleaned, sandblasted and coated with strong watertight sealing.

All steel cables have to be replaced, both those which support counterweights as well as those of electric hoists.

Gearboxes, winches, wheels, brakes and spindles can be reused but they need to be dismantled, cleaned and lubricated.

Electrical motors have to be replaced, as well as their control boxes and power cables.

Lastly, outer structures need some minor repairs: replacement of glass bricks and windows, also some repainting.

2.5 Rail-track works on land

These rail-tracks are in good condition. Rail-cars are currently able to reach the ramp and marshalling area is long enough to park the full capacity of a ferry, i.e. 28 rail-cars. However rail switches need to be dismantled, cleaned and lubricated. Moreover, in case the operator wishes to use the remote operating system and related traffic lights, then the whole equipment has to be renovated: control panels, piloting station, communication cables and control room.

2.6 Electricity supply

Current power supply system is unable to feed the ramp engines. A new high voltage cable (6 kV) will be laid from the port main intake station to a new power substation located next to the ramp. From new substation low voltage cables (0.4 kV) will reach control tower and dispatch power to lifting towers.

2.7 Earthworks and pavements

Sufficient parking areas for road vehicles already exist near the ramp and outside the port boundaries, each of them being able to accommodate full capacity of a Dagestan ferry, i.e. 37 trailers-trucks. However only a small part is paved, the rest should also be paved to avoid dust and mud.

End stretches of access roads to the ramp and to the control tower need to be repaired, their asphalt pavement is severely cracked.

Lastly, the building which will become the passenger terminal needs two access road, one on each side. This requires some fill material and paving works.

2.8 Miscellaneous works

Water supply pipes feeding the control tower and the future passenger terminal should be installed, as well as out-coming sewage water piping. This is for the comfort of port staff operating the ramp. Also rainwater drainage networks are needed along roads and parking areas, to avoid inundation in case of heavy rain.

Traffic signalling should be installed at the crossing between access road to the ramp and rail-track leading to the dry cargo berths.

Instead of fixing the numerous old small light poles, the ferry terminal should be fitted with a few high floodlighting masts.

2.9 Passenger facilities

A building near the port entrance will be refurbished to become a passenger terminal. This building will allow to carry out immigration and border control procedures, as well as customs control. It will also provide waiting lounges, a ticketing booth, a bank and a restaurant. Some refurbishment has already been undertaken by ACSP.

A shuttle bus should be available to carry passengers between the ferry and the passenger terminal. This could be purchased or contracted.

3. Implementation schedule

It is anticipated that the works will last 8 months, from date of signature of the contract until provisional acceptance.

The rehabilitation of the ramp structure will impose a suspension of ferry services for a period of three months.

4. Cost estimate

The breakdown of work items and estimate of costs are included on the attached bill of quantities.

The Memorandum of Understanding between TRACECA and the MOTCT foresaw a maximum TRACECA contribution of 2MEURO to the rehabilitation works. Likewise it included an outline allocation of the respective contributions of the two parties. These provisions are maintained.

The attached bill of quantities and preliminary cost estimates foresee two categories of work items. Essential items to satisfy Phase 1 objectives are indicated in normal type. Generally, though not exclusively, these essential items are related to the safety and speed of operation of the ferry ramp, to the provision for rail traffic, and are covered by the TRACECA budget.

Items shown in the bill of quantities in *italic type* are of lower absolute priority, and generally, though not exclusively, relate to works on land facilities. For tendering purposes they are optional items. They may be included in the eventual TRACECA works contract, if the TRACECA budget is sufficient, and at the discretion of TRACECA management.

Alternatively, the optional italicised items may be contracted by the MOTCT, at the discretion of the MOTCT.

The optional italicised items shall be the subject of discussions between TRACECA, the MOTCT, and the winning tenderer. In general the co-financing of the rehabilitation works by TRACECA and by the MOTCT will be by separate contracts. Neither party is expected to contract for works that will be paid for by the other party.

Subject to EC procurement rules, the winning tender will be considered to be the technically conforming tender with the lowest total price, including all essential and optional items.

Attachments:

- Memorandum of Understanding
- Cost estimate and Drawings

ANNEX 4

Terms of Reference attached to the Contract

(Aktau Ferry Terminal part)

1.2.4 Co-ordination with Other Donors

No other donors or external assistance agencies are known to have shown interest in the issue of shipping on the Caspian Sea. One other donor has cited clarification of legal issues and regulations as a first priority to allow external investment.
TACIS is undertaking a study of Inland Water Transport in Russia, including the Volga-Don.
A previous Tacis project entitled Development of the Caspian Shipping Company is also of relevance
Investment opportunities would be of obvious interest to the private sector, and to the investment bank agencies which specialise in private sector development.
Private sector maritime investors have declared (very preliminary) interest in the Caspian and the consultant would be expected to collaborate with such investors.
A TACIS national project in Azerbaijan will probably run concurrently with this project and will deal with the creation of an Azeri MOT, the creation of an Azeri Maritime authority, and the restructuring of the Caspian Sea Shipping Company.
The consultants involved must hold an early co-ordination meeting, exchange information freely, avoid duplication and generally collaborate.

1.2.5 Module C - Rehabilitation of the Aktau Port Ferry Terminal

The northern branch of the TRACECA corridor passes through the Port of Aktau. It is the preferred routing by Kazakhs for their traffic, as obviously it increases revenues to the Kazak railways and the port of Aktau, relative to the more southerly route passing through other states.
The Port of Aktau is recovering from a decline in traffic, thanks to its ideal position for servicing the Tenghiz oilfields, and an increase in general cargo between other origins and destinations. There are however questions concerning its cash-flow and loan repayments. Oil is the major port revenue earner at present.
Between 1986 and 1992 the Port operated a ro-ro ferry service between other ports, principally Baku. According to reports the rail ro-ro facilities were never used. Due to the economic dislocation in the Caucasus, the ro-ro service was halted. The condition of the ferry ramp in Aktau has deteriorated due to age and lack of attention, so that today it is not operable. A technical mission has made a brief inspection of the facilities and reported on the requirements to re-commission the ramp and associated facilities.
The Port of Aktau has negotiated a loan of approximately 60MUSD from the EBRD for rehabilitation of the general Port facilities. This loan does not cover the ferry ramp.
The Ministry of Transport and Communications of Kazakhstan has called for tenders (firstly in 1997, lastly in early 1998) to propose re-development and operation of the ferry ramp on a concession basis. So far there have been no serious proposals. Oil companies are rumoured to be interested in opening the ferry terminal.
The port management considered a quick and cheap adaptation of the existing quay side to permit ro-ro operations for road transport. This is an interesting idea, and would test demand. However, expert observers have raised questions about the safety of such an initiative.
There are unresolved issues concerning the layout of access roads, holding areas, and facilities for customs and immigration procedures. These require attention in this project, for the ferry service to be fast, and for the unloading-loading procedures to be well organised.
The present main operator of ferries on the Caspian is the Caspian Sea Shipping Company. They have not expressed great interest in serving Aktau.
A new ferry service was recently inaugurated between Astrakhan and Turkmenbashi, using a Russian vesel.

1.2.6 Co-ordination With Other Donors

As the major creditor of the Port of Aktau the EBRD is interested in the outcome of this study and has declared willingness to consider financing the rehabilitation of the ferry terminal. The key issue for this Module is the potential contribution of the ferry service to the financial viability of the port. For this to be established, reliable robust traffic forecasts must be developed.
Other financing agencies or private investors might well be interested.
The consultant must collaborate fully with potential investors, and may have to adapt his planned work programme to satisfy questions which they raise.

1.2.7 Module D - Navigation Channel for Turkmenbashi Port

The main access channel to the port is via an excavated navigation channel, which is reportedly of insufficient depth, and poorly marked for the safe operation of vessels. The deepest draft vessels which regularly use the channel at present are the Caspian Sea Shipping Company ferries (4 to 4,5 metres). Occasionally tankers of deeper draft use the channel, and access by this type of vessel may increase in the future (reportedly 7 metres). The port is equipped to carry out its own dredging maintenance. According to reports this equipment is not ideal, but adequate.
The problem of draught, if it is in fact serious, could be compounded by a lowering of the level of the Caspian Sea. Considerable variations in the sea level are a historic fact. In recent years the continuation of operation of the ports has

MODULE C – Aktau Ferry Terminal Redevelopment

2. Rationale and Objectives

2.1 Overall Objectives

The overall objectives of this module are firstly to reveal the investment merits of the redevelopment of the Aktau Ferry Terminal for road and rail traffic on the northern branch of the TRACECA route.
If there is shown to be investment merit, and the Ministry of Transport of Kazakhstan and the EBRD commence negotiations for the financing of the project, then documentation for tendering the works will be prepared.

2.2 Project Purpose

The module should:

- Refine, verify and complete previous technical investigations which have defined three options and related costs for opening the ferry terminal
- Develop financial projections for redeveloping and operating a ferry terminal
- Prepare and present a feasibility study based on the foregoing

2.3 Results

The sought after result is that the Ministry of Transport and Telecommunications of Kazakhstan, and the Port Authorities of Aktau, be provided with a feasibility study allowing them decide on a well informed basis whether or not it is advantageous for them to redevelop the ferry terminal.

3. Risks and Assumptions

The risks for the successful completion of the feasibility study are quite minimal. Previous similar studies have been completed successfully by TRACECA projects for the ports of Baku and Turkmenbashi.
The potentially most uncertain issue for the study is the traffic forecasts, and Module A of this project provides consultancy resources for the forecasts to be made with fully as much confidence as the state of the art and the local circumstances permit.

4. Main Components

4.1.1 Geographic Focus

The beneficiary of this module is the Ministry of Transport and Communications of Kazakhstan, represented by the Maritime Section of the Ministry and the management of the Port of Aktau.

4.1.2 Refine, Verify and Complete Previous Technical Investigations

The previous investigation carried out by TRACECA comprised a mission report which identified three options for re-opening the single-berth ferry ramp (road traffic only, road and rail, and variations on the shoreside facilities).

- Further engineering work is necessary, in particular to examine the condition of, and redesign:
- mechanical-electrical installations,
- the ramp structure,
- the civil works,
- whatever architectural facilities may be necessary (eg.ticketing, administration, specific customs and immigration facilities, etc).

Underwater inspection of the ramp installations should be foreseen.
A full site topographical survey should be produced.
The design of the access and holding areas for the ferry ramp land approaches needs to be finalised with the counter-parts (road, and rail links and parking areas, etc).
The role of Customs (also Immigration) operations and facilities needs to be properly integrated into the project. This should build on previous TRACECA projects (Trade Facilitation), in conformity with the TRACECA Multi-lateral Agreement and Intergovernmental Joint Commission. Customs authorities at the Port and in Astana should be involved.
The ferry terminal should be conceived to be adaptable to probable future changes in the level of the Caspian Sea over its design life.
The ramp design should correspond with the Baku and Turkmenbashi ferry ramps, as they will be rehabilitated within the presently planned TACIS/EBRD projects, to allow for:

- the full range of vessels which could eventually dock at those other ports.

- identical or greater tolerance for future variation of the Caspian sea level.
- similar loading and off-loading conditions for vehicles (permissible vehicle weights, profiles, etc.)

4.1.3 Traffic Forecasts – Demand Analysis

Traffic forecasts necessary to identify potential demand for the ferry terminal should be prepared within module A. They should be comprehensive and cover all categories of cargo which might be transported.
The principal correspondent port for the ferry service is Baku but others might be considered.
In a previous TRACECA study considerable road traffic was observed using the Baku-Turkmenbashi ferry and driving north through Aktau to connect with Russian destinations north of the Caspian. This high traffic was apparently temporary and due to the closure of a border during the Chechen civil war. This is an illustration of the need for great care in the preparation of the traffic forecasts.

4.1.4 Cost Estimates

Cost estimates for redevelopment works should be prepared on the basis of the tenders for similar works underway or foreseen at the ports of Turkmenbashi and Aktau (and Baku, if available).

4.1.5 Financial Projections

Financial projections should be made to allow appraisal of the ferry terminal redevelopment according to standard development bank criteria, and in particular those of the EBRD.
Current fees for berthing at Baku, Turkemenbashi and Astrakhan should be reported. The consultant should carefully appraise the range of fees which might be applied at Aktau, the sensitivity of demand, and the revenues which might be generated by the ferry ramp.
Operating costs should be estimated, as should depreciation, loan servicing and repayment.
The financial projections, tariffs, and their presentation should be discussed during the course of the project with the EBRD, to ensure satisfaction of that institution's criteria.

4.1.6 Environmental Due Diligence

An environmental due diligence study should be prepared according to EBRD criteria.

4.1.7 Recommendations for Redevelopment

The consultant is to present to the Ministry of Transport, to the Port authority, and to the EBRD, a detailed feasibility study containing his recommendations and justifications.
The study report should be sufficiently detailed, and of a format, suitable for inclusion in a Build-Operate-Transfer type concession tender, or a Design and Build tender, including well defined layouts, typical details, schematics, performance specifications, and design criteria.
A plan for ownership/operations/management options, and Customs procedures, is to be included.
The consultant is to respond to any questions raised on the study, but according to the Implementation Procedures for this project very close collaboration with the beneficiary on site is required throughout the work, so that questions should be minimal.

4.2 Implementation Procedures

See Section 4.2 Module A
Much of the work connected with this module should be carried out at the Port of Aktau.

4.3 Rough Timetable

The feasibility study is to be substantially completed in draught form within twelve months, which is intended to allow time for orderly data collection and forecasting within Module A to feed into this Module. The final report is to be presented two months later.

4.4 Global Budget

Approximately 10 % of the total project budget may be allocated to this module, inclusive of preparation of tender documents.
Adequate provision should be foreseen for local staff.

PMR

ANNEX 5

Port construction costs in the Caspian sea area

PORT CONSTRUCTION COSTS IN THE CASPIAN SEA AREA

SOURCE: TACIS - TRACECA & EBRD, AUGUST 1997

1. INTRODUCTION

The following analysis of construction costs in the Caspian Sea area is from recent international tenders and is for the purpose of providing data on which to base future project estimates. The figures have generally been rounded in keeping with their source and approximate nature. All prices are given in US dollars.

The note is in three sections. The first reviews the overall makeup and spread of tenders, the second derives some rough total costs for facilities and the third covers rates for specific items of construction.

2. TENDERS

The total spread between six tenderers was about 68% but this reduces to 26% if the highest is excluded. The lowest three were within 10%.

The tenderers' pricing of the General/Preliminaries bills varied between 11% and 30% of the total bids, with an average of 22%. The lowest bidder's Preliminaries amounted to some 17% of the eventual agreed total contract value, representing an on-cost of about 20% on billed rates. This value has been used where necessary in the following analyses.

3. TOTAL COSTS FOR FACILITIES

Quay construction amounted to about $22,000 per metre (gross, including preliminaries), of which 74% was accounted for by the piling, with the remainder for the superstructure.

If the total development is regarded as cornprising 4 berths, the cost per berth is approximately $11 million, in the following proportions:

Quay Construction	29%
Paving	17%
Services (utilities)	22%
Buildings with equipment	12%
Other	20%

The unit Costs for buildings vary from $560 - $830 per square meter depending on size (higher unit costs for smaller buildings) and type. This covers design and construction including all internal services.

4. RATES FOR CONSTRUCTION ITEMS

Prices in the following text are all expressed as billed rates i.e. exclusive of 20% Preliminaries.

4.1 Piling

Steel sheet piling

Supply to site (plain)	840	per tonne
Corners, junctions	+75%	per tonne
Painting, driving etc.	1,600	per tonne
(+ all miscellaneous work)		(i.e. supply cost +90% approx.)

Load bearing piles

170 tonne SWL vertical	145	per metre
Handle and pitch	1,205	per pile
Drive	155	per metre
Typical total cost	6,900	per pile
230 tome SWL vertical	+50%	per pile (on 170 tonne pile)
Static load test	26,700	per pile
Tensile load test	19,200	per pile

4.2 Concrete Work

Concrete

Grade 15/20 (15 N/mm²: 20mm aggregate)	66	per cubic metre
Grade 40/20	92	per cubic metre

Formwork

Typical for 40/20 grade	11	per square metre

HT reinforcement

32 mm dia	533	per tonne
25 mm dia	566	per tonne
20 mm dia	608	per tonne
16 mm dia	649	per tonne
12 mm dia	663	per tonne

4.4 Quay-side furniture

50 tonne SWL bollard (supply and install)	2,100	per bollard
20 tonne SWL bollard	1,650	per bollard
Horizontal rubber fender	5,200	per fender

4.5 Surfacing

Selected earth fill	6.3	per cubic metre
Grading to level	0.15	per square metre
Granular sub-base. 300 mm thick	3.7	per square metre
Lean-mix, 250 mm thick	29	per square metre
Lean-mix, 370 mm thick	37	per square metre
Block paving, 80 mm on sand	14	per square metre
Road asphalt paving, complete	44	per square metre
Footpath surfacing	34	per square metre
Thermoplastic marking, 100 mm	3.5	per metre

4.6 Rail Track work

Supply and place ballast	52	per cubic metre
Standard gauge trackwork on ballast	175	per metre of track
Standard gauge trackwork on/in	174	per metre of track
Extra to trackwork for turnouts	16,500	per turnout

4.7 Miscellaneous

Armour rock

Rock armour 1000- 1500 kg	35	per cubic metre
Geotextile layer underwater	2.5	per square metre

Navigation aids

Navigation buoys	715	per buoy
Leading lights	2,200	per set of lights