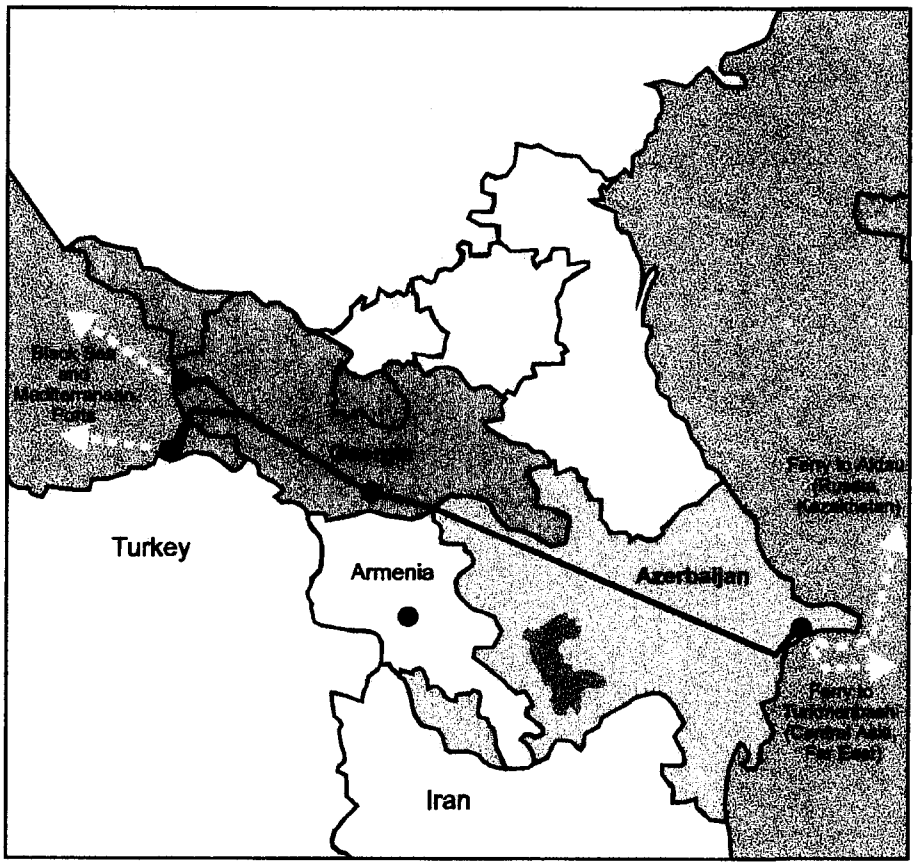
TRACECA

Infrastructure Maintenance 1
-
Railways
Pre-Investment study and Pilot train
Baku - Tbilisi - Batumi/Poti



Final Report

Module A

Volume II (Annexes)

October 1997

Contents

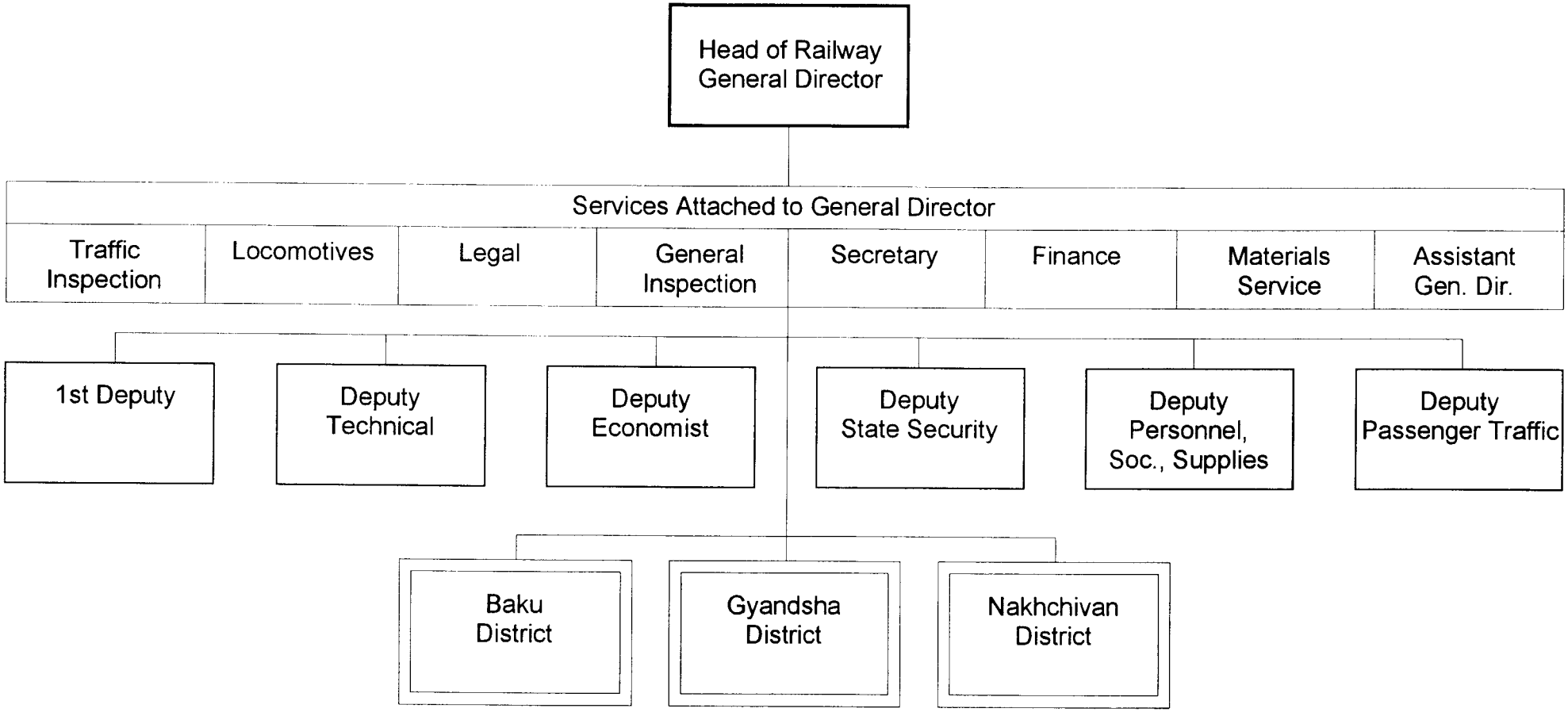
Final Report Module A

Annexes

Chapter 2 Institutional, organisational and commercial pre-feasibility

2.1 Institutional and organisational pre-feasibility

Azerbaijan State Railways Management Structure



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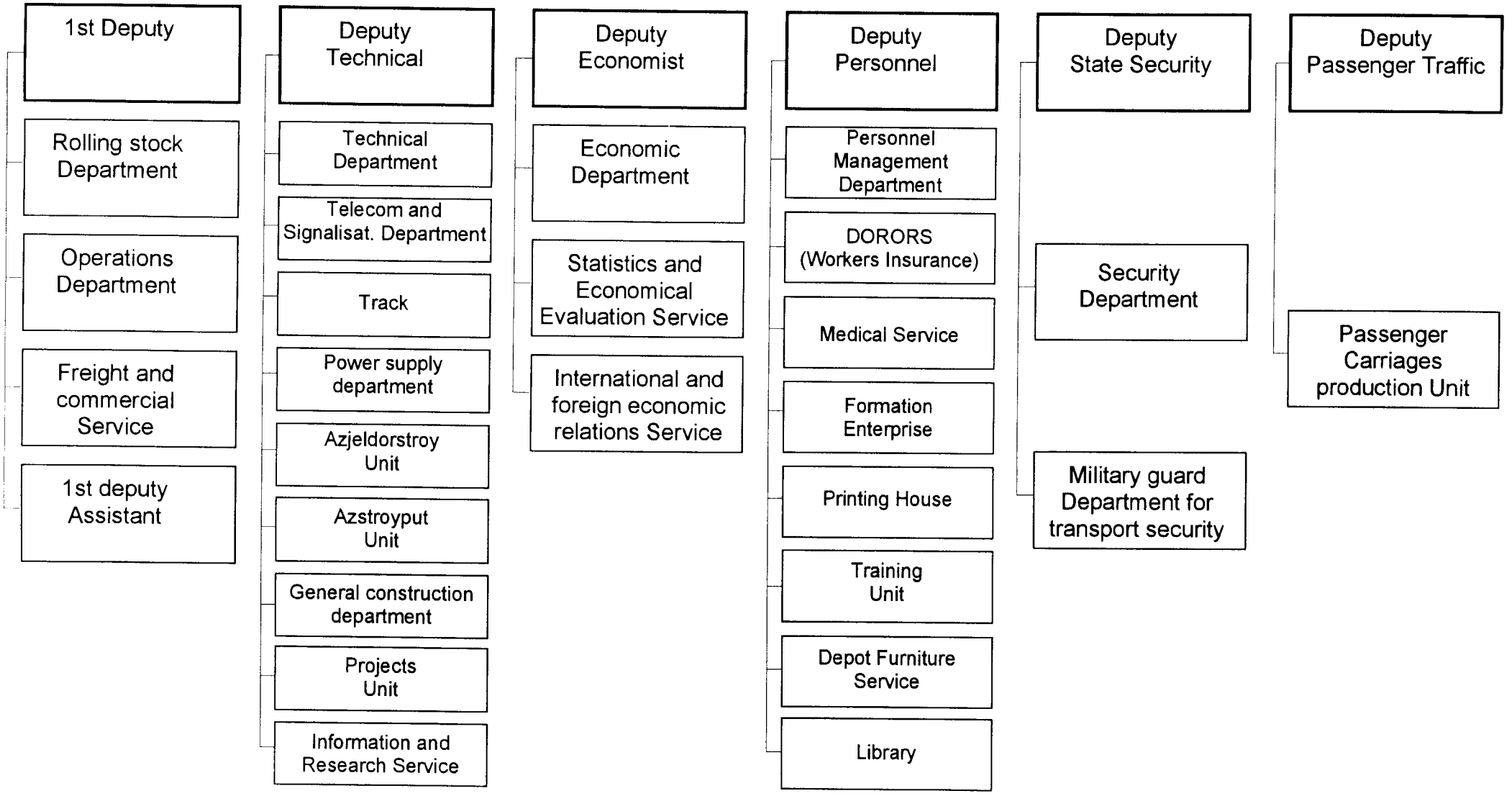
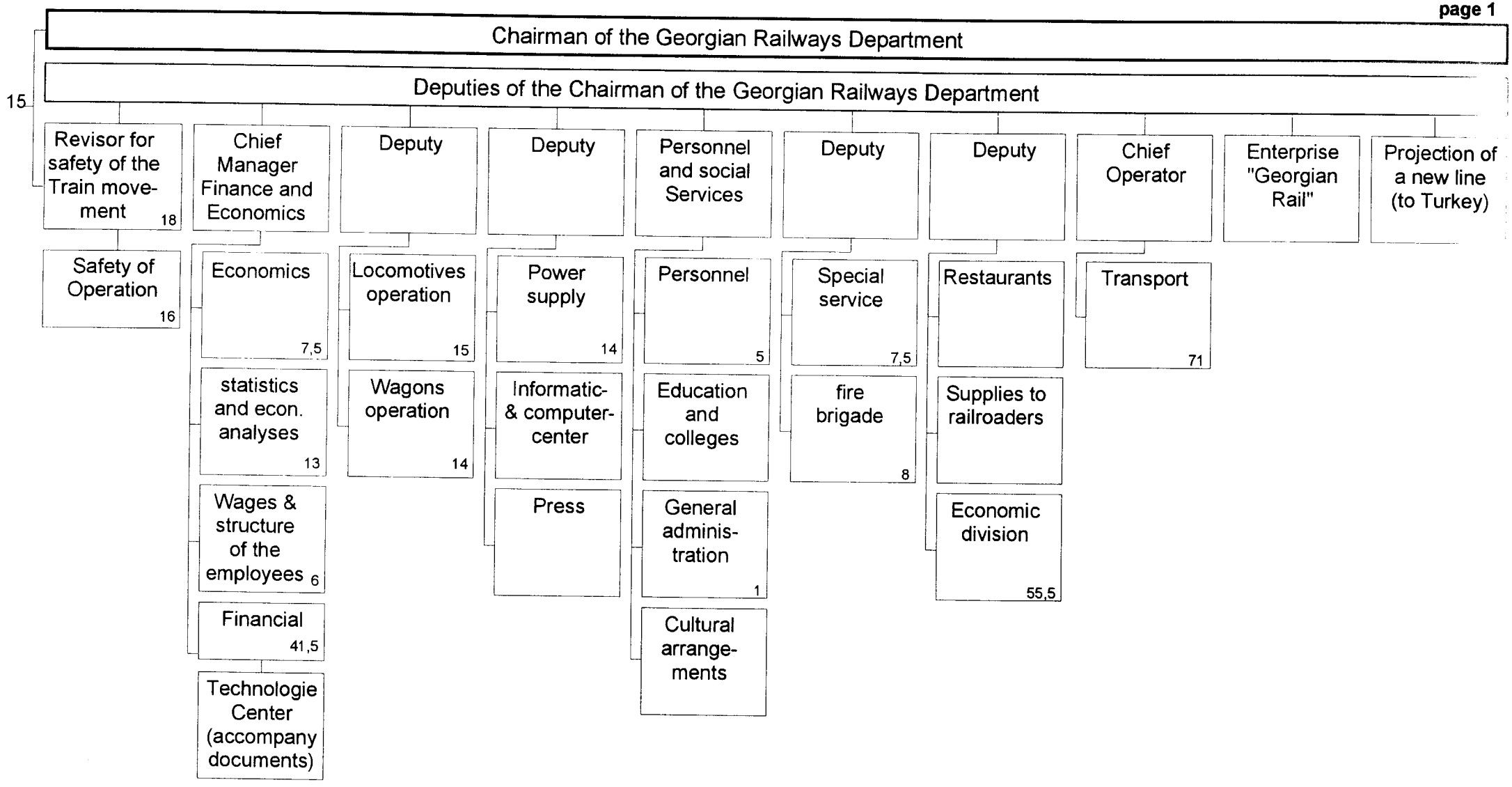
page 2

A.G.Z.D. - Headquarters Structure

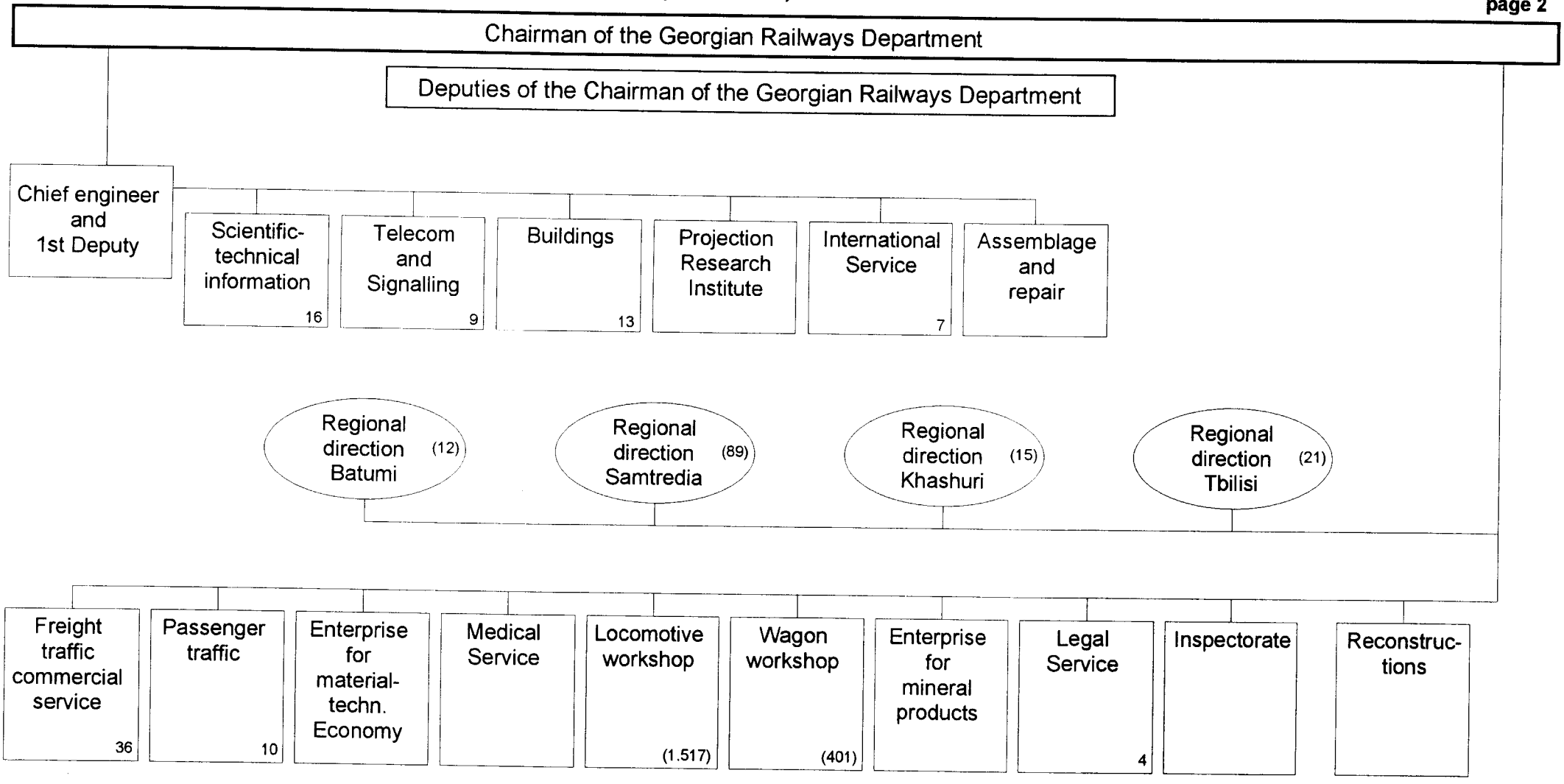


Structure of the Georgian Railways Administration



The figures refer to the number off staff of the units belonging to the "Georgian Railways Department". Figures in brackets () refer to the staff of other organisational units.

Structure of the Georgian Railways Administration (01.06.1997)



On 05.05.1997 unit "Service for international transport and relations" has been established. It is subordinated to a Deputy Manager of the "Georgian Railways Department".

Final Report Module A

Annexes

Chapter 2 Institutional, Organisational and Commercial Pre-feasibility

2.2 Commercial pre-feasibility

2.2.1 Traffic volume forecast

Geographical structure of Azerbaijan foreign trade

1. Exports

(% of total value)

	1989	1990	1991	1992	1993	1994	1995
FSU	**93.7**	**94.9**	**93.3**	**40.8**	**51.6**	**43.1**	**39.6**
Russia			56.1		25.6	21.9	18.1
Ukraine			12.3		6.7	9.1	6.1
Belarus			4.7		2.1	1.2	0.5
Kazakhstan			3.9		4.2	2.6	3.1
Turkmenistan			4.2		5.4	2.7	2.4
Uzbekistan			2.4		0.6	0.4	0.7
Georgia			5.7		4.2	2.6	7.6
Non-FSU	**6.3**	**5.1**	**6.1**	**59.2**	**48.4**	**56.9**	**60.4**
European Union					6.3	11.0	17.1
Turkey					8.4	2.6	4.8
Iran					26.6	38.0	29.8

2. Imports

(% of total value)

	1989	1990	1991	1992	1993	1994	1995
FSU	**73.1**	**73.8**	**80.3**	**56.0**	**56.2**	**62.5**	**34.2**
Russia			45.0		23.1	15.1	13.2
Ukraine			22.7		9.7	11.1	5.0
Belarus			2.3		1.5	1.0	0.7
Kazakhstan			4.2		6.4	6.7	2.6
Turkmenistan			0.2		9.9	25.1	7.7
Uzbekistan			1.7		0.3	0.3	1.2
Georgia			1.6		3.3	1.0	2.8
Non-FSU	**26.9**	**26.2**	**19.7**	**44.0**	**43.8**	**37.5**	**65.8**
European Union					7.1	7.6	11.7
Turkey					11.5	9.8	21.0
Iran					7.6	8.6	12.0

Geographical structure of Azerbaijan´s foreign trade

Exports

Destination	1994		1995	
	Tons	%	Tons	%
Total	**2,683,798**		**2,548,620**	
Russia	255,015	9.5	208,145	8.2
Ukraine	273,424	10.2	98,563	3.9
Belarus	14,124	0.5	4,341	0.2
Georgia	91,724	3.4	397,616	15.6
Total	*379,272*	*14.1*	*500,520*	*19.6*
Uzbekistan	2,822	0.1	2,349	0.1
Kazakhstan	29,391	1.1	45,266	1.8
Kirgiztan	21,612	0.8	7,628	0.3
Tadshikistan	16,842	0.6	19,783	0.8
Turkmenistan	159,427	5.9	26,535	1.0
Total	*230,094*	*8.6*	*101,561*	*4.0*
Turkey	16,994	0.6	36,288	1.4
Iran	1,405,866	52.4	1,040,194	40.8

Imports

Destination	1994		1995	
	Tons	%	Tons	%
Total	**2,439,559**		**1,164,814**	
Russia	497,778	20.4	108,782	9.3
Ukraine	301,080	12.3	42,219	3.6
Belarus	8,102	0.3	4,159	0.4
Georgia	33,516	1.4	65,233	5.6
Total	*342,698*	*14.0*	*111,611*	*9.6*
Uzbekistan	5,866	0.2	56,033	4.8
Kazakhstan	979,985	40.2	157,258	13.5
Kirgiztan	42,385	1.7	2,031	0.2
Tadshikistan	330	0.0	137	0.0
Turkmenistan	144,367	5.9	40,674	3.5
Total	*1,172,933*	*48.1*	*256,133*	*22.0*
Turkey	142,344	5.8	102,280	8.8
Iran	171,059	7.0	351,141	30.1

Annex 2.2.1-2

Geographical structure of Georgian foreign trade

1. Exports

(% of total value)

	1989	1990	1991	1992	1994	1995
FSU	**94.0**	**95.7**	**99.1**	**96.3**	**...**	**...**
Russia			66.6	54.7	33.7	30.8
Ukraine			10.3	12.4	2.1	...
Belarus			2.0	3.2	...	...
Kazakhstan			6.2	3.6	2.0	...
Turkmenistan			1.5	10.2	10.0	4.5
Uzbekistan			2.9	2.4	...	...
Azerbaijan			1.7	6.4	9.4	6.6
Armenia			2.3	0.6	8.3	12.4
Non FSU	**6.0**	**4.3**	**0.9**	**3.7**	**...**	**...**
Europe			0.4	3.3	...	17.2
Turkey			0.0	0.2	14.6	22.8
Iran			-	-	1.1	...

2. Imports

(% of total value)

	1989	1990	1991	1992	1994	1995
FSU	**75.6**	**72.3**	**84.5**	**96.8**	**...**	**...**
Russia			50.7	10.3	8.4	13.6
Ukraine			16.9	10.1	...	...
Belarus			2.4	1.8	...	...
Kazakhstan			1.4	0.9	...	...
Turkmenistan			0.0	64.9	65.0	13.7
Uzbekistan			1.2	1.1	...	...
Azerbaijan			6.0	1.2	4.9	11.1
Armenia			1.5	0.6	0.3	0.6
Non-FSU	**24.4**	**27.7**	**15.5**	**3.2**	**...**	**...**
Europe			4.1	0.5	...	...
Turkey			6.8	0.4	10.8	21.0
Bulgaria			...	...	0.6	7.0
Romania			...	...	1.0	7.7

Annex 2.2.1-3
Page 1

Commodity structure of Azerbaijan foreign trade

Exports

(in % of total value)

Commodity group	1994			1995		
	Total	FSU	Non-FSU	Total	FSU	Non-FSU
live animals, animal products	0.1	0.2	0.0	0.1	0.2	0.1
plant products	2.3	5.0	0.2	2.4	5.5	0.3
animals or vegetable oil and fat	0.0	0.0	0.0	0.1	0.1	0.0
food, beverages, tobacco	7.7	17.1	0.5	4.5	8.5	1.8
mineral products (oil, ore, build. mater.)	34.2	25.2	41.0	51.8	49.3	53.4
chemical products	3.6	6.7	1.3	3.6	7.7	0.8
plastic, rubber, rubber products	1.6	2.9	0.6	2.5	4.5	1.1
hides, furs and products thereof	0.1	0.1	0.1	0.3	0.0	0.4
timber, timber products	0.1	0.0	0.1	0.0	0.0	0.1
pulp, paper, cardboard	0.6	0.1	0.9	0.1	0.1	0.1
textiles	18.0	8.4	25.2	22.8	5.0	34.5
shoes and oth. prod. of ligth industry	0.1	0.3	0.0	0.1	0.0	0.0
prod. of stone, ceramics, cement, glass	0.2	0.4	0.0	0.3	0.7	0.0
precious metals and stones	0.0	0.0	0.0	0.0	0.0	0.0
metal, metal products	16.5	1.4	28.0	3.2	1.4	4.4
machines, electrical appliances	14.0	30.4	1.7	7.2	14.8	2.2
means of transport	0.7	1.2	0.3	0.8	1.2	0.6
other equip., watches, musical instr.	0.2	0.4	0.0	0.3	0.8	0.0
other finished industrial products	0.1	0.2	0.0	0.0	0.1	0.0

Annex 2.2.1-3
Page 2

Commodity structure of Azerbaijan foreign trade

Imports

(in % of total value)

Commodity group	1994			1995		
	Total	FSU	Non-FSU	Total	FSU	Non-FSU
live animals, animal products	5.4	4.2	7.5	11.1	6.9	13.3
plant products	10.1	9.6	10.8	7.7	6.8	8.2
animals or vegetable oil and fat	3.0	0.2	7.5	8.2	0.3	12.3
food, beverages, tobacco	7.9	4.4	13.7	14.5	6.2	18.8
mineral products (oil, ore, build. mater.)	33.3	49.0	7.3	15.1	32.2	6.2
chemical products	4.9	2.5	8.8	9.2	6.3	10.7
plastic, rubber, rubber products	1.9	2.6	0.6	1.7	3.3	0.9
hides, furs and products thereof	0.2	0.1	0.4	0.4	0.0	0.6
timber, timber products	0.8	1.1	0.2	0.8	1.3	0.5
pulp, paper, cardboard	0.9	1.0	0.7	2.3	3.7	1.5
textiles	2.3	1.2	4.2	1.7	1.5	1.8
shoes and oth. prod. of ligth industry	0.9	0.3	1.9	0.3	0.1	0.4
prod. of stone, ceramics, cement, glass	0.9	1.0	0.8	1.2	1.9	0.8
precious metals and stones	0.0	0.0	0.1	0.0	0.0	0.0
metal, metal products	12.5	15.0	8.4	6.3	12.9	2.9
machines, electrical appliances	10.1	4.6	19.4	12.4	12.3	12.5
means of transport	2.9	2.4	3.7	5.5	3.2	6.7
other equip., watches, musical instr.	0.5	0.1	1.2	0.6	0.7	0.5
other finished industrial products	1.5	0.7	2.8	1.1	0.6	1.3

Annex 2.2.1-4

Commodity structure of foreign trade of Georgia

(in % of total value)

Commodity group	Export		Import	
	1994	1995	1994	1995
Electric power	-	-	2.8	2.3
Crude oil	5.0	7.7	11.1	30.9
Natural gas	-	-	64.4	13.8
Coal, coke	0.3	0.3	0.4	0.4
Ferrous metallurgy	30.1	33.9	0.4	0.4
Non-ferrous metallurgy	0.9	3.0	0.2	0.2
Chemical and petrochem. prod.	11.4	9.8	2.4	4.2
Machinery and metal works	14.1	7.2	4.1	6.5
Wood, pulp, paper products	1.8	2.0	0.3	0.6
Building materials	3.7	4.4	1.2	1.3
Light industry products	10.2	4.1	0.9	2.0
Agricultural and food prod.	21.6	27.3	10.8	34.4
Others	1.1	0.2	1.1	3.1

Annex 2.2.1-5

Main export items of Azerbaijan

(in Tons)

Type of goods	1994	1995
fish (fresh, processed)	1,878	998
fruit, vegetable	31,985	8,492
citrus fruit	415	149
tea	1,972	1,274
cotton products	1,927	19,158
food, preserve	1,721	3,778
tomato pulp	10,064	6,463
fruit juices	6,804	5,648
beverages (alc., non-alc.)	1,100	790
champagne	2,026	1,401
tobacco	12,918	8,952
bentonit	147,488	68,258
heavy spare	13,264	5,945
natural stone (unprocessed)	3,826	331
cement		180
iron ore	4,225	
petrol	412	89,192
kerosene	132,190	188,718
diesel	1,507,093	1,625,216
mazout	58,322	125,621
lubricants	100,618	119,557
other petrochem. products	5,411	22,824
liquid gas	15,150	8,762
petrol coke	15,010	4,817
bitumen	52	14,536
chem. products	74,590	45,427
aluminium oxide	14,488	17,980
hydrocarbone	39,007	10,108
mineral fertiliser	7,836	5,824
tyres	767	250
timber, chipboards	2,195	875
paper	12,826	2,188
cotton	78,286	75,992
metallurgical products	348,783	45,073
non-ferrous metals	9,983	4,277
air conditioning	3,940	2,407
compressors	8,467	1,893
refrigerators	3,555	644
electric motors	990	821
tractors	800	3,570
busses	250	90
cars	21	5
lorries	880	60
motorcycles	263	76
Total	**2,683,798**	**2,548,620**

Annex 2.2.1-6

Main import items of Azerbaijan

(in Tons)

Type of goods	1994	1995
food	93,535	207,874
fruit, vegetables	78,188	64,770
potatoes	41,116	19,054
cereals	291,993	112,553
flour	248,800	69,891
sugar	46,495	104,186
beverages	3,420	738
salt	21,629	23,771
minerals	18,559	28,975
cement	83,007	91,295
bauxite	37,395	32,420
coal, coke	1,600	1,059
oil	852,567	61,936
petrochemical products	145,632	2,006
chemical products	60,869	34,813
mineral fertiliser	4,147	36,062
tyres	1,918	1,255
timer, timber products	44,830	28,862
paper	8,325	26,189
building materials	9,766	153,049
metallurgical products	334,432	55,772
non-ferrous metals	1,605	1,116
tractors	2,830	270
busses	850	1,970
cars	1,091	2,864
lorries	4,960	2,064
Total	**2,439,559**	**1,164,814**

Annex 2.2.1-7

Foreign trade between Azerbaijan and Georgia

(in Tons)

Type of goods	Export Georgia		Export Azerbaijan	
	1994	1995	1994	1995
food		281	513	932
tea	108	34		
tobacco			41	411
fruit and vegetable juice	785			
sugar	20			
minerals	70	11,808		6
kerosene			11,325	84,521
diesel			25,894	188,448
petrol			51	4,684
mazout	17,000		20,262	51,498
lubricants		8	1,739	12,154
gas			1,304	8,762
chemistry	277	2,975	1,956	26,964
acids	62	65	17,585	7,734
carbide	139	105		
caustic soda			2,619	1,121
hydrocarbon			7,277	10,108
ammonia	671	1,537		
spirit		1,950		
phenol	2,021	7,921		
nitrogen fertiliser	1,904	21,113		
paper	338	153	259	266
stone	294	124		
metal and metal products	8,879	17,159	285	
Total	***32,568***	***65,233***	***91,110***	***397,609***

Annex 2.2.1-8

Azerbaijan's export of oil products

Destination	1994		1995	
	Tons	%	Tons	%
Total	***1,819,108***		***2,190,481***	
Russia	11,056	0.6	102,068	4.7
Ukraine	219,739	12.1	82,608	3.8
Belarus	7,500	0.4	177	0.0
Uzbekistan	110	0.0	108	0.0
Moldova	112,933	6.2	39,480	1.8
Kazakhstan	22,976	1.3	41,201	1.9
Georgia	59,280	3.3	364,393	16.6
Kyrghyzstan	20,600	1.1	5,669	0.3
Tajikistan	2,524	0.1	3,931	0.2
Turkmenistan	146,635	8.1	20,177	0.9
FSU	**603,353**	**33.2**	**659,812**	**30.1**
Afghanistan	1,591	0.1		
Lithuania	12,744	0.7	47,756	2.2
Latvia	35,683	2.0	13,464	0.6
Austria	52,998	2.9	22,355	1.0
Gibraltar		0.0	45,421	2.1
Greece	10,303	0.6	101,988	4.7
Iran	1,045,326	57.5	976,324	44.6
Italy		0.0	277,138	12.7
Poland	22,695	1.2		
UK	32,745	1.8	46,071	2.1
Non FSU	**1,214,085**	**66.7**	**1,530,517**	**69.9**

Annex 2.2.1-9

Development of rail freight traffic - Azerbaijan

		1989	1995	1997		2000		2010		2015	
				opt.	pess.	opt.	pess.	opt.	pess.	opt.	pess.
Total amount	,000 t	**91,363**	**9,073**	**10,863**	**10,173**	**20,102**	**12,992**	**29,690**	**20,519**	**34,825**	**23,685**
Total perform.	Mio tkm	**41,895**	**2,409**	**2,879**	**2,696**	**8,805**	**5,469**	**13,004**	**8,638**	**15,253**	**9,971**
Export, amount	,000 t	15,859	1,277	1,270	1,251	6,454	1,965	10,668	4,456	11,201	4,912
Import, amount	,000 t	15,477	815	894	885	1,162	1,151	1,743	1,611	2,265	2,014
Transit, amount	,000 t	37,082	219	881	608	4,187	2,005	5,150	3,810	6,438	4,763
Domestic traffic		*22,945*	*6,762*	*7,817*	*7,429*	*8,462*	*7,871*	*12,129*	*10,642*	*14,921*	11,997
Freight dispatch		*39,466*	*8,429*	*9,087*	*8,680*	*14,916*	*9,836*	*22,797*	*15,098*	*26,123*	16,909
Oil products	,000 t	10,692	6,416	7,342	6,987	11,880	7,120	18,611	11,483	21,403	12,718
Building materials	,000 t	13,044	1,031	812	796	1,827	1,593	2,466	2,071	2,713	2,381
Iron ore	,000 t	697	4	10	4	22	5	30	5	33	6
Cement	,000 t	835	141	126	122	145	141	195	183	215	210
Cereals	,000 t	725	241	251	248	276	273	345	335	379	368
others	,000 t	8,294	596	548	522	767	704	1,150	1,021	1,380	1,226
Transport distance	km		265	265	265	438	421	438	421	438	421

Annex 2.2.1-10

Development of rail freight traffic - Georgia

		1988	1995	1997		2000		2010		2015	
				opt.	pess.	opt.	pess.	opt.	pess.	opt.	pess.
Total amount	,000 t	**36,190**	**4,700**	**4,886**	**4,390**	**9,525**	**4,477**	**15,268**	**7,611**	**17,470**	**9,135**
Total perform.	Mio tkm	**12,591**	**1,246**	**1,319**	**1,185**	**3,238**	**1,522**	**5,191**	**2,588**	**5,940**	**3,106**
Export, amount	,000 t		330	353	306	494	367	815	606	1,019	787
Import, amount	,000 t		1,225	820	603	943	620	1,179	715	1,267	805
Transit, amount	,000 t		1,775	2,245	2,050	6,011	1,758	10,525	4,192	12,104	5,220
Domestic traffic			1,370	*1,467*	*1,430*	*2,076*	*1,732*	*2,748*	*2,099*	*3,079*	2,323
Freight dispatch			1,600	*1,820*	*1,736*	*2,570*	*2,099*	*3,564*	*2,704*	*4,098*	3,110
Coal	,000 t	2,352	41	50	44	87	62	130	74	149	86
Oil products	,000 t	1,332	271	297	290	371	334	483	434	555	499
Building materials	,000 t	10,329	218	252	247	441	309	661	463	760	533
Iron ore	,000 t	5,467	80	88	86	110	103	132	123	151	142
Cement	,000 t	882	20	22	22	39	26	58	38	66	43
Cereals	,000 t	2,624	157	177	170	222	204	266	255	306	293
Metal	,000 t	1996	161	199	172	309	216	494	302	568	347
Others	,000 t		652	736	705	994	846	1,341	1,015	1,542	1,168
Transport distance	km		268	270		340		340		340	

Annex 2.2.1-11

Westbound traffic in Baku - Tbilisi - Poti / Batumi corridor (optimistic scenario)

(in '000 tons)

	1995	1996	1997	2000	2010	2015
1 Baku - Gyandsha						
Domestic	3,299	3,283	3,529	3,793	5,311	6,373
Azeri exports	952	928	947	4,734	7,811	8,358
Georgian imports	26	27	28	35	53	66
Transit	134	335	469	1,759	2,198	2,748
Azeri imports	30	30	32	33	36	38
Total	*4,441*	*4,602*	*5,004*	*10,354*	*15,409*	*17,583*
2 Gyandsha - Tbilisi						
Domestic	0	0	0	0	0	0
Azeri exports	964	940	959	4,793	7,909	8,463
Georgian imports	26	27	28	35	53	66
Transit	134	335	469	1,759	2,198	2,748
Total	*1,124*	*1,302*	*1,456*	*6,587*	*10,160*	*11,277*
3 Tbilisi - Batumi						
Domestic	380	399	429	515	643	740
Azeri exports	615	600	612	3,609	6,568	6,962
Georgian imports	11	11	12	14	18	19
Transit	126	315	410	942	1,224	1,592
Georgian exports	30	30	32	45	74	93
Total	*1,162*	*1,355*	*1,494*	*5,124*	*8,527*	*9,405*
4 Tbilisi - Poti						
Domestic	310	326	350	420	567	652
Azeri exports	109	106	108	867	1,041	1,093
Georgian imports	3	3	3	4	5	5
Transit	28	70	151	828	952	1,047
Georgian exports	60	60	64	90	148	185
Total	*510*	*565*	*676*	*2,209*	*2,712*	*2,982*

Annex 2.2.1-12

Westbound traffic in Baku - Tbilisi - Poti / Batumi corridor (pessimistic scenario)

(in '000 tons)

	1995	1996	1997	2000	2010	2015
1 Baku - Gyandsha						
Domestic	3,299	3,283	3,447	3,481	4,525	5,087
Azeri exports	952	928	944	1,429	3,208	3,635
Georgian imports	26	27	28	31	37	43
Transit	134	335	352	1,354	1,693	2,065
Azeri imports	30	30	30	31	34	36
Total	*4,441*	*4,602*	*4,801*	*6,326*	*9,497*	*10,866*
2 Gyandsha - Tbilisi						
Domestic	0	0	0	0	0	0
Azeri exports	964	940	956	1,463	3,374	3,714
Georgian imports	26	27	28	31	37	43
Transit	134	335	352	1,354	1,693	2,065
Total	*1,124*	*1,302*	*1,336*	*2,848*	*5,104*	*5,822*
3 Tbilisi - Batumi						
Domestic	380	399	409	458	490	564
Azeri exports	615	600	510	692	2,375	2,618
Georgian imports	11	11	12	13	16	18
Transit	126	315	372	743	870	1,218
Georgian exports	30	30	32	39	64	79
Total	*1,162*	*1,355*	*1,335*	*1,945*	*3,815*	*4,496*
4 Tbilisi - Poti						
Domestic	310	326	335	349	436	501
Azeri exports	109	106	98	450	598	635
Georgian imports	3	3	3	4	5	5
Transit	28	70	63	677	792	990
Georgian exports	60	60	61	80	119	149
Total	*510*	*565*	*561*	*1,559*	*1,950*	*2,281*

Annex 2.2.1-13

Eastbound traffic in Baku - Tbilisi - Poti / Batumi corridor (optimistic scenario)

(in '000 tons)

	1995	1996	1997	2000	2010	2015
1 Gyandsha - Baku						
Domestic	676	592	621	932	1,165	1,339
Azeri imports	265	270	291	378	567	737
Georgian exports	155	154	166	224	336	403
Transit	54	55	96	386	675	843
Azeri exports	30	29	30	90	107	113
Total	*1,180*	*1,100*	*1,204*	*2,008*	*2,849*	*3,435*
2 Tbilisi - Gyandsha						
Domestic	0	0	0	0	0	0
Azeri imports	293	299	321	418	626	814
Georgian exports	160	159	171	231	347	416
Transit	54	55	96	386	675	843
Total	*507*	*513*	*589*	*1,034*	*1,648*	*2,074*
3 Batumi - Tbilisi						
Domestic	195	205	220	275	371	427
Azeri imports	53	54	58	76	113	147
Georgian exports	45	45	48	67	104	125
Transit	195	191	196	245	306	367
Georgian imports	290	276	282	325	406	436
Total	*778*	*770*	*805*	*988*	*1,301*	*1,503*
4 Poti - Tbilisi						
Domestic	143	150	161	202	272	313
Azeri imports	240	245	263	342	513	667
Georgian exports	10	10	10	13	17	20
Transit	350	348	357	446	558	669
Georgian imports	610	580	377	433	541	582
Total	*1,353*	*1,333*	*1,169*	*1,436*	*1,902*	*2,252*

Annex 2.2.1-14

Eastbound traffic in Baku - Tbilisi - Poti / Batumi corridor (pessimistic scenario)

(in '000 tons)

	1995	1996	1997	2000	2010	2015
1 Gyandsha - Baku						
Domestic	676	592	603	845	1,014	1,135
Azeri imports	265	270	284	355	522	654
Georgian exports	155	154	148	170	272	327
Transit	54	55	83	323	581	726
Azeri exports	30	29	29	64	74	77
Total	*1,180*	*1,099*	*1,146*	*1,757*	*2,463*	*2,919*
2 Tbilisi - Gyandsha						
Domestic	0	0	0	0	0	0
Azeri imports	293	297	312	391	574	719
Georgian exports	160	160	154	177	283	339
Transit	54	55	83	323	581	726
Total	*507*	*512*	*549*	*890*	*1,438*	*1,784*
3 Batumi - Tbilisi						
Domestic	195	196	206	237	308	345
Azeri imports	53	54	56	71	102	130
Georgian exports	45	45	46	48	63	72
Transit	195	195	198	238	285	333
Georgian imports	290	261	144	165	198	232
Total	*778*	*751*	*650*	*758*	*956*	*1,112*
4 Poti - Tbilisi						
Domestic	143	144	151	174	226	253
Azeri imports	240	244	256	320	464	589
Georgian exports	10	10	10	11	14	16
Transit	350	341	346	416	499	584
Georgian imports	610	549	302	347	417	488
Total	*1,353*	*1,288*	*1,065*	*1,267*	*1,619*	*1,929*

Annex 2.2.1-15

Development of rail passenger traffic in Azerbaijan

	1995	1997	%	2000	%	2010	%	2015	%
Optimistic scenario									
Regional traffic									
Passengers (,000)	6,400	2,918	45.6	3,298	51.5	5,372	83.9	6,078	95.0
Pkm (Mio)	140.2	73.0	52.1	82	58.8	134.3	95.8	151.9	108.3
Domestic traffic									
Passengers (,000)	2,432	1,409	57.9	1,820	74.8	3,741	153.8	4,233	174.1
Pkm (Mio)	608.0	352.3	57.9	455.0	74.8	935.3	153.8	1058.2	174.0
International traffic									
Passengers (,000)	168	5	3.0	87	51.8	283	168.5	406	241.7
Pkm (Mio)	42.0	1.5	3.6	25.8	61.4	83.4	198.6	119.8	285.2
Total									
Passengers (,000)	**9,000**	**4,332**	**48.1**	**5,205**	**57.8**	**9,396**	**104.4**	**10,717**	**119.1**
Pkm (Mio)	**790.2**	**426.8**	**54.0**	**563.2**	**71.3**	**1153.0**	**145.9**	**1329.9**	**168.3**
Pessimistic scenario									
Regional traffic									
Passengers (,000)	6,400	2,304	36.0	1,975	30.9	2,348	36.7	2,468	38.6
Pkm (Mio)	140.2	57.6	41.1	49.4	35.2	58.7	41.9	61.7	44.0
Domestic traffic									
Passengers (,000)	2,432	1,335	54.9	1,269	52.2	1,995	82.0	2,097	86.2
Pkm (Mio)	608.0	333.8	54.9	317.3	52.2	498.7	82.0	524.2	86.2
International traffic									
Passengers (,000)	168	5	3.0	47	28.0	114	67.9	145	86.3
Pkm (Mio)	42.0	1.5	3.6	13.9	33.1	33.5	79.8	42.8	101.9
Total									
Passengers (,000)	**9,000**	**3,644**	**40.5**	**3,291**	**36.6**	**4,457**	**49.5**	**4,710**	**52.3**
Pkm (Mio)	**790.2**	**392.9**	**49.7**	**380.6**	**48.2**	**590.9**	**74.8**	**628.7**	**79.6**

Note: Percentage rates refer to year 1995

Annex 2.2.1-16

Development of rail passenger traffic in Georgia

	1996	1997	%	2000	%	2010	%	2015	%
Optimistic scenario									
Regional traffic									
Passengers (,000)	1,761	1,761	100.0	1,868	106.1	2,451	139.2	2,773	157.5
Pkm (Mio)	137.7	79	57.5	84	61.1	110.3	80.1	124.8	90.6
Domestic traffic									
Passengers (,000)	1,454	1,454	100.0	1,683	115.7	3,084	212.1	3,936	270.7
Pkm (Mio)	269.0	269.0	100.0	311.4	115.8	570.5	212.1	728.2	270.7
International traffic									
Passengers (,000)	4	4	100.0	81		166		211	
Pkm (Mio)	0.2	0.2	100.0	16.9		34.8		44.4	
Total									
Passengers (,000)	**3,219**	**3,219**	**100.0**	**3,632**	**112.8**	**5,701**	**177.1**	**6,920**	**215.0**
Pkm (Mio)	**406.9**	**348.4**	**85.6**	**412.4**	**101.4**	**715.6**	**175.9**	**897.4**	**220.5**
Pessimistic scenario									
Regional traffic									
Passengers (,000)	1,761	1,673	95.0	1,526	86.7	1,719	97.6	1,898	107.8
Pkm (Mio)	137.7	75.3	54.7	68.7	49.9	77.3	56.1	85.4	62.0
Domestic traffic									
Passengers (,000)	1,454	1,418	97.5	1,348	92.7	2,441	167.9	2,762	190.0
Pkm (Mio)	269.0	262.3	97.5	249.3	92.7	451.6	167.9	510.9	189.9
International traffic									
Passengers (,000)	4	4	100.0	33		101		114	
Pkm (Mio)	0.2	0.2	100.0	2.5		21.1		23.9	
Total									
Passengers (,000)	**3,219**	**3,095**	**96.1**	**2,907**	**90.3**	**4,261**	**132.4**	**4,774**	**148.3**
Pkm (Mio)	**406.9**	**337.8**	**83.0**	**320.5**	**78.8**	**550.0**	**135.2**	**620.2**	**152.4**

Note: Percentage rates refer to year 1995

Final Report Module A

Annexes

Chapter 2 Institutional, Organisational and Commercial Pre-feasibility

2.2 Commercial pre-feasibility

2.2.2 Financial forecast

Annex 2.2.2-1

Structure of the Azerbaijan State Railways' prime costs Year 1995 divided according to functional structure

Functional structure	Share of total cost	Amount 1995 '000 000 manats/year
I. Sum of expenditure at stations for passenger transport, container transport and commercial work	14.5 %	18,982.0
II. Sum of expenditure for tractive units	41.8 %	54,480.1
III. Sum of expenditure for wagons	13.6 %	17,682.2
IV. Sum of expenditure for route costs	15.2 %	19,781.9
V. Sum of expenditure for building construction	2.3 %	2,988.7
VI. Sum of expenditure for security and telecommunication technology	4.4 %	5,725.6
VII. Sum of cost for energy supply	3.1 %	4,085.0
VIII. Transit cost		-
IX. Cost for breakdown trains	0.2 %	240.4
X. Remaining overheads for the three areas	0.7 %	888.1
XI. Railway administration cost	4.2 %	5,531.5
Total cost	**100 %**	**130.385.5**
out of it for passenger transport	21.2 %	27,641.7
out of it for goods transport	78.8 %	102,743.8

Annex 2.2.2-2

Structure of the Azerbaijan State Railways' prime costs Year 1995 divided according to selected cost types

Selected cost types	Amount 1995 '000 000 manats/year	Share of total cost
Personnel cost		
Wage fund	6,214.8	
Social contribution	+ 11,431.5	
Sum of personnel cost	17,646.3	13.5 %
Cost for driving fuel traction		
fuel	7,728.8	
electrical energy	+ 32,795.1	
Sum of cost for driving fuel	40,523.9	31.1 %
Cost for repairs (repair fund)	24,688.7	18.9 %
Cost for other energy consumption		
fuel	4,788.1	
electrical energy	+ 15,201.9	
Sum of cost for other energy consumption	19,990.0	15.3 %
Other costs	27,536.6	21.2 %
including amortisation	(7,565.2)	(5.8 %)
Total cost	**130,385.5** = $ 29.63 million	**100 %**

Annex 2.2.2-3

Structure of the Azerbaijan State Railways' revenue Year 1995

Item	Amount 1995 '000 000 manats/year	Share of total revenue
Revenue from goods transport		
Revenue from transportation services	237,018.2	82.9 %
Revenue from additional charges	40,729.1	14.3 %
Sum of revenue from goods transport	*277,747.3*	*97.2 %*
Revenue from passenger transport		
Revenue from transportation services	5,265.8	1.8 %
Revenue from seat reservation	2,678.2	1.0 %
Revenue from luggage	47.1	(0.0 %)
Revenue from mail transportation	-	
Sum of revenue from passenger transport	*7,991.1*	*2.8 %*
Total revenue	**285,738.4**	**100 %**

Estimation of the future financial situation of Azerbaijan Railways (optimistic case)

Annex 2.2.2-4

Item	Time						
	1994	1995	1995 norm.	1997	2000	2010	2015
Development of Transportation Output							
No. of passengers (millions)	10,6	8,9	8,9	4,3	5,2	9,4	10,7
Passenger-kms (millions)	1.104	787	787	427	563	1.153	1.330
Average travel distance (km)	104	88	88	99	108	123	124
Tonnes originating (1000 t)	12.952	9.073	9.073	10.863	20.102	29.690	34.825
Net tonne-kms (milions)	3.276	2.409	2.409	2.879	8.805	13.004	15.253
Average lead (km)	253	265	265	265	438	438	438
Revenue from Passenger and Freight Transport							
Revenue from passenger transport (1000 US$)	2.542,2	1.816,2	1.816,2	1.280,4	8.449,5	57.655,0	133.000,0
Revenue from freight transport (1000 US$)	86.081,4	63.124,4	63.124,4	86.370,0	352.200,0	650.200,0	838.915,0
Total revenue (1000 US$)	88.623,6	64.940,6	64.940,6	87.650,4	360.649,5	707.855,0	971.915,0
Unit revenue in passenger transport (US$/passkm)	0,0023	0,0023	0,0023	0,0030	0,0150	0,0500	0,1000
Unit revenue in freight transport (US$/tkm)	0,0263	0,0262	0,0262	0,0300	0,0400	0,0500	0,0550
Prime Costs of Transport							
Prime costs of freight transport (1000 US$)	31.763,2	23.350,9	35.891,4	61.963,9	206.586,5	362.189,1	500.420,7
Prime costs of passenger transport (1000 US$)	8.812,3	6.282,2	9.540,8	10.934,8	22.954,1	40.243,2	55.602,3
Total prime costs (1000 US$)	40.575,5	29.633,1	45.432,2	72.898,7	229.540,6	402.432,4	556.023,0
Proportional coefficient prime costs freight transport of total costs	0,78	0,79	0,79	0,85	0,90	0,90	0,90
Proportional coefficient prime costs passenger transport of total costs	0,22	0,21	0,21	0,15	0,10	0,10	0,10
Unit cost freight transport (US$/tkm)	0,0097	0,0097	0,0149	0,0215	0,0235	0,0279	0,0328
Unit cost passenger transport (US$/passkm)	0,0080	0,0080	0,0121	0,0256	0,0407	0,0349	0,0418
DIfference unit revenue vs. unit cost passenger transport	-0,0057	-0,0057	-0,0098	-0,0226	-0,0257	0,0151	0,0582
Difference unit revenue vs. unit cost freight transport	0,0166	0,0165	0,0113	0,0085	0,0165	0,0221	0,0222
Selected Cost Components							
Personnel costs (1000 US$)		4.010,5	10.059,6	10.560,0	80.000,0	175.000,0	280.000,0
Percentage of total costs (%)		13,53	22,14	14,49	34,85	43,49	50,36
of which personnel costs for freight transport (1000 US$)		3.160,3	7.947,1	8.976,0	72.000,0	157.500,0	252.000,0
of which personnel costs for passenger transport (1000 US$)		850,2	2.112,5	1.584,0	8.000,0	17.500,0	28.000,0

Estimation of the future financial situation of Azerbaijan Railways (optimistic case)

Annex 2.2.2-4

Item	Time						
	1994	1995	1995 norm.	1997	2000	2010	2015
costs for traction energy (1000 US$)		9.210,0	9.210,0	10.637,5	24.141,7	40.523,9	50.631,9
Percentage of total costs (%)		31,08	20,27	14,59	10,52	10,07	9,11
of which costs for freight transport (1000 US$)		7.257,5	7.275,9	9.041,9	21.727,5	36.471,5	45.568,7
of which costs for passenger transport (1000 US$)		1.952,5	1.934,1	1.595,6	2.414,2	4.052,4	5.063,2
of which fuel (1000 US$)		1.756,5	1.756,5	2.028,8	4.604,3	7.728,8	9.656,6
of which electric power (1000 US$)		7.453,4	7.453,4	8.608,7	19.537,3	32.795,1	40.975,2
Repair costs (1000 US$)		5.611,1	11.222,2	26.136,4	52.272,7	79.545,5	90.909,1
Percentage of total costs (%)		18,94	24,70	35,85	22,77	19,77	16,35
of which costs for freight transport (1000 US$)		4.421,5	8.865,5	22.215,9	47.045,5	71.590,9	81.818,2
of which costs for passenger transport (1000 US$)		1.189,5	2.356,7	3.920,5	5.227,3	7.954,5	9.090,9
costs for other energy usage (1000 US$)		4.543,2	4.543,2	4.785,5	9.642,9	15.409,0	18.922,4
Percentage of total costs (%)		15,33	10,00	6,56	4,20	3,83	3,40
of which fuel (1000 US$)		1.088,2	1.088,2	1.146,2	2.309,7	3.690,8	4.532,4
of which electric power (1000 US$)		3.455,0	3.455,0	3.639,2	7.333,2	11.718,1	14.390,0
Other costs (1000 US$)		6.258,3	10.397,3	20.779,3	63.483,3	91.954,1	115.559,7
Percentage of total costs (%)		21,12	22,89	28,50	27,66	22,85	20,78
of which costs for material (1000 US$)		1.274,0	3.822,1	8.790,9	35.500,0	45.454,5	53.636,4
Percentage of total costs (%)		4,30	8,41	12,06	15,47	11,29	9,65
of which amortisation (1000 US$)		1.719,4	3.310,3	8.560,3	24.310,3	42.010,3	57.026,0
Percentage of total costs (%)		5,80	7,29	11,74	10,59	10,44	10,26
of which other costs (1000 US$)		3.264,9	3.264,9	3.428,2	3.673,0	4.489,3	4.897,4
Percentage of total costs (%)		11,02	7,19	4,70	1,60	1,12	0,88
Sum prime costs (1000 US$)		29.633,1	45.432,2	72.898,7	229.540,6	402.432,4	556.023,0

Estimation of the future financial situation of Azerbaijan Railways (optimistic case)

Annex 2.2.2-4

Item	Time						
	1994	1995	1995 norm.	1997	2000	2010	2015
Cost Coverage							
Cost coverage passenger transport (1000 US$)		-4.466,0	-7.724,6	-9.654,4	-14.504,6	17.411,8	77.397,7
Cost coverage freight transport (1000 US$)		39.773,5	27.233,0	24.406,1	145.613,5	288.010,9	338.494,3
Cost coverage total transport (1000 US$)		35.307,5	19.508,4	14.751,7	131.108,9	305.422,6	415.892,0
Profit Calculation							
Net profit before tax requ. depreciation, interest and tax (1000 US$)		34.773,6	19.508,4	14.751,7	131.108,9	305.422,6	415.892,0
Tax required depreciation (1000 US$)		1.719,4	3.310,3	8.560,3	24.310,3	42.010,3	57.026,0
Net profit before interest and tax (1000 US$)		33.054,3	16.198,1	6.191,4	106.798,6	263.412,3	358.866,0
Interest for (additional) loans (1000 US$)							
Net profit before tax (1000 US$)		33.054,3	16.198,1	6.191,4	106.798,6	263.412,3	358.866,0
Taxes (1000 US$)		12.397,3	5.669,3	2.167,0	37.379,5	92.194,3	125.603,1
Net profit after tax (1000 US$)		20.657,0	10.528,8	4.024,4	69.419,1	171.218,0	233.262,9
Financial Resources							
Own resources							
net profit after tax (1000 US$)		20.657,0	10.528,8	4.024,4	69.419,1	171.218,0	233.262,9
tax required depreciation (1000 US$)		1.719,4	3.310,3	8.560,3	24.310,3	42.010,3	57.026,0
Sum of own resources (1000 US$)		22.376,3	13.839,0	12.584,7	93.729,4	213.228,3	290.288,9

Estimation of the future financial situation of Azerbaijan Railways (pessimistic case)

Annex 2.2.2-5

Item	Time						
	1994	1995	1995 norm.	1997	2000	2010	2015
Development of Transportation Output							
No. of passengers (millions)	10,6	8,9	8,9	3,6	3,3	4,5	4,7
Passenger-kms (millions)	1.104	787	787	393	381	591	629
Average travel distance (km)	104	88	88	109	115	131	134
Tonnes originating (1000 t)	12.952	9.073	9.073	10.173	12.992	20.519	23.685
Net tonne-kms (milions)	3.276	2.409	2.409	2.696	5.469	8.638	9.971
Average lead (km)	253	265	265	265	421	421	421
Revenue from Passenger and Freight Transport							
Revenue from passenger transport (1000 US$)	2.542,2	1.816,2	1.816,2	982,3	3.806,0	17.727,0	31.430,0
Revenue from freight transport (1000 US$)	86.081,4	63.124,4	63.124,4	72.792,0	164.070,0	345.520,0	448.695,0
Total revenue (1000 US$)	88.623,6	64.940,6	64.940,6	73.774,3	167.876,0	363.247,0	480.125,0
Unit revenue in passenger transport (US$/passkm)	0,0023	0,0023	0,0023	0,0025	0,0100	0,0300	0,0500
Unit revenue in freight transport (US$/tkm)	0,0263	0,0262	0,0262	0,0270	0,0300	0,0400	0,0450
Prime Costs of Transport							
Prime costs of freight transport (1000 US$)	31.763,2	23.350,9	35.891,4	58.859,7	147.960,4	287.850,0	400.611,9
Prime costs of passenger transport (1000 US$)	8.812,3	6.282,2	9.540,8	10.387,0	9.444,3	18.373,4	25.571,0
Total prime costs (1000 US$)	40.575,5	29.633,1	45.432,2	69.246,7	157.404,6	306.223,4	426.182,9
Proportional coefficient prime costs freight transport of total costs	0,78	0,79	0,79	0,85	0,94	0,94	0,94
Proportional coefficient prime costs passenger transport of total costs	0,22	0,21	0,21	0,15	0,06	0,06	0,06
Unit cost freight transport (US$/tkm)	0,0097	0,0097	0,0149	0,0218	0,0271	0,0333	0,0402
Unit cost passenger transport (US$/passkm)	0,0080	0,0080	0,0121	0,0264	0,0248	0,0311	0,0407
DIfference unit revenue vs. unit cost passenger transport	-0,0057	-0,0057	-0,0098	-0,0239	-0,0148	-0,0011	0,0093
Difference unit revenue vs. unit cost freight transport	0,0166	0,0165	0,0113	0,0052	0,0029	0,0067	0,0048
Selected Cost Components							
Personnel costs (1000 US$)		4.010,5	10.059,6	10.200,0	60.000,0	150.000,0	240.000,0
Percentage of total costs (%)		13,53	22,14	14,73	38,12	48,98	56,31
of which personnel costs for freight transport (1000 US$)		3.160,3	7.947,1	8.670,0	56.400,0	141.000,0	225.600,0
of which personnel costs for passenger transport (1000 US$)		850,2	2.112,5	1.530,0	3.600,0	9.000,0	14.400,0

Estimation of the future financial situation of Azerbaijan Railways (pessimistic case)

Annex 2.2.2-5

Item	Time						
	1994	1995	1995 ber.	1997	2000	2010	2015
costs for traction energy (1000 US$)		9.210,0	9.210,0	10.250,7	16.940,6	29.063,2	35.504,5
Percentage of total costs (%)		31,08	20,27	14,80	10,76	9,49	8,33
of which costs for freight transport (1000 US$)		7.257,5	7.275,9	8.713,1	15.924,2	27.319,4	33.374,2
of which costs for passenger transport (1000 US$)		1.952,5	1.934,1	1.537,6	1.016,4	1.743,8	2.130,3
of which fuel (1000 US$)		1.756,5	1.756,5	1.955,0	3.230,9	5.543,0	6.771,5
of which electric power (1000 US$)		7.453,4	7.453,4	8.295,7	13.709,7	23.520,2	28.733,0
Repair costs (1000 US$)		5.611,1	11.222,2	24.394,0	32.420,5	52.883,0	59.457,1
Percentage of total costs (%)		18,94	24,70	35,23	20,60	17,27	13,95
of which costs for freight transport (1000 US$)		4.421,5	8.865,5	20.734,9	30.475,3	49.710,0	55.889,7
of which costs for passenger transport (1000 US$)		1.189,5	2.356,7	3.659,1	1.945,2	3.173,0	3.567,4
costs for other energy usage (1000 US$)		4.543,2	4.543,2	4.779,4	7.274,8	11.640,0	13.947,6
Percentage of total costs (%)		15,33	10,00	6,90	4,62	3,80	3,27
of which fuel (1000 US$)		1.088,2	1.088,2	1.144,8	1.742,5	2.788,1	3.340,8
of which electric power (1000 US$)		3.455,0	3.455,0	3.634,6	5.532,3	8.851,9	10.606,8
Other costs (1000 US$)		6.258,3	10.397,3	19.622,6	40.768,8	62.637,1	77.273,7
Percentage of total costs (%)		21,12	22,89	28,34	25,90	20,45	18,13
of which costs for material (1000 US$)		1.274,0	3.822,1	8.204,8	22.018,1	30.218,8	35.079,7
Percentage of total costs (%)		4,30	8,41	11,85	13,99	9,87	8,23
of which amortisation (1000 US$)		1.719,4	3.310,3	7.989,6	15.077,7	27.929,1	37.296,6
Percentage of total costs (%)		5,80	7,29	11,54	9,58	9,12	8,75
of which other costs (1000 US$)		3.264,9	3.264,9	3.428,2	3.673,0	4.489,3	4.897,4
Percentage of total costs (%)		11,02	7,19	4,95	2,33	1,47	1,15
Sum prime costs (1000 US$)		29.633,1	45.432,2	69.246,7	157.404,6	306.223,4	426.182,9

Estimation of the future financial situation of Azerbaijan Railways (pessimistic case)

Annex 2.2.2-5

Item	Time						
	1994	1995	1995 ber.	1997	2000	2010	2015
Cost Coverage							
Cost coverage passenger transport (1000 US$)		-4.466,0	-7.724,6	-9.404,8	-5.638,3	-646,4	5.859,0
Cost coverage freight transport (1000 US$)		39.773,5	27.233,0	13.932,3	16.109,6	57.670,0	48.083,1
Cost coverage total transport (1000 US$)		35.307,5	19.508,4	4.527,6	10.471,4	57.023,6	53.942,1
Profit Calculation							
Net profit before tax requ. depreciation, interest and tax (1000 US$)		34.773,6	19.508,4	4.527,6	10.471,4	57.023,6	53.942,1
Tax required depreciation (1000 US$)		1.719,4	3.310,3	7.989,6	15.077,7	27.929,1	37.296,6
Net profit before interest and tax (1000 US$)		33.054,3	16.198,1	-3.462,0	-4.606,3	29.094,5	16.645,5
Interest for (additional) loans (1000 US$)							
Net profit before tax (1000 US$)		33.054,3	16.198,1	-3.462,0	-4.606,3	29.094,5	16.645,5
Taxes (1000 US$)		12.397,3	5.669,3	0,0	0,0	10.183,1	5.825,9
Net profit after tax (1000 US$)		20.657,0	10.528,8	-3.462,0	-4.606,3	18.911,5	10.819,6
Financial Resources							
Own resources							
net profit after tax (1000 US$)		20.657,0	10.528,8	-3.462,0	-4.606,3	18.911,5	10.819,6
tax required depreciation (1000 US$)		1.719,4	3.310,3	7.989,6	15.077,7	27.929,1	37.296,6
Sum of own resources (1000 US$)		22.376,3	13.839,0	4.527,6	10.471,4	46.840,5	48.116,2

Annex 2.2.2-6

Structure of the Georgian State Railways' prime costs Year 1995 divided according to functional structure

Functional structure	Share of total cost	Amount 1995 '000 lari/year
I. Sum of expenditure at stations for passenger transport, container transport and commercial work	17.3 %	5,639.1
II. Sum of expenditure for tractive units	32.4 %	10,580.8
III. Sum of expenditure for wagons	7.3 %	2,388.8
IV. Sum of expenditure for route costs	26.8 %	8,749.5
V. Sum of expenditure for building construction	3.4 %	1,120.3
VI. Sum of expenditure for security and telecommunication technology	4.2 %	1,352.6
VII. Sum of the cost for energy supply	4.6 %	1,501.8
VIII. Transit cost		-
IX. Cost for breakdown trains	0.5 %	164.2
X. Remaining overheads for the two areas	1.3 %	430.3
XI. Railway administration cost	2.2 %	720.0
Total cost	**100 %**	**32.647.4**
out of it for passenger transport	38.1 %	12,426.5
out of it for goods transport	62.9 %	20,220.9

Annex 2.2.2-7

Structure of the Georgian State Railways' prime costs Year 1995 divided according to selected cost types

Selected cost types	Amount 1995 '000 lari/year	Share of total cost
Personnel cost		
Wage fund	5,881.5	
Social contribution	+ 2,589.1	
Sum of personnel cost	8,470.6	25.9 %
Cost for driving fuel traction		
fuel	1,954.8	
electrical energy	+ 3,879.8	
Sum of cost for driving fuel	5,834.6	17.9 %
Cost for repairs (repair fund)	7,495.6	23.0 %
Cost for other energy consumption		
fuel	1,252.4	
electrical energy	+ 697.8	
Sum of cost for other energy consumption	1,950.2	6.0 %
Other costs	8,896.4	27.2 %
including amortisation	(1,767.2)	(5.4 %)
Total cost	**32,647.4** = $26.12 million	**100 %**

Annex 2.2.2-8

Structure of the Georgian State Railways' revenue Year 1995

Item	Amount 1995 '000 lari/year	Share of total revenue
Revenue from goods transport		
Revenue from transportation services	43,425.6	93.0 %
Revenue from additional charges	2,659.0	5.7 %
Sum of revenue from goods transport	*46,084.6*	*98.7 %*
Revenue from passenger transport		
Revenue from transportation services	605.4	1.3 %
Revenue from seat reservation	6.4	(0.0 %)
Revenue from luggage	9.9	(0.0 %)
Revenue from mail transportation	3.4	(0.0 %)
Sum of revenue from passenger transport	*625.1*	*1.3 %*
Total revenue	**46,709.7**	**100 %**

Estimation of the future financial situation of Georgian Railways (optimistic case)

Annex 2.2.2-9

Item	Time						
	1994	1995	1995 norm.	1997	2000	2010	2015
Development of Transportation Output							
No. of passengers (millions)	10,8	3,7	3,7	3,2	3,6	5,7	6,9
Passenger-kms (millions)	1.164	371	371	348	412	716	897
Average travel distance (km)	95	101	101	109	115	126	130
Tonnes originating (1000 t)	5.656	4.655	4.655	4.886	9.525	15.268	17.469
Net tonne-kms (milions)	955	1.246	1.246	1.319	3.238	5.191	5.940
Average lead (km)	182	268	268	270	340	340	340
Revenue from Passenger and Freight Transport							
Revenue from passenger transport (1000 US$)	372,4	520,9	520,9	871,0	2.062,0	35.780,0	89.730,0
Revenue from freight transport (1000 US$)	24.143,3	38.403,8	38.403,8	46.165,0	129.520,0	259.550,0	326.700,0
Total revenue (1000 US$)	24.515,7	38.924,7	38.924,7	47.036,0	131.582,0	295.330,0	416.430,0
Unit revenue in passenger transport (US$/passkm)	0,0003	0,0014	0,0014	0,0025	0,0050	0,0500	0,1000
Unit revenue in freight transport (US$/tkm)	0,0253	0,0308	0,0308	0,0350	0,0400	0,0500	0,0550
Prime Costs of Transport							
Prime costs of freight transport (1000 US$)	5.756,1	16.863,3	21.153,1	29.828,4	98.413,6	212.918,3	289.640,7
Prime costs of passenger transport (1000 US$)	3.660,3	10.355,3	12.964,8	10.480,2	17.367,1	37.573,8	51.113,1
Total prime costs (1000 US$)	9.416,3	27.218,7	34.117,8	40.308,6	115.780,7	250.492,1	340.753,7
Proportional coefficient prime costs freight transport of total costs	0,61	0,62	0,62	0,74	0,85	0,85	0,85
Proportional coefficient prime costs passenger transport of total costs	0,39	0,38	0,38	0,26	0,15	0,15	0,15
Unit cost freight transport (US$/tkm)	0,0060	0,0135	0,0170	0,0226	0,0304	0,0410	0,0488
Unit cost passenger transport (US$/passkm)	0,0031	0,0279	0,0349	0,0301	0,0421	0,0525	0,0570
DIfference unit revenue vs. unit cost passenger transport	-0,0028	-0,0265	-0,0335	-0,0276	-0,0371	-0,0025	0,0430
Difference unit revenue vs. unit cost freight transport	0,0193	0,0173	0,0138	0,0124	0,0096	0,0090	0,0062
Selected Cost Components							
Personnel costs (1000 US$)	2.125,4	6.731,9	8.265,7	8.300,0	35.000,0	100.000,0	150.000,0
Percentage of total costs (%)	22,6	24,7	24,2	20,6	30,2	39,9	44,0
of which personnel costs for freight transport (1000 US$)	1.299,2	4.170,8	5.124,7	6.142,0	29.750,0	85.000,0	127.500,0
of which personnel costs for passenger transport (1000 US$)	826,2	2.561,2	3.141,0	2.158,0	5.250,0	15.000,0	22.500,0

Estimation of the future financial situation of Georgian Railways (optimistic case)

Annex 2.2.2-9

Item	Time						
	1994	1995	1995 ber.	1997	2000	2010	2015
costs for traction energy (1000 US$)	2.661,8	4.862,3	4.862,3	5.411,7	9.682,0	17.282,3	21.041,4
Percentage of total costs (%)	28,3	17,9	14,3	13,4	8,4	6,9	6,2
of which costs for freight transport (1000 US$)	1.627,1	3.012,4	3.014,6	4.004,6	8.229,7	14.689,9	17.885,2
of which costs for passenger transport (1000 US$)	1.034,7	1.849,8	1.847,7	1.407,0	1.452,3	2.592,3	3.156,2
of which fuel (1000 US$)	701,8	1.629,0	1.629,0	1.813,1	3.243,7	5.790,1	7.049,5
of which electric power (1000 US$)	1.960,1	3.233,3	3.233,3	3.598,6	6.438,2	11.492,2	13.991,9
Repair costs (1000 US$)	2.493,7	8.522,1	10.000,0	11.800,0	32.000,0	62.000,0	75.000,0
Percentage of total costs (%)	26,5	31,3	29,3	29,3	27,6	24,8	22,0
of which costs for freight transport (1000 US$)	1.524,3	5.279,9	6.200,0	8.732,0	27.200,0	52.700,0	63.750,0
of which costs for passenger transport (1000 US$)	969,3	3.242,2	3.800,0	3.068,0	4.800,0	9.300,0	11.250,0
costs for other energy usage (1000 US$)	823,9	1.625,2	1.625,2	1.706,4	2.766,8	4.715,0	5.753,1
Percentage of total costs (%)	8,7	6,0	4,8	4,2	2,4	1,9	1,7
of which fuel (1000 US$)	300,8	581,5	581,5	610,6	990,0	1.687,1	2.058,5
of which electric power (1000 US$)	523,1	1.043,7	1.043,7	1.095,9	1.776,8	3.027,9	3.694,6
Other costs (1000 US$)	1.311,3	5.477,3	9.364,6	13.090,5	36.331,9	66.494,8	88.959,3
Percentage of total costs (%)	13,9	20,1	27,4	32,5	31,4	26,5	26,1
of which costs for material (1000 US$)	243,1	1.585,3	3.300,8	4.050,0	13.433,0	28.300,0	38.000,0
Percentage of total costs (%)	2,6	5,8	9,7	10,0	11,6	11,3	11,2
of which amortisation (1000 US$)	498,2	1.472,5	3.644,3	6.500,0	20.177,0	34.868,0	47.330,0
Percentage of total costs (%)	5,3	5,4	10,7	16,1	17,4	13,9	13,9
of which other costs (1000 US$)	570,1	2.419,5	2.419,5	2.540,5	2.721,9	3.326,8	3.629,3
Percentage of total costs (%)	6,1	8,9	7,1	6,3	2,4	1,3	1,1
Sum prime costs (1000 US$)	9.416,2	27.218,7	34.117,7	40.308,6	115.780,7	250.492,1	340.753,7

Estimation of the future financial situation of Georgian Railways (optimistic case)

Annex 2.2.2-9

Item	Time						
	1994	1995	1995 ber.	1997	2000	2010	2015
Cost Coverage							
Cost coverage passenger transport (1000 US$)	-3.287,9	-9.834,4	-12.443,9	-9.609,2	-15.305,1	-1.793,8	38.616,9
Cost coverage freight transport (1000 US$)	18.387,2	21.540,5	17.250,8	16.336,6	31.106,4	46.631,7	37.059,3
Cost coverage total transport (1000 US$)	15.099,3	11.706,1	4.806,9	6.727,4	15.801,3	44.837,9	75.676,3
Profit Calculation							
Net profit before tax requ. depreciation, interest and tax (1000 US$)		13.413,8	4.807,1	6.727,4	15.801,3	44.837,9	75.676,3
Tax required depreciation (1000 US$)		1.472,5	3.644,3	6.500,0	20.177,0	34.868,0	47.330,0
Net profit before interest and tax (1000 US$)		11.941,3	1.162,8	227,4	-4.375,7	9.969,9	28.346,3
Interest for (additional) loans (1000 US$)							
Net profit before tax (1000 US$)		11.941,3	1.162,8	227,4	-4.375,7	9.969,9	28.346,3
Taxes (1000 US$)		1.723,5	232,6	45,5	0,0	1.994,0	5.669,3
Net profit after tax (1000 US$)		10.217,8	930,2	181,9	-4.375,7	7.975,9	22.677,0
Financial Resources							
Own resources							
net profit after tax (1000 US$)		10.217,8	930,2	181,9	-4.375,7	7.975,9	22.677,0
tax required depreciation (1000 US$)		1.472,5	3.644,3	6.500,0	20.177,0	34.868,0	47.330,0
Sum of own resources (1000 US$)		11.690,3	4.574,5	6.681,9	15.801,3	42.843,9	70.007,0

Estimation of the future financial situation of Georgian Railways (pessimistic case)

Annex 2.2.2-10

Item	Time						
	1994	1995	1995 norm.	1997	2000	2010	2015
Development of Transportation Output							
No. of passengers (millions)	10,8	3,7	3,7	3,1	2,9	4,3	4,8
Passenger-kms (millions)	1.164	371	371	338	321	550	620
Average travel distance (km)	95	101	101	109	111	129	129
Tonnes originating (1000 t)	5.656	4.655	4.655	4.390	4.477	7.611	9.135
Net tonne-kms (milions)	955	1.246	1.246	1.185	1.522	2.588	3.106
Average lead (km)	182	268	268	270	340	340	340
Revenue from Passenger and Freight Transport							
Revenue from passenger transport (1000 US$)	372,4	520,9	520,9	675,4	1.602,5	16.503,0	31.010,0
Revenue from freight transport (1000 US$)	24.143,3	38.403,8	38.403,8	37.920,0	53.270,0	103.520,0	139.770,0
Total revenue (1000 US$)	24.515,7	38.924,7	38.924,7	38.595,4	54.872,5	120.023,0	170.780,0
Unit revenue in passenger transport (US$/passkm)	0,0003	0,0014	0,0014	0,0020	0,0050	0,0300	0,0500
Unit revenue in freight transport (US$/tkm)	0,0253	0,0308	0,0308	0,0320	0,0350	0,0400	0,0450
Prime Costs of Transport							
Prime costs of freight transport (1000 US$)	5.756,1	16.863,3	21.153,1	27.383,6	46.360,9	101.231,3	146.768,1
Prime costs of passenger transport (1000 US$)	3.660,3	10.355,3	12.964,8	11.184,8	8.181,3	17.864,3	21.930,9
Total prime costs (1000 US$)	9.416,3	27.218,7	34.117,8	38.568,4	54.542,3	119.095,6	168.699,0
Proportional coefficient prime costs freight transport of total costs	0,61	0,62	0,62	0,71	0,85	0,85	0,87
Proportional coefficient prime costs passenger transport of total costs	0,39	0,38	0,38	0,29	0,15	0,15	0,13
Unit cost freight transport (US$/tkm)	0,0060	0,0135	0,0170	0,0231	0,0305	0,0391	0,0473
Unit cost passenger transport (US$/passkm)	0,0031	0,0279	0,0349	0,0331	0,0255	0,0325	0,0354
DIfference unit revenue vs. unit cost passenger transport	-0,0028	-0,0265	-0,0335	-0,0311	-0,0205	-0,0025	0,0146
Difference unit revenue vs. unit cost freight transport	0,0193	0,0173	0,0138	0,0089	0,0045	0,0009	-0,0023
Selected Cost Components							
Personnel costs (1000 US$)	2.125,4	6.731,9	8.265,7	8.300,0	13.000,0	40.000,0	65.000,0
Percentage of total costs (%)	22,6	24,7	24,2	21,5	23,8	33,6	38,5
of which personnel costs for freight transport (1000 US$)	1.299,2	4.170,8	5.124,7	5.893,0	11.050,0	34.000,0	56.550,0
of which personnel costs for passenger transport (1000 US$)	826,2	2.561,2	3.141,0	2.407,0	1.950,0	6.000,0	8.450,0

Estimation of the future financial situation of Georgian Railways (pessimistic case)

Annex 2.2.2-10

Item	Time						
	1994	1995	1995 ber.	1997	2000	2010	2015
costs for traction energy (1000 US$)	2.661,8	4.862,3	4.862,3	4.977,7	6.071,7	10.295,8	12.726,9
Percentage of total costs (%)	28,3	17,9	14,3	12,9	11,1	8,6	7,5
of which costs for freight transport (1000 US$)	1.627,1	3.012,4	3.014,6	3.534,2	5.161,0	8.751,4	11.072,4
of which costs for passenger transport (1000 US$)	1.034,7	1.849,8	1.847,7	1.443,5	910,8	1.544,4	1.654,5
of which fuel (1000 US$)	701,8	1.629,0	1.629,0	1.667,7	2.034,2	3.449,4	4.263,9
of which electric power (1000 US$)	1.960,1	3.233,3	3.233,3	3.310,0	4.037,5	6.846,4	8.463,0
Repair costs (1000 US$)	2.493,7	8.522,1	10.000,0	11.650,9	15.015,4	30.925,7	39.150,9
Percentage of total costs (%)	26,5	31,3	29,3	30,2	27,5	26,0	23,2
of which costs for freight transport (1000 US$)	1.524,3	5.279,9	6.200,0	8.272,2	12.763,1	26.286,8	34.061,3
of which costs for passenger transport (1000 US$)	969,3	3.242,2	3.800,0	3.378,8	2.252,3	4.638,8	5.089,6
costs for other energy usage (1000 US$)	823,9	1.625,2	1.625,2	1.644,1	1.962,4	3.039,1	3.648,5
Percentage of total costs (%)	8,7	6,0	4,8	4,3	3,6	2,6	2,2
of which fuel (1000 US$)	300,8	581,5	581,5	599,1	702,2	1.087,4	1.305,5
of which electric power (1000 US$)	523,1	1.043,7	1.043,7	1.045,0	1.260,2	1.951,7	2.343,0
Other costs (1000 US$)	1.311,3	5.477,3	9.364,6	11.995,7	18.492,8	34.835,1	48.172,6
Percentage of total costs (%)	13,9	20,1	27,4	31,1	33,9	29,2	28,6
of which costs for material (1000 US$)	243,1	1.585,3	3.300,8	3.629,7	6.303,2	14.116,1	19.836,5
Percentage of total costs (%)	2,6	5,8	9,7	9,4	11,6	11,9	11,8
of which amortisation (1000 US$)	498,2	1.472,5	3.644,3	5.825,5	9.467,7	17.392,2	24.706,9
Percentage of total costs (%)	5,3	5,4	10,7	15,1	17,4	14,6	14,6
of which other costs (1000 US$)	570,1	2.419,5	2.419,5	2.540,5	2.721,9	3.326,8	3.629,3
Percentage of total costs (%)	6,1	8,9	7,1	6,6	5,0	2,8	2,2
Sum prime costs (1000 US$)	9.416,2	27.218,7	34.117,7	38.568,4	54.542,3	119.095,6	168.699,0

Estimation of the future financial situation of Georgian Railways (pessimistic case)

Annex 2.2.2-10

Item	Time						
	1994	1995	1995 ber.	1997	2000	2010	2015
Cost Coverage							
Cost coverage passenger transport (1000 US$)	-3.287,9	-9.834,4	-12.443,9	-10.509,4	-6.578,8	-1.361,3	9.079,1
Cost coverage freight transport (1000 US$)	18.387,2	21.540,5	17.250,8	10.536,4	6.909,1	2.288,7	-6.998,1
Cost coverage total transport (1000 US$)	15.099,3	11.706,1	4.806,9	27,0	330,2	927,4	2.081,0
Profit Calculation							
Net profit before tax requ. depreciation, interest and tax (1000 US$)		13.413,8	4.807,1	27,0	330,2	927,4	2.081,0
Tax required depreciation (1000 US$)		1.472,5	3.644,3	5.825,5	9.467,7	17.392,2	24.706,9
Net profit before interest and tax (1000 US$)		11.941,3	1.162,8	-5.798,5	-9.137,5	-16.464,8	-22.625,8
Interest for (additional) loans (1000 US$)							
Net profit before tax (1000 US$)		11.941,3	1.162,8	-5.798,5	-9.137,5	-16.464,8	-22.625,8
Taxes (1000 US$)		1.723,5	232,6	0,0	0,0	0,0	0,0
Net profit after tax (1000 US$)		10.217,8	930,2	-5.798,5	-9.137,5	-16.464,8	-22.625,8
Financial Resources							
Own resources							
net profit after tax (1000 US$)		10.217,8	930,2	-5.798,5	-9.137,5	-16.464,8	-22.625,8
tax required depreciation (1000 US$)		1.472,5	3.644,3	5.825,5	9.467,7	17.392,2	24.706,9
Sum of own resources (1000 US$)		11.690,3	4.574,5	27,0	330,2	927,4	2.081,0

Final Report Module A

Annexes

Chapter 3 Technical Pre-feasibility

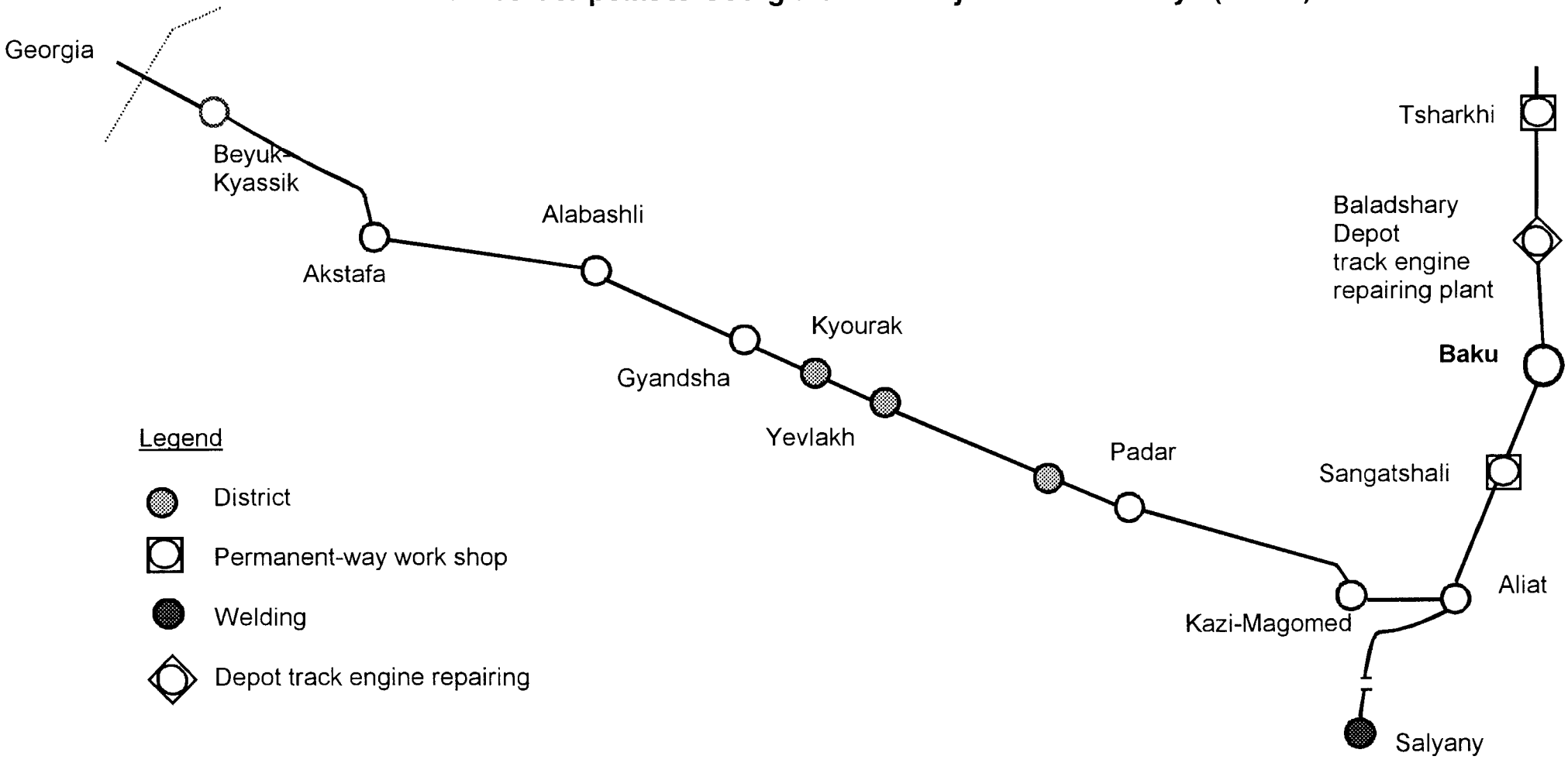
Final Report Module A

Annexes

Chapter 3 Technical Pre-feasibility

3.1 Track and Constructional works
3.1.1 Azerbaijan

Track line Baku - border point to Georgia of Azerbaijan State Railways (AGZD) Annex 3.1.1-1



List of bridges located on the investigated line

Annex 3.1.1-2

No.	Bridge km	Type of bridge	crossing river valley	length	Span	Needs	remarks
1	61 +800 le	Metallbr.	Kaza-su	51.20	4 x 10,66	Maintenance	
2	61 +800 ri	Fer.concrete	"	51,65	4 x 11,50	Maintenance	
3	66 +500 le	"	Feeder	27,65	1 x 10,68	Maintenance	
4	66 +500 ri	"	"	32,50	3 x 9,30	Maintenance	
5	72 +300	Metal-bridge	Kuza	208,36	11,52+34,00+87,00+55,00+11,52	Maintenance	singel track
6	88 +000	Pedestrien	St.Akstafa	60,10	12,30+18,60+8,50+19,20	Maintenance	
7	88 +900	Fer.concrete	Irrig.canal	36,10	2x10,00+16,00	Maintenance	
8	93 +700 le	Metal-bridge	Cassan-su	37,53	1x22,76	Maintenance	
9	" ri	"	"	36,55	1x23,00	Maintenance	
10	111 +200 le	"	Achindshats.	110,87	56,23+2x22,76		Openings in
11	" ri	"	" "	114,50	53,40+13,60		construction
12	112 +800le	"	Aseik-tschai	25,16	1x21,34	Maintenance	
13	130 +100le	"	Dsegyam-tsch	53,24	2x22,36	Maintenance	
14	130 +100ri	"	" "	44,38	4x10,70	Maintenance	
15	145 +100le	Fer.concrete	Irrig.canal	25,18	1x11,60	Maintenance	
16	145 +100ri	"	" "	25,18	1+11,60	Maintenance	
17	147 +500le	"	" "	32,50	2x11,88	Maintenance	
18	147 +500ri	"	" "	34,17	2x11,80	Maintenance	
19	157 +700le	Metal-bridge	Shamkirtsch	53,85	2x22,70	Riverdraining urgent	
20	157 +700ri	"	" "	53,90	2x21,30	Riverdraining urgent	
21	174 +800le	"	Koshkastsc	28,10	1x21,19	Maintenance	
22	174 +800ri	"	" "	29,14	1x22,36	Maintenance	
23	179 +700	Fer.concrete	Chan-asch	25,21	2x8,70	Maintenance	
24	182 +000	Footbridge	St.Gyandsha	114,00	1x63,30	Maintenance	
25	186 +200le	Metalbridge	Gyandshats.	56,95	2x22,36	Maintenance	
26	186 +200ri	"	" "	51,30	4x10,66	Maintenance	
27	208 +300le	Fer.concrete	Kjusaktschai	28,20	1x23,00	Maintenance	
28	208 +300ri	"	" "	26,32	1x6,5+1x13,98	Maintenance	
29	221,+900le	Metal-bridge	Gerantschai	27,18	1x14,44+1x7,55	Maintenance	
30	221 +900ri	"	" "	37,00	1x23,60	Maintenance	

List of bridges located on the investigated line

Annex 3.1.1-2

No.	Bridge km	Type of bridge	crossing river valley	length	Span	Needs	remarks
31	234 +600	Fer.concrete	Obes.Kasca.	34,20	2x3,65+2x3,60	bridge openings to small	
32	249 +800	Footbridge	St Yewlach	66,10	1x18,00+1x21,00+1x27,00	Maintenance	
33	252 +800le	Metalbridge	Kura	262,77	2x11,50+3x76,80	heavy repair	
34	252 +800ri	"	"	262,77	11,50+77,00+2x76,80+11,50	heavy repair	
35	275 +900le	Fer.concrete	Turiantschai	46,35	1x10,80+1x15,80+1x10,80	Maintenance	
36	275 +900ri	Metal-bridge	" "	44,68	1x33,60	Maintenance	
37	294 +900	Footbridge	St.Udshary	54,06	1x26,77+1x26,78	maintenance	
38	300 +900le	Fer.concrete	Geoktschai	43,30	3x10,80	Maintenance	
39	300 +900ri	Metalbridge	" "	41,40	3x10,67	Maintenance	
40	341 +300	Footbridge	Kjurdamic	57,10	1x20,87+1x12,05+1x22,40	Maintenance	
41	360 +200le	Fer.concrete	Canal	38,96	4x6,00	Maintenance	
42	360 +200ri	" "	Canal	38,96	4x6,00	Maintenance	
43	368 +400le	Fer.concrete	Irrig.canal	30,18	3x7,13	Maintenance	
44	368 +400ri	Fer.concrete	Irrig.canal	28,15	3x7,62	Maintenance	
45	418 +100	Fer.concrete		26,20	1x10,80	Maintenance	
46	475 +000	Metalbridge		33,90	1x18,00	Maintenance	
47	475 +000ri	Metalbridge		33,90	1x18,00	Maintenance	
48	475 +000	Fer.concrete		35,75	1x19,40	Maintenance	
49	482 +600le	Metalbridge		38,40	1x22,36	heavy repair	
50	482 +600	Metalbridge		38,40	1x22,36	heavy repair	
51	531 +200ri	Metallbridge		31,20	1x21,36	Maintenance	
52	532 +600le	Fer.concrete	Binagad	53,16	2x10,61	Maintenance	
53	532 +600ri	Fer.concrete	Binagad	53,16	2x10,61	Maintenance	
54	538 +000	Fer.concrete	Bagis-bridge	33,01	1x18,00	Maintenance	
55	540 +700	Footbridge	St.Montino	27,71	1x6,31+1x10,10	Maintenance	
56	541 +500	Fer.concrete	Moskowskiy	48,40	1x19,05	renewing,damaged	
57	543 +000	Metalbridge	St.Fioletowo	61,30		Maintenance	

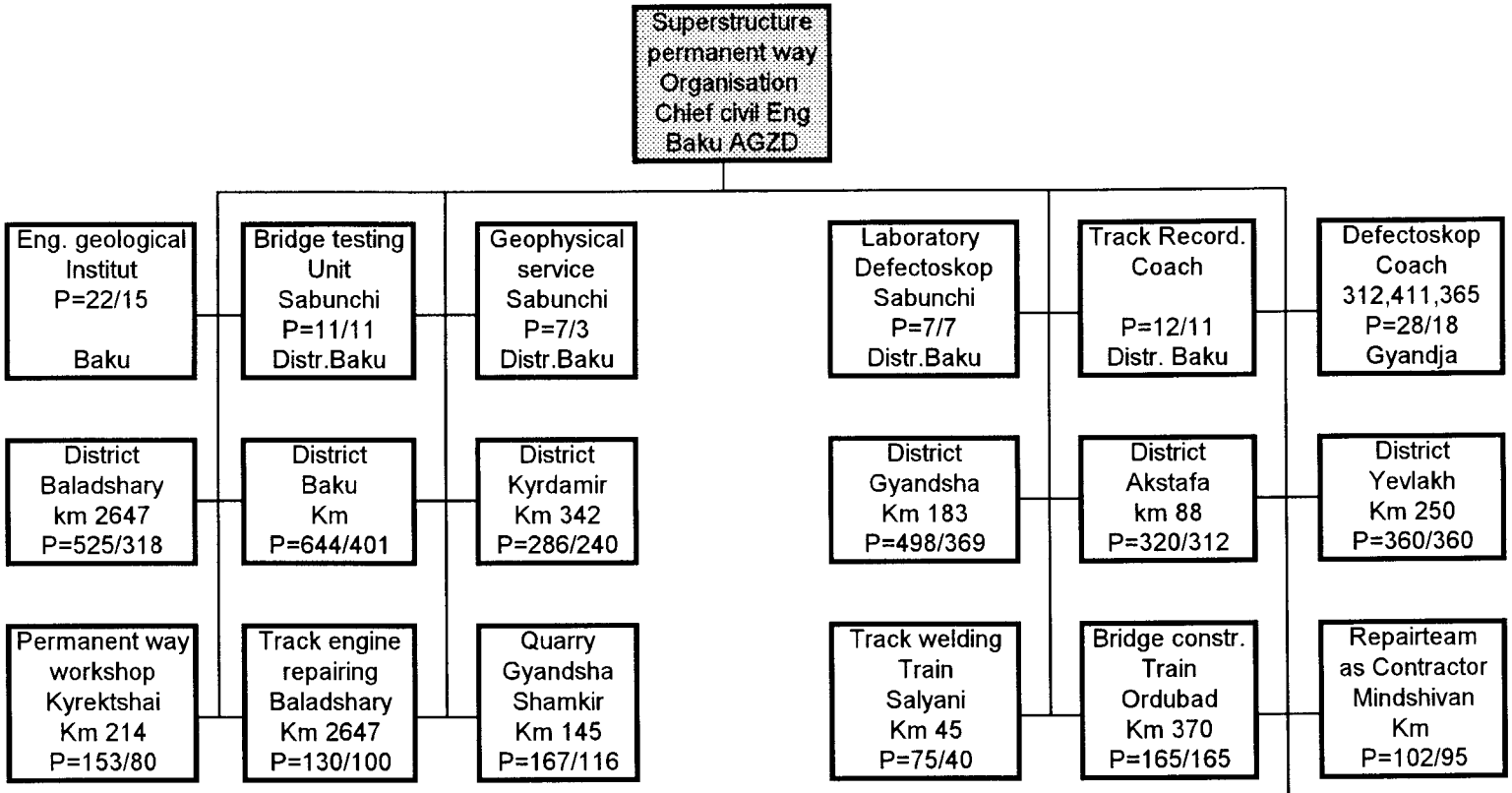
Worst track sections on the investigated line

Annex 3.1.1-3

No.	section	site start km	site end km	site length km	actual speed restriction	ranking list	remarks
1	2	3	4	5	6	7	8
1	Yevlakh-Mingetshaur	236	246	10	5km 25km/h 4km 40km/h	7	2km (-6)
2	Yjaki-Malai	262	266	4	2km 25km/h	10	
3	Udshary-Alikend	286	294	8	3km 60km/h 4km 40km/h	11	
4	Gadjshievo-Padar	384	392	8	1km 40km/h	4	3km(-6)
5	Karabudshag-Mysysly	320	330	10		3	5km(-6)
6	Atbulak-Navagi	433	446	13		5	2km(-6)
7	Aliat-Atbulak	446	460	14	3km 25km/h	1	11km(-6)
8	Duvanni-Aliat	460	473	13	10km 40km/h	2	5km(-6)
9	Sangatshaly-Duvanni	473	484	11	1km 15km/h	6	2km(-6)
10	Karadag-Sangatshaly	488	497	9		8	1km(-6)
11	Baladshary-Eibat	517	527	10	1km 40km/h 2km 60km/h	9	1km(-6)
12	Baku-gr.Kishli	2654	2660	6		12	
Track border point-Baku				**116**			**50km(-6)**
13	Karabudshag-Kyrdamir	328	341	13	1km 25km/h	3	4km(-6)
14	Kerar-Sgiri-Padar	352	378	26	14km 60km/h	1	12km(-6)
15	Mugan-Gadjshievo	391	404	13	13km 60km/h	2	11km(-6)
16	Sangatshaly-Karadag	484	496	14	1km 25km/h	4	2km(-6)
17	Eibat-Baladshary	515	525	10		5	1km(-6)
18	Puta-Eibat	509	517	8		7	
Track Baku -border point				**84**			**30km(-6)**

Organisational structure of permanent way general management

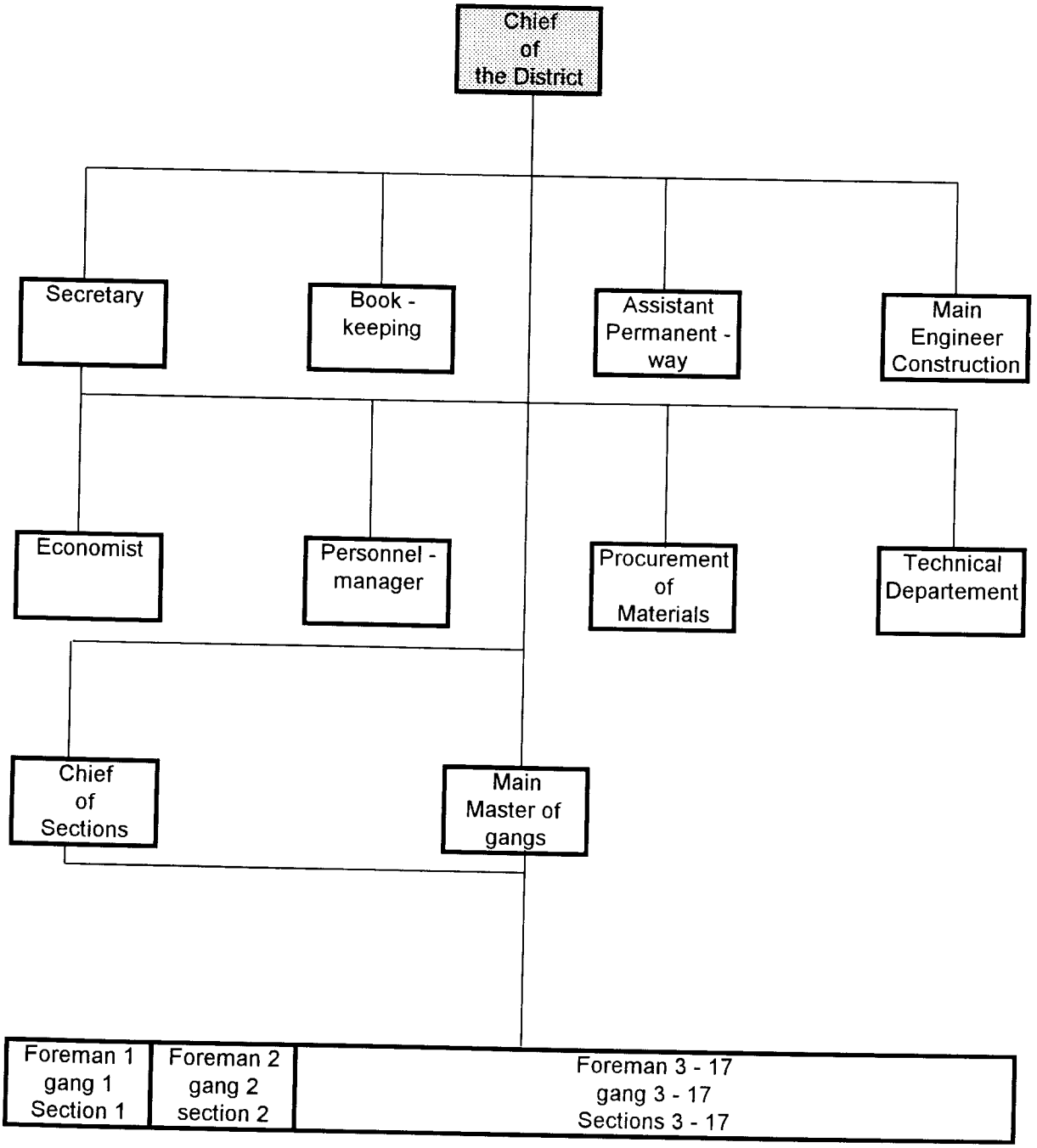
Annex 3.1.1-4



The organisation structure ,second line,shows only the districts which are responsible for the maintenance of the main line Baku - border point to Georgia. Alltogether there are 15 districts for the entire network.

Organisation scheme of the Baku distirct

Annex 3.1.1-5



Annex 3.1.1-6

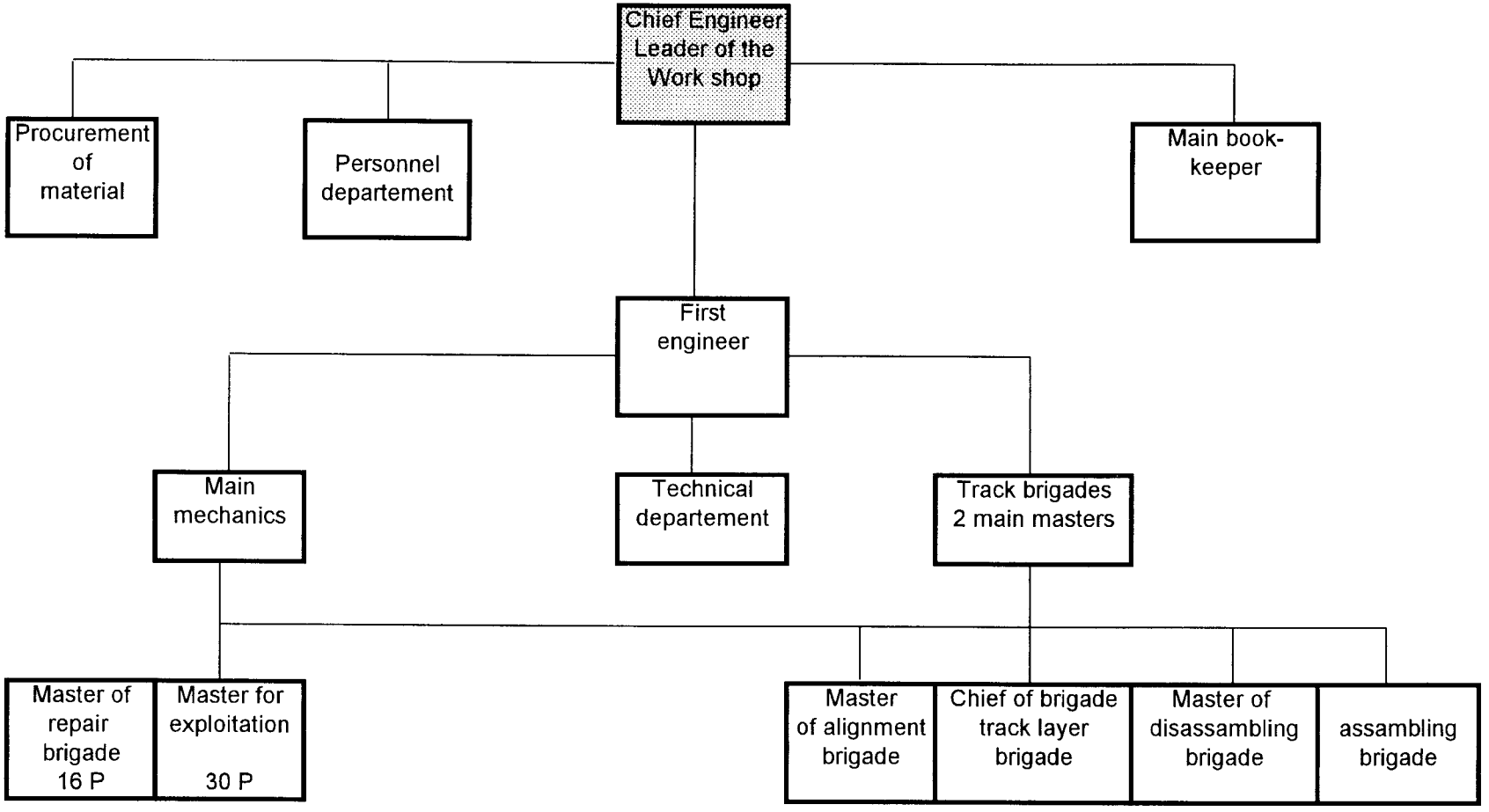
Inventory of small track maintenance engines and track tools

District BAKU						
Equipment of small track maintenance machines and track tools						
No.	Designation	Basic requirement of one gang	Stock and shortage of essential equipment for 17 track gangs of Baku - District			
			required	available	shortage	remarks
1	packing of sleepers (el)	10	170	36	134	
2	rail saw (el) RM 2	1	17	12	5	
3	rail drilling machine (el)	1	17	15	2	
	1024 B					
4	rail grindingmachine (el)					
	MRSh 3	1	17	2	15	
5	rail screwmachine (el)					
	EK 1	2	34	3	31	
6	screwmachine ShV - 1	2	34	0	34	
7	hydraulic rail pinch	1	17	15	2	
8	hydraulic track-lifter	6	102	67	35	
9	hydraulic					
	track-straightening-set					
	one set consists of 5 pieces	1	17	2	15	
10	tongs for concrete sleepers.	2	34	0	34	
11	rail puller for long rails	2	34	0	34	
12	generator AB - 2 kw	1	17	9	8	
	AB - 4 kw	1	17	15	2	
13	signallamps	8	136	7	129	
14	personnel transport truck	12	12	0	12	per district
15	leadership car	2	2	0	2	per district

The Annex shows the stock and the shortage of the equipment with regard of one gang and extrapolated of the 17 gangs which exist at Baku district.

Annex 3.1.1-7

Organisational structure of permanent way workshop Sangatshali



Inventory of track engines

Annex 3.1.1-8

No.	Type of engine	Performance	Quantity	operating	out of order	needs		Remarks
						repair	replace	
1	2	3	4	5	6	7	8	9
1	VPO 3000 Tamper ing & levelling	3 km/h	3	1	2	1	1	
2	ELB leveling grader with ballast brush & plough	2.8 m/s	3	3	0	0	0	managed by permanent way work shop
3	VPRS - 02 tamping,levelling straitening,track & switches	270 m/h	1	0	1	1	0	
4	VPR, tamping, levelling track only	650 m/h	1	0	1	0	0	
5	ROM rail cleaner by high pressure water jets	2000 m/h	1	1	0	0	0	
6	Shom ballast cleaner	2000 m^3/h or 750 m/h track	1	1	0	0	0	seen 29.05.96 only shunting cleaning unsufficient only 60 cm f. rail head
7	PRSM, butt welding & rail grinding machine	10 welds per h	2	1	0	0	1	managed by rail welding plant at Saliani
8	PMG,bold screw-ing machine	800m/h	4	4	0	0	0	
9	R 2000 track liner	2000 m/h	1	0	0	0	1	
10	ZOuB,snow &waste-plough	74.2 t/h	2	1	1	1	0	Balaschenko
11	Cranes,with hori-zontal swinging jib	4 t at 5.8m	33	16	17	14	3	2 -3 per distrct type DGKU
12	ballast hoppers	35 m^3	338	0	0	0	0	pneumatik command
13	Snowplough unit	750 t/h	5	4	1	1	0	type SM-2
14	Snowplough unit	25 km/h	10	5	5	0	5	type SDP
15	Snowplough unit	25 km/h	3	3	0	0	0	type TARAN
16	Snowplough unit	25 km/h	3	1	2	0	2	type UDPM
17	Trackmotorcar	5 t	4	4	0	0	0	type MPT
18	Motorcranwagon	45 t	13	10	3	3	0	type MPD
19	UK-25/18	1000 m/h	8	6	2	2	0	
20	Planningmachine	40 kN	3	2	1	1	0	
21	Railwaycran	170 kN	17	12	5	3	2	
22	Dieselengine	100 kN	11	10	1	1	0	type TGM-2
23	Dieselengine	1000 kN	1	1	0	0	0	type TEM

Annex 3.1.1-9

AGZD corridor-
Cost estimation of track renewal and connected equipment

No	Designation and short description	quantity	price per unit in 1,000 US$	to realise as priority 1 1,000 US$	to realise as priority 2 1,000 US$
1	2	3	4	5	6
	Part 1 - Track and switch renewals				
1	track border point GRZD-Baku, worst sections km	116	240	27,840	
2	track-Baku-border point, km	84	240	20,160	
3	track Baku-border point v.v., difference 366-200 km	166	240		39,840
4	switch renewals,				
	200 p R65 1:11, pieces	200	40	8,000	
5	crossing timber sets,	140	10	1,400	
	Part 2-District equipment				
8	small engines and tools	6	2,500	15,000	
9	bridge inspection vehicle	1	1,170	1,170	
10	track vehicle model VMT 850	6	570	3,420	
11	rail/road loader excavator	6	335	2,010	
	total			**21.600**	
	Part 3 - Equipment for permanent way work-shop				
12	RM 80 ballast cleaning machine, universal application, pieces	2	4,380	4,380	4,380
	spare parts to no 12		438	438	438
13	Unimat 08-475-4S, pieces	2	2,860	2,860	2,860
	spare parts to no 13		286	286.	286
14	high performance ballast regulating machine,	2	1,400	1,400	1,400
	spare parts to no. 14		160	160	160

Annex 3.1.1-9

AGZD corridor-
Cost estimation of track renewal and connected equipment

No	Designation and short description	quantity	price per unit in 1,000 US$	to realise as priority 1 1,000 US$	to realise as priority 2 1,000 US$
1	2	3	4	5	6
15	hydraulic rail threater type MPR	3	550	1,100	550
16	diesel motors for UK - crane UK 18/25	4	20	80	
17	set spare parts for UK system	4	10.	40	
	total			**10,744**	**10,074**
	Part 4 - Bridge renewal and major repair				
18	bridge 56, km 541+500	1	1,000	1,000	
19	bridge 19+20, km 157+700	2	433	866	
20	bridge 10+11, km 111+200	2	477	954	
21	bridge 31, km 204+600	1	100	100	
22	bridge 33+34, km 252+800	2	1,475	2,950	
23	bridge 41+42, km 360+200	2	100	200	
24	bridge 5, km 72+300	1	4,545		4,545
	total			**6,070**	**4,545**
	Part 5 - Quarry equipment				
25	total lump sum			600	
26	track engine repair			200	
	Part 6 - Training				
27	total lump sum			500	

Final Report Module A

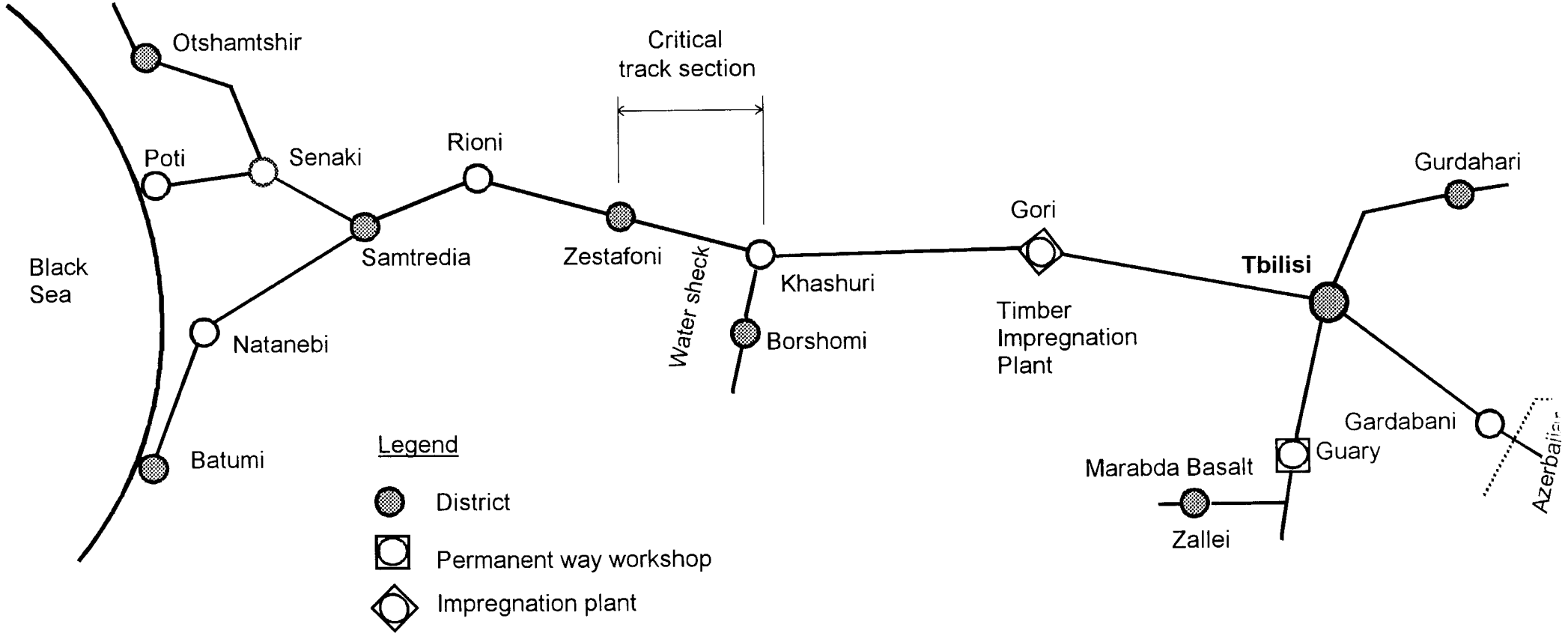
Annexes

Chapter 3 Technical Pre-feasibility

3.1 Track and Constructional works
3.1.2 Georgia

Annex 3.1.2-1

Track line Border point AGZD - Tbilisi - Poti / Batumi of the Georgian Railways (GRZD)



List of bridges located on the investigated line

Annex 3.1.2-2

No.	Bridge km	crossing river valley	length m	Needs of major or minor repair	missing	remarks
1	31 + 849	Rioni	413	400 bridge sleepers renewal		Poti - Senaki
2	29 + 700	Korathi	41	20 bridge sleepers renewal		Poti - Senaki
3	21 + 791	Korathi	40	20 bridge sleepers renewal		Poti - Senaki
4	18 + 657	Korathi	59	25 bridge sleepers renewal		Poti - Senaki
5	3 + 678	Ziwi	103		Maintenance	Poti - Senaki
6	2 + 915	Gortali	26		Maintenance	Poti - Senaki
7	2234 + 383	Techuri	183	renewal of bridge support		Senaki - Samtredia
8	2235 + 491	Galitscha	34		Maintenance	Senaki - Samtredia
9	2238 +043	Skuria	34		Maintenance	Senaki - Samtredia
10	2241 + 529	Abascha	116	100 bridge sleepers renewal		Senaki - Samtredia
11	2248 + 179	Nochela	118	100 as above and corrosion prot.		Senaki - Samtredia
12	2248 + 179	Nochela	119		Maintenance	Senaki - Samtredia
13	2255 + 143	Zchenisskaro	118	400 bridge sleepers renewal		Senaki - Samtredia
14	2255 + 143	Zchenisskaro	129		Maintenance	Senaki - Samtredia
15	2261 + 963	Estakade	175		Maintenance	Senaki - Samtredia
16	2266 + 528	Gubitzwali	111		Maintenance	Samtredia - Sestafoni
17	2266 + 528	Gubitzwali	115		Maintenance	Samtredia - Sestafoni
18	2289 + 216	Lioni	185	needs renewal, year of constr. 1896		Samtredia - Sestafoni
19	2290 + 850		28		Maintenance	Samtredia - Sestafoni
20	2291 + 887	Zkazitela	57		Maintenance	Samtredia - Sestafoni
21	2291 + 887	Zkazitela	61		Maintenance	Samtredia - Sestafoni
22	2295 + 801	Kwirila	208		Maintenance	Samtredia - Sestafoni
23	2295 + 801	Kwirila	210		Maintenance	Samtredia - Sestafoni
24	2304 + 578	Lehuti	27		Maintenance	Samtredia - Sestafoni
25	2308 + 214	Kwrila	162		Maintenance	Samtredia - Sestafoni
26	2308 + 214	Kwrila	170		Maintenance	Samtredia - Sestafoni
27	2324 + 239	Kwrila	93	needs renewal, year of constr.1907		Samtredia - Sestafoni
28	2324 + 239	Kwrila	87		Maintenance	Sestafoni - Khashuri

List of bridges located on the investigated line

Annex 3.1.2-2

No.	Bridge km	crossing river valley	length m	Needs of major or minor repair	missing	remarks
29	2327 + 428	Dzirula	157		Maintenance	Sestafoni - Khashuri
30	2327 +895	Dzirula	120		Maintenance	Sestafoni - Khashuri
31	2388 + 100	Dzirula	126		Maintenance	Sestafoni - Khashuri
32	2328 + 132	Dzirula	117		Maintenance	Sestafoni - Khashuri
33	2332 + 999	Dzirula	97		Maintenance	Sestafoni - Khashuri
34	2336 + 648	Korneba	46		Maintenance	Sestafoni - Khashuri
35	2337 + 234	Tshherimela	47		Maintenance	Sestafoni - Khashuri
36	2338 + 104	Tshherimela	55		Maintenance	Sestafoni - Khashuri
37	2344 + 251	Tshherimela	94		Maintenance	Sestafoni - Khashuri
38	2344 + 567	Tshherimela	75		maintenance	Sestafoni - Khashuri
39	2344 + 742i	Tshherimela	52		Maintenance	Sestafoni - Khashuri
40	2345 + 659	Tshherimela	53		Maintenance	Sestafoni - Khashuri
41	2345 + 659	Tshherimela	57		Maintenance	Sestafoni - Khashuri
42	2358 + 366	Molta	47		Maintenance	Sestafoni - Khashuri
43	2358 + 892	Molta	43		Maintenance	Sestafoni - Khashuri
44	2358 + 892	Molta	55		Maintenance	Sestafoni - Khashuri
45	2361 + 528	Wiaduki	88		Maintenance	Sestafoni - Khashuri
46	2362 + 100	Wiaduki	172		Maintenance	Sestafoni - Khashuri
47	2362 + 075	Eskada	236		Maintenance	Sestafoni - Khashuri
48	2363 + 092	Chercheulis	92		Maintenance	Sestafoni - Khashuri
49	2363 + 868	Torolis chewi	87		Maintenance	Sestafoni - Khashuri
50	2363 + 868	Torolis chewi	75		Maintenance	Sestafoni - Khashuri
51	2365 + 661	Tarabela	39		Maintenance	Sestafoni - Khashuri
52	2365 + 661	Tarabela	59		Maintenance	Sestafoni - Khashuri
53	2382 + 784	Suramula	53		Maintenance	Sestafoni - Khashuri
54	2385 + 880	Suramula	38		Maintenance	Khashuri - Tbilisi
55	2385 + 880	Suramula	40		Maintenance	Khashuri - Tbilisi
56	2404 + 790	Mtkwari	169	needs renewal, year of constr.1896		Khashuri - Tbilisi

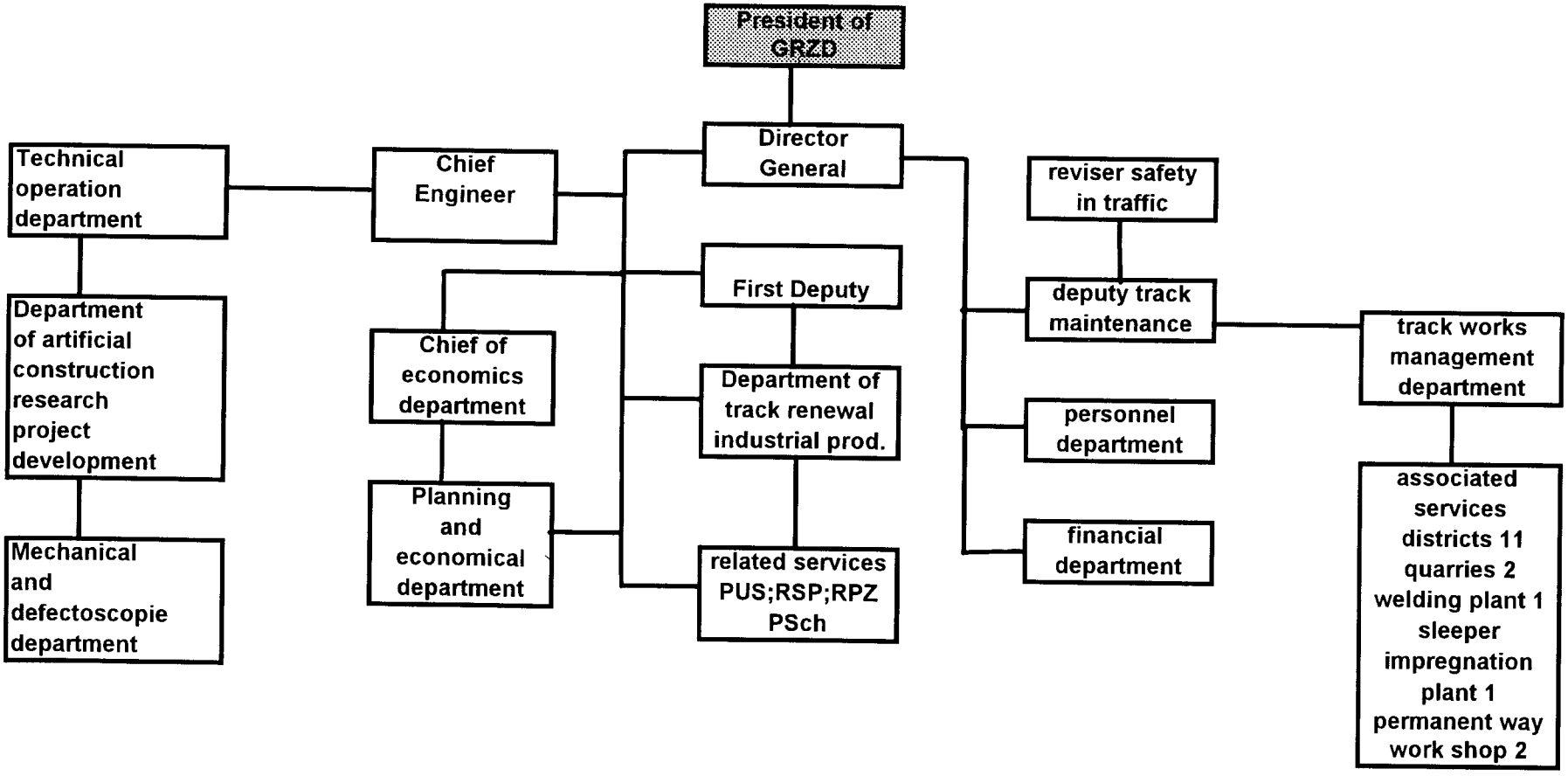
List of bridges located on the investigated line

Annex 3.1.2-2

No.	Bridge km	crossing river valley	length m	Needs of major or minor repair	missing	remarks
57	2404 + 790	Mtkwari	178		Maintenance	Khashuri - Tbilisi
58	2442 + 260	Mtkwari	219		Maintenance	Khashuri - Tbilisi
59	2450 + 089	Kotzachuri	68		Maintenance	Khashuri - Tbilisi
60	2450 + 089	Kotzachuri	61		Maintenance	Khashuri - Tbilisi
61	2454 + 970	Lechura	65		Maintenance	Khashuri - Tbilisi
62	2454 + 970	Lechura	73		Maintenance	Khashuri - Tbilisi
63	2468 + 667	Ksani	80		Maintenance	Khashuri - Tbilisi
64	2468 + 667	Ksani	83		Maintenance	Khashuri - Tbilisi
65	2472 + 759	Mtkwari	123	needs renewal, constr. year 1896		Khashuri - Tbilisi
66	2472 + 759	Mtkwari	137	40 bridge sleepers renewal		Khashuri - Tbilisi
67	2483 + 357	underbridge	29		Maintenance	Khashuri - Tbilisi
68	2486 + 446	underbridge	27		Maintenance	Khashuri - Tbilisi
69	2488 + 642	Mtkwari	208		Maintenance	Khashuri - Tbilisi
70	2494 + 600	underbridge	50		Maintenance	Khashuri - Tbilisi
71	2499 + 529	underbridge	37		Maintenance	Khashuri - Tbilisi
72	2503 + 229	underbridge	50		Maintenance	Khashuri - Tbilisi
73	2503 + 927	underbridge	29		Maintenance	Khashuri - Tbilisi
74	2507 + 383	underbridge	35		Maintenance	Khashuri - Tbilisi
75	2508 + 135	underbridge	26		Maintenance	Khashuri - Tbilisi
76	1 + 642	underbridge	101		Maintenance	Tbilisi - Baku
77	2 + 755	underbridge	28		Maintenance	Tbilisi - Baku
78	6 + 110	underbridge	43		Maintenance	Tbilisi - Baku
79	10 + 144	Lotchino	81	needs renewal, constr. year 1896		Tbilisi - Baku
80	1044 + 144	Lotchino	88		Maintenance	Tbilisi - Baku
Total length of the main bridges			**7530**			

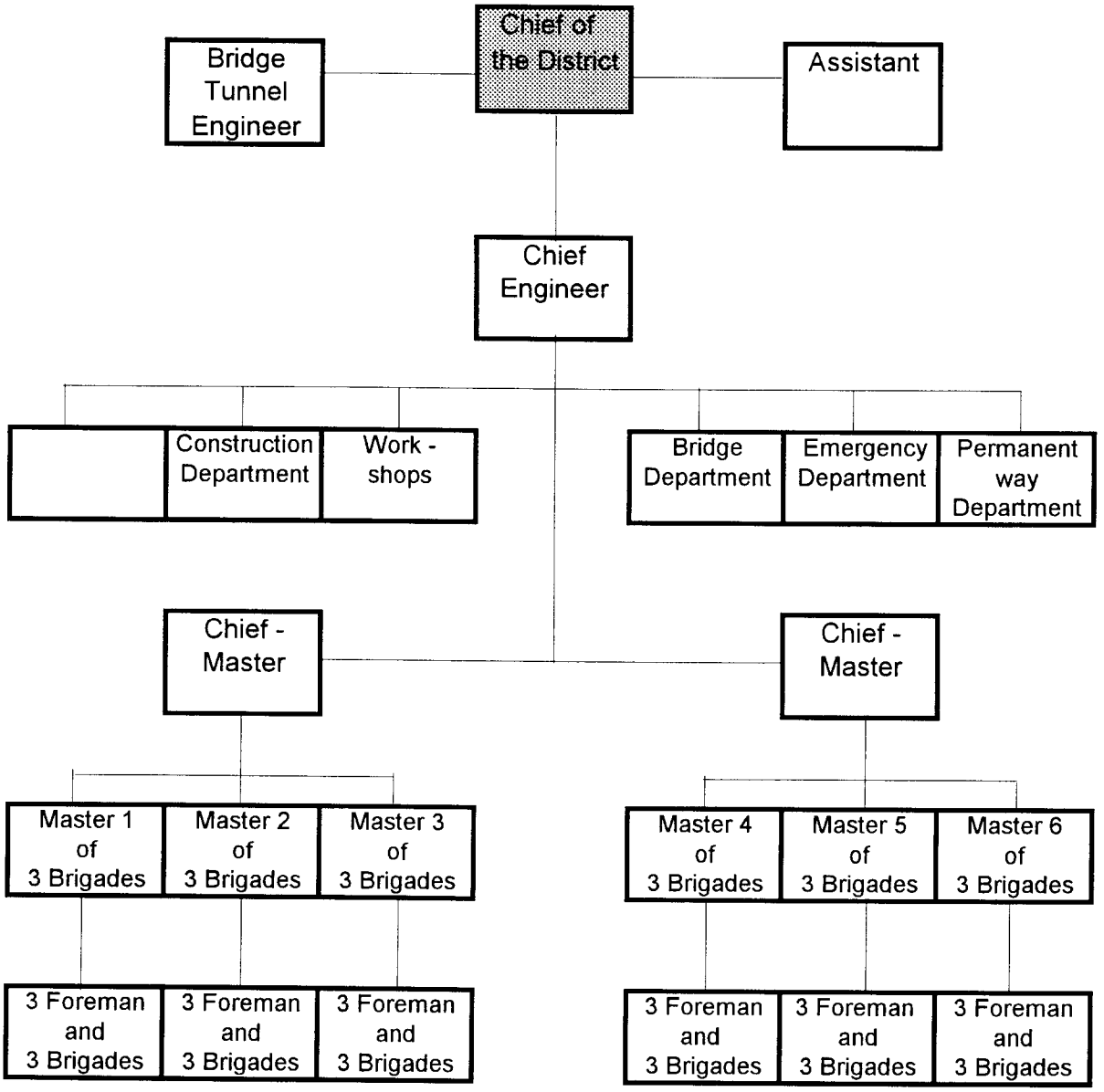
Organisational structure of permanent-way general management

Annex 3.1.2-3



Organisational structure of the Tbilisi district

Annex 3.1.2-4



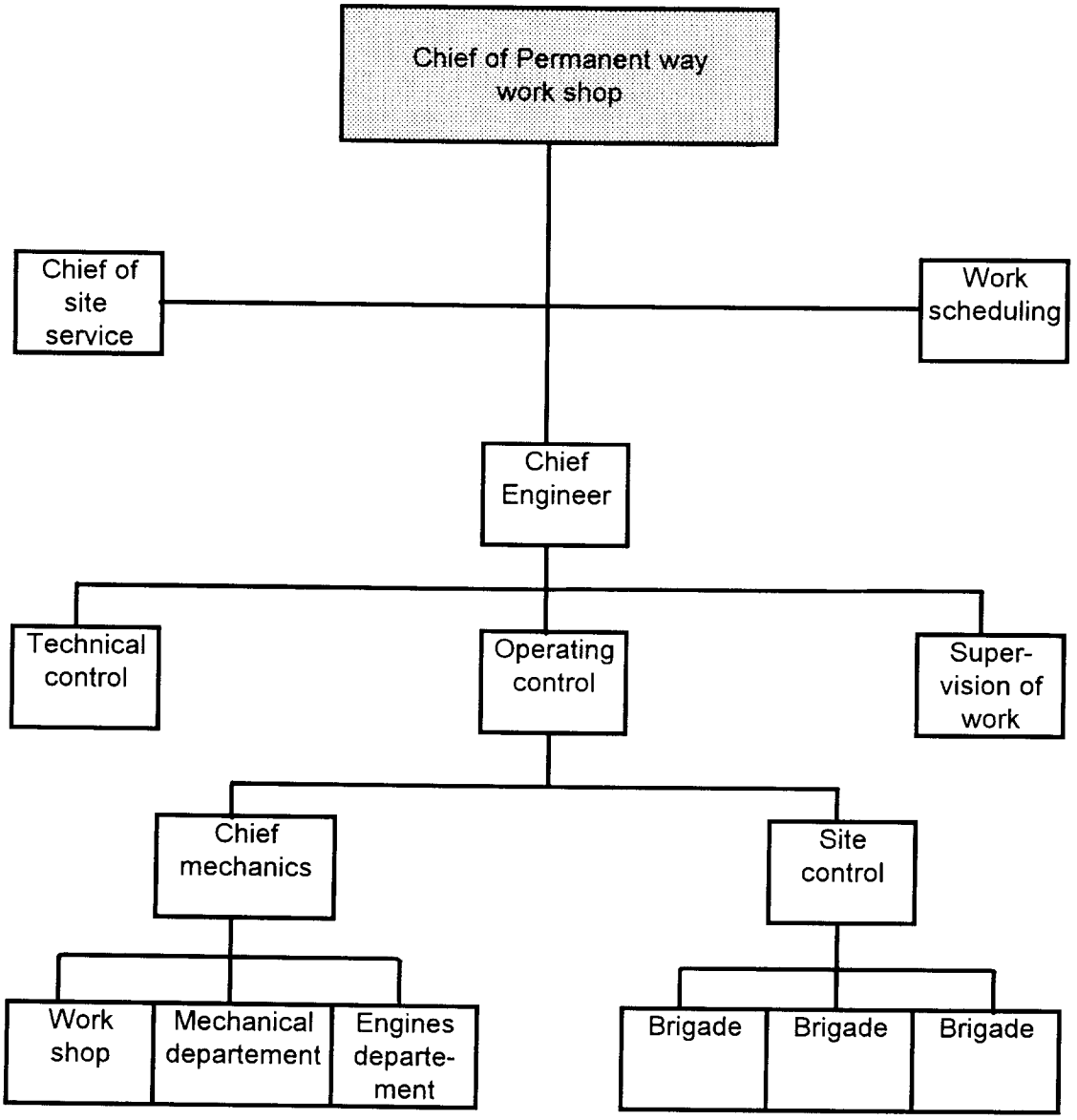
Stock and shortage of essential equipment of all districts

Annex 3.1.2-5

Equipment of small track - maintenance machines and track tools						
item	Designation	Basic requirement of one gang	Stock and shortage of essential equipment for 200 track gangs of all GRZD - Districts			
			required	available	shortage	remarks
1	2	3	4	5	6	7
1	packing of sleepers (el)	1 set	200	125	75	1.0/ brigade
2	rail saw (el) RM 2	0.5	100	50	50	0.5 /brigade
3	rail drilling machine (el) 1024 B	0.5	100	50	50	0.5/ brigade
4	rail grindingmachine (el) MRSh 3	0.5	100	30	70	0.5/ brigade
5	rail screwmachine (el) EK 1	0.5	100	40	60	0.5/ brigade
6	screwmachine ShV - 1	0.5	100	50	50	0.5 /brigade
7	hydraulic rail pinch	0.5	100	60	40	0.5/ brigade
8	hydraulic track-lifter	4	800	200	600	4.0/ brigade
9	hydraulic track-straightening-set one set consists of 5 pieces	0.5	100	50	50	0.5/ brigade
10	tongs for concrete sleepers.	2	400	0	400	2.0/ brigade
11	rail puller for long rails	0.5	100	0	100	0.5/ brigade
12	rail lifting and slewing mach. Type RV 100	1	11	0	11	1.0/ district
13	generator AB - 2 kw	1	200	55	145	1.0/ brigade
	AB - 4 kw	1	200	50	150	1.0/ brigade
14	signallamps	5	1000	140	860	5.0/ brigade
15	personal transport truck	0.5	100	55	45	0.5/brigade
16	leadership car/per district	2	22	0	22	2/ district
17	hammer sleeper spikes	4	800	500	300	4/ brigade
18	slewing bars different kinds	8	1600	1100	500	8/brigade
19	adjustable wrench	1.5	300	0	300	1.5/brigade
20	wrench sets track works	4	800	240	560	4/brigade
21	abrasive discs		10000	2000	8000	
22	rail thermometers		120	70	50	
23	rail pulling rollers		240	140	100	
24	tamping pick		2200	1000	1200	
25	wooden sleeper drilling mach.		120	60	60	
26	ballast forks OMV 111				1200	

Organisational structure of Tbilisi permanent-way work shop

Annex 3.1.2-6



List of permanent speed restriction sections

Annex 3.1.2-7

N°	Section	Length of speed restriction from - to km	km	actual speed km/h	load by mill. tkm	quality coefficient
1	Tscheladidi Poti	29 37	9	25	346	**656**
2	Senaki-Abasha	2235+600-2235+700	0,1	15	222	277
3	Abasha-Samtredia	2246+300-2260+400	15	25	461	**1550**
4	Adshamrti-Swiri right	2298 2307	8,5	25	617	433
5	Argweta-Zestafoni left	2313 2318	6	25	513	**1058**
6	Shorgpani-Dzirula left	2325 2325	0,1	25	859	33
7	Gomi-Agarz	2399 2402	4	25	621,4	**878**
8	Agarz-Kareli right	2405 2405	0,1	15	621,8	29
9	Agarz-Kareli right	2406 2408	3	25	621,4	**1120**
10	Kareli-Skea right	2410 2420	11	25	576,4	**4321**
11	Ckia-Gori right	2424 2427	4	25	570,9	**1225**
12	Gozi-Upliszi-khe right	2429 2434	6	25	561,8	**965**
13	Metekhi-Kaspi right	2449 2454	6	25	688,2	**2347**
14	Kaspi right Kaspi right	2449 100 2449 500	0,4	25	684,1	304
15	Metekhi-Kaspi right	2452 500 2452 900	0,4	25	684,1	292
16	Ksani-Dzeg-wi left	2473 700 2473 800	0,1	15	588,4	67
17	Ksani-Dzeg-wi right	2472 2474	3	25	529,1	**1057**
18	Dzegwi-Mzkhete right	2477 2481	5,5	25	684,8	472

Average of permanent speed restriction right direction (even track)=**24 km/h**
Average of permanent speed restriction left direction(odd track) = **22 km/h**
Reduction of speed from **100(80)km/h up to 25 - 15 km/h**
average load/km of the above mentioned sections **580 mill. tkm**
track length of speed restriction right direction(even track) =**76.0 km**
track length of speed restriction left direction(odd track) =**6.2 km**
quality coefficient > 500 is assessed as very bad track condition and needs track renewal

Inventory of track engines of GRZD permanent-way work shops

Annex 3.1.2-8

No.	Type of engine	Performance per h	Quantity	operating	out of order	needs		Remarks
						repair	replace	
1	2	3	4	5	6	7	8	9
1	UK-25/9-18	18 t	4	4	0	0	0	Platow crane
2	UK-25/9	9 t	4	0	4		4	Platow crane
3	Ballast cleaner	3,000 m3	2	2	0	0	0	Type Shom-4
4	Track tamping and levelling unit	3,000 m	2	1	1	1	0	VPO-3000
5	lelling unit	1,200 m	1	1	0	0	0	VPR-1200
6	levelling unit	500 m	2	1	1	0	1	VPRS-500
7	Straigthening machine el.	3,000 m	2	1	1	0	1	ELBR-1
8	Straigthening machine	4,000 m	1	1	0	0	0	PRB-10
9	Draisine platforme wagon		6	2	4	2	2	MPD
10	Motor planning machine		2	0	2	0	2	
11	Bulldozer		4	3	1	1	0	T-130
12	Mobil workshop car (road)		7	4		3	0	GAZ-53
13	motor lorry	6 t	2	2	0	0	0	KAZ-4540
14	crane railroad	16 t	4	3	1	0	1	KZhDE-16
15	Hoppers		5	4	1	0	1	DVZ
16	Diesel engine		2	2	0	0	0	ChME-3
17	Diesel motors D6 D12						 6 14	
	Engines for subsoil and artificial construction							
1	Caterpillar excavator	1.5 m3	8	6	0	0	2	Eo-4124
2	as above	0.5 m3	2	2	0	0	0	Eo-3322
3	as above	0.25 m3	6	2	0	0	4	Eo-2621
4	Bulldozer		6	3	0	3	0	T-130
5	Crawler tractor with welding unit		2	0	0	0	2	DT-75
6	Bulldozer		8	6	0	0	2	DT-75
7	Scraper	9 m3	4	4	0	0	0	
8	Motor lorry	6-8 t	20	12	0	0	8	GAZ,GAL
9	Lorry		24	14	10	0	10	GAZ,ZIL
10	Mobil workshop car		34	24	10	0	10	GAZ-53
11	Draisine with crane	6 t	12	6	6	0	6	DGKU
12	Motor Lorry		3	2	1	0	1	VS-60

Annex 3.1.2-9

GRZD corridor
Cost estimation of track renewal and connected equipment

No	Designation and short description	quantity	price per unit in million US$	to realise as	
				priority 1 million US$	priority 2 million US$
1	2	3	4	5	6
	Part 1				
	Track renewals				
1	track border point AGZD - Tbilisi - Poti km	261	0.240	62.640	
2	track border AGZD - Tbilisi - Poti km	303	0.240		72.720
	switch renewals				
3	200 R65 1: 11, pieces	200	0.040	8. 000	
4	200 R65 1:11, pieces	200	0.040		8.000
5	crossing timber sets	150	0.010	1.500	
	total			**72.140**	**80.720**
	Part 2				
	District equipment				
9	small engines and tools 5 districts	5	1.000	5.000	
10	bridge inspection vehicle	1	1.170		1.170
11	track vehicle, model VMT 850, split up in 3 + 2	5	0.570	1.710	1.140
12	rail/road loader excavator split up in 3 + 2 =	5	0.335	1.005	0.670
	total			**7. 715**	**2. 980**
	Part 3				
	Equipment for permanent way workshop				
13	RM 80 ballast cleaning machine, universal application, pieces	2	4.380	4.380	4.380
14	spare parts to no 13 - 10%		0.438	0.438	0.438
15	Unimat 08-475-4S, pieces,	2	2.860	2.860	2.860
16	spare parts to no 15 - 10%		0.286	0.286	0.286

Annex 3.1.2-9

GRZD corridor
Cost estimation of track renewal and connected equipment

No	Designation and short description	quantity	price per unit in million US$	to realise as	
				priority 1 million US$	priority 2 million US$
1	2	3	4	5	6
17	high performance ballast regulating machine,	2	1.240	1.240	1.240
18	spare parts to no. 17		0.160	0.160	0.160
19	hydraulic rail threater type MPR,	2	0.550	0.550	0.550
20	diesel motors for UK - crane UK 18/25	4	0.020	0.080	
21	spare parts for UK system, sets	4	0.010	0.040	
	total			**10.034**	**9.914**
	Part 4				
	Bridge renewal and major repair				
22	bridge 18, km 2289+216	1	5.000	5.000	
23	bridge 27, km 2324+239	1	2.000	2.000	
24	bridge 56, km 2404+790	1	2.000	2.000	
25	bridge 65, km 2472+759	1	2.000	2.000	
26	bridge 79, km 10+144	1	1.000	1.000	
27	bridge 1-4, 10, 11,and 13	7		0.140	
	total			**12.140**	
	Part 5				
28	Durnuki Plant				
29	quarry equipment			1.000	
30	sleeper impregnation plant			0.200	
	total			**1.200**	
	Part 6				
31	training			0.500	
	total			**0.500**	

source of prices:
Cemafer, Breisach for district equipment and Plasser & Theurer for track engines

Final Report Module A

Annexes

Chapter 3 Technical Pre-feasibility

3.2 Rolling stock
3.2.1 Azerbaijan

Annex 3.2.1-1

Survey of AGZD electric locomotives
May 1996

Depot	Type of locomotive	amount			problems		
		in total	in operation	**out of order** in total/in the depot/ in the work shop	waiting for rejection	waiting for repair TR 3	waiting for repair KR1/KR2
Baladshary	VL-8	86	50	36/26/10 6(JAERS)/4(KRL)	70	24	45/12
Baladshary	VL-11M	35	30	5/3/2(TEVRS)	2	31	0/0
Beyuk-Shtshor	VL-8	30	15	15/14/1(JAERS)	18	13	9/2
Beyuk-Shtshor	VL23	2	2	0	2	0	0/2
Gyandsha	VL-8	67	43	24/20/4 2(JAERS)/1(KRL)/ 1(TEVRS)	48	20	32/10
Gyandsha	VL-11M	8	5	3/3/0	0	6	0/0
Gyandsha	VL-22	1	1	0	1	0	0/1
Total	**VL-8**	**183**	**108**	**75/60/15**	**136**	**57**	**86/24**
	VL-11M	**43**	**35**	**8/6/2**	**2**	**37**	**0/0**
	VL-22	**1**	**1**	**0**	**1**	**0**	**0/1**
	VL-23	**2**	**2**	**0**	**2**	**0**	**0/2**

JAERS - Jaroslavskij Elektro Remontnij Savod **TEVRS**- Tbiliskij Elektro Vagono Remontnij Savod **KRL** - Krasno-Liman Locomotive Depot

Annex 3.2.1-2

Age structure of the AGZD-electric locomotives - 1996 -

type of locomotive	age	number
VL-8		
	38	6
	37	32
	36	25
	35	29
	34	16
	33	34
	32	27
	31	14
VL-11		
	7	9
	6	28
	5	6

Annex 3.2.1-3

Brief technical description of the electric line locomotives of the Transcaucasian Railways

type of locomotive	VL-8	VL-10	VL-11
service weight	184 tons	184 tons	180 tons
number of axles	8	8	8
axle-load	23 tons	23 tons	22.5 tons
number of traction engines	8	8	8
installed power per traction engine	525 kW	650 kW	670 kW
power per hour	4,200 kW	5,200 kW	5,360 kW
constant power	3,660 kW	4,530 kW	4,600 kW
traction per hour	352 kN	397.6 kN	387 kN
constant traction	303 kN	324.8 kN	314 kN
designed speed	80 km/h	100 km/h	100 km/h
speed at constant power	44.3 km/h	51.2 km/h	51.2 km/h
speed at power per hour	42.6 km/h	48.7 km/h	48.7 km/h
length	27.52 m	32.84 m	32.88 m
diameter of driving wheel	1,200 mm	1,250 mm	1,250 mm

Annex 3.2.1-4

Inventory of freight wagon stock of AGZD

May 1996

type of wagon	number
covered wagons	6,453
open wagons	5,860
tank wagons	4,948
platforms	4,942
refrigerators	2,280
bulk cement wagons	834
bulk grain wagons	1,285
container wagons	551
others	1,965
Subtotal	**29,118**
private wagons	1,453
Total	**30,571**

Annex 3.2.1-5

Present number of wagons repaired by AGZD

May 1996

Work shop	Monthly repair of wagons
Baladshary VTshD - 3	specialisation: tank wagons and coal wagons **DR: 329+31(private) / TR: 753**
DR:	213 tank wagons; 14 covered wagons; 16 platforms; 36 coal wagons; 2 bulk grain wagons; 48 others
TR:	684 tank wagons; 16 covered wagons; 14 platforms; 21 coal wagons; 18 others
remarks:	a bridge crane is out of order
Kasi-Magomed VTshD - 5	specialisation: coal wagons and platforms **DR: 81 / TR: 8**
DR:	63 covered wagons; 15 coal wagons; 3 others
TR:	1 covered wagon; 6 coal wagons; 1 tank wagon
remarks:	
Kishli VTshD - 2	specialisation: containers **DR: 0 / TR: 364**
DR:	0
TR:	58 covered wagons; 2 platforms; 166 coal wagons; 133 tank wagons; 5 others
remarks:	
Gyandsha VTshD - 6	specialisation: covered wagons **DR: 213 / TR: 263**
DR:	62 covered wagons; 9 platforms; 98 coal wagons; 4 tank wagons; 40 others
TR:	18 covered wagons; 27 platforms; 90 coal wagons; 23 tank wagons; 105 others
remarks:	
Aliat VTshD - 4	specialisation: refrigerators **DR: 70 / TR: 32**
DR:	70 refrigerators
TR:	32 refrigerators
remarks:	
WRS Baku present output:	specialisation: tank wagons **500 tank wagons per annum**
designed for:	2,500 tank wagons per annum
remarks:	500 wheelsets per annum for other work shops
WWSS Baku present output:	specialisation: tank wagons **80 tank wagons per day**
designed for:	170 tank wagons per day
remarks:	

DR	Middle Repair
TR	Technical revision
VTshD	Wagon Depot
WRS	Wagon Repair Shop
WWSS	Wagon Washing and Steaming Station

Annex 3.2.1-6

Occurred damages on AGZD electric locomotives in operation
1st quarter 1996

main components	concerned details	cases	per cent
traction motor		**22**	**29**
	insulation ruptures of the armatures	12	
	damaged bearing of the armatures	7	
	damaged bandages of the armatures	2	
	damaged cables	1	
auxiliary engines		**11**	**14**
	insulation ruptures of the armatures of the compressor's engine	9	
	insulation ruptures of the armatures of the motor for the ventilator	2	
electric equipment		**26**	**34**
	fuse switch	4	
	launching rheostat	6	
	broken down the sliding contacts	16	
mechanic components		**8**	**10**
	operating limiting size of the axles bandages	1	
	oil consumption of the train of toothed gears	1	
	wear of the motor bearings	6	
automatic brake		**1**	**1**
	damaged compressors	1	
others		**9**	**12**
Total		**77**	100

Annex 3.2.1-7

Comparison of the inventory freight wagon stock with the average damaged stock of AGZD

April 1996

type of wagon	inventory volume	damaged wagons in average for the four last month	portion in percent
covered wagons	6,453	6,379	99
platforms	4,942	4,194	85
coal wagons	5,860	2,739	47
tank wagons	4,948	2,200	44
refrigerators	2,280	2,006	88
others	1,965	1,179	60
container wagons	551	208	38
bulk cement wagons	834	521	62
bulk grain wagons	1,285	380	30
Total	**29,118**	**19,806**	**68**

Annex 3.2.1-8

Volume of maintenance work for the freight wagon stock of AGZD

Type of wagon	inventory stock	stock in operation	Maintenance period for DR in years	Volume of DR work related to inventory stock	Volume of DR work related to stock in operation	Maintenance period for KR in years	Volume of KR work related to inventory stock	Volume of KR work related to stock in operation
covered wagons	6,453	65	2	2,904	29	10	645	7
open wagons	5,860	741	1	5,128	648	8	733	93
tank wagons	4,948	3,106	1	4,498	2,824	11	450	282
platforms	4,942	2,771	2	2,326	1,304	17	291	163
refrigerators	2,280	274	1	2,052	247	10	228	27
bulk cement wagons	834	317	2	379	144	11	76	29
bulk grain wagons	1,285	900	2	584	409	11	117	82
container wagons	551	342	1	551	342	0	0	0
other wagons	1,965	786	2	884	354	10	197	79
Subtotal per year	29,118	9,302		**19,306**	**6,301**		**2,735**	**761**
Subtotal per month				**1,609**	**525**		**228**	**63**

Development of the daily volume of freight train service on the Transcaucasian Railway corridor and respective locomotive demand - westbound traffic on AGZD sections -

Annex 3.2.1-9

westbound traffic	1998		2000		2010		2015	
trunk line Baku - Gyandsha	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic
freight volume per year in k-tons	5,004	4,801	10,354	6,326	15,409	9,497	17,583	10,866
freight per day in tons	16,038	15,388	33,186	20,276	49,388	30,439	56,356	34,827
trains tonnage	24,058	23,082	49,779	30,413	74,082	45,659	84,534	52,240
trains per day	12	12	25	15	37	23	42	26
locomotives per day	17	16	35	21	33	21	38	24
trunk line Gyandsha - Border								
freight volume per year in k-tons	1,456	1,336	6,587	2,848	10,160	5,104	11,277	5,822
freight per day in tons	4,667	4,282	21,112	9,128	32,564	16,359	36,144	18,660
trains tonnage	7,000	6,423	31,668	13,692	48,846	24,538	54,216	27,990
trains per day	4	3	16	7	24	12	27	14
locomotives per day	5	4	22	10	22	11	24	13
Total locomotive demand	**22**	**21**	**57**	**31**	**55**	**32**	**62**	**36**

As operational factors were used:

1) loaded wagons per train: 30 ... 45
2) trains load factor: 0.67
3) trains tonnage: 2000 tons
4) locos turn round for 1998 and 2000: 1.4, after 2010: 0.9

Development of the daily volume of freight train service on the Transcaucasian Railway corridor and respective locomotive demand - eastbound traffic on AGZD sections -

Annex 3.2.1-10

eastbound traffic	1998		2000		2010		2015	
trunk line Border - Gyandsha	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic
freight volume per year in k-tons	589	549	1,034	890	1,648	1,438	2,074	1,784
freight per day in tons	1,888	1,760	3,314	2,853	5,282	4,609	6,647	5,718
trains tonnage	2,832	2,639	4,971	4,279	7,923	6,913	9,971	8,577
trains per day	1	1	2	2	4	3	5	4
locomotives per day	2	2	3	3	4	3	4	4
trunk line Gyandsha - Baku								
freight volume per year in k-tons	1,204	1,146	2,008	1,757	2,849	2,463	3,435	2,919
freight per day in tons	3,859	3,673	6,436	5,631	9,131	7,894	11,010	9,356
trains tonnage	5,788	5,510	9,654	8,447	13,697	11,841	16,514	14,034
trains per day	3	3	5	4	7	6	8	7
locomotives per day	4	4	7	6	6	5	7	6
Total locomotive demand	**6**	**6**	**10**	**9**	**10**	**8**	**12**	**10**

As operational factors were used:

1) loaded wagons per train: 30 ... 45
2) trains load factor: 0.67
3) trains tonnage: 2000 tons
4) locos turn round for 1998 and 2000: 1.4, after 2010: 0.9

Annex 3.2.1-11

Demand for main components and spare parts for repair of AGZD locomotives

specification	units	price per unit (USD)	total amount (USD)
traction motor HB 406	50	10,000	500,000
motor for the compressor HB 431	50	3,000	150,000
motor for the ventilator HB 430	50	2,500	125,000
wheelsets for VL-8	100	4,000	400,000

Annex 3.2.1-12

List of urgently required material and elements for AGZD locomotive repair

specification	units
brake shoes for locomotives	25,000
brake shoes for wagons	30,000
working cylinders bush	30
bearing shell main- 1,2,3,5,6 rest, 0,1,2,3,4 degree	180
bearing shell main - 4-5 rest, 0,1,2,3,4 degree	40
bearing shell main - 7 rest	40
bearing shell of stick 0,1,2,3,4,6,9 degree	180
piston of the working cylinder	30
sealing	100
blow pipe	50
cleaner for blow pipe	240
cylinder with socket	30
middle bearing shell	20
basic bearing shell	40
disc connector	800
long cross-beam connector	10
short cross-beam connector	10
cardan GAS-51 vertical	10
cardan GAS-51 horizontal	20
bearing shell MOP under ED118A	30
main bearing shell 4,5,6,7 degree	200
main bearing shell	100
main bearing shell	200
main bearing shell	200
main bearing shell	400
main bearing shell	400
main bearing shell	400
blow pipe	160
needle cleaner	200

Annex 3.2.1-12

List of urgently required material and elements for AGZD locomotive repair

specification	units
plunger with socket	100
pinion	100
pinion	50
disc connector	600
head of cardan	120
vee belt GOST 1284-68	100
vee belt GOST 1284-68	100
flap	60
flap	60
diaphragma	400
little flap plate	200
big flap plate	200
flap spring	600
carbon brush 2(12,5x32x50) ТЕ-006	1,000
carbon brush 2(12,5x50x52) ЭГТ-200Б	1,600
carbon brush 12,5x44x40	600
carbon brush 12,5x32x64	1,000
carbon brush 2(12,5x32x65,5)	2,000
carbon brush 10x25x40	5,000
carbon brush 2(10x50x60)	16,000
carbon brush 10x25x50	6,000
carbon for sliding contacts type A	10 tons
alkali accumulators	100 compl.
bearing shell for engine axles	240 compl.
retaining frame for sliding bows compl.	250
conical pipe for sliding contacts	800
sliding contacts	800
profile for contact bar	500
babbit Б - 16	3,000

Annex 3.2.1-12

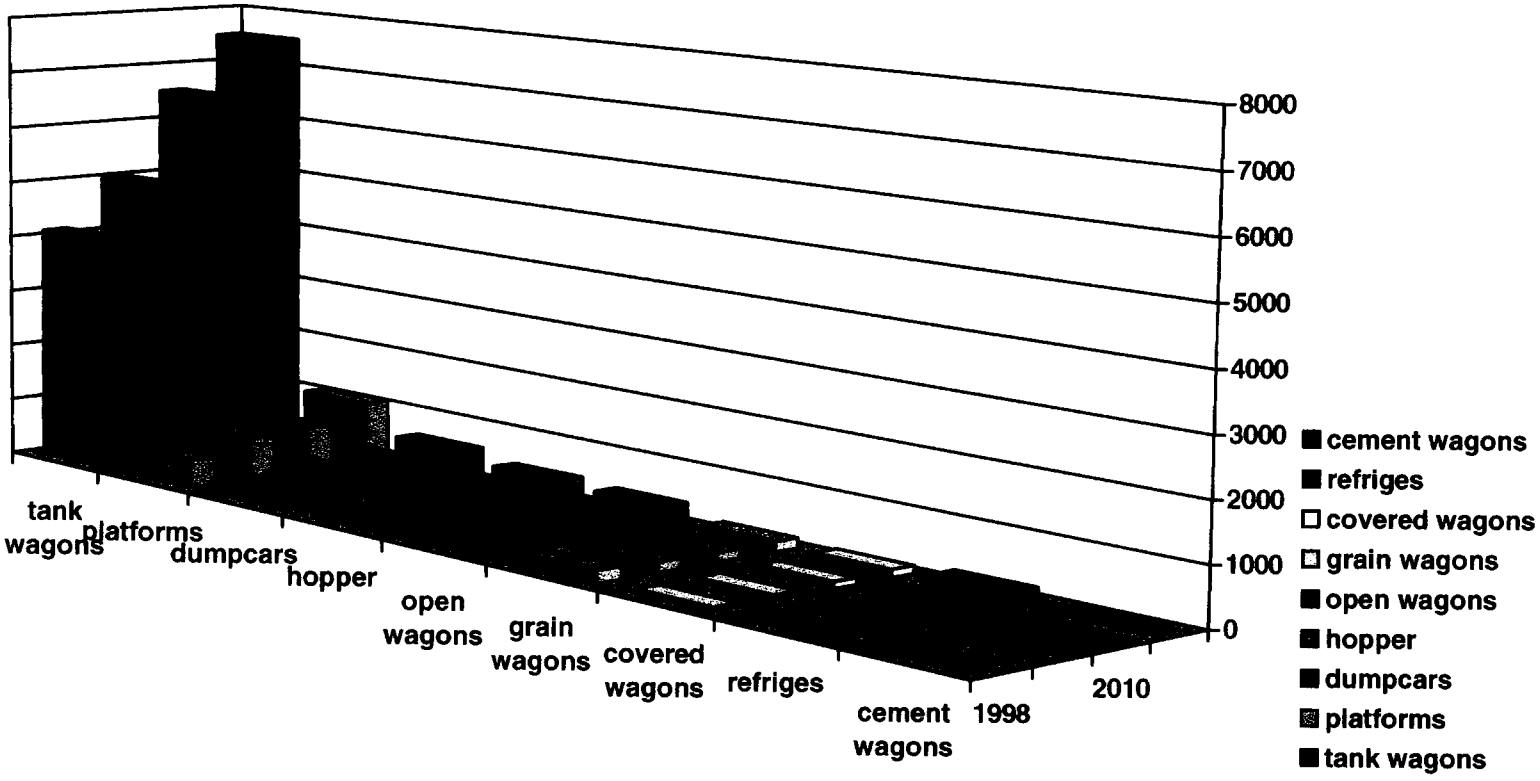
List of urgently required material and elements for AGZD locomotive repair

specification	units
toothed gear	100
toothed gear	100
quick operating switch БВП - 3А	30
spark quencher chamber	50
electric oven ПЭТ	200
heating element ТЭН-44	2,000
spark quencher chamber	50
spark quencher chamber	200
spark quencher chamber	50
spark quencher chamber	50
power leading-in wire СЛ ТЭМ2 (flexible with protection) Type B-124-2000	150
brush 8x25x50	3,000
brush 16x32x32	2,000
brush 16x32x50	3,000
brush 2(8x50x60)	3,000

Annex 3.2.1-13

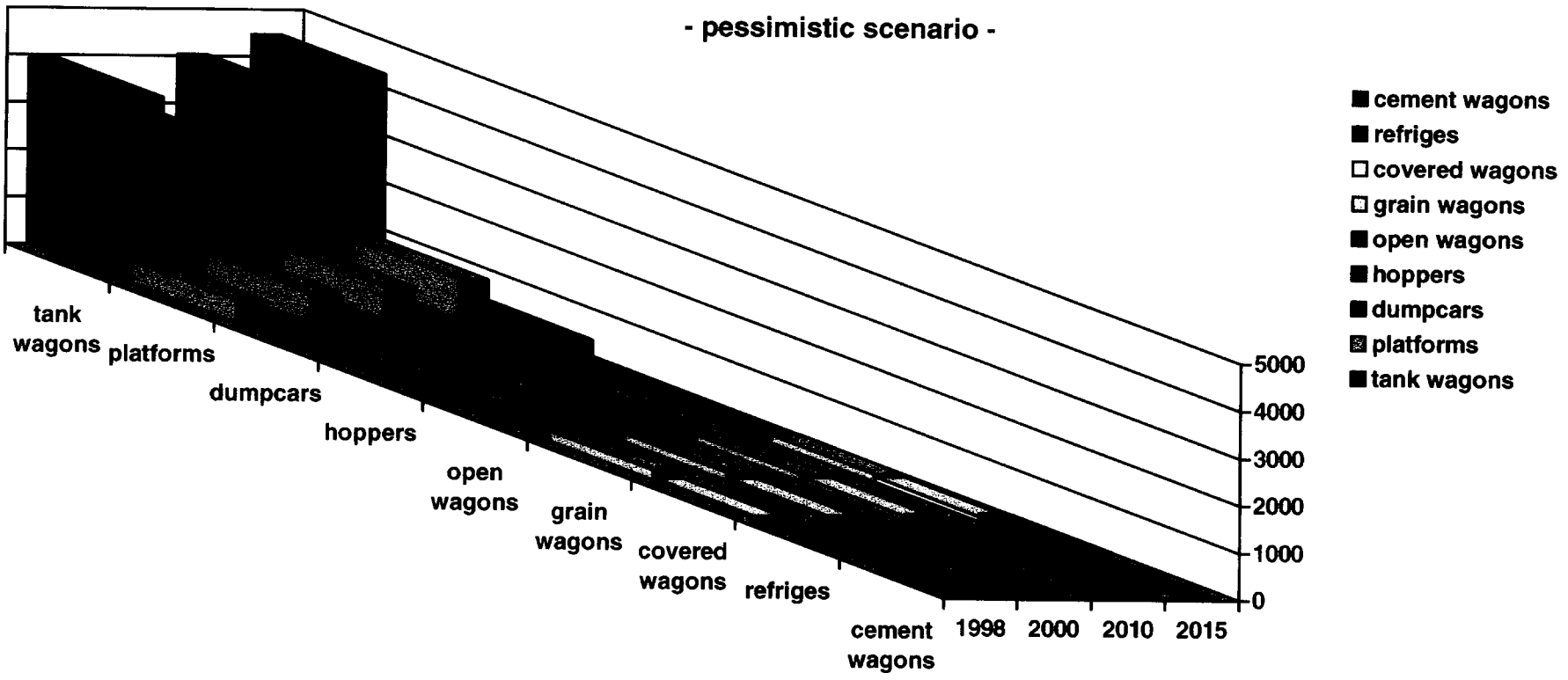
Future wagon stock requirements of the AGZD 1998 - 2015

- optimistic scenario -



Future wagon stock requirements of the AGZD 1998 - 2015

- pessimistic scenario -



Required wagon stock of AGZD in total in 1998

Annex 3.2.1-14

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Optimistic variant														
oil	7,342	23,532	23,532	1	tank	52	57	453	413	**413**	**453**	8	3,303	4,128
building material	812	2,603	1,041	1	flat	43	50	24	21	**43**	**52**	9	387	483
building material		0	1,562	1	dumpcar	48	55	33	28	**28**	**33**	9	256	319
iron ore	10	32	13	60	open	51	63	15	12	**23**	**28**	9	206	257
iron ore		0	19	60	mineral	48	55	24	21	**21**	**24**	9	189	236
cement	126	404	404	1	cement	52	62	8	7	**7**	**8**	9	59	73
grain	251	804	804	1	cereal	31	42	26	19	**19**	**26**	9	172	215
others	548	1,756	650	1	open	49	61	13	11	**8**	**9**	9	75	93
			553	1	flat	20	25	28	22	**5**	**7**	9	47	59
			332	1	refrigerator	35	40	9	8					5,866
			221	1	covered	31	42	7	5					

1) 1=daily
60= every 2 month

Required wagon stock of AGZD in total in 1998

Annex 3.2.1-14

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Pessimistic variant						min	max	max	min			d	max	max
										tanks				
oil	6,987	22,394	22,394	1	tank	52	57	431	393	393	431	8	3,143	3,929
building material	796	2,551	1,021	1	flat	43	50	24	20	flats				
building material		0	1,531	1	dumpcar	48	55	32	28	41	49	9	368	460
iron ore	4	13	5	60	open	51	63	6	5	dumpcars				
iron ore		0	8	60	mineral	48	55	10	8	28	32	9	250	313
cement	122	391	391	1	cement	52	62	8	6	open				
grain	248	795	795	1	cereal	31	42	26	19	16	19	9	140	175
others	522	1,673	650	1	open	49	61	13	11	hoppers				
			512	1	flat	20	25	26	20	8	10	9	76	94
			307	1	refrigerator	35	40	9	8	cements				
			205	1	covered	31	42	7	5	6	8	9	57	71
										grain				
										19	26	9	170	213
										refrigerators				
										8	9	9	69	86
										covereds				
										5	7	9	44	55
														5,396

1) 1=daily
60= every 2 month

Required wagon stock of AGZD in total in 2000

Annex 3.2.1-15

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading		turn-round	required operational stock	required stock in total
						min	max	max	min	min	max	d	max	max
Optimistic variant														
oil	11,880	38,077	38,077	1	tank	52	57	732	668	**tanks**				
building material	1,827	5,856	2,342	1	flat	43	50	54	47	**668**	**732**	6	**4,008**	**5,010**
building material		0	3,513	1	dumpcar	48	55	73	64	**flats**				
iron ore	22	71	28	60	open	51	63	33	27	**83**	**100**	7	**581**	**726**
iron ore		0	42	60	mineral	48	55	53	46	**dumpcars**				
cement	145	465	465	1	cement	52	62	9	7	**64**	**73**	6	**383**	**479**
grain	276	885	885	1	cereal	31	42	29	21	**open**				
others	767	2,458	650	1	open	49	61	13	11	**38**	**46**	7	**263**	**328**
			904	1	flat	20	25	45	36	**hoppers**				
			543	1	refrigerator	35	40	16	14	**46**	**53**	7	**323**	**404**
			362	1	covered	31	42	12	9	**cements**				
										7	**9**	7	**52**	**66**
										grain				
										21	**29**	7	**147**	**184**
										refrigerators				
										14	**16**	7	**95**	**119**
										covereds				
										9	**12**	7	**60**	**75**
														7,392

1) 1=daily
60= every 2 month

Required wagon stock of AGZD in total in 2000

Annex 3.2.1-15

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Pessimistic variant						min	max	max	min			d	max	max
										tanks				
oil	7,120	22,821	22,821	1	tank	52	57	439	400	400	439	6	2,402	3,003
building material	1,593	5,106	2,042	1	flat	43	50	47	41	flats				
building material		0	3,063	1	dumpcar	48	55	64	56	73	88	7	511	639
iron ore	5	16	6	60	open	51	63	8	6	dumpcars				
iron ore		0	10	60	mineral	48	55	12	10	56	64	6	334	418
cement	141	452	452	1	cement	52	62	9	7	open				
grain	273	875	875	1	cereal	31	42	28	21	17	21	7	117	147
others	704	2,256	650	1	open	49	61	13	11	hoppers				
			803	1	flat	20	25	40	32	10	12	7	73	92
			482	1	refrigerator	35	40	14	12	cements				
			321	1	covered	31	42	10	8	7	9	7	51	64
										grain				
										21	28	7	146	182
										refrigerators				
										12	14	7	84	105
										covereds				
										8	10	7	54	67
														4,716

1) 1=daily
60= every 2 month

Required wagon stock of AGZD in total in 2010

Annex 3.2.1-16

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading		turn-round	required operational stock	required stock in total
						min	max	max	min	min	max	d	max	max
Optimistic variant														
oil	18,611	59,651	59,651	1	tank	52	57	1,147	1,047	**tanks**				
										1,047	**1,147**	5	**5,233**	**6,541**
building material	2,466	7,904	3,162	1	flat	43	50	74	63	**flats**				
building material		0	4,742	1	dumpcar	48	55	99	86	**124**	**149**	5	**620**	**775**
iron ore	30	96	38	60	open	51	63	45	37	**dumpcars**				
iron ore		0	58	60	mineral	48	55	72	63	**86**	**99**	5	**431**	**539**
cement	195	625	625	1	cement	52	62	12	10	**open**				
grain	345	1,106	1,106	1	cereal	31	42	36	26	**47**	**59**	6	**284**	**355**
others	1,150	3,686	650	1	open	49	61	13	11	**hoppers**				
			1,518	1	flat	20	25	76	61	**63**	**72**	5	**315**	**393**
			911	1	refrigerator	35	40	26	23	**cements**				
			607	1	covered	31	42	20	14	**10**	**12**	5	**50**	**63**
										grain				
										26	**36**	5	**132**	**165**
										refrigerators				
										23	**26**	6	**137**	**171**
										covereds				
										14	**20**	6	**87**	**108**
														9,109

1) 1=daily
60= every 2 month

Required wagon stock of AGZD in total in 2010

Annex 3.2.1-16

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Pessimistic variant						min	max	max	min			d	max	max
										tanks				
oil	11,483	36,804	36,804	1	tank	52	57	708	646	**646**	**708**	5	**3,228**	**4,036**
building material	2,071	6,638	2,655	1	flat	43	50	62	53	flats				
building material		0	3,983	1	dumpcar	48	55	83	72	**106**	**127**	6	**633**	**792**
iron ore	5	16	6	60	open	51	63	8	6	dumpcars				
iron ore		0	10	60	mineral	48	55	12	10	**72**	**83**	5	**362**	**453**
cement	183	587	587	1	cement	52	62	11	9	open				
grain	335	1,074	1,074	1	cereal	31	42	35	26	**17**	**21**	6	**101**	**126**
others	1,021	3,272	650	1	open	49	61	13	11	hoppers				
			1,311	1	flat	20	25	66	52	**10**	**12**	5	**52**	**66**
			787	1	refrigerator	35	40	22	20	cements				
			524	1	covered	31	42	17	12	**9**	**11**	5	**47**	**59**
										grain				
										26	**35**	5	**128**	**160**
										refrigerators				
										20	**22**	6	**118**	**148**
										covereds				
										12	**17**	6	**75**	**94**
														5,931

1) 1=daily
60= every 2 month

Required wagon stock of AGZD in total in 2015

Annex 3.2.1-17

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading		turn-round	required operational stock	required stock in total
						min	max	max	min	min	max	d	max	max
Optimistic variant														
oil	21,403	68,599	68,599	1	tank	52	57	1,319	1,203	**tanks**				
										1,203	**1,319**	5	**6,017**	**7,522**
building material	2,713	8,696	3,478	1	flat	43	50	81	70	**flats**				
										145	**175**	6	**870**	**1,088**
building material		0	5,217	1	dumpcar	48	55	109	95	**dumpcars**				
										95	**109**	5	**474**	**593**
iron ore	33	106	42	60	open	51	63	50	40	**open**				
										51	**63**	6	**306**	**382**
iron ore		0	63	60	mineral	48	55	79	69	**hoppers**				
										69	**79**	5	**346**	**433**
cement	215	689	689	1	cement	52	62	13	11	**cements**				
										11	**13**	5	**56**	**69**
grain	379	1,215	1,215	1	cereal	31	42	39	29	**grain**				
										29	**39**	5	**145**	**181**
others	1,380	4,423	650	1	open	49	61	13	11	**refrigerators**				
										28	**32**	6	**170**	**212**
			1,887	1	flat	20	25	94	75	**covereds**				
										18	**24**	6	**108**	**135**
			1,132	1	refrigerator	35	40	32	28					10,614
			755	1	covered	31	42	24	18					

1) 1=daily
60= every 2 month

Required wagon stock of AGZD in total in 2015

Annex 3.2.1-17

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Pessimistic variant						min	max	max	min			d	max	max
										tanks				
oil	12,718	40,763	40,763	1	tank	52	57	784	715	**715**	**784**	5	**3,576**	**4,470**
building material	2,381	7,631	3,053	1	flat	43	50	71	61	**flats**				
building material		0	4,579	1	dumpcar	48	55	95	83	**127**	**153**	6	**760**	**950**
iron ore	6	19	8	60	open	51	63	9	7	**dumpcars**				
iron ore		0	12	60	mineral	48	55	14	13	**83**	**95**	5	**416**	**520**
cement	210	673	673	1	cement	52	62	13	11	**open**				
grain	368	1,179	1,179	1	cereal	31	42	38	28	**18**	**22**	6	**108**	**135**
others	1,226	3,929	650	1	open	49	61	13	11	**hoppers**				
			1,640	1	flat	20	25	82	66	**13**	**14**	5	**63**	**79**
			984	1	refrigerator	35	40	28	25	**cements**				
			656	1	covered	31	42	21	16	**11**	**13**	5	**54**	**68**
										grain				
										28	**38**	5	**140**	**176**
										refrigerators				
										25	**28**	6	**148**	**184**
										covereds				
										16	**21**	6	**94**	**117**
														6,698

1) 1=daily
60= every 2 month

Annex 3.2.1-18

AGZD - Freight wagon stock available and future demand

1998

type	inventory stock	stock in operation in %	stock in operation in wagons	demand in 1998 -opt-	need to repair	to rent or to procure	demand in 1998 -pess-	need to repair	to rent or to procure
covered wagons	6,453	1	65	59	*-6*	*-6,394*	55	*-10*	*-6,398*
platforms	4,942	15	741	483	*-258*	*-4,459*	460	*-281*	*-4,482*
open wagons	5,860	53	3,106	257	*-2,849*	*-5,603*	175	*-2,931*	*-5,685*
tank wagons	4,948	56	2,771	4,128	**1,357**	*-820*	3,929	**1,158**	*-1,019*
refriges	2,280	12	274	93	*-181*	*-2,187*	86	*-188*	*-2,194*
cement wagons	834	38	317	73	*-244*	*-761*	71	*-246*	*-763*
grain wagons	1,285	70	900	215	*-685*	*-1,070*	213	*-687*	*-1,072*
other wagons	4,635	40	1,854	555	*-1,299*	*-4,080*	407	*-1,447*	*-4,228*
total wagon stock to maintain				5,863			5,396		

Need to short the backlog of maintenance in order to cover the traffic requirements by main overhauls:

in optimistic case: **1,357 tanks**

in pessimistic case: **1,158 tanks**

AGZD - Freight wagon stock available and future demand

2000

type	inventory stock	stock in operation in %	stock in operation in wagons	demand in 1998 -opt-	need to repair	to rent or to procure	demand in 1998 -pess-	need to repair	to rent or to procure
covered	6,453	2	129	75	*-54*	*-6,378*	67	*-62*	*-6,386*
platforms	4,942	25	1,236	726	*-510*	*-4,216*	639	*-597*	*-4,303*
open w.	5,860	53	3,106	328	*-2,778*	*-5,532*	147	*-2,959*	*-5,713*
tank w.	4,948	83	4,128	5,010	**882**	**62**	3,003	*-926*	*-1,945*
refriges	2,280	12	274	119	*-155*	*-2,161*	105	*-169*	*-2,175*
cement	834	38	317	66	*-251*	*-768*	64	*-253*	*-770*
grain w.	1,285	70	900	184	*-716*	*-1,101*	182	*-718*	*-1,103*
others	4,635	40	1,854	883	*-971*	*-3,752*	510	*-1,344*	*-4,125*
total wagon stock to maintain				7,391			4,717		

Need to short the backlog of maintenance in order to cover the traffic requirements in any case **65 covered**
by main overhauls **494 platforms**
in optimistic case: **882 tanks**

Need of procurement in optimistic case: **62 tanks**

Annex 3.2.1-18

AGZD - Freight wagon stock available and future demand

2010

type	inventory stock	stock in operation in %	stock in operation in wagons	demand in 1998 -opt-	need to repair	to rent or to procure	demand in 1998 -pess-	need to repair	to rent or to procure
covered	6,453	3	194	108	*-86*	*-6,345*	94	*-100*	*-6,359*
platforms	4,942	25	1,236	775	*-461*	*-4,167*	792	*-444*	*-4,150*
open w.	5,860	53	3,106	355	*-2,751*	*-5,505*	126	*-2,980*	*-5,734*
tank w.	5,010	100	5,010	6,541	**0**	**1,531**	4,036	**107**	*-974*
refriges	2,280	12	274	171	*-103*	*-2,109*	148	*-126*	*-2,132*
cement	834	38	317	63	*-254*	*-771*	59	*-258*	*-775*
grain w.	1,285	70	900	165	*-735*	*-1,120*	160	*-740*	*-1,125*
others	4,635	40	1,854	932	*-922*	*-3,703*	519	*-1,335*	*-4,116*
total wagon stock to maintain				9,110			5,934		

Need to short the backlog of maintenance in order to cover the traffic requirements by main overhauls: **in optimistic case: 65 covered**

in pessimistic case: 107 tanks

Need for procurement in optimistic case: 1,531 tanks

AGZD - Freight wagon stock available and future demand

2015

type	inventory stock	stock in operation in %	stock in operation in wagons	demand in 1998 -opt-	**need to repair**	**to rent or to procure**	demand in 1998 -pess-	**need to repair**	**to rent or to procure**
covered	6,453	5	323	135	*-188*	*-6,318*	117	*-206*	*-6,336*
platforms	4,942	35	1,730	1,088	*-642*	*-3,854*	950	*-780*	*-3,992*
open w.	5,860	53	3,106	382	*-2,724*	*-5,478*	135	*-2,971*	*-5,725*
tank w.	6,541	100	6,541	7,522	**0**	**981**	4,470	**434**	*-2,071*
refriges	2,280	20	456	212	*-244*	*-2,068*	184	*-272*	*-2,096*
cement	834	38	317	69	*-248*	*-765*	68	*-249*	*-766*
grain w.	1,285	70	900	181	*-719*	*-1,104*	176	*-724*	*-1,109*
others	4,635	40	1,854	1,026	*-828*	*-3,609*	599	*-1,255*	*-4,036*
total wagon stock to maintain				10,615			6,699		

Need to short the backlog of maintenance in order to cover the traffic requirements by main overhauls: **in optimistic case:**
129 covered
182 refriges

in pessimistic case:
434 tanks

Need for procurement in optimistic case: **981 tanks**

Finance needs for AGZD rolling stock required for main corridor traffic

Annex 3.2.1-19

Optimistic variant

No	costs in US$ mln	rn	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
1	backlog of loco repair in Georgia and Russia	a	1.200																		
2	main overhaul of old locomotives	a	1.500	2.300	2.500	2.900															9.200
3	regular loco maintenance	c			2.076	2.076	2.076	2.076	2.076	2.076	2.076	2.076	2.076	2.076	1.275	1.275	1.275	1.275	1.275	1.367	28.502
4	scrapping of locos	d	0.0015	0.0040	0.0040	0.0035	0.0035	0.00325	0.00325						0.00375	0.0050	0.00625	0.0050	0.00275		0.046
5	procurement of locomotives	c													24	28	48	56	56	56	268.000
6	procurement of lifting jacks for Baladshary locomotive depot	a	0.160																		0.160
7	equip the traction motor work shop	b	0.150	0.150	0.150	0.150	0.150														0.750
8	procurement of main components and spare parts for locomotive repair	a	0.587	0.587																	1.174
9	procurement of required material and elements for locomotive repair	a	1.023	1.023																	2.045
10	equip the BWRS	a	0.104																		0.104
11	reconstruction of the BWRS	b		4.000	4.000	4.000	4.000														16.000
12	equip the Baladshary wagon depot with overhead crane	a	0.030																		0.030
13	upgrading 5 wagon depots	c	0.500	0.500	0.500	0.500	0.500														2.500
14	procurement of tanks	d			2.480										61.240					39.240	102.960
15	procurement of spare parts for wagon repair	b	2.500																		2.500
16	backlog of wagon maintenance	b	0.340	0.340	0.823	0.823									0.033	0.033				0.311	2.703
17	regular wagon maintenance	b	2.932	2.932	3.700	3.700	3.700	3.700	3.700	3.700	3.700	3.700	3.700	3.700	4.555	4.555	4.555	4.555	4.555	5.308	70.947
18	Training course	c	0.060																		0.060
19	**Total costs**		11.087	11.836	16.233	14.153	10.430	5.779	5.779	5.776	5.776	5.776	5.776	5.776	91.107	33.868	53.836	61.835	61.833	102.226	508.881

Finance needs for AGZD rolling stock required for main corridor traffic

Annex 3.2.1-19

Pessimistic variant

No	costs in US$ mln	rn	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
1	backlog of loco repair in Georgia and Russia	a	1.200																		
2	main overhaul of old locomotives	a	1.500	2.300																	3.800
3	regular loco maintenance	c			1.306	1.306	1.306	1.306	1.306	1.152	1.152	1.152	1.152	1.152	1.169	1.169	1.169	1.169	1.169	1.169	19.304
4	scrapping of locos	d	0.0025	0.0075	0.0070	0.0063	0.0058	0.00575	0.00755	0.0053											0.048
5	procurement of locomotives	c									28				40						68.000
6	procurement of lifting jacks for Baladshary locomotive depot	a	0.160																		0.160
7	equip the traction motor work shop	b	0.150	0.150	0.150	0.150	0.150														0.750
8	procurement of main elements for locomotive repair	a	0.587	0.587																	1.174
9	procurement of spare parts for locomotive repair	a	1.023	1.023																	2.045
10	equip the BWRS	a	0.104																		0.104
11	reconstruction of the BWRS	b		4.000	4.000	4.000	4.000														16.000
12	equip the Baladshary wagon depot with overhead crane	a	0.030																		0.030
13	upgrading 5 wagon depots	c	0.500	0.500	0.500	0.500	0.500														2.500
14	procurement of tanks	d																			0.000
15	procurement of spare parts for wagon repair	b	2.500																		2.500
16	backlog of wagon maintenance	b	0.290	0.290	0.343	0.343									0.054	0.054				0.434	1.808
17	regular wagon maintenance	b	2.698	2.698	2.359	2.359	2.359	2.359	2.359	2.359	2.359	2.359	2.359	2.359	2.967	2.967	2.967	2.967	2.967	3.350	47.171
18	Training course	c	0.060																		0.060
19	**Total costs**		10.804	11.555	8.665	8.664	8.321	3.671	3.673	3.516	31.511	3.511	3.511	3.511	44.190	4.190	4.136	4.136	4.136	4.953	166.654

rn - Ranking notes: a utmost urgent
b very urgent
c urgent
d needed

Final Report Module A

Annexes

Chapter 3 Technical Pre-feasibility

3.2 Rolling stock
3.2.2 Georgia

Annex 3.2.2-1

Survey of GRZD electric locomotives

June 1996

Depot	Type of locomotive	amount			Problems		
		in total	in operation / in reserve	out of order	waiting for rejection	waiting for repair TR 3	waiting for repair KR1/KR2
Samtredia	VL-8	54	14/5	35	24	10	1
Khashuri	VL-8	1	1/0	0	0	0	0
Khashuri	VL-10	56	7/4	45	39	5	1
Khashuri	VL-11	8.5	1/1	6.5	0	2	4.5
Tbilisi-Sortir.	VL-10	41	9/2	30	22	8	0
Tbilisi-Sortir.	VL-11	21	6/3	12	0	1	11
Total GRZD (including loco-motives from other depots)	**VL-8**	**85**	**29/8**	**48**	**28+4**	**15**	**1**
	VL10	**103**	**17/7**	**79**	**62**	**16**	**1**
	VL-11	**42.5**	**9/6**	**27.5**	**0**	**3**	**24.5**

Remarks: Among all 83.5 electric locomotives of the types VL 10 + VL 11, being in operation and in reserve as well as waiting for repair, 68.5 locomotives (82%) need main repair (KR-1, KR-2) for covering the rules of exploitation cycles of locomotives.

Annex 3.2.2-2

Age structure of the GRZD-electric locomotives - 1996 -

type of locomotive	age	number
VL-8		
	38 ... 35	11
	34 ... 33	36
	32 ... 31	22
	30	23
	29	8
VL-10		
	29 ... 26	41
	24 ... 22	44
VL-10^{u}		
	15	4
	14	6
	13	8
VL-11		
	16	5
	13	2
	12	5
	10	11
	7	12.5
	6	6
	1	1

Annex 3.2.2-3

Brief technical description of the most important electric locomotives of the Transcaucasian Railways

type of locomotive	VL-8	VL-10	VL-11
service weight	184 tons	184 tons	180 tons
number of axles	8	8	8
axle-load	23 tons	23 tons	22.5 tons
number of traction engines	8	8	8
installed power per traction engine	525 kW	650 kW	670 kW
power per hour	4,200 kW	5,200 kW	5,360 kW
constant power	3,660 kW	4,530 kW	4,600 kW
traction per hour	352 kN	397.6 kN	387 kN
constant traction	303 kN	324.8 kN	314 kN
designed speed	80 km/h	100 km/h	100 km/h
speed at constant power	44.3 km/h	51.2 km/h	51.2 km/h
speed at power per hour	42.6 km/h	48.7 km/h	48.7 km/h
length	27.52 m	32.84 m	32.88 m
diameter of driving wheel	1,200 mm	1,250 mm	1,250 mm

Annex 3.2.2-4

Freight wagon stock of GRZD

17, June 1996

type of wagon	number
covered wagons	4,982
open wagons	6,076
tank wagons	2,243
platforms	2,303
refrigerators	549
bulk cement wagons	961
bulk grain wagons	1,693
container wagons	440
others	1,848
Total	**21,095**

Annex 3.2.2-5

Present number of wagons repaired by GRZD

May 1996

Work shop	Monthly repair of wagons
Batumi VTshD - 1	specialisation: tank wagons **DR: 83 / TR: 25**
DR:	2 covered wagons, 2 open wagons, 22 tank wagons, 57 bulk grain wagons
TR:	7 covered wagons, 7 tank wagons , 1 platform, 10 bulk grain wagons
Remarks:	5 places for repair
Samtredia VTchD - 2	specialisation: **DR: 154 / TR: 15**
DR:	33 covered wagons, 47 open wagons, 2 tank wagons, 30 platforms, 42 bulk grain wagons
TR:	2 covered wagons, 8 tank wagons, 5 bulk grain wagons
Remarks:	8 places for repair
Khashuri VTchD - 3	specialisation: **DR: 164 / TR: 18**
DR:	30 covered wagons, 111 open wagons, 10 tank wagons, 5 platforms, 2 bulk cement wagons 4 bulk grain wagons, 2 others
TR:	2 covered wagons, 1 open wagon, 11 tank wagons, 4 bulk grain wagons
Remarks:	12 places for repair
Tbilisi VTchD - 4	specialisation: containers **DR: 0 / TR: 423**
DR:	0
TR:	66 covered wagons, 115 open wagons, 130 tank wagons, 48 platforms, 64 bulk grain wagons
Remarks:	unplanned repairs only
WWP Poti present output:	specialisation:
designed for:	
Remarks:	
Tbilisi EWRS present output:	specialisation: passenger coaches, EMU's, covered wagons for World Food Programme
designed for:	
Remarks:	

DR	Middle repair
TR	Technical revision
VTchD	Wagon Depot
TEWRS	Tbilisi Electro-Wagon Repair Work Shop
WWP	Wagon Washing Station

Annex 3.2.2-6

Occurred damages on GRZD electric locomotives in operation

- first sixth months of 1996 -

main components	cases	per cent
traction motor	70	17
auxiliary engines	76	19
electric equipment	112	27
mechanic components	106	26
others	46	11
Total	408	100

Annex 3.2.2-7

Comparison of the inventory freight wagon stock with the average damaged stock of GRZD per day

June 1996

type of wagon	inventory stock	damaged wagons per day	proportion in percent
covered wagons	4,982	4,372	88
platforms	2,303	1,984	86
open/coal wagons	6,076	4,968	82
tank wagons	2,243	1,211	54
refrigerators	549	444	81
others	1,848	1,482	81
container wagons	440	353	80
bulk cement w.	961	836	87
bulk grain wagons	1,693	781	46
Total	**21,095**	**16,449**	**77**

Annex 3.2.2-8

Volume of maintenance work for the freight wagon stock of GRZD

Type of wagon	inventory stock	stock in operation	Main-tenance period for DR, years	Volume of DR-work related to inventory stock	Volume of DR-work related to stock in operation	Main-tenance period for KR, years	Volume of KR-work related to inventory stock	Volume of KR-work related to stock in operation
covered wagons	4,982	610	2	2,242	271	10	498	60
open wagons	6,076	1,108	1	2,279	409	8	760	136
tank wagons	2,243	1,032	1	918	421	11	204	94
platforms/flats	2,303	319	1	1,016	61	17	135	8
refrigerators	549	105	1	494	95	10	55	11
bulk cement wagons	961	125	2	437	57	11	87	11
bulk grain wagons	1,693	912	2	770	415	11	154	83
container wagons	440	87	1	440	87	0	0	0
Subtotal	**19,247**			**8,594**	**1,815**		**1,893**	**403**

Development of the daily volume of freight train service on the Transcaucasian Railway corridor and respective locomotive demand - westbound traffic on GRZD sections -

Annex 3.2.2-9

westbound traffic	1998		2000		2010		2015	
	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic
trunk line Border - Tbilisi								
freight volume per year in k-tons	1,456	1,336	6,587	2,848	10,160	5,104	11,277	5,822
freight per day in tons	4,667	4,282	21,112	9,128	32,564	16,359	36,144	18,660
trains tonnage	7,000	6,423	31,668	13,692	48,846	24,538	54,216	27,990
trains per day	4	3	16	7	24	12	27	14
locomotives per day	5	4	22	10	22	11	24	13
trunk line Tbilisi - Samtredia								
freight volume per year in k-tons	2,170	1,896	7,333	3,504	11,239	5,765	12,387	8,777
freight per day in tons	6,955	6,077	23,503	11,231	36,022	18,478	39,702	28,131
trains tonnage	10,433	9,115	35,255	16,846	54,034	27,716	59,553	42,197
trains per day	5	5	18	8	27	14	30	21
locomotives per day	15	13	49	24	76	39	83	59
trunk line Samtredia - Batumi								
freight volume per year in k-tons	1,494	1,335	5,124	1,945	8,527	3,815	9,405	4,496
freight per day in tons	4,788	4,279	16,423	6,234	27,330	12,228	30,144	14,410
trains tonnage	7,183	6,418	24,635	9,351	40,995	18,341	45,216	21,615
trains per day	4	3	12	5	20	9	23	11
locomotives per day	5	4	17	7	18	8	20	10

Development of the daily volume of freight train service on the Transcaucasian Railway corridor and respective locomotive demand - westbound traffic on GRZD sections -

Annex 3.2.2-9

westbound traffic	1998		2000		2010		2015	
	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic
trunk line Samtredia - Poti								
freight volume per year in k-tons	676	561	2,209	1,559	2,712	1,950	2,982	2,281
freight per day in tons	2,167	1,798	7,080	4,997	8,692	6,250	9,558	7,311
trains tonnage	3,250	2,697	10,620	7,495	13,038	9,375	14,337	10,966
trains per day	2	1	5	4	7	5	7	5
locomotives per day	2	2	7	5	6	4	6	5
Total locomotive demand	**27**	**24**	**96**	**45**	**122**	**62**	**135**	**86**

As operational factors were used:

1) loaded wagons per train: 30 ... 45
2) trains load factor: 0.67
3) trains tonnage: 2000 tons
4) locos turn round for 1998 and 2000: 1.4, after 2010: 0.9
5) locos factor for 1 train: for trains in section Tbilisi - Samtredia: 2

Development of the daily volume of freight train service on the Transcaucasian Railway corridor and respective locomotive demand - eastbound traffic on GRZD sections -

Annex 3.2.2-10

westbound traffic	1998		2000		2010		2015	
	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic
trunk line Tbilisi - Border								
freight volume per year in k-tons	589	549	1,034	890	1,648	1,438	2,047	1,784
freight per day in tons	1,888	1,760	3,314	2,853	5,282	4,609	6,561	5,718
trains tonnage	2,832	2,639	4,971	4,279	7,923	6,913	9,841	8,577
trains per day	1	1	2	2	4	3	5	4
locomotives per day	2	2	3	3	4	3	4	4
trunk line Samtredia - Tbilisi								
freight volume per year in k-tons	1,974	1,715	2,424	2,025	3,203	2,575	3,755	3,041
freight per day in tons	6,327	5,497	7,769	6,490	10,266	8,253	12,035	9,747
trains tonnage	9,490	8,245	11,654	9,736	15,399	12,380	18,053	14,620
trains per day	5	4	6	5	8	6	9	7
locomotives per day	20	17	24	20	32	26	38	31
trunk line Batumi - Samtredia								
freight volume per year in k-tons	805	650	988	758	1,301	956	1,503	1,112
freight per day in tons	2,580	2,083	3,167	2,429	4,170	3,064	4,817	3,564
trains tonnage	3,870	3,125	4,750	3,644	6,255	4,596	7,226	5,346
trains per day	2	2	2	2	3	2	4	3
locomotives per day	3	2	3	3	3	2	3	2

Development of the daily volume of freight train service on the Transcaucasian Railway corridor and respective locomotive demand - eastbound traffic on GRZD sections -

Annex 3.2.2-10

westbound traffic	1998		2000		2010		2015	
	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic	optimistic	pessimistic
trunk line Poti - Samtredia								
freight volume per year in k-tons	1,169	1,065	1,436	1,267	1,902	1,619	2,252	1,929
freight per day in tons	3,747	3,413	4,603	4,061	6,096	5,189	7,218	6,183
trains tonnage	5,620	5,120	6,904	6,091	9,144	7,784	10,827	9,274
trains per day	3	3	3	3	5	4	5	5
locomotives per day	4	4	5	4	4	4	5	4
Total locomotive demand	**29**	**25**	**36**	**30**	**43**	**35**	**50**	**41**

As operational factors were used:

1) loaded wagons per train: 30 ... 45
2) trains load factor: 0.67
3) trains tonnage: 2000 tons
4) locos turn round for 1998 and 2000: 1.4, after 2010: 0.9
5) locos factor for 1 train: for trains in section Tbilisi - Samtredia: 3

Annex 3.2.2-11

Demand for main equipment for GRZD locomotive depots

specification	units	price per unit (USD)	total price (USD)
lubricating device for pantographs	6	3,500	21,000
electric still A468	8	2,500	125,000
inspection detector for wheelsets A1370	2	3,000	6,000
lifting jacks, 40 t	8	10,000	80,000
lifting jacks, 35 t	10	15,000	150,000
lifting jacks, 25 t	10	3,000	30,000
electric truck, 2 t	6	10,000	60,000
electric truck, 5 t	2	15,000	30,000
electrolift, 0.5 t	4	3,000	12,000
electrolift, 1 t	4	4,500	18,000
electrolift, 3 t	5	7,500	37,500
electrolift, 5 t	5	10,000	50,000
oil pump A-1326	6	3,500	21,000
welding rectifier VDM-1001	4	4,000	16,000
welding transformer TDM-401	7	3,500	24,500
electric loader, 1 t	4	20,000	80,000

Annex 3.2.2-12

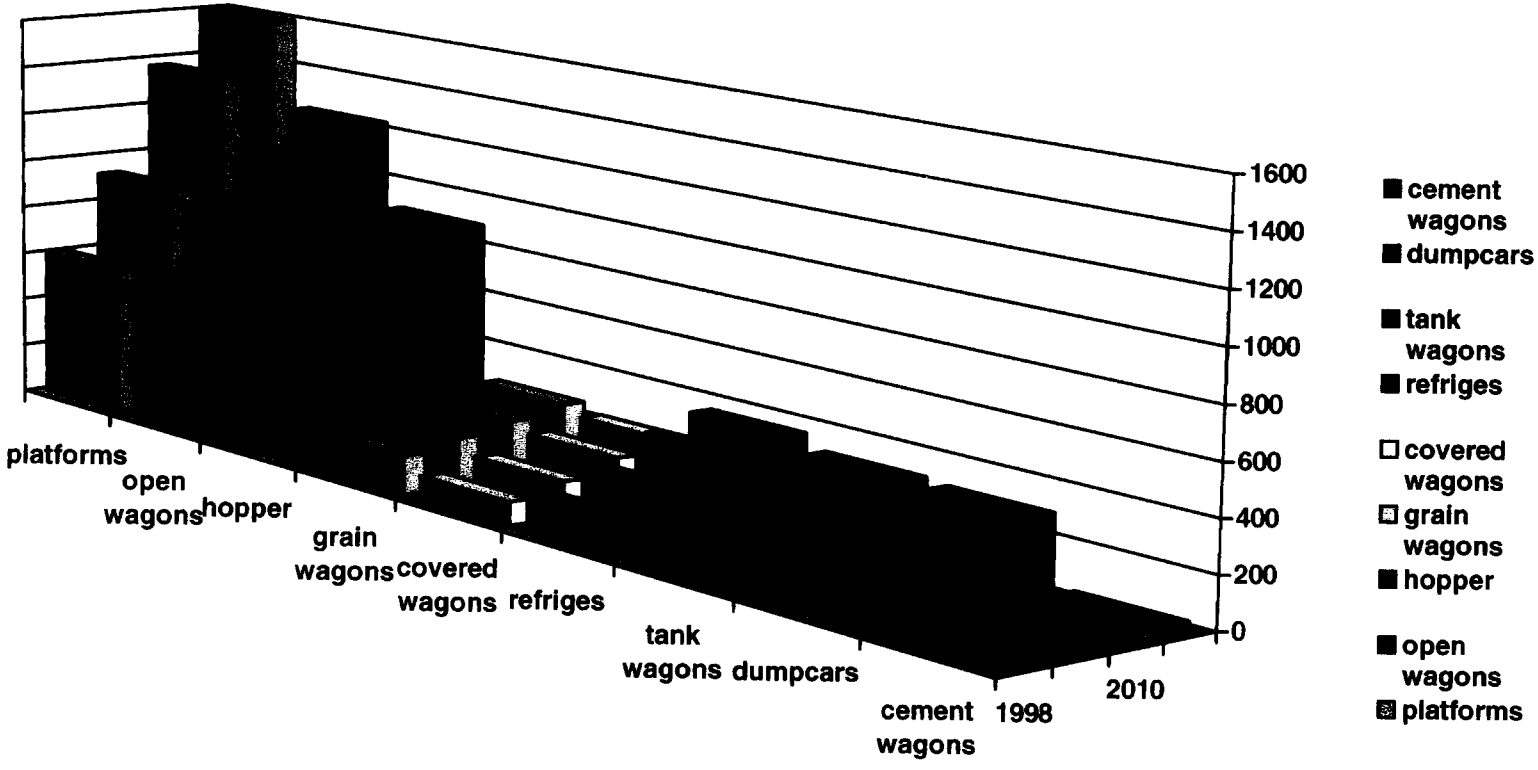
List of urgently required material and elements for GRZD locomotive repair

specification	units
compressor NB-431	100
wheelset VL-10	100
wheelset VL-8	40
wheel tire	200
accumulators NK-120	10
sliding contacts P 5	50
traction motors TL-2k, NB-406	40
brake shoes	10,000
electropneumatic contactors	25
electromagnetic contactors	25
carbon brushes	2,500
ventilators NB-430, TL-110	10
quick circuit switch BWP-5, BWP-3a	15
profiled coppering device for contactors 10x34x41	200 kg
plating for sliding contacts	1,000
trolley for sliding contacts	each per 60
inductive rheostat Isch-2k, Isch-406	100
group switch PKG-4a, PKF-6b	10
insulating paint NU - 929	150 kg
spring VL-8	40
coupling gears VL-8	10
spark quencher chamber BWP-5, BWP-3a	10
suspension of cradle, complete	3
safety fuse PK 6/75	120
babbit B-16, B-83	1,500 kg
electric oven PET-IUZ	150

Annex 3.2.2-13

Future wagon stock requirements of the GRZD 1998 - 2015

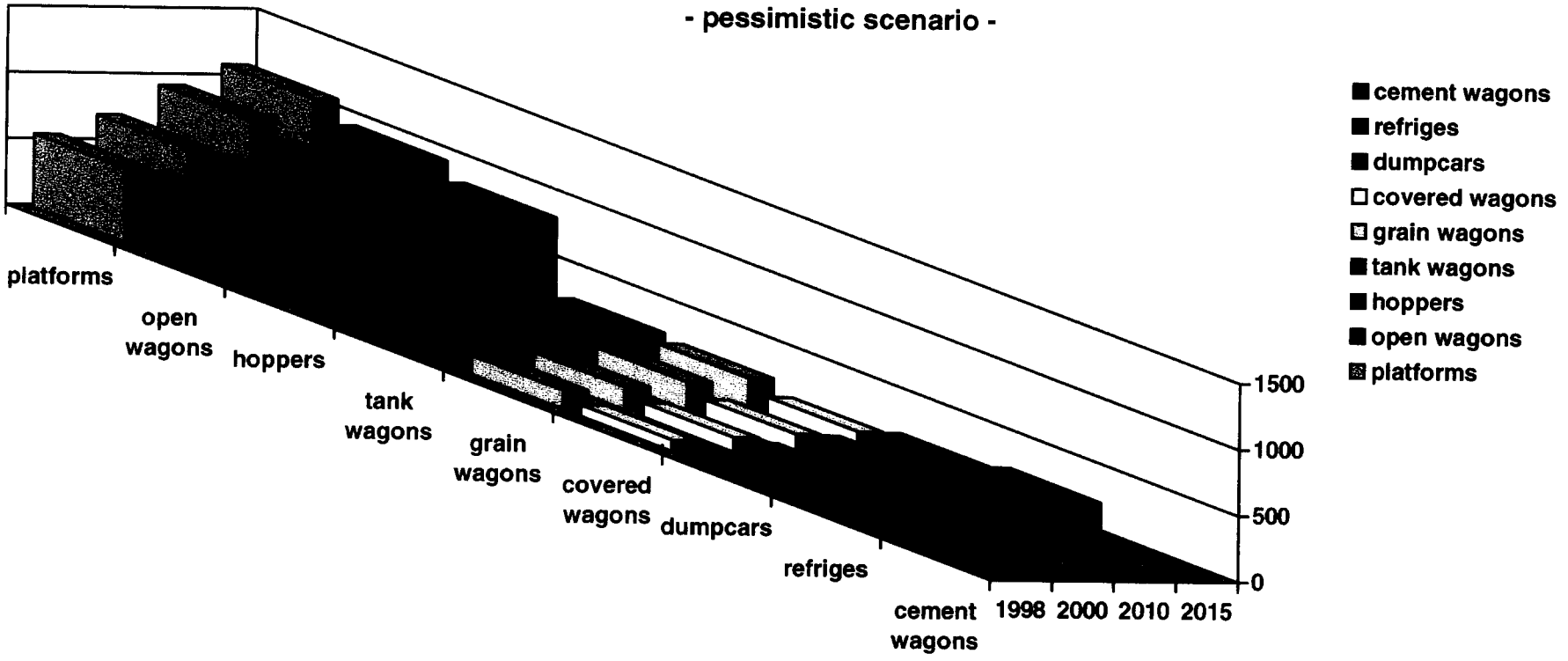
- optimistic scenario -



Annex 3.2.2-13

Future wagon stock requirements of the GRZD 1998 - 2015

- pessimistic scenario -



Required wagon stock of GRZD in total in 1998

Annex 3.2.2-14

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Optimistic variant														
coal	50	160	160	7	open	51	63	22	18	**tanks**				
oil	297	952	952	1	tank	52	57	18	17	**17**	**18**	8	134	167
building material	252	808	323	1	flat	43	50	8	6	**flats**				
building material			485	1	dumpcar	48	55	10	9	**53**	**65**	9	481	601
iron ore	88	282	113	15	open	51	63	33	27	**dumpcars**				
iron ore			169	15	mineral	48	55	53	46	**9**	**10**	9	79	99
cement	22	71	71	1	cement	52	62	1	1	**open**				
grain	177	567	567	1	cereal	31	42	18	14	**55**	**68**	9	498	622
others	736	2,359	650	1	open	49	61	13	11	**hoppers**				
			854	1	flat	20	25	43	34	**46**	**53**	9	415	519
			513	1	refrigerator	35	40	15	13	**cements**				
			342	1	covered	31	42	11	8	**1**	**1**	9	10	13
metals	199	638	638	1	flat	43	50	15	13	**grain**				
		1)	1=daily							**14**	**18**	9	122	152
			60= every 2 month							**refrigerators**				
										13	**15**	9	115	144
										covereds				
										8	**11**	9	73	92
														2,409

Required wagon stock of GRZD in total in 1998

Annex 3.2.2-14

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Pessimistic variant														
coal	44	141	141	7	open	51	63	19	16	tanks				
oil	290	929	929	1	tank	52	57	18	16	16	18	8	130	163
building material	247	792	317	1	flat	43	50	7	6	flats				
building material			475	1	dumpcar	48	55	10	9	50	60	9	446	557
iron ore	86	276	110	15	open	51	63	32	26	dumpcars				
iron ore			165	15	mineral	48	55	52	45	9	10	9	78	97
cement	22	71	71	1	cement	52	62	1	1	open				
grain	170	545	545	1	cereal	31	42	18	13	53	65	9	473	591
others	705	2,260	650	1	open	49	61	13	11	hoppers				
			805	1	flat	20	25	40	32	45	52	9	406	507
			483	1	refrigerator	35	40	14	12	cements				
			322	1	covered	31	42	10	8	1	1	9	10	13
metals	172	551	551	1	flat	43	50	13	11	grain				
										13	18	9	117	146
										refrigerators				
										12	14	9	109	136
										covereds				
										8	10	9	69	86
														2,297

1) 1=daily
60= every 2 month

Required wagon stock of GRZD in total in 2000

Annex 3.2.2-15

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading		turn-round	required operational stock	required stock in total
						min	max	max	min	min	max	d	max	max
Optimistic variant														
coal	87	279	279	7	open	51	63	38	31	**tanks**				
oil	371	1,189	1,189	1	tank	52	57	23	21	**21**	**23**	8	**167**	**209**
building material	441	1,413	565	1	flat	43	50	13	11	**flats**				
building material			848	1	dumpcar	48	55	18	15	**82**	**100**	9	**737**	**921**
iron ore	110	353	141	15	open	51	63	41	34	**dumpcars**				
iron ore			212	15	mineral	48	55	66	58	**15**	**18**	9	**139**	**173**
cement	39	125	125	1	cement	52	62	2	2	**open**				
grain	222	712	712	1	cereal	31	42	23	17	**75**	**93**	9	**677**	**846**
others	994	3,186	650	1	open	49	61	13	11	**hoppers**				
			1,268	1	flat	20	25	63	51	**58**	**66**	9	**519**	**649**
			761	1	refrigerator	35	40	22	19	**cements**				
			507	1	covered	31	42	16	12	**2**	**2**	9	**18**	**23**
metals	309	990	990	1	flat	43	50	23	20	**grain**				
										17	**23**	9	**152**	**191**
										refrigerators				
										19	**22**	9	**171**	**214**
										covereds				
										12	**16**	9	**109**	**136**
														3,361

1) 1=daily
60= every 2 month

Required wagon stock of GRZD in total in 2000

Annex 3.2.2-15

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
Pessimistic variant						min	max	max	min			d	max	max
coal	62	199	199	7	open	51	63	27	22	**tanks**				
oil	334	1,071	1,071	1	tank	52	57	21	19	**19**	**21**	8	**150**	**188**
building material	309	990	396	1	flat	43	50	9	8	**flats**				
building material			594	1	dumpcar	48	55	12	11	**63**	**77**	9	**567**	**709**
iron ore	103	330	132	15	open	51	63	39	31	**dumpcars**				
iron ore			198	15	mineral	48	55	62	54	**11**	**12**	9	**97**	**122**
cement	26	83	83	1	cement	52	62	2	1	**open**				
grain	204	654	654	1	cereal	31	42	21	16	**64**	**79**	9	**578**	**722**
others	846	2,712	650	1	open	49	61	13	11	**hoppers**				
			1,031	1	flat	20	25	52	41	**54**	**62**	9	**486**	**608**
			618	1	refrigerator	35	40	18	15	**cements**				
			412	1	covered	31	42	13	10	**1**	**2**	9	**12**	**15**
metals	216	692	692	1	flat	43	50	16	14	**grain**				
										16	**21**	9	**140**	**175**
										refrigerators				
										15	**18**	9	**139**	**174**
										covereds				
										10	**13**	9	**88**	**110**
														2,822

1) 1=daily
60= every 2 month

Required wagon stock of GRZD in total in 2010

Annex 3.2.2-16

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
Optimistic variant						min	max	max	min			d	max	max
coal	130	417	417	7	open	51	63	57	46	**tanks**				
oil	483	1,548	1,548	1	tank	52	57	30	27	**27**	**30**	8	**217**	**272**
building material	661	2,119	847	1	flat	43	50	20	17	**flats**				
building material			1,271	1	dumpcar	48	55	26	23	**122**	**148**	9	**1,094**	**1,368**
iron ore	132	423	169	15	open	51	63	50	40	**dumpcars**				
iron ore			254	15	mineral	48	55	79	69	**23**	**26**	9	**208**	**260**
cement	58	186	186	1	cement	52	62	4	3	**open**				
grain	266	853	853	1	cereal	31	42	28	20	**97**	**120**	9	**875**	**1,094**
others	1,341	4,298	650	1	open	49	61	13	11	**hoppers**				
			1,824	1	flat	20	25	91	73	**69**	**79**	9	**623**	**779**
			1,094	1	refrigerator	35	40	31	27	**cements**				
			730	1	covered	31	42	24	17	**3**	**4**	9	**27**	**34**
metals	494	1,583	1,583	1	flat	43	50	37	32	**grain**				
		1)	1=daily							**20**	**28**	9	**183**	**228**
			60= every 2 month							**refrigerators**				
										27	**31**	9	**246**	**308**
										covereds				
										17	**24**	9	**156**	**195**
														4,538

Required wagon stock of GRZD in total in 2010

Annex 3.2.2-16

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Pessimistic variant														
coal	74	237	237	7	open	51	63	33	26	**tanks**				
oil	434	1,391	1,391	1	tank	52	57	27	24	**24**	**27**	8	**195**	**244**
building material	463	1,484	594	1	flat	43	50	14	12	**flats**				
building material			890	1	dumpcar	48	55	19	16	**83**	**101**	9	**750**	**937**
iron ore	123	394	158	15	open	51	63	46	38	**dumpcars**				
iron ore			237	15	mineral	48	55	74	65	**16**	**19**	9	**146**	**182**
cement	38	122	122	1	cement	52	62	2	2	**open**				
grain	255	817	817	1	cereal	31	42	26	19	**75**	**92**	9	**671**	**839**
others	1,015	3,253	650	1	open	49	61	13	11	**hoppers**				
			1,302	1	flat	20	25	65	52	**65**	**74**	9	**581**	**726**
			781	1	refrigerator	35	40	22	20	**cements**				
			521	1	covered	31	42	17	12	**2**	**2**	9	**18**	**22**
metals	302	968	968	1	flat	43	50	23	19	**grain**				
										19	**26**	9	**175**	**219**
										refrigerators				
										20	**22**	9	**176**	**220**
										covereds				
										12	**17**	9	**112**	**139**
														3,528

1) 1=daily
60= every 2 month

Required wagon stock of GRZD in total in 2015

Annex 3.2.2-17

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading		turn-round	required operational stock	required stock in total
						min	max	max	min	min	max	d	max	max
Optimistic variant														
coal	149	478	478	7	open	51	63	66	53	**tanks**				
oil	555	1,779	1,779	1	tank	52	57	34	31	**31**	**34**	8	**250**	**312**
building material	760	2,436	974	1	flat	43	50	23	19	**flats**				
building material			1,462	1	dumpcar	48	55	30	27	**142**	**172**	9	**1,276**	**1,595**
iron ore	151	484	194	15	open	51	63	57	46	**dumpcars**				
iron ore			290	15	mineral	48	55	91	79	**27**	**30**	9	**239**	**299**
cement	66	212	212	1	cement	52	62	4	3	**open**				
grain	306	981	981	1	cereal	31	42	32	23	**110**	**136**	9	**988**	**1,235**
others	1,542	4,942	650	1	open	49	61	13	11	**hoppers**				
			2,146	1	flat	20	25	107	86	**79**	**91**	9	**713**	**891**
			1,288	1	refrigerator	35	40	37	32	**cements**				
			858	1	covered	31	42	28	20	**3**	**4**	9	**31**	**38**
metals	568	1,821	1,821	1	flat	43	50	42	36	**grain**				
										23	**32**	9	**210**	**263**
										refrigerators				
										32	**37**	9	**290**	**362**
										covereds				
										20	**28**	9	**184**	**230**
														5,225

1) 1=daily
60= every 2 month

Required wagon stock of GRZD in total in 2015

Annex 3.2.2-17

goods			splitting of load and load per wagon							wagons stock				
kind of goods	total load per year in k tons	total volume per day in tons	splitting of load in tons	Factor 1)	type of wagon	use of wagon capacity in tons		wagons demand for goods traffic		wagons stock required for loading min	max	turn-round	required operational stock	required stock in total
						min	max	max	min			d	max	max
Pessimistic variant														
coal	86	276	276	7	open	51	63	38	31	**tanks**				
oil	499	1,599	1,599	1	tank	52	57	31	28	**28**	**31**	8	**224**	**281**
building material	533	1,708	683	1	flat	43	50	16	14	**flats**				
building material			1,025	1	dumpcar	48	55	21	19	**98**	**119**	9	**880**	**1,100**
iron ore	142	455	182	15	open	51	63	54	43	**dumpcars**				
iron ore			273	15	mineral	48	55	85	74	**19**	**21**	9	**168**	**210**
cement	43	138	138	1	cement	52	62	3	2	**open**				
grain	293	939	939	1	cereal	31	42	30	22	**85**	**105**	9	**762**	**952**
others	1,168	3,744	650	1	open	49	61	13	11	**hoppers**				
			1,547	1	flat	20	25	77	62	**74**	**85**	9	**670**	**838**
			928	1	refrigerator	35	40	27	23	**cements**				
			619	1	covered	31	42	20	15	**2**	**3**	9	**20**	**25**
metals	347	1,112	1,112	1	flat	43	50	26	22	**grain**				
		1)	1=daily							**22**	**30**	9	**201**	**252**
			60= every 2 month							**refrigerators**				
										23	**27**	9	**209**	**261**
										covereds				
										15	**20**	9	**133**	**166**
														4,084

Annex 3.2.2-19

List of required equipment for wagon repair in GRZD depots

specification	remarks	units	price per unit (USD)	demand	total price (USD)
electric hoist block	2 tons				
	VTshD Khashuri			2	2,000
	VTshD Tbilisi			2	2,000
	VTshD Batumi			2	2,000
electric hoist block	5 tons				
	VTshD Samtredia	1		1	1,000
	VTshD Khashuri			1	1,000
	VTshD Tbilisi			1	1,000
	VTshD Batumi			1	1,000
electric hoist block	10 tons				
	VTshD Samtredia	1		1	1,000
	VTshD Khashuri			1	1,000
	VTshD Tbilisi			1	1,000
	VTshD Batumi			1	1,000
electrical lifting jacks					
	VTshD Samtredia	1 compl	30,000	2 compl.	60,000
	VTshD Khashuri			2 compl.	60,000
	VTshD Tbilisi			2 compl.	60,000
	VTshD Batumi			2 compl.	60,000
hydraulic lifting jack	20 - 25 tons				
	VTshD Samtredia	1	100	8	800
	VTshD Khashuri			8	800
	VTshD Tbilisi			8	800
	VTshD Batumi			8	800

GRZD - Freight wagon stock available and future demand

2000

type	inventory stock	stock in operation in %	stock in operation in wagons	demand in 1998 -opt-	need to repair	to rent or to procure	demand in 1998 -pess-	need to repair	to rent or to procure
covered	4,982	12	598	136	*-462*	*-4,846*	110	*-488*	*-4,872*
platforms	6,076	14	851	921	**70**	*-5,155*	709	*-142*	*-5,367*
open w.	2,243	28	622	846	**224**	*-1,397*	722	**131**	*-1,521*
tank w.	2,303	46	1,059	209	*-850*	-2,094	188	*-871*	*-2,115*
refriges	549	26	144	214	**70**	*-335*	174	**38**	*-375*
cement	961	13	125	23	*-102*	*-938*	15	*-110*	*-946*
grain w.	1,693	54	914	191	*-723*	*-1,502*	175	*-739*	*-1,518*
others	1,848	33	618	822	**204**	*-1,026*	730	**126**	*-1,118*
total wagon stock to maintain				3,362			2,823		

Need to short the backlog of maintenance in order to cover the traffic requirements by main overhauls:

in optimistic case:

70 platforms
224 open
70 refriges
204 others

in pessimistic case:

131 open
38 refriges
126 others

GRZD - Freight wagon stock available and future demand

2010

type	inventory stock	stock in operation in %	stock in operation in wagons	demand in 1998 -opt-	need to repair	to rent or to procure	demand in 1998 -pess-	need to repair	to rent or to procure
covered	4,982	12	598	195	*-403*	*-4,787*	139	*-459*	*-4,843*
platforms	6,076	14	921	1,368	**447**	*-4,708*	937	**228**	*-5,139*
open w.	2,243	38	846	1,094	**248**	*-1,149*	839	**117**	*-1,404*
tank w.	2,303	46	1,059	272	*-787*	*-2,031*	244	*-815*	*-2,059*
refriges	549	39	214	308	**94**	*-241*	220	**46**	*-329*
cement	961	13	125	34	*-91*	*-927*	22	*-103*	*-939*
grain w.	1,693	54	914	228	*-686*	*-1,465*	219	*-695*	*-1,474*
others	1,848	44	822	1,039	**217**	*-809*	908	**178**	*-940*
total wagon stock to maintain				4,538			3,528		

Need to short the backlog of maintenance in order to cover the traffic requirements by main overhauls:

in optimistic case:

447 platforms
248 open
94 refriges
217 others

in pessimistic case:

228 platforms
117 open
46 refriges
178 others

GRZD - Freight wagon stock available and future demand

2015

type	inventory stock	stock in operation in %	stock in operation in wagons	demand in 1998 -opt-	need to repair	to rent or to procure	demand in 1998 -pess-	need to repair	to rent or to procure
covered	4,982	12	598	230	*-368*	*-4,752*	166	*-432*	*-4,816*
platforms	6,076	23	1,368	1,595	**227**	*-4,481*	1,100	**163**	*-4,976*
open w.	2,243	49	1,094	1,235	**141**	*-1,008*	952	**113**	*-1,291*
tank w.	2,303	23	1,059	312	*-787*	-1,991	281	*-778*	*-2,022*
refriges	549	56	308	362	**54**	*-187*	261	**41**	*-288*
cement	961	23	125	38	*-56*	*-923*	25	*-57*	*-936*
grain w.	1,693	23	914	263	*-733*	*-1,430*	252	*-738*	*-1,441*
others	1,848	56	1,039	1,190	**151**	*-658*	1048	**140**	*-800*
total wagon stock to maintain				5,225			4,085		

Need to short the backlog of maintenance in order to cover the traffic requirements by main overhauls:

in optimistic case:

227 platforms
141 open
54 refriges
151 others

in pessimistic case:

163 platforms
113 open
41 refriges
140 others

Annex 3.2.2-19

List of required equipment for wagon repair in GRZD depots

specification	remarks	units	price per unit (USD)	demand	total price (USD)
bridge cranes, width of crane track -22,5 m	10 tons				
	VTshD Samtredia	1	30,000	1	30,000
	VTshD Khashuri			1	30,000
bridge cranes, width of crane track -19,5 m	10 tons				
	VTshD Batumi	1	30,000	1	30,000
gantry crane width 12,5 m	5 - 10 tons				
	VTshD Tbilisi	1	10,000	2	20,000
wheel lathe					
	VTshD Samtredia	1	1.2 million	1	1.2 million
planing machine	quadrilateral				
	VTshD Samtredia	1	65,000	1	65,000
	VTshD Khashuri			1	65,000
	VTshD Tbilisi			1	65,000
air presser 8 atm	10 m^3/min				
	VTshD Samtredia	1	65,000	1	65,000
	VTshD Khashuri			1	65,000
	VTshD Tbilisi			1	65,000
electric hoist block	2 tons				
	VTshD Samtredia	1	1,000	2	2,000

Annex 3.2.2-19

List of required equipment for wagon repair in GRZD depots

specification	remarks	units	price per unit (USD)	demand	total price (USD)
electric hoist block	2 tons				
	VTshD Khashuri			2	2,000
	VTshD Tbilisi			2	2,000
	VTshD Batumi			2	2,000
electric hoist block	5 tons				
	VTshD Samtredia	1		1	1,000
	VTshD Khashuri			1	1,000
	VTshD Tbilisi			1	1,000
	VTshD Batumi			1	1,000
electric hoist block	10 tons				
	VTshD Samtredia	1		1	1,000
	VTshD Khashuri			1	1,000
	VTshD Tbilisi			1	1,000
	VTshD Batumi			1	1,000
electrical lifting jacks					
	VTshD Samtredia	1 compl	30,000	2 compl.	60,000
	VTshD Khashuri			2 compl.	60,000
	VTshD Tbilisi			2 compl.	60,000
	VTshD Batumi			2 compl.	60,000
hydraulic lifting jack	20 - 25 tons				
	VTshD Samtredia	1	100	8	800
	VTshD Khashuri			8	800
	VTshD Tbilisi			8	800
	VTshD Batumi			8	800

Annex 3.2.2-19

List of required equipment for wagon repair in GRZD depots

specification	remarks	units	price per unit (USD)	demand	total price (USD)
shop for repairing axle roller-bearings					
	VTshD Samtredia	1	200,000	1	200,000
	VTshD Khashuri			1	200,000
centrifugal pump 10 - 20 m³/h	for washing machines	1	1,200	10	12,000
mechanic lifting jack	15 tons				
	VTshD Khashuri	1	7,500	4	30,000

Annex 3.2.2-20

List of urgently required spare parts for GRZD wagon repair

specification	unit	price, in USD	demand 1997	total amount 1997, in USD	demand per year	costs per year
wooden material	m²	150	3,000	450,000	1,200	180,000
wheelsets	pieces	3,200	500	1,600,000	500	1,600,000
bogies type ZNII-H3	ditto	2,285	200	457,000	100	228,500
composed brake shoe inserts	ditto	5	18,000	90,000	60,000	300,000
lubricating grease for axle boxes	tons	311	25	7,775	20	6,220
lubricating grease for brakes	tons	309	1	309	1	309
lubricating grease for slide bearing	tons	295	60	17,700	120	35,400
corner bracings 50x50	tons	556	5	2,780	5	2,780
corner bracings 63x45	tons	556	10	5,560	10	5,560
auxiliary reservoir	pieces	30	50	1,500	50	1,500
distributor valve 483, bracket	ditto	150	800	120,000	100	15,000
distributor valve 483	ditto	150	200	30,000	100	15,000
air brake hose	ditto	28	1,000	28,000	300	8,400
pins M12x50	tons	1,000	5	5,000	3	3,000
pins M12x70	tons	1,000	10	10,000	5	5,000
pins M12x100	tons	1,000	10	10,000	5	5,000
doors for covered wagons	pieces	274	500	137,000	50	13,700
doors for open	ditto	260	120	31,200	15	3,900

Annex 3.2.2-20

List of urgently required spare parts for GRZD wagon repair

specification	unit	price, in USD	demand 1997	total amount 1997, in USD	demand per year	costs per year
wagons						
auto coupler with draft gear	pieces	205	20	4,100	50	10,250
brake slack adjuster	ditto	80	50	4,000	50	4,000
automatic brake position device	ditto	85	50	4,250	50	4,250
welding electrode	tons	1,270	5	6,350	5	6,350
miner's lamp	pieces	40	300	12,000	30	1,200
diesel fuel	tons	187	200	37,400	1,110	207,570
diesel lubrication	tons	792	50	39,600	200	158,400
freon (cooling liquid)	tons	8,730	10	87,300	5	43,650
special for 8-axle tank wagons						
automatic coupler	pieces	215	100	215,000		
auxiliary reservoir	ditto	35	50	1,750		

Finance needs for GRZD rolling stock required for the main corridor traffic

Optimistic variant

No	costs in US$ mln	rn	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
1	main overhaul of out-of-order locomotives	a	2.100	2.100	0.700					4.500					0.900						10.300
2	regular loco maintenance	c			2.600	2.600	2.600	2.600	2.600	3.425	3.425	3.425	3.425	3.425	4.325	4.325	4.325	4.325	4.325	4.475	56.225
3	scrapping of locos	d	0.0040	0.0040	0.0035	0.0035	0.0033	0.00300													0.02125
4	procurement of locomotives	c													40						40.000
5	procurement of equipment for Tbilisi Electro Locomotive Construction Factory	a	2.650	5	5																12.650
6	equip the Khashuri loco depot	a	0.160																		0.160
7	procurement of main equipment for different locomotive depots	a	0.381	0.381																	0.762
8	procurement of required material, spare parts and elements for locomotive repair	a	1	1																	2.000
9	equip and re-construct the TEWRS	b			2	2	2	2	2	2	2				6						20.000
10	equip the Khashuri wagon depot	b	0.060																		0.060
11	upgrading 5 wagon depots	c	0.500	0.500	0.500	0.500	0.280														2.280
12	procurement of spare parts for wagon repair	b	3.420																		3.420
13	backlog of wagon maintenance	b	0.127	0.127	0.284	0.284									0.503	0.503				0.573	2.401
14	regular wagon maintenance	b	1.205	1.205	1.681	1.681	1.681	1.681	1.681	1.681	1.681	1.681	1.681	1.681	2.269	2.269	2.269	2.269	2.269	2.613	33.178
15	Training course	c	0.060																		0.060
16	**Total costs**		11.667	10.317	12.769	7.069	6.564	6.284	6.281	11.606	7.106	5.106	5.106	5.106	53.997	7.097	6.594	6.594	6.594	7.661	183.517

Finance needs for GRZD rolling stock required for the main corridor traffic

Pessimistic variant

No	costs in US$ mln	rn	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
1	main overhaul of out-of-order locomotives	a								0.700					3.900					1.500	6.100
2	regular loco maintenance	c			1.306	1.306	1.306	1.306	1.306	1.152	1.152	1.152	1.152	1.152	1.169	1.169	1.169	1.169	1.169	1.169	19.304
3	scrapping of locos	d	0.0040	0.0040	0.0035	0.0035	0.0033	0.0030		0.0013	0.0013	0.0013	0.0013	0.0013	0.00250						0.030
4	procurement of equipment for Tbilisi Electro Locomotive Construction Factory	a	2.650	5	5																12.650
5	equip the loco depot Khashuri	b	0.160																		0.160
6	procurement of main elements for locomotive repair	b	0.381	0.381																	0.762
7	procurement of spare parts for locomotive repair	b	1	1																	2.000
8	equip and re-construct the TEWRS	c			2	2	2	2	2	2	2				6						20.000
9	equip the Khashuri wagon depot	b	0.060																		0.060
10	upgrading 5 wagon depots	c	0.500	0.500	0.500	0.500	0.280														2.280
11	procurement of spare parts for wagon repair	b	3.420																		3.420
12	backlog of wagon maintenance	b	0.114	0.114	0.118	0.118									0.285	0.285				0.457	1.491
13	regular wagon maintenance	b	1.148	1.148	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.764	1.764	1.764	1.764	1.764	2.043	27.279
14	Training course	c	0.060																		0.060
15	**Total costs**		9.497	8.147	10.340	5.340	5.001	4.721	4.718	5.265	4.565	2.565	2.565	2.565	13.121	3.218	2.933	2.933	2.933	5.169	95.596

rn - Ranking notes:
- a utmost urgent
- b very urgent
- c urgent
- d needed

Annex 3.2.2-22

Demand of electric locomotives for the corridor and the respective yearly maintenance

type of scenario / year	locomotives	TO-3	TR-1	TR-2	TR-3	KR-1	KR-2
2000							
optimistic: AGZD	134	782	703	44	22	12	4
GRZD	104	607	546	35	17	12	11
total	238	1389	1249	79	39	24	15
pessimistic: AGZD	64	374	335	21	11	6	4
GRZD	76	443	399	25	13	6	6
total	140	817	734	46	24	12	10
2005							
optimistic: AGZD	134	782	703	44	22	4	4
GRZD	137	799	719	46	23	26	26
total	271	1591	1422	90	45	30	30
pessimistic: AGZD	50	292	262	16	8	4	4
GRZD	76	443	399	25	13	9	8
total	126	735	661	41	21	13	12
2010							
optimistic: AGZD	96	560	503	32	16	4	4
GRZD	177	1032	930	59	29	17	17
total	173	1592	1433	91	45	21	21
pessimistic: AGZD	60	301	269	17	9	5	5
GRZD	81	473	425	27	17	26	17
total	141	774	694	44	16	31	22
2015							
optimistic: AGZD	96	406	362	23	11	6	6
GRZD	183	1067	961	61	30	14	14
total	279	1473	1323	84	41	20	20
pessimistic: AGZD	60	301	269	17	9	5	5
GRZD	110	642	578	37	18	14	14
total	170	943	847	54	27	19	19

Annex 3.2.2-23

Maintenance places for main overhauls of the electric locomotive fleet

		optimistic case		pessimistic case	
year	**2000**	**KR-1**	**KR-2**	**KR-1**	**KR-2**
	numbers	**24**	**15**	**10**	**12**
	h per unit	**200**	**240**	**200**	**240**
	total h	**4,800**	**3,600**	**2,000**	**2,880**
Places Total		**2**	**2**	**1**	**1**
Total in groups			**4**		**2**
year	**2005**	**KR-1**	**KR-2**	**KR-1**	**KR-2**
	numbers	**30**	**30**	**13**	**12**
	h per unit	**200**	**240**	**200**	**240**
	total h	**6,000**	**7,200**	**2,600**	**2,880**
Places Total		**3**	**3**	**1**	**1**
Total in groups			**6**		**3**
year	**2010**	**KR-1**	**KR-2**	**KR-1**	**KR-2**
	numbers	**21**	**21**	**31**	**22**
	h per unit	**200**	**240**	**200**	**240**
	total h	**4,200**	**5,040**	**6,200**	**5,280**
Places Total		**2**	**2**	**3**	**3**
Total in groups			**4**		**6**
year	**2015**	**KR-1**	**KR-2**	**KR-1**	**KR-2**
	numbers	**20**	**20**	**19**	**19**
	h per unit	**200**	**240**	**200**	**240**
	total h	**4,000**	**4,800**	**3,800**	**4,560**
Places Total		**2**	**2**	**2**	**2**
Total in groups			**4**		**4**

Annex 3.2.2-24

Establishment of a wheelset repair shop in the Tbilisi Electro-Locomotive-Factory (Production workshop) TECF

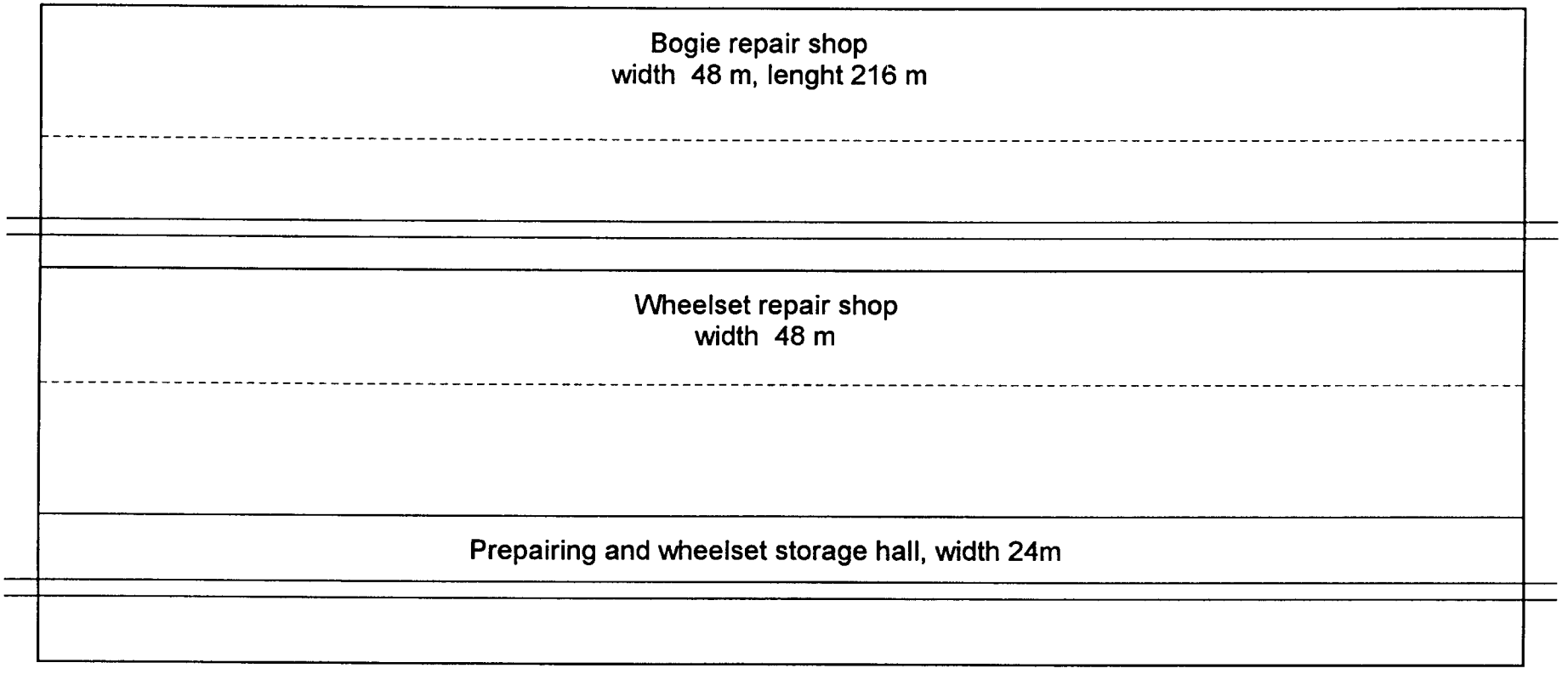
Equipment needed for loco repair inside the loco production workshop with costs

Nr.	type	number	price (USD)
1	gear wheel burnishing lathe	1	200,000.00
2	wheel centre press	1	160,000.00
3	axle roller press machine	1	100,000.00
4	axle planing machine	1	150,000.00
5	wheelset counterbalancing machine	1	250,000.00
6	wheelset borer	1	200,000.00
7	wheelset adzing lathe	1	100,000.00
8	washing cabin for electro-locomotives	1	1,000,000.00
9	planning and preparation work	1	500,000.00
	Total costs		2,650,000.00

Annex 3.2.2-25

TECF - Bogie and wheelset repair hall
(within the corpus No. 3)

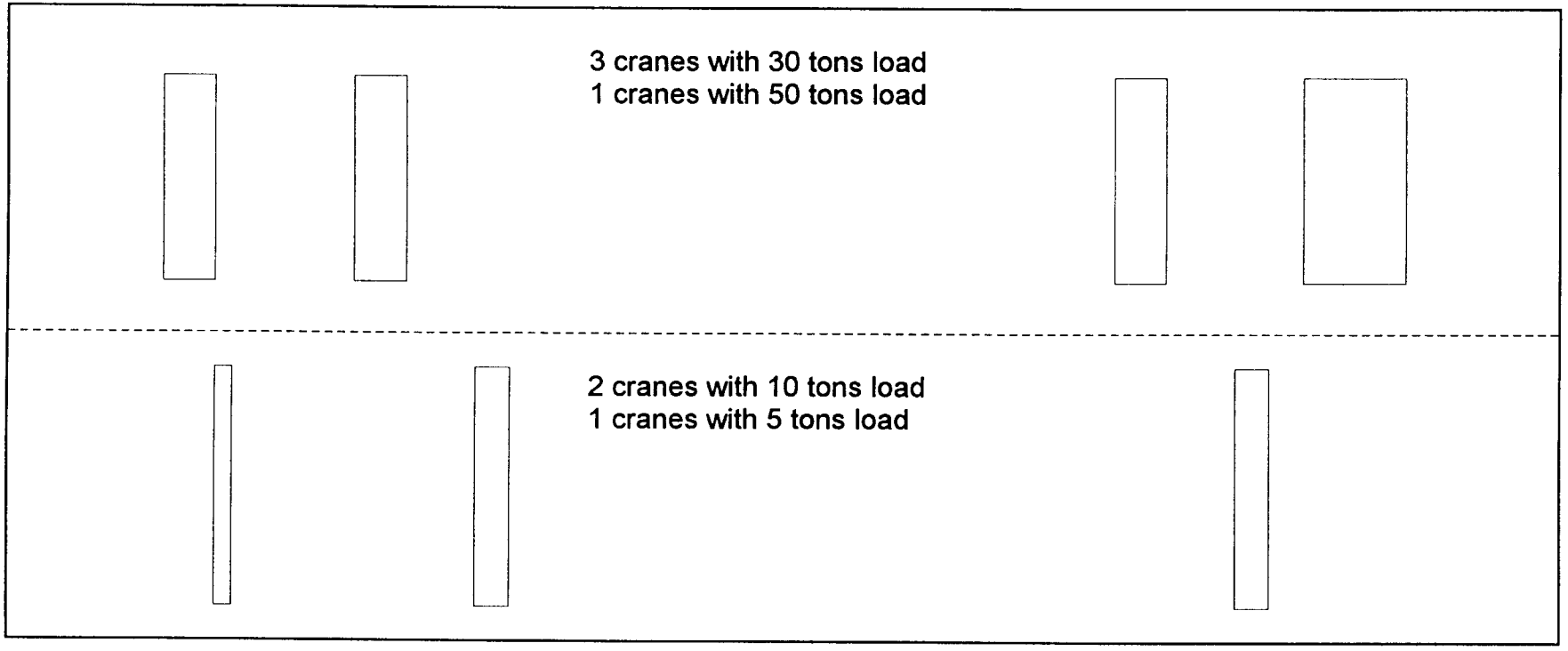
General view



Annex 3.2.2-25

TECF - Bogie and wheelset repair hall
(within the corpus No. 3)

Wheelset repair shop
width 48 m

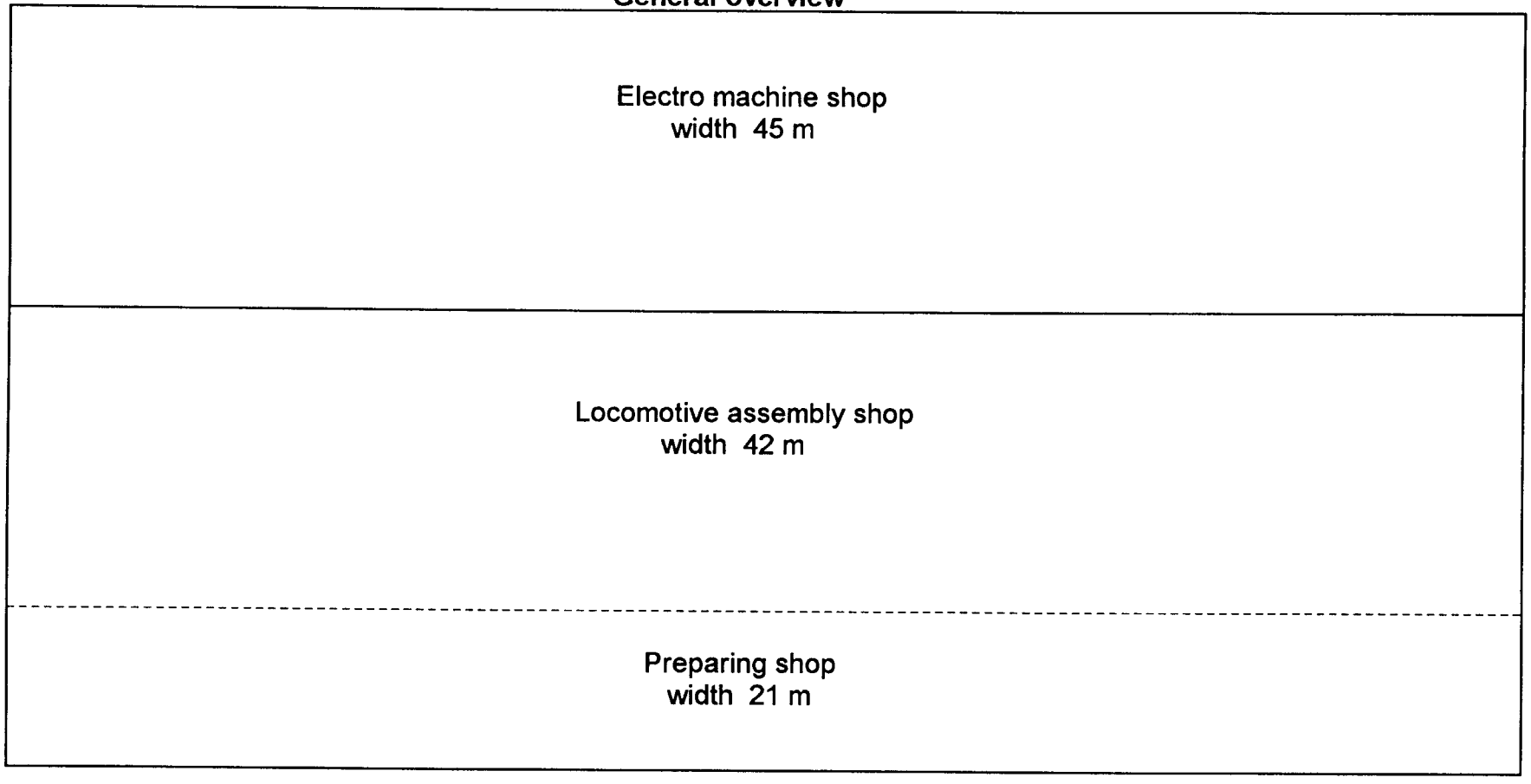


Annex 3.2.2-26

TECF - Locomotive repair hall /main assembly hall (within the corpus No. 1)

lenght 150 m

General overview



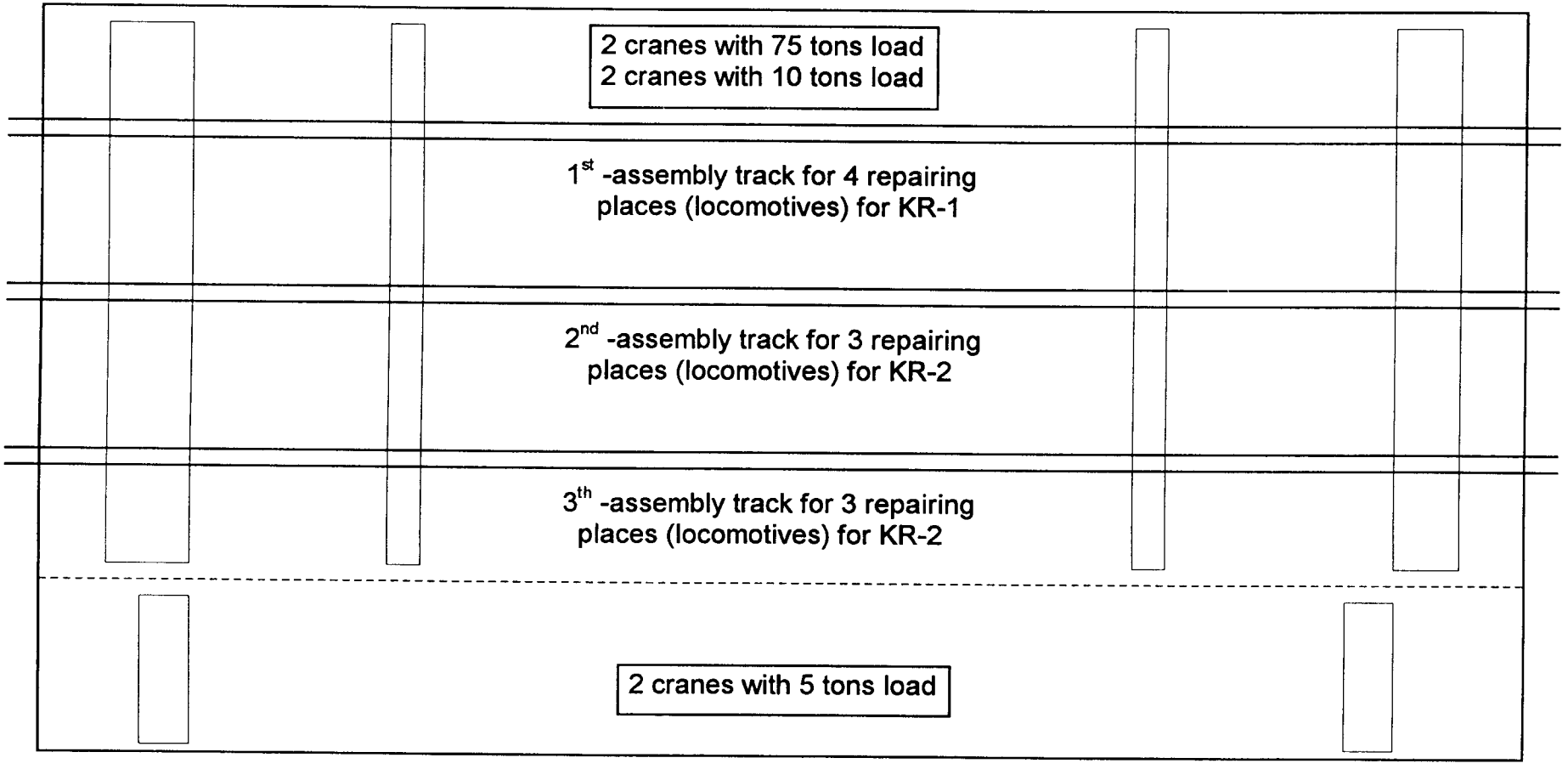
Annex 3.2.2-26

TECF - Locomotive repair hall /main assembly hall (within the corpus No. 1)

lenght 150 m

Locomotive assembly shop

width 42 m



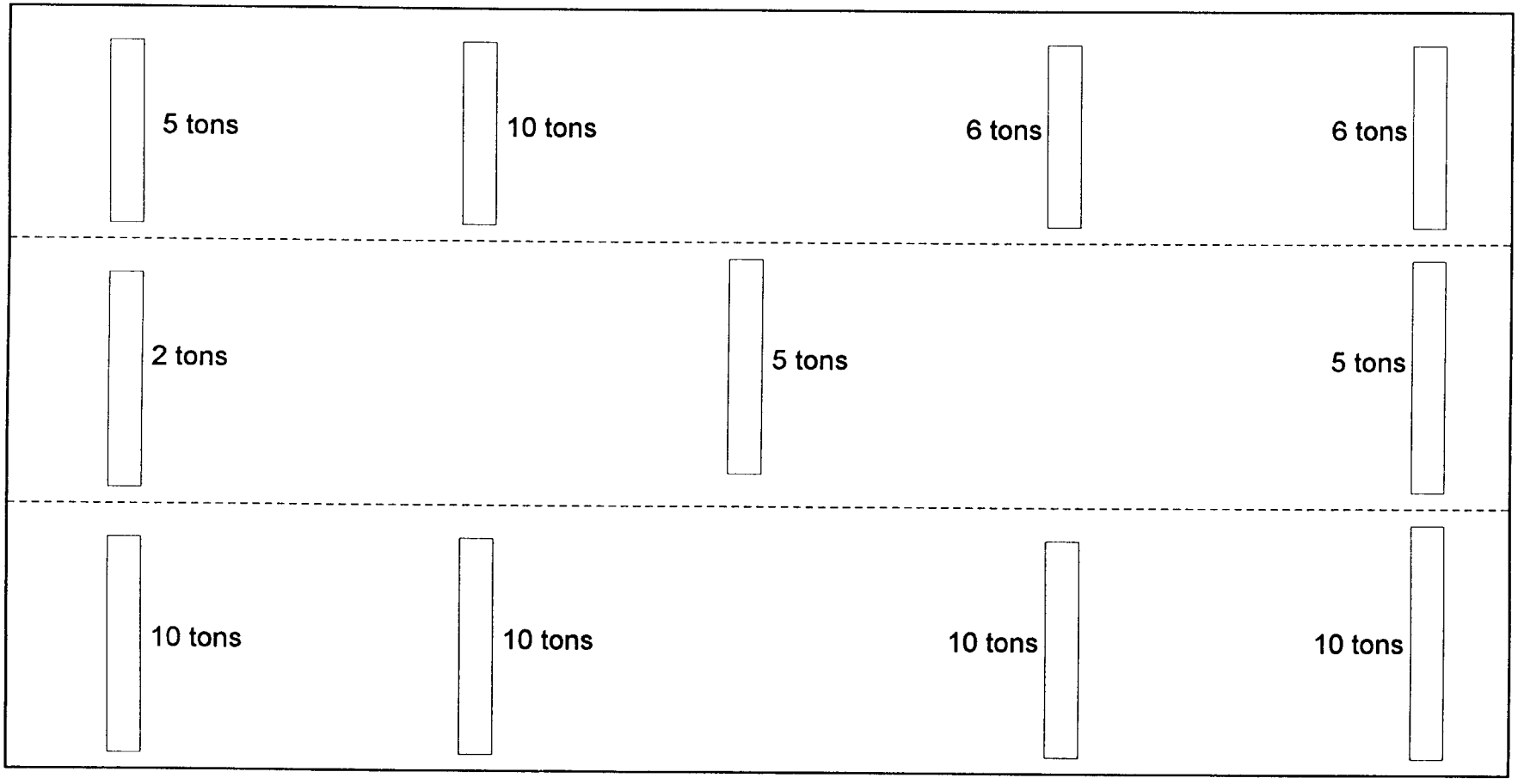
Annex 3.2.2-26

TECF - Locomotive repair hall /main assembly hall (within the corpus No. 1)

lenght 150 m

Electro machine shop

width 45 m



Final Report Module A

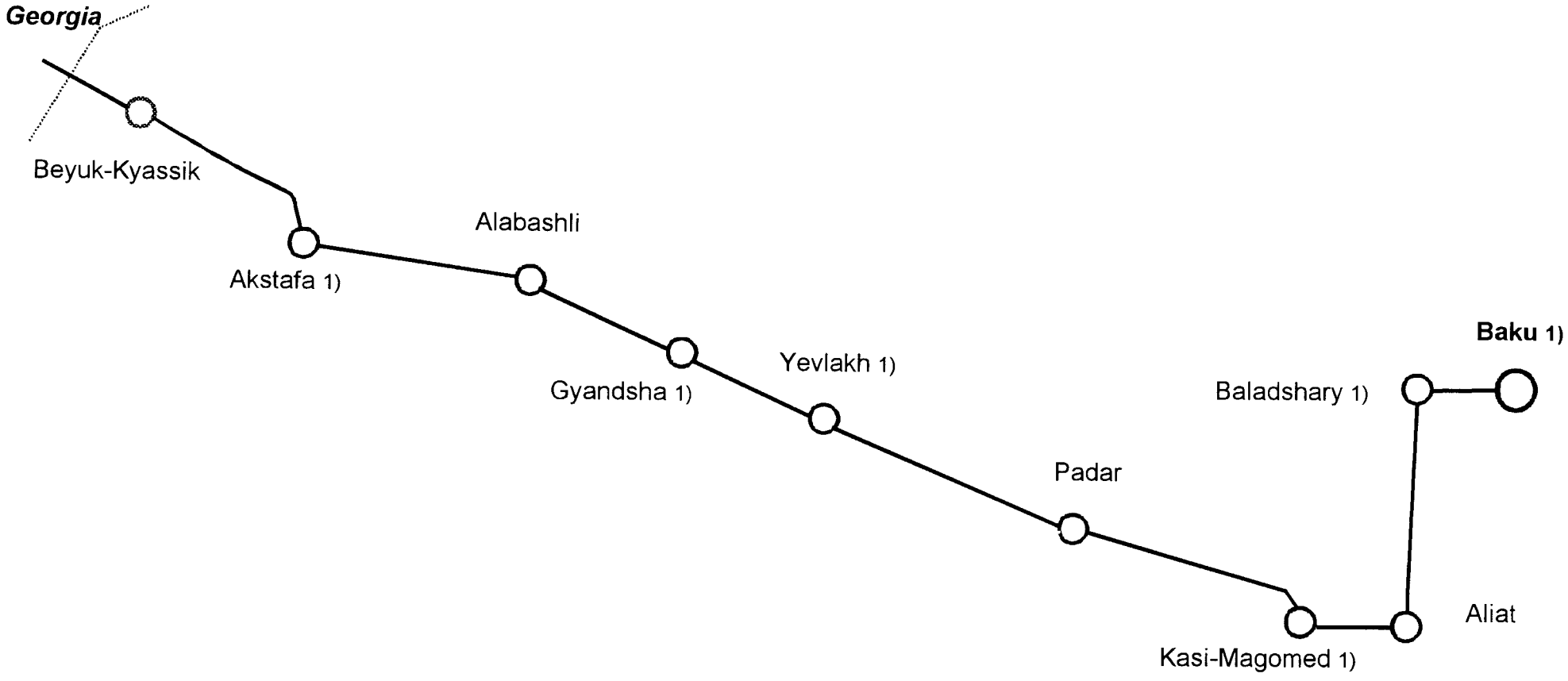
Annexes

Chapter 3 Technical Pre-feasibility

3.3 Signalling and Telecommunication
3.3.1 Azerbaijan

Annex 3.3.1-1

Line section Baku - Beyuk-Kyassik of AGZD



1) Location of maintenance facilities for signalling and telecommunication equipment

Annex 3.3.1-2

Stations of AGZD section Baku - Beyuk-Kyassik

N°	station	km	interlocking system	number of switches	year of installation	condition
1	Baku - storage sidings	2661	BMRZ	51	1987	sufficient
2	Baku - freight station	2659	BMRZ	65	1963	sufficient
3	Kishli - main station	2654	BMRZ	66	1963	sufficient
4	Kishli - station part „A“	2654	BSZ	24	1976	sufficient
5	Baladshary	2646	BMRZ	193	1994	sufficient
6	Baladshary - hump yard	530	BMRZ	36	1993	sufficient
7	Eybat	518	SZ	15	1965	sufficient
8	Puta	510	SZ	12	1965	sufficient
9	Karadag	498	BMRZ	24	1963	sufficient
10	Sangatshali	484	SZ	20	1965	sufficient
11	Duvanni	475	SZ	20	1965	sufficient
12	Aliat - main station	461	BMRZ	65	1975	sufficient
13	Atbulak	447	SZ	14	1975	sufficient
14	Navagi	436	SZ	16	1965	sufficient
15	Pirsagat	427	SZ	15	1965	sufficient

Annex 3.3.1-2

Stations of AGZD section Baku - Beyuk-Kyassik

N°	station	km	interlocking system	number of switches	year of installation	condition
16	Kasi-Magomed	417	MRZ	69	1961	poor
17	Mugan	405	SZ	12	1967	poor
18	Gadshievo	391	SZ	11	1967	poor
19	Padar	379	SZ	24	1978	good
20	Sagiri	366	SZ	12	1967	good
21	Kerar	352	SZ	13	1964	good
22	Kyrdamir	342	MRZ	30	1968	poor (switches operated by hand)
23	Karabudshak	331	SZ	12	1967	good
24	Mysysli	321	SZ	15	1969	good
25	Bargusheti	308	SZ	15	1971	sufficient
26	Udshary	295	MRZ	44	1971	good
27	Alikent	286	SZ	12	1965	good
28	Yjaki	275	SZ	18	1965	good
29	Malai	264	SZ	14	1972	good
30	Yevlakh	250	MRZ	53	1966	poor

Annex 3.3.1-2

Stations of AGZD section Baku - Beyuk-Kyassik

N°	station	km	interlocking system	number of switches	year of installation	condition
31	Mingechaur - main station	238	SZ	19	1966	good
32	Geran	225	SZ	12	1969	poor
33	Kyrektshai	214	SZ	14	1966	poor
34	Dalimamedli	200	SZ	11	1966	good
35	Sasali	193	SZ	19	1966	good
36	Gyandsha	183	BMRZ	108	1987	good
37	Alabashli	170	MRZ	30	1963	switches operated by hand
38	Shamkir	159	MRZ	16	1962	switches operated by hand
39	Dollyar	149	MRZ	21	1962	switches operated by hand
40	Dsegam	136	MRZ	13	1961	switches operated by hand
41	Kovlyar	122	MRZ	17	1961	switches operated by hand
42	Taus	109	SZ	27	1982	good

Annex 3.3.1-2

Stations of AGZD section Baku - Beyuk-Kyassik

N°	station	km	interlocking system	number of switches	year of installation	condition
43	Tatlu	98	SZ	10	1975	good
44	Akstafa	88	MRZ	47	1969	good
45	Poili - main station	74	SZ	24	1966	good
46	Salogli	65	SZ	23	1975	good
47	Soyuk-Bulak	56	SZ	27	1975	good
48	Beyuk-Kyassik	45	MRZ	47	1975	poor

Annex 3.3.1-3

Number of failures on the AGZD signalling installations

year	signals	electric switches	track circuits	automatic level crossings
1995	23	15	413 *1)/78 *2)	- *3)
until April 1996	7	1	18	- *3)

*1) total failures occurred on track circuits

*2) of them failures in responsibility of the signalling department

*3) no data available

Annex 3.3.1-4

Schedule of costs for signalling equipment and installations for AGZD

installations / year	until 2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
signals	4.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	***7.6***
electric switch machines	5.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	***8.6***
track circuits / axle counters	2.5	2.0	1.0	0.5	0.5	0.5	0.4	0.4	0.4	***8.2***
automatic level crossings	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	***13.0***
spare parts, cables	2.0	1.0	0.5	0.5	0.5	0.4	0.4	0.4	0.4	***6.1***
complete signal boxes 1)	0	14.0	4.0	4.0	7.0	11.0	4.5	5.0	7.0	**56.5**
replacement of manual systems	0	7.0	7.0	5.0	5.5	4.0	5.0	0	0	***33.5***
subtotal for technical installations	*15.5*	*26.5*	*15.0*	*12.3*	*15.8*	*18.2*	*12.4*	*7.9*	*9.9*	***133.5***
equipment for the central repair shops	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.1	0.1	***2.8***
renewal of the rolling stock for maintenance and fault clearing	0.5	0.5	0.3	0.3	0.2	0.2	0.1	0.1	0.1	***2.3***
Total	***16.5***	***27.5***	***15.8***	***13.1***	***16.2***	***18.6***	***12.7***	***8.1***	***10.1***	***138.6***

1) replacement of the worn signalling equipment

All figures in million US$

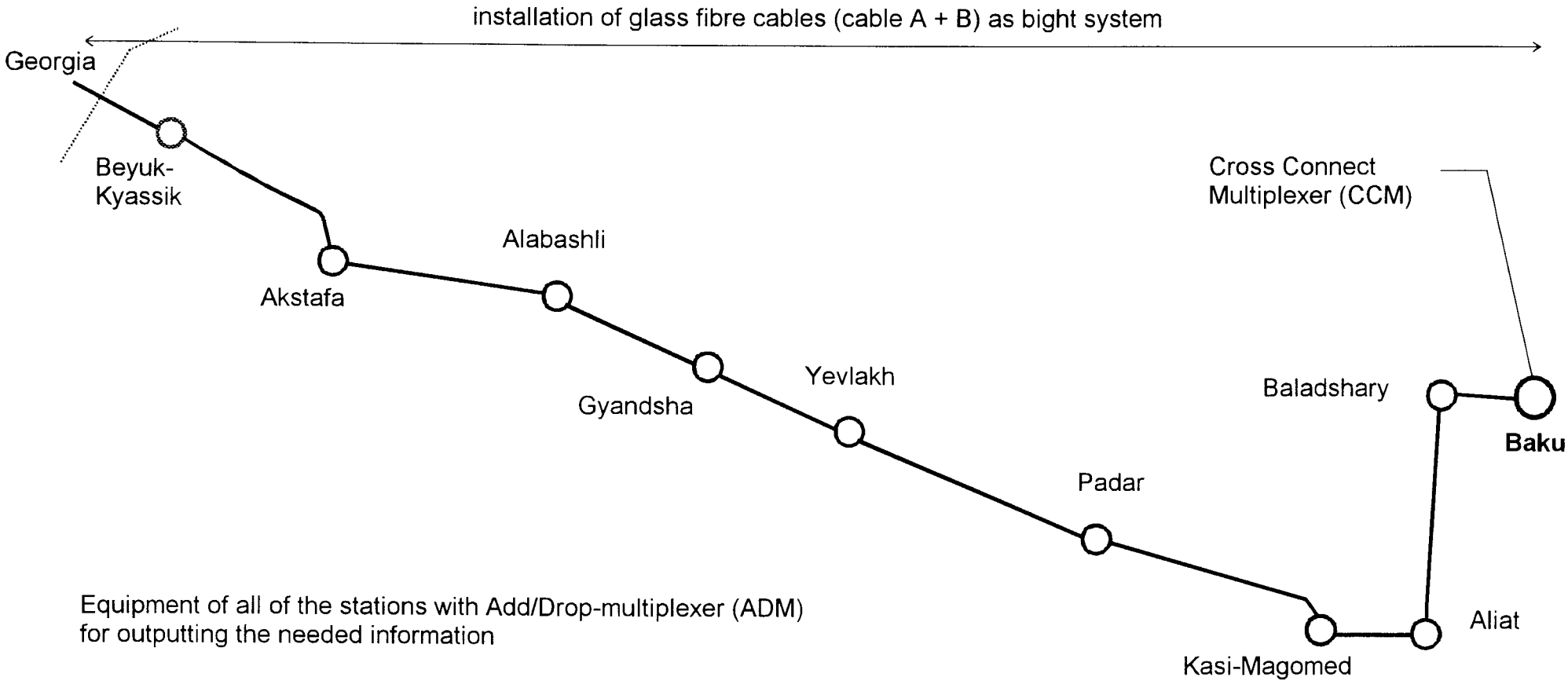
Annex 3.3.1-5

Number of failures on the AGZD telecommunication installations

year	cable installations	dispatching network	teletypes	telephone installations	radio installations
1995	18	74	4	33	16
until April 1996	9	14	2	8	4

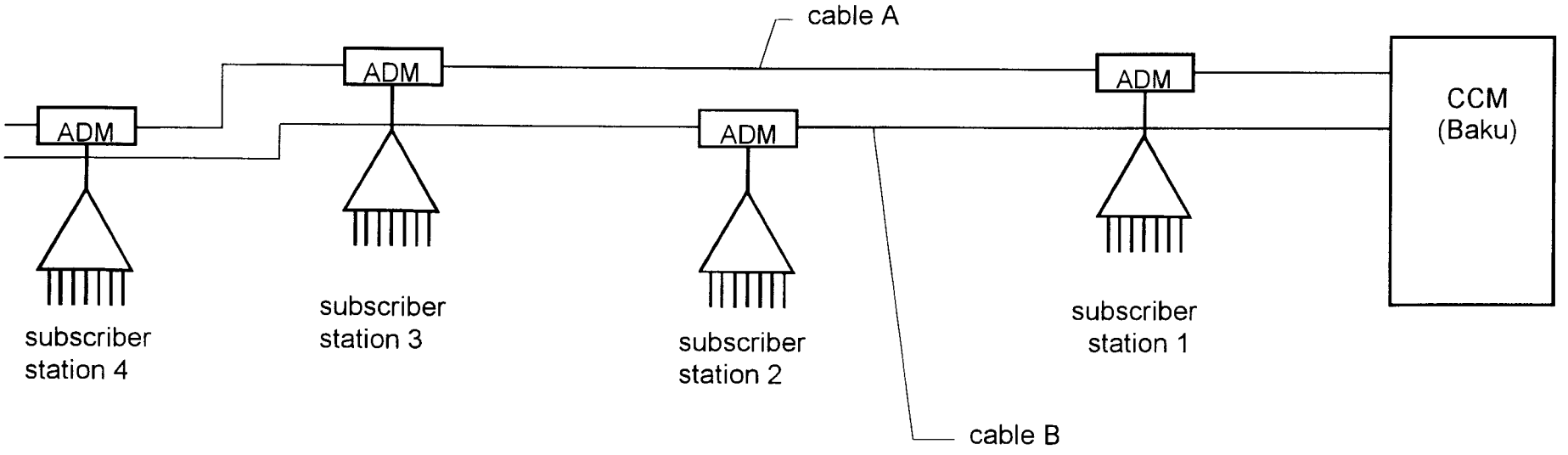
Annex 3.3.1-6

Survey of AGZD lines with telecom installations



Annex 3.3.1-7

Survey of AGZD systems of telecommunication installations



ADM - Add/Drop-Multiplexer
CCM - Cross Connect Multiplexer

Annex 3.3.1-8

Schedule of costs for telecommunication installations for AGZD

installations / year	until 2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
glass fibre cables	5.0	2.0	2.0	2.0	1.5	1.5	1.0	1,0	1.0	***17.0***
communication installations	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0,5	0.5	***5.0***
exchange installations	1.0	0.5	0.5	0.5	0.5	0.4	0.4	0,4	0.3	***4.5***
radio installations	2.5	1.5	1.0	0.8	0.8	0.5	0.5	0,5	0.5	***8.6***
other equipment	1.0	0.4	0.4	0.4	0.4	0.3	0.2	0,2	0.2	***3.5***
subtotal for technical installations	*10.5*	*4.9*	*4.4*	*4.2*	*3.7*	*3.2*	*2.6*	*2.6*	*2.5*	***38.6***
equipment for the central repair shops	1.0	0.4	0.4	0.2	0.1	0.1	0.1	0.1	0.1	***2.5***
renewal of the rolling stock for maintenance and fault clearing	0.5	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	***2.0***
Total	***12.0***	***5.6***	***5.1***	***4.6***	***4.0***	***3.5***	***2.8***	***2.8***	***2.7***	***43.1***

All figures in million US$

Final Report Module A

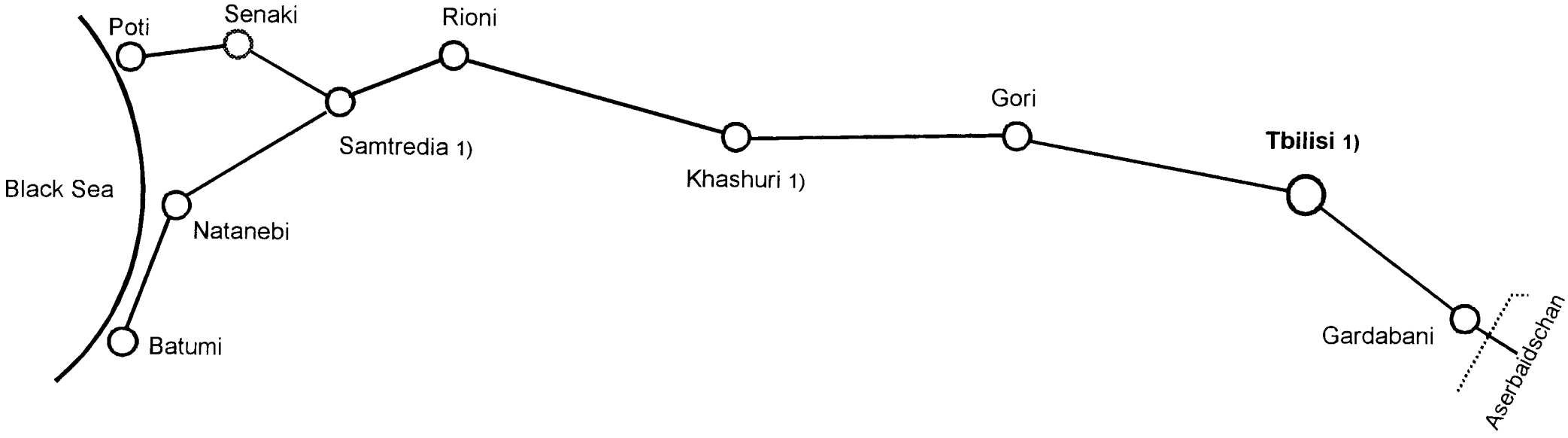
Annexes

Chapter 3 Technical Pre-feasibility

3.3 Signalling and Telecommunication
3.3.2 Georgia

Annex 3.3.2-1

Line section Tbilisi - Poti/Batumi of GRZD



1) Location of maintenance facilities for signalling and telecommunication equipment

Annex 3.3.2-2

Stations of GRZD section Gardabani - Poti/Batumi

N°	station	km	interlocking system	number of switches	year of installation	condition [2]
1	Gardabani	32.9	MRZ-13	36	1973	24 reactors / 8 light signals
2	Rustavi - freight station	24.6	MRZ-13	46	1973	10 reactors / 14 light signals
3	Rustavi - passenger station	21.5	EZ-9	19	1967	2 reactors / 2 light signals
4	Gatshiani	15.1	MRZ-13	33	1976	31 reactors / 12 light signals
5	Veli	9.6	EZ-9	22	1970	6 reactors / 4 light signals
6	Tbilisi - marshalling yard		MRZ-13	76	1990	40 reactors / 6 light signals
7	Tbilisi - marshalling sidings		-	-	1978	- reactors / 6 light signals
8	Tbilisi - uzlovaya	2509.2	MRZ-13	75	1964	12 reactors / 12 light signals
9	Tbilisi - passenger station	2502.9	MRZ-13	78	1976	1 reactors / 3 light signals
10	Tbilisi - freight station	2500.6	TP-47	47	1963	3 reactors / 7 light signals
11	Didube	2499.0	EZ-9	14	1977	4 reactors / 2 light signals
12	Avtshala	2492.5	EZ-9	12	1957	24 reactors / 4 light signals
13	Sages	2489.4	EZ-9	19	1977	4 reactors / 4 light signals
14	Mzkheta	2481.5	EZ-9	15	1976	1 reactors / - light signals
15	Dsegvi	2475.0	EZ-9	23	1978	13 reactors / 6 light signals

Annex 3.3.2-2

Stations of GRZD section Gardabani - Poti/Batumi

N°	station	km	interlocking system	number of switches	year of installation	condition [2]
16	Ksani	2469.9	EZ-9	19	1979	7 reactors / 3 light signals
17	Kavtiskhevi	2459.8	EZ-9	21	1980	7 reactors / 3 light signals
18	Kaspi	2454.3	EZ-9	30	1980	1 reactors / - light signals
19	Metekhi	2447.2	EZ-9	19	1981	24 reactors / 6 light signals
20	Grakali	2441.8	EZ-9	19	1981	16 reactors / 3 light signals
21	Upliszikhe	2434.5	EZ-9	16	1978	35 reactors / 4 light signals
22	Gori	2427.3	MRZ-13	35	1978	23 reactors / 3 light signals
23	Skra	2419.2	EZ-9	14	1974	7 reactors / 2 light signals
24	Kareli	2409.1	EZ-9	18	1980	7 reactors / 2 light signals
25	Agara	2402.7	EZ-9	29	1981	33 reactors / 2 light signals
26	Gomi	2394.0	EZ-9	17	1965	19 reactors / 2 light signals
27	Khashuri	2383.2	TP-47	59	1968	28 reactors / 4 light signals
28	Likhi	2375.0	EZ-2	14	1975	14 reactors / 2 light signals
29	Zipa	2366.7	EZ-9	11	1979	21 reactors / 2 light signals
30	Moliti	2359.6	EZ-2	8	1969	18 reactors / 2 light signals

Annex 3.3.2-2

Stations of GRZD section Gardabani - Poti/Batumi

N°	station	km	interlocking system	number of switches	year of installation	condition [2]
31	Marelisi	2352.6	EZ-2	11	1969	13 reactors / 4 light signals
32	passing point 2347 km	2347.0	EZ-9	-	1969	4 reactors / 1 light signals
33	Kharagauli	2343.1	EZ-9	12	1969	9 reactors / 2 light signals
34	passing point 2338 km	2338.1	EZ-9	-	1970	9 reactors / 2 light signals
35	Dsirula	2333.4	EZ-2	10	1974	13 reactors / 2 light signals
36	passing point 2328 km	2328.5	EZ-9	-	1969	12 reactors / 2 light signals
37	Schoropani	2323.9	EZ-9	12	1969	13 reactors / 3 light signals
38	Zestafoni	2320.1	MRZ-13	52	1990	50 reactors / 7 light signals
39	Argveta	2313.3	EZ-9	29	1980	20 reactors / 6 light signals
40	Sviri	2306.9	EZ-9	16	1978	43 reactors / 2 light signals
41	Adshameti	2297.1	EZ-9	21	1978	53 reactors / 6 light signals
42	Rioni	2289.9	EZ-9	25	1991	29 reactors / 6 light signals
43	Brozeula	2285.7	EZ-9	22	1960	40 reactors / 7 light signals
44	Mukhiani	2280.1	EZ-9	20	1978	34 reactors / 2 light signals
45	Kopitnari	2271.5	EZ-9	19	1978	45 reactors / 6 light signals

Annex 3.3.2-2

Stations of GRZD section Gardabani - Poti/Batumi

N°	station	km	interlocking system	number of switches	year of installation	condition [2]
46	Samtredia II	2262.4	MRZ-13	106	1988	92 reactors / 11 light signals
47	Samtredia I	2259.1	TP-43	58	1975	8 reactors / 2 light signals
48	Kolobani	2251.4	EZ-9	12	1988	4 reactors / 2 light signals
49	Abasha	2245.6	EZ-9	4	1963	9 reactors / 2 light signals
50	Agur- Kakhana	2238.9	EZ-2	6	1963	9 reactors / 3 light signals
51	Senaki	2232.2	EZ-9	15	1964	24 reactors / 10 light signals
52	Kvaloni	10.1	EZ-9	8	1969	16 reactors / 4 light signals
53	Tshaladidi	23.2	EZ-2	4	1968	16 reactors / 3 light signals
54	Poti	38.3	EZ-9	2		4 reactors / 2 light signals
55	Sadshevakho	96.0	EZ-2	12	1966	4 reactors / 3 light signals
56	passing point 2256 km	-	-	-	-	[1]
57	passing point 101 km	-	-	-	1987	[1]
58	Dshapani	88.1	EZ-9	3	1987	8 reactors / 2 light signals

[1] The operating points in km 101 and 2256 are out of operation because of stolen equipment.
[2] Listed are all installations that were dismantled by theft.

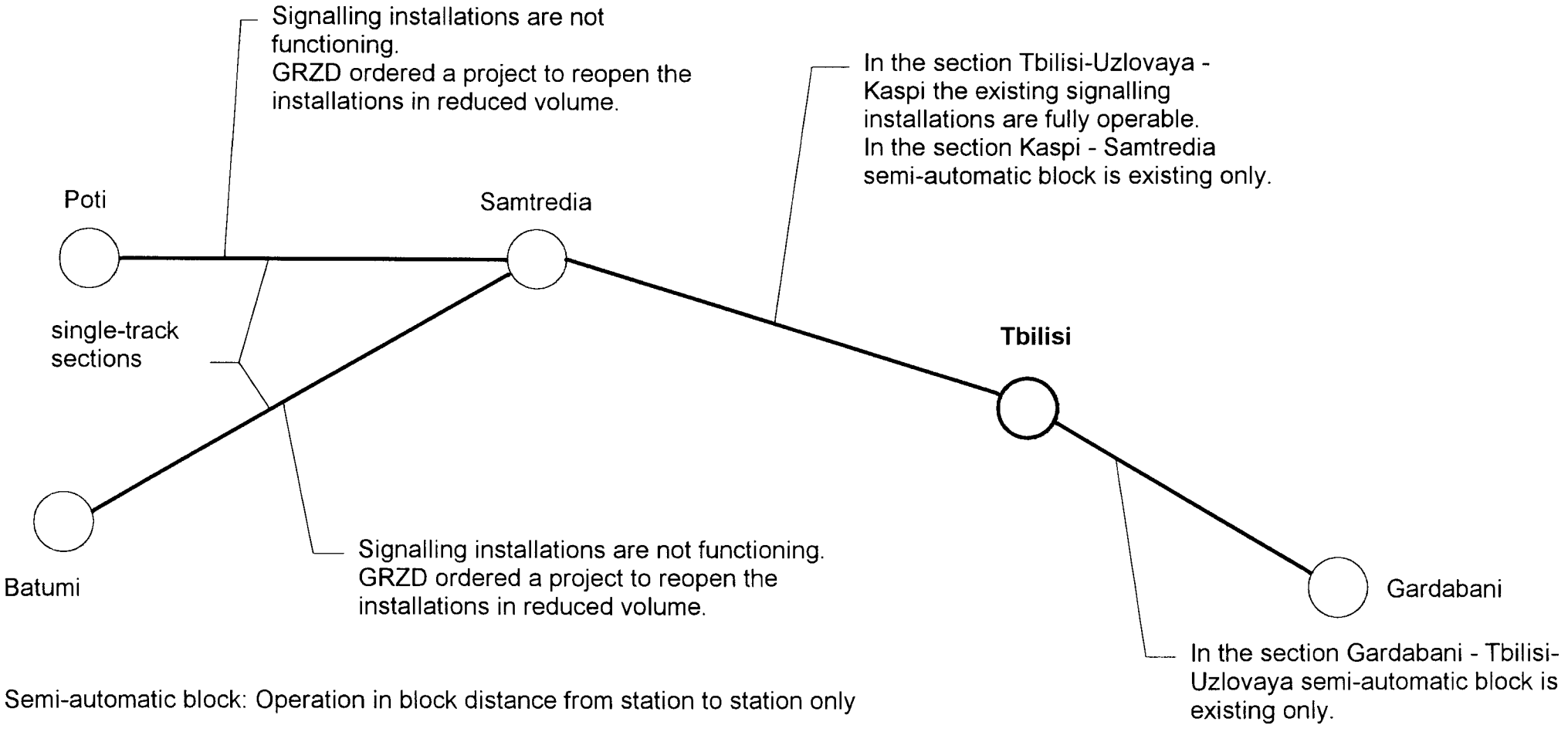
Annex 3.3.2-2

Stations of GRZD section Gardabani - Poti/Batumi

N°	station	km	interlocking system	number of switches	year of installation	condition [2]
59	Nigoiti	81.8	EZ-2	5	1987	4 reactors / 2 light signals
60	Lantshkhuti	75.1	EZ-2	6	1980	5 reactors / 2 light signals
61	Dshumati	63.4	EZ-2	6	1980	5 reactors / 2 light signals
62	Supsa	54.5	EZ-2	5	1966	4 reactors / 3 light signals
63	Ureki	48.0	EZ-9	7	1966	2 reactors / 3 light signals
64	Natanebi	39.5	EZ-2	8	1966	2 reactors / 2 light signals
65	Otshkhamuri	30.3	EZ-2	9	1967	2 reactors / 3 light signals
66	Kobuleti	23.5	EZ-2	11	1965	4 reactors / 2 light signals
67	Tshakva	13.9	EZ-2	11	1965	2 reactors / 2 light signals
68	Makhindshauri	6.9	EZ-9	4	1965	13 reactors / 1 light signals
69	Batumi	1.6	EZ-9	35	1965	6 reactors / 8 light signals

Annex 3.3.2-3

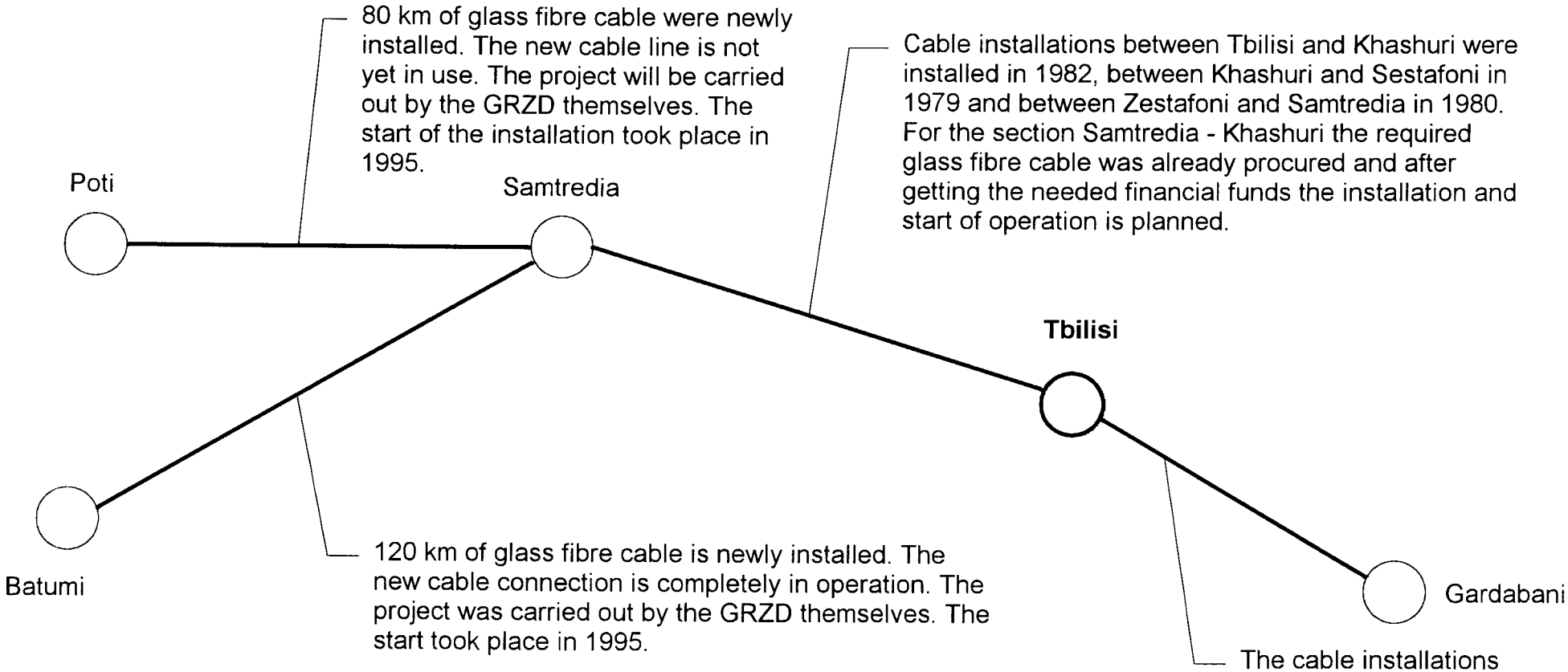
Survey of GRZD lines with signalling installations



Semi-automatic block: Operation in block distance from station to station only

Annex 3.3.2-4

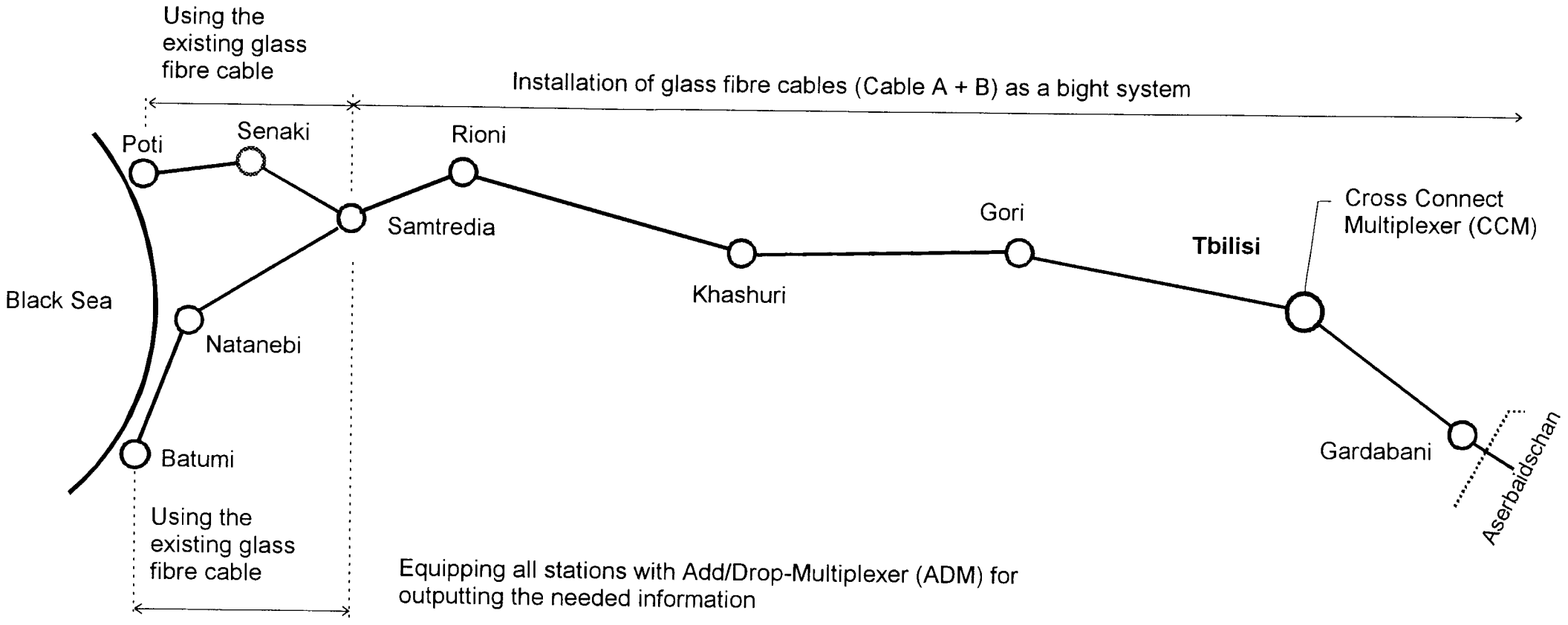
Survey of GRZD lines with telecommunication installations



Installed cable type for telecommunication installations: MKPAB-7*4*1,2+5*0,9+1*0,7

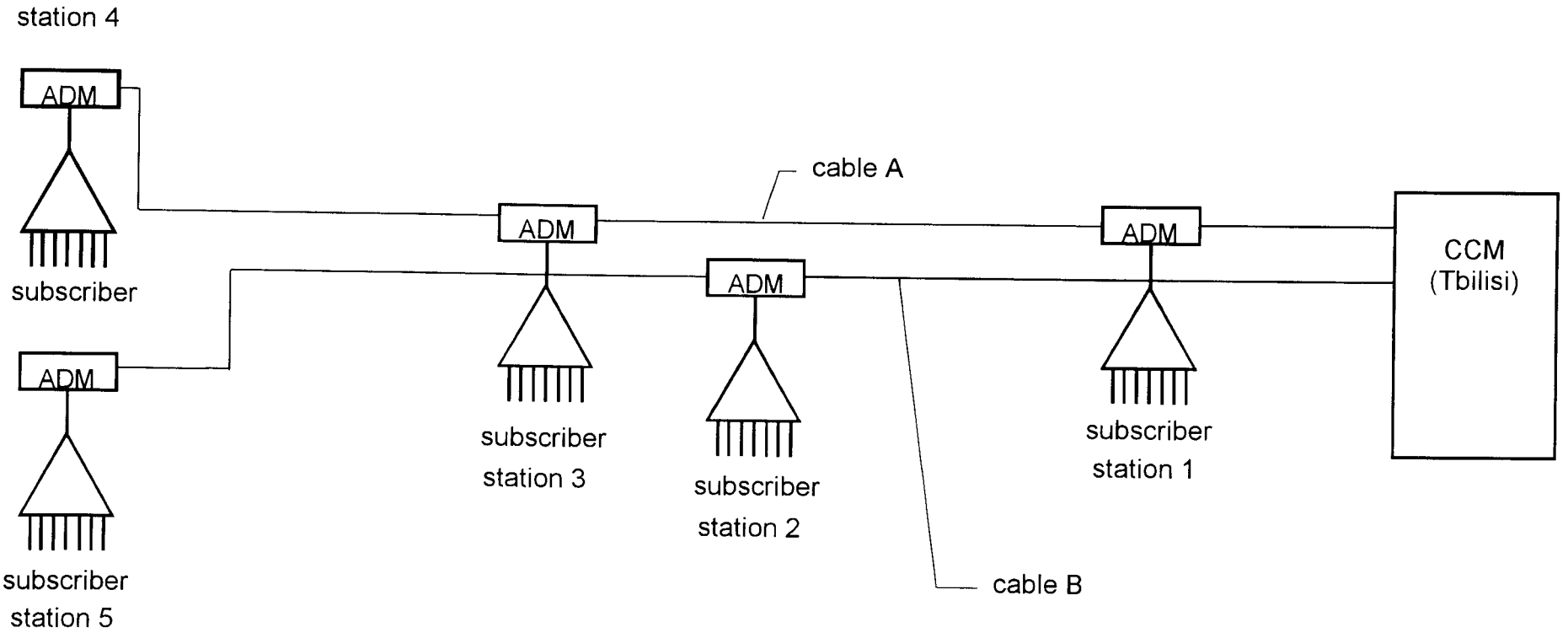
Annex 3.3.2-5

Survey of GRZD lines with telecommunication equipment



Annex 3.3.2-6

Survey of GRZD systems of telecommunication installations



ADM - Add/Drop-Multiplexer
CCM - Cross Connect Multiplexer

Annex 3.3.2-7

Schedule of costs of signalling equipment and installations for GRZD

installations / year	until 2000	2001	2002	2003	2004	2005	2006	2007	2008	total
signals	5.0	2.5	1.0	0.4	0.4	0.4	0.3	0.3	0.3	***10.6***
electric switch machines	3.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	***6.6***
track circuits / axle counters	4.5	2.0	1.5	1.0	0.5	0.5	0.4	0.4	0.4	***11.2***
automatic level crossings	4.8	2.5	2.5	2.0	2.0	2.0	2.0	2.0	2.0	***21.8***
spare parts, cables	3.0	2.0	1.5	1.0	0.5	0.5	0.4	0.4	0.4	***9.7***
complete signal boxes 1)	0	14.0	5.0	5.0	8.0	10.0	5.0	5.0	5.0	**57.0**
equipment for Samtredia - Poti/Batumi section 2)	2.0	0	0	0	0	0	0	0	0	***2.0***
subtotal for technical installations	*22.8*	*23.5*	*12.0*	*9.8*	*1.8*	*13.8*	*8.4*	*8.4*	*8.4*	***118.9***
equipment for the central repair shops	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.1	0.1	***2.8***
renewal of the stock for maintenance and fault clearing	0.5	0.5	0.3	0.3	0.2	0.2	0.1	0.1	0.1	***2.3***
Total	***23.8***	***24.5***	***12.8***	***10.6***	***12.2***	***14.2***	***8.7***	***8.6***	***8.6***	***124.0***

1) replacement of the worn signalling equipment

2) Projects of procurement of minimum equipment requirements have already been ordered by the Georgian Railways.

All figures in million US$

Annex 3.3.2-8

Schedule of costs of telecommunication installations for GRZD

installations / year	until 2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
glass fibre cables	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	***10.0***
communication installations	1.0	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	***4.5***
exchange installations	1.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	***5.3***
radio installations	1.5	1.5	1.0	0.6	0.6	0.6	0.5	0.4	0.4	***7.1***
other equipment	1.0	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	***3.0***
subtotal for technical installations	*6.8*	*3.8*	*3.3*	*2.9*	*2.8*	*2.7*	*2.6*	*2.5*	*2.5*	***29.9***
equipment for the central repair shops	1.0	0.4	0.4	0.2	0.1	0.1	0.1	0.1	0.1	***2.5***
renewal of the rolling stock for maintenance and fault clearing	0.5	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	***2.0***
Total	***8.3***	***4.5***	***4.0***	***3.3***	***3.1***	***3.0***	***2.8***	***2.7***	***2.7***	***34.4***

All figures in million US$

Final Report Module A

Annexes

Chapter 4 Financial Pre-feasibility

Forecast Requirements - Permanent Way: Azerbaijan

Annex 4.1-1

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
New Investments:																				
Line: Tbilisi - Baku:-Item 1 -12: 116km	7,0	7,0	7,0	7,0	8,0	8,0	8,0	8,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	67,7
Line: Baku - Tbilisi:-Item 1 - 7: 84km	5,0	5,0	5,0	5,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	20,2
Changeover Points - Both Directions	2,0	2,0	2,0	2,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	8,0
Crossing Timber Sets	0,4	0,4	0,4	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,4
Total New Investments	14,4	14,4	14,4	14,4	8,0	8,0	8,0	8,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	97,2
Maintenance Requirements:																				
Line: Tbilisi - Baku:-Item 1 -12: 116km	0,7	1,4	2,1	2,8	3,6	4,4	5,2	6,0	6,8	6,8	6,8	6,8	6,8	6,8	6,8	6,8	6,8	6,8	6,8	100,5
Line: Baku - Tbilisi:-Item 1 - 7: 84km	0,5	1,0	1,5	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	35,3
Changeover Points - Both Directions	0,2	0,4	0,6	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	14,0
Crossing Timber Sets	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	2,5
Total Maintenance	1,4	2,9	4,3	5,7	6,5	7,3	8,1	8,9	9,7	9,7	9,7	9,7	9,7	9,7	9,7	9,7	9,7	9,7	9,7	152,2
Depreciation:																				
Line: Tbilisi - Baku:-Item 1 -12: 116km	0,3	0,6	0,8	1,1	1,4	1,8	2,1	2,4	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	40,2
Line: Baku - Tbilisi:-Item 1 - 7: 84km	0,2	0,4	0,6	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	14,1
Changeover Points - Both Directions	0,1	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	5,6
Crossing Timber Sets	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	1,0
Total Depreciation	0,6	1,1	1,7	2,2	2,6	2,9	3,2	3,5	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	59,9

Forecast Requirements -Permanent Way Maintenance Equipt.: Azerbaijan

Annex 4.1-2

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
New Investments:																				
Misc. Machinery & Equipt.	2,50	2,50	2,50	2,50	2,50	2,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	15,00
Track Engines	0,57	0,57	0,57	0,57	0,57	0,57	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	3,42
Ballast Regulating Machine	0,00	1,40	0,00	0,00	0,00	0,00	0,00	1,40	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,80
Trolley for Bridge Inspection	1,17	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,17
Excavators	0,34	0,34	0,34	0,34	0,34	0,34	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,01
Ballast Cleaning Machine	0,00	4,38	0,00	0,00	0,00	0,00	0,00	4,38	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	8,76
Sleeper Positioner	0,00	0,00	2,86	0,00	0,00	0,00	0,00	2,86	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	5,72
Hydraulic Rail Treater	0,00	0,55	0,55	0,00	0,00	0,00	0,55	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,65
Diesel Motors for UK Crane	0,02	0,02	0,02	0,02	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,08
Total New Investments	4,60	9,76	6,84	3,43	3,41	3,41	0,55	8,64	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	40,61
Maintenance Requirements:																				
Misc. Machinery & Equipt.	0,25	0,50	0,75	1,00	1,25	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	24,75
Track Engines	0,06	0,11	0,17	0,23	0,29	0,34	0,34	0,34	0,34	0,34	0,34	0,34	0,34	0,34	0,34	0,34	0,34	0,34	0,34	5,64
Ballast Regulating Machine	0,00	0,14	0,14	0,14	0,14	0,14	0,14	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	4,20
Trolley for Bridge Inspection	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	2,22
Excavators	0,03	0,07	0,10	0,13	0,17	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	3,32
Ballast Cleaning Machine	0,00	0,44	0,44	0,44	0,44	0,44	0,44	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	13,14
Sleeper Positioner	0,00	0,00	0,29	0,29	0,29	0,29	0,29	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	8,29
Hydraulic Rail Treater	0,00	0,06	0,11	0,11	0,11	0,11	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	2,64
Diesel Motors for UK Crane	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,14
Spare Parts for UK System	0,01	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,04
Spare Parts for Sleeper Positioner	0,00	0,00	0,29	0,00	0,00	0,00	0,00	0,29	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,57
Spare Parts for Ballast Machine	0,00	0,16	0,00	0,00	0,00	0,00	0,00	0,16	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,32
Spare Parts for Ballast Cleaning Mach.	0,00	0,44	0,00	0,00	0,00	0,00	0,00	0,44	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,88
Total Maintenance	0,47	1,45	2,41	2,47	2,80	3,14	3,20	4,35	4,06	4,06	4,06	4,06	4,06	4,06	4,06	4,06	4,06	4,06	4,06	64,96

Forecast Requirements -Permanent Way Maintenance Equipt.: Azerbaijan

Annex 4.1-2

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Depreciation:																				
Misc. Machinery & Equipt.	0,25	0,50	0,75	1,00	1,25	1,50	1,50	1,50	1,50	1,50	1,25	0,75	0,75	0,75	0,00	0,00	0,00	0,00	0,00	14,75
Track Engines	0,02	0,05	0,07	0,09	0,11	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	2,26
Ballast Regulating Machine	0,00	0,14	0,14	0,14	0,14	0,14	0,14	0,28	0,28	0,28	0,28	0,28	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,24
Trolley for Bridge Inspection	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	1,11
Excavators	0,02	0,03	0,05	0,07	0,08	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	1,66
Ballast Cleaning Machine	0,00	0,22	0,22	0,22	0,22	0,22	0,22	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44	6,57
Sleeper Positioner	0,00	0,00	0,14	0,14	0,14	0,14	0,14	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	4,15
Hydraulic Rail Treater	0,00	0,03	0,06	0,06	0,06	0,06	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	1,32
Diesel Motors for UK Crane	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,14
Total Depreciation	0,35	1,03	1,49	1,78	2,07	2,36	2,39	2,89	2,89	2,89	2,64	2,14	1,86	1,86	1,11	1,11	1,11	1,11	1,11	34,19

Forecast Requirements -Bridges: Azerbaijan

Annex 4.1-3

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
New Investments or Major Repairs:																				
Bridge No. 56 - Baku	0,25	0,25	0,25	0,25	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,00
Bridges 19 & 20 - Km 157 & 70	0,22	0,22	0,22	0,22	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,87
Bridges 10 & 11 - Km 111 & 20	0,24	0,24	0,24	0,24	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,95
Bridge 31 - Km 234 & 600	0,03	0,03	0,03	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,10
Bridges 33 & 34 - Km 252 & 80	0,74	0,74	0,74	0,74	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,95
Bridges 41 & 42 - Km 360 & 20	0,05	0,05	0,05	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,20
Bridge No.5 - Km 72 & 300	0,00	0,00	0,00	0,00	0,91	0,91	0,91	0,91	0,91	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	4,55
Quarry Equipt.	0,13	0,13	0,13	0,13	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,50
Total New Investments	1,64	1,64	1,64	1,64	0,91	0,91	0,91	0,91	0,91	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	11,12
Maintenance Requirements:																				
Bridge No. 56 - Baku	0,01	0,03	0,04	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,88
Bridges 19 & 20 - Km 157 & 70	0,01	0,02	0,03	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,76
Bridges 10 & 11 - Km 111 & 20	0,01	0,02	0,04	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,83
Bridge 31 - Km 234 & 600	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,09
Bridges 33 & 34 - Km 252 & 80	0,04	0,07	0,11	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	2,58
Bridges 41 & 42 - Km 360 & 20	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,18
Bridge No.5 - Km 72 & 300	0,00	0,00	0,00	0,00	0,05	0,09	0,14	0,18	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,23	2,95
Quarry Equipt.	0,01	0,01	0,02	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,44
Total Maintenance	0,08	0,16	0,25	0,33	0,37	0,42	0,46	0,51	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	8,70

Forecast Requirements -Bridges: Azerbaijan

Annex 4.1-3

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Depreciation:																				
Bridge No. 56 - Baku	0,01	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,35
Bridges 19 & 20 - Km 157 & 70	0,00	0,01	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,30
Bridges 10 & 11 - Km 111 & 20	0,00	0,01	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,33
Bridge 31 - Km 234 & 600	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,04
Bridges 33 & 34 - Km 252 & 80	0,01	0,03	0,04	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	1,03
Bridges 41 & 42 - Km 360 & 20	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,07
Bridge No.5 - Km 72 & 300	0,00	0,00	0,00	0,00	0,02	0,04	0,05	0,07	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	1,18
Quarry Equipt.	0,01	0,03	0,04	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,00	0,00	0,00	0,00	0,00	0,63
Total Depreciation	0,04	0,09	0,13	0,17	0,19	0,21	0,23	0,24	0,26	0,26	0,26	0,26	0,26	0,26	0,21	0,21	0,21	0,21	0,21	3,93

Forecast Requirements Rolling Stock: Azerbaijan

Annex 4.1-4

Optimistic Variant: In US$'000s

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Investments																			
Purchase of Locomotives													24.000	28.000	48.000	56.000	56.000	56.000	268.000
Main Overhauls	2.700	2.300	2.500	2.900															10.400
Scrapping Costs	2	4	4	4	4	3	3						4	5	6	5	3		46
Purchase of Wagons			2.480										61.240					39.240	102.960
Total	2.702	2.304	4.984	2.904	4	3	3	0	0	0	0	0	85.244	28.005	48.006	56.005	56.003	95.240	381.406
Regular Maintenance																			
Locomotives	1.610	1.610	2.076	2.076	2.076	2.076	2.076	2.076	2.076	2.076	2.076	2.076	1.275	1.275	1.275	1.275	1.275	1.367	31.721
Wagons	5.832	3.272	4.523	4.523	3.700	3.700	3.700	3.700	3.700	3.700	3.700	3.700	4.588	4.588	4.555	4.555	4.555	5.619	76.210
Total	7.442	4.882	6.599	6.599	5.776	5.776	5.776	5.776	5.776	5.776	5.776	5.776	5.863	5.863	5.830	5.830	5.830	6.986	107.931
Depreciation																			
Locomotives	82	152	227	315	315	315	315	315	315	315	315	315	1.042	1.891	3.345	5.042	6.739	8.436	29.794
Wagons			75	75	75	75	75	75	75	75	75	75	1.931	1.931	1.931	1.931	1.931	3.120	13.526
Total	82	152	302	390	390	390	390	390	390	390	390	390	2.973	3.822	5.276	6.973	8.670	11.556	43.320

Workshops																			
Investments	604	4.500	4.500	4.500	4.500	0	0	0	0	0	0	0	0	0	0	0	0	0	18.604
Equipment	444	150	150	150	150	0	0	0	0	0	0	0	0	0	0	0	0	0	1.044
Total	1.048	4.650	4.650	4.650	4.650	0	0	0	0	0	0	0	0	0	0	0	0	0	19.648
Maintenance of workshops	105	570	1.035	1.500	1.965	1.965	1.965	1.965	1.965	1.965	1.965	1.965	1.965	1.965	1.965	1.965	1.965	1.965	30.716
Depreciation for workshops	56	161	266	371	476	476	476	476	476	476	476	476	476	476	476	476	476	476	7.527

Forecast Requirements Rolling Stock: Azerbaijan

Annex 4.1-4

Pessimistic Variant: In US$'000s

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Investments																			
Purchase of Locomotives									28.000				40.000						68.000
Main Overhauls	2.700	2.300																	5.000
Scrapping Costs	3	8	7	6	6	6	8	5											48
Purchase of Wagons	0																		0
Total	2.703	2.308	7	6	6	6	8	5	28.000	0	0	0	40.000	0	0	0	0	0	73.048
Regular Maintenance																			
Locomotives	2.810	1.610	1.306	1.306	1.306	1.306	1.306	1.152	1.152	1.152	1.152	1.152	1.169	1.169	1.169	1.169	1.169	1.169	23.723
Wagons	5.548	2.988	2.702	2.702	2.359	2.359	2.359	2.359	2.359	2.359	2.359	2.359	3.021	3.021	2.967	2.967	2.967	3.784	51.539
Total	8.358	4.598	4.008	4.008	3.665	3.665	3.665	3.511	3.511	3.511	3.511	3.511	4.190	4.190	4.136	4.136	4.136	4.953	75.262
Depreciation																			
Locomotives	82	152	152	152	152	152	152	152	1.000	1.000	1.000	1.000	2.212	2.212	2.212	2.212	2.212	2.212	18.415
Wagons			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	82	152	152	152	152	152	152	152	1.000	1.000	1.000	1.000	2.212	2.212	2.212	2.212	2.212	2.212	18.415
Workshops																			
Investments	500	4.500	4.500	4.500	4.500	0	0	0	0	0	0	0	0	0	0	0	0	0	18.500
Equipment	444	150	150	150	150	0	0	0	0	0	0	0	0	0	0	0	0	0	1.044
Total	944	4.650	4.650	4.650	4.650	0	0	0	0	0	0	0	0	0	0	0	0	0	19.544
Maintenance of workshops	94	559	1.024	1.489	1.954	1.954	1.954	1.954	1.954	1.954	1.954	1.954	1.954	1.954	1.954	1.954	1.954	1.954	30.529
Depreciation for workshops	54	159	264	369	474	474	474	474	474	474	474	474	474	474	474	474	474	474	7.489

Forecast Requirements - Signalling: Azerbaijan

Annex 4.1-5

Figures in $US mill.

Description	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
New Investments:																				
Complete Signal Interlocking Locations	0,0	0,0	0,0	0,0	11,2	3,2	3,2	5,6	8,8	3,6	4,0	5,6	3,2	3,2	5,6	3,2	3,2	5,6	3,2	72,4
Replacement of Manual Signal Boxes	0,0	0,0	0,0	0,0	5,6	5,6	4,0	4,4	3,2	4,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	26,8
Signals	1,2	1,2	0,8	0,4	0,4	0,4	0,3	0,3	0,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	7,8
Electric Points Systems	1,2	1,2	1,2	0,8	0,4	0,4	0,3	0,3	0,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	8,6
Direct Current Circuits	0,4	0,4	0,4	0,8	1,6	0,8	0,4	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	8,8
Automatic Level Crossings	0,2	0,2	0,2	0,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	18,8
Cable Equipment	0,4	0,4	0,4	0,4	0,8	0,4	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	7,1
Equipment for Central Repair Workshops	0,1	0,1	0,1	0,1	0,4	0,4	0,4	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	2,8
Renewal of Rolling Stock for Maintenance and Fault Clearing	0,1	0,1	0,1	0,1	0,4	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	2,4
Total New Investments	3,6	3,6	3,2	2,8	22,0	12,6	10,5	13,0	14,9	10,2	6,5	8,1	5,7	5,7	8,1	5,7	5,7	8,1	5,7	155,4

Forecast Requirements - Signalling: Azerbaijan

Annex 4.1-5

Figures in $US mill.

Description	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Maintenance Requirements:																				
Complete Signal Interlocking Locations	0,0	0,0	0.0	0,0	2,8	0,8	0,8	1,4	2,2	0,9	1,0	1,4	0,8	0,8	1,4	0,8	0,8	1,4	0,8	18,1
Replacement of Manual Signal Boxes	0,0	0,0	0,0	0,0	1,4	1,4	1,0	1,1	0,8	1,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	6,7
Signals	0,3	0,3	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	1,9
Electric Points Systems	0,3	0,3	0,3	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	2,1
Direct Current Circuits	0,1	0,1	0,1	0,2	0,4	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	2,2
Automatic Level Crossings	0,1	0,1	0,1	0,1	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	4,7
Cable Spare Parts	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	1,8
Equipment for Central Repair Workshops	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,7
Renewal of Rolling Stock for Maintenance and Fault Clearing	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,6
Total Maintenance	0,9	0,9	0,8	0,7	5,5	3,2	2,6	3,2	3,7	2,5	1,6	2,0	1,4	1,4	2,0	1,4	1,4	2,0	1,4	38,9

Forecast Requirements - Signalling: Azerbaijan

Annex 4.1-5

Figures in $US mill.

Description	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Depreciation:																				
Complete Signal Interlocking Locations	0,0	0,0	0,0	0,0	0,7	1,0	1,2	1,5	2,1	2,4	2,6	3,0	3,2	3,4	3,8	4,0	4,2	4,6	4,8	42,8
Replacement of Manual Signal Boxes	0,0	0,0	0,0	0,0	0,4	0,7	1,0	1,3	1,5	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	22,8
Signals	0,1	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	6,7
Electric Points Systems	0,1	0,2	0,2	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,5	0,6	0,6	7,6
Direct Current Circuits	0,0	0,0	0,1	0,1	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	5,1
Automatic Level Crossings	0,0	0,0	0,0	0,1	0,1	0,2	0,3	0,4	0,5	0,5	0,6	0,7	0,8	0,9	0,9	1,0	1,1	1,2	1,3	10,5
Cable Equipment	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	2,6
Equipment for Central Repair Workshops	0,0	0,0	0,0	0,0	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,1	2,4
Renewal of Rolling Stock for Maintenance and Fault Clearing	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	2,8
Total Depreciation	0,2	0,5	0,7	0,8	2,3	3,1	3,8	4,7	5,6	6,3	6,7	7,2	7,6	8,0	8,4	8,8	9,1	9,6	10,0	103,3

Forecast Requirements - Telecommunications: Azerbaijan

Annex 4.1-6

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
New Investments:																				
Cable Equipment	1,0	1,0	1,0	1,0	1,6	1,6	1,6	1,2	1,2	0,8	0,8	0,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	13,6
Transmitting Equipment	0,2	0,2	0,2	0,2	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	4,0
Telecommunication Exchange Equipt	0,2	0,2	0,2	0,2	0,4	0,4	0,4	0,4	0,3	0,3	0,3	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	3,6
Radio Transmitting Equipment	0,5	0,5	0,5	0,5	1,2	0,8	0,6	0,6	0,4	0,4	0,4	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	6,9
Other Installations	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,2	0,2	0,2	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,8
Equipment for Central Repair Workshops	0,2	0,2	0,2	0,2	0,3	0,3	0,2	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,0
Renewal of Rolling Stock for Maintenance and Fault Clearing	1,0	1,0	1,0	1,0	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	5,2
Total New Investments	3,3	3,3	3,3	3,3	4,5	4,1	3,7	3,2	2,8	2,2	2,2	2,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	38,1
Maintenance Requirements:																				
Cable Equipment	0,3	0,5	0,8	1,0	1,4	1,8	2,2	2,5	2,8	3,0	3,2	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	46,6
Transmitting Equipment	0,1	0,1	0,2	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	12,7
Telecommunication Exchange Equipt	0,1	0,1	0,2	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,8	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	11,8
Radio Transmitting Equipment	0,1	0,3	0,4	0,5	0,8	1,0	1,2	1,3	1,4	1,5	1,6	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	23,9
Other Installations	0,1	0,1	0,2	0,2	0,3	0,4	0,4	0,5	0,6	0,6	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	9,6
Equipment for Central Repair Workshops	0,1	0,1	0,2	0,2	0,3	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	7,3
Renewal of Rolling Stock for		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
Maintenance and Fault Clearing	0,1	0,3	0,6	0,8	0,9	0,9	1,0	1,0	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	17,7
Total Maintenance	0,6	1,5	2,3	3,1	4,2	5,3	6,2	7,0	7,7	8,2	8,8	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	129,5

Forecast Requirements - Telecommunications: Azerbaijan

Annex 4.1-6

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Depreciation:																				
Cable Equipment	0,0	0,1	0,1	0,1	0,2	0,2	0,3	0,3	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	6,2
Transmitting Equipment	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	2,5
Telecommunication Exchange Equipt	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	2,4
Radio Transmitting Equipment	0,0	0,1	0,1	0,1	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	4,8
Other Installations	0,0	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,0	2,8
Equipment for Central Repair Workshops	0,0	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,0	0,0	0,0	2,0
Renewal of Rolling Stock for Maintenance and Fault Clearing	0,2	0,4	0,6	0,8	0,8	0,9	0,9	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	17,0
Total Depreciation	0,3	0,6	1,0	1,3	1,5	1,8	2,0	2,2	2,3	2,5	2,5	2,6	2,6	2,5	2,5	2,4	2,4	2,3	2,3	37,6

Forecast Requirements - Permanent Way: Georgia

Annex 4.2-1

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
New Investments:																				
Line: Tbilisi - Poti: 1st Priority	15,7	15,7	15,7	15,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	62,6
Line: Tbilisi - Poti: 2nd Priority	0,0	0,0	0,0	0,0	18,2	18,2	18,2	18,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	72,7
Line: Tbilisi - Poti: Crossovers	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	16,0
Cross Timber Sets	0,4	0,4	0,4	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,5
Total New Investments	18,0	18,0	18,0	18,0	20,2	20,2	20,2	20,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	152,9
Maintenance Requirements:																				
Line: Tbilisi - Poti: 1st Priority	1,6	3,1	4,7	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	109,6
Line: Tbilisi - Poti: 2nd Priority	0,0	0,0	0,0	0,0	1,8	3,6	5,5	7,3	7,3	7,3	7,3	7,3	7,3	7,3	7,3	7,3	7,3	7,3	7,3	98,2
Line: Tbilisi - Poti: Crossovers	0,2	0,4	0,6	0,8	1,0	1,2	1,4	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	24,8
Cross Timber Sets	0,0	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	2,6
Total Maintenance	1,8	3,6	5,4	7,2	9,2	11,3	13,3	15,3	15,3	15,3	15,3	15,3	15,3	15,3	15,3	15,3	15,3	15,3	15,3	235,2
Depreciation:																				
Line: Tbilisi - Poti: 1st Priority	0,6	1,3	1,9	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	43,8
Line: Tbilisi - Poti: 2nd Priority	0,0	0,0	0,0	0,0	0,7	1,5	2,2	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	39,3
Line: Tbilisi - Poti: Crossovers	0,1	0,2	0,2	0,3	0,4	0,5	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	9,9
Cross Timber Sets	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	1,1
Total Depreciation	0,7	1,4	2,2	2,9	3,7	4,5	5,3	6,1	6,1	6,1	6,1	6,1	6,1	6,1	6,1	6,1	6,1	6,1	6,1	94,1

Forecast Requirements -Permanent Way Maintenance Equipt.: Georgia

Annex 4.2-2

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
New Investments:																				
Misc. Machinery & Equipt.	1,25	1,25	1,25	1,25	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	5,00
Bridge Inspection Vehicle	0,00	0,00	0,00	1,17	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,17
Track Vehicle	0,57	0,57	0,57	0,00	0,57	0,57	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,85
Loader Excavator	0,34	0,34	0,34	0,00	0,34	0,34	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,68
Ballast Cleaning Machine	0,00	0,00	4,38	0,00	0,00	0,00	0,00	4,38	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	8,76
Unimat	0,00	0,00	2,86	0,00	0,00	0,00	0,00	2,86	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	5,72
Ballast Regulating Machine	0,00	0,00	1,24	0,00	0,00	0,00	0,00	1,24	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,48
Hydraulic Rail Treater	0,00	0,55	0,00	0,00	0,00	0,00	0,55	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,10
Diesel Motors for UK Crane	0,02	0,02	0,02	0,02	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,08
Quarry Equipt.	0,25	0,25	0,25	0,25	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,00
Sleeper Impregnation Plant	0,05	0,05	0,05	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,20
Training	0,13	0,13	0,13	0,13	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,50
Total New Investments	2,60	3,15	11,08	2,87	0,91	0,91	0,55	8,48	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	30,54

Forecast Requirements -Permanent Way Maintenance Equipt.: Georgia

Annex 4.2-2

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Maintenance Requirements:																				
Misc. Machinery & Equipt.	0,13	0,25	0,38	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	8,75
Bridge Inspection Vehicle	0,00	0,00	0,00	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	1,87
Track Vehicle	0,06	0,11	0,17	0,17	0,23	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	4,73
Loader Excavator	0,03	0,07	0,10	0,10	0,13	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	2,78
Ballast Cleaning Machine	0,00	0,00	0,44	0,44	0,44	0,44	0,44	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	12,70
Unimat	0,00	0,00	0,29	0,29	0,29	0,29	0,29	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57	8,29
Ballast Regulating Machine	0,00	0,00	0,12	0,12	0,12	0,12	0,12	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	3,60
Hydraulic Rail Treater	0,00	0,06	0,06	0,06	0,06	0,06	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	1,71
Diesel Motors for UK Crane	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,14
Quarry Equipt.	0,03	0,05	0,08	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	1,75
Sleeper Impregnation Plant	0,01	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,35
Spares: Ballast Cleaning Machine	0,11	0,11	0,11	0,11	0,11	0,09	0,09	0,09	0,09	0,09	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,99
Spares: Unimat	0,07	0,07	0,07	0,07	0,06	0,06	0,06	0,06	0,06	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,57
Spares: Ballast Regulating Machine	0,04	0,04	0,04	0,04	0,03	0,03	0,03	0,03	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,32
Spares: UK System	0,01	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,04
Total Maintenance	0,48	0,78	1,88	2,15	2,21	2,28	2,33	3,18	3,18	3,09	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	48,59

Forecast Requirements -Permanent Way Maintenance Equipt.: Georgia

Annex 4.2-2

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Depreciation:																				
Misc. Machinery & Equipt.	0,13	0,25	0,38	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,38	0,13	0,13	0,13	0,00	0,00	0,00	0,00	0,00	5,00
Bridge Inspection Vehicle	0,00	0,00	0,00	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,00	0,00	0,00	0,00	0,00	0,00	1,17
Track Vehicle	0,06	0,11	0,17	0,17	0,23	0,29	0,29	0,29	0,29	0,29	0,23	0,11	0,11	0,00	0,00	0,00	0,00	0,00	0,00	2,62
Loader Excavator	0,03	0,07	0,10	0,10	0,13	0,17	0,17	0,17	0,17	0,17	0,13	0,07	0,07	0,00	0,00	0,00	0,00	0,00	0,00	1,54
Ballast Cleaning Machine	0,00	0,00	0,44	0,44	0,44	0,44	0,44	0,88	0,88	0,88	0,88	0,88	0,44	0,44	0,44	0,44	0,44	0,00	0,00	8,76
Unimat	0,00	0,00	0,29	0,29	0,29	0,29	0,29	0,57	0,57	0,57	0,57	0,57	0,29	0,29	0,29	0,29	0,29	0,00	0,00	5,72
Ballast Regulating Machine	0,00	0,00	0,12	0,12	0,12	0,12	0,12	0,25	0,25	0,25	0,25	0,25	0,12	0,12	0,12	0,12	0,12	0,00	0,00	2,48
Hydraulic Rail Treater	0,00	0,06	0,06	0,06	0,06	0,06	0,11	0,11	0,11	0,11	0,11	0,06	0,06	0,06	0,06	0,06	0,00	0,00	0,00	1,10
Diesel Motors for UK Crane	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,09
Quarry Equipt.	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,14
Sleeper Impregnation Plant	0,01	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,35
Total Depreciation	0,22	0,50	1,58	1,83	1,92	2,01	2,06	2,91	2,91	2,91	2,70	2,21	1,36	1,06	0,93	0,93	0,88	0,03	0,03	28,97

Forecast Requirements -Bridges:Georgia

Annex 4.2-3

Figures in $US'000

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
New Investments or Major Repairs:																				
Bridge No.18 - km 2289 & 216	1,25	1,25	1,25	1,25	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	5,00
Bridge No. 27 - Km 2324 & 239	0,50	0,50	0,50	0,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,00
Bridge No. 56 - Km 2494 & 790	0,50	0,50	0,50	0,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,00
Bridge No. 65 - Km 2472 & 759	0,50	0,50	0,50	0,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,00
Bridge No. 79 - Km 10 & 144	0,25	0,25	0,25	0,25	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,00
Bridges Nos. 1, 4, 10, 11 & 13	0,04	0,04	0,04	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,14
Total New Investments	3,04	3,04	3,04	3,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	12,14
Maintenance Requirements:																				
Bridge No.18 - km 2289 & 216	0,06	0,13	0,19	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	4,38
Bridge No. 27 - Km 2324 & 239	0,03	0,05	0,08	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	1,75
Bridge No. 56 - Km 2494 & 790	0,03	0,05	0,08	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	1,75
Bridge No. 65 - Km 2472 & 759	0,03	0,05	0,08	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	1,75
Bridge No. 79 - Km 10 & 144	0,01	0,03	0,04	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,88
Bridges Nos. 1, 4, 10, 11 & 13	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,12
Total Maintenance	0,15	0,30	0,46	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	10,62

Forecast Requirements -Bridges:Georgia

Annex 4.2-3

Figures in $US'000

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Depreciation:																				
Bridge No.18 - km 2289 & 216	0,03	0,05	0,08	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10	1,75
Bridge No. 27 - Km 2324 & 239	0,01	0,02	0,03	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,70
Bridge No. 56 - Km 2494 & 790	0,01	0,02	0,03	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,70
Bridge No. 65 - Km 2472 & 759	0,01	0,02	0,03	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,70
Bridge No. 79 - Km 10 & 144	0,01	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,35
Bridges Nos. 1, 4, 10, 11 & 13	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,05
Total Depreciation	0,06	0,12	0,18	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	4,25

Forecast Requirements Rolling Stock: Georgia

Annex 4.2-4

Optimistic Variant: In US$'000s

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Investments																			
Purchase of Locomotives													40.000						40.000
Main Overhauls	2.100	2.100	700					4.500					900						10.300
Scrapping Costs	4	4	4	4	3	3													21
Total	2.104	2.104	704	4	3	3	0	4.500	0	0	0	0	900	0	0	0	0	0	10.321
Regular Maintenance																			
Locomotives	1.000	1.000	2.600	2.600	2.600	2.600	2.600	3.425	3.425	3.425	3.425	3.425	4.325	4.325	4.325	4.325	4.325	4.475	58.225
Wagons	4.812	1.332	1.965	1.965	1.681	1.681	1.681	1.681	1.681	1.681	1.681	1.681	2.772	2.772	2.269	2.269	2.269	3.186	39.059
Total	5.812	2.332	4.565	4.565	4.281	4.281	4.281	5.106	5.106	5.106	5.106	5.106	7.097	7.097	6.594	6.594	6.594	7.661	97.284
Depreciation																			
Locomotives	64	64	21	0	0	0	0	136	0	0	0	0	27	0	0	0	0	0	313

Workshops																			
Investments	500	500	2.500	2.500	2.280	2.000	2.000	2.000	2.000	0	0	0	6.000	0	0	0	0	0	22.280
Equipment	3.251	5.381	5.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13.632
Total	3.751	5.881	7.500	2.500	2.280	2.000	2.000	2.000	2.000	0	0	0	6.000	0	0	0	0	0	35.912
Maintenance of workshops	375	588	750	250	228	200	200	200	200	0	0	0	600	0	0	0	0	0	3.591
Depreciation for workshops	335	883	1.433	1.483	1.529	1.569	1.609	1.649	1.689	1.689	1.689	1.689	1.809	1.809	1.809	1.809	1.809	1.809	28.098

Annex 4.2-4

Forecast Requirements Rolling Stock: Georgia

Pessimistic Variant: In US$'000s

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Investments																			
Main Overhauls								700					3.900					1.500	6.100
Scrapping Costs	4	4	4	4	3	3		1	1	1	1	1	3						30
Total	4	4	4	4	3	3	0	701	1	1	1	1	3.903	0	0	0	0	1.500	6.130
Regular Maintenance																			
Locomotives	1.381	1.381	1.306	1.306	1.306	1.306	1.306	1.152	1.152	1.152	1.152	1.152	1.169	1.169	1.169	1.169	1.169	1.169	22.066
Wagons	4.742	1.262	1.530	1.530	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412	2.049	2.049	1.764	1.764	1.764	2.500	32.250
Total	6.123	2.643	2.836	2.836	2.718	2.718	2.718	2.564	2.564	2.564	2.564	2.564	3.218	3.218	2.933	2.933	2.933	3.669	54.316

Workshops																			
Investments	500	500	2.500	2.500	2.280	2.000	2.000	2.000	2.000	0	0	0	6.000	0	0	0	0	0	22.280
Equipment	2.870	5.000	5.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.870
Total	3.370	5.500	7.500	2.500	2.280	2.000	2.000	2.000	2.000	0	0	0	6.000	0	0	0	0	0	35.150
Maintenance of workshops	337	887	1.637	1.887	2.115	2.315	2.515	2.715	2.915	2.915	2.915	2.915	3.515	3.515	3.515	3.515	3.515	3.515	47.158
Depreciation for workshops	297	807	1.357	1.407	1.453	1.493	1.533	1.573	1.613	1.613	1.613	1.613	1.733	1.733	1.733	1.733	1.733	1.733	26.764

Forecast Requirements - Signalling: Georgia

Annex 4.2-5

Figures in $US mill.

Description	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
New Investments:																				
Complete Signal Interlocking Locations	0,0	0,0	0,0	0,0	11,2	4,0	4,0	6,4	8,0	4,0	4,0	4,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	45,6
Installations Samtredia - Poti - Batumi 2	0,4	0,4	0,4	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,6
Signals	1,0	1,0	1,0	1,0	2,0	0,8	0,3	0,3	0,3	0,2	0,2	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	8,5
Electric Points Systems	0,7	0,7	0,7	0,7	0,4	0,4	0,3	0,3	0,3	0,2	0,2	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	5,3
Direct Current Circuits	0,9	0,9	0,9	0,9	1,6	1,2	0,8	0,4	0,4	0,3	0,3	0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	9,0
Automatic Level Crossings	1,0	1,0	1,0	1,0	2,0	2,0	1,6	1,6	1,6	1,6	1,6	1,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0	17,4
Cable Equipment	0,6	0,6	0,6	0,6	1,6	1,2	0,8	0,4	0,4	0,3	0,3	0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	7,8
Equipment for Central Repair Workshops	0,1	0,1	0,1	0,1	0,4	0,4	0,4	0,2	0,2	0,2	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,2
Renewal of Vehicles for Maintenance and Fault Clearing	0,1	0,1	0,1	0,1	0,4	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,8
Total New Investments	4,8	4,8	4,8	4,8	19,6	10,2	8,5	9,8	11,4	7,0	6,9	6,9	0,0	0,0	0,0	0,0	0,0	0,0	0,0	99,2

Forecast Requirements - Signalling: Georgia

Annex 4.2-5

Figures in $US mill.

Description	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Maintenance Requirements:																				
Complete Signal Interlocking Locations	0,0	0,0	0,0	0,0	2,8	3,8	4,8	6,4	8,4	9,4	10,4	11,4	11,4	11,4	11,4	11,4	11,4	11,4	11,4	137,2
Installations Samtredia - Poti - Batumi 2	0,1	0,2	0,3	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	7,0
Signals	0,3	0,5	0,8	1,0	1,5	1,7	1,8	1,9	1,9	2,0	2,1	2,1	2,1	2,1	2,1	2,1	2,1	2,1	2,1	32,3
Electric Points Systems	0,2	0,4	0,5	0,7	0,8	0,9	1,0	1,1	1,1	1,2	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	19,7
Direct Current Circuits	0,2	0,5	0,7	0,9	1,3	1,6	1,8	1,9	2,0	2,1	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	33,0
Automatic Level Crossings	0,2	0,5	0,7	1,0	1,5	2,0	2,4	2,8	3,2	3,6	4,0	4,4	4,4	4,4	4,4	4,4	4,4	4,4	4,4	56,5
Cable Spare Parts	0,2	0,3	0,5	0,6	1,0	1,3	1,5	1,6	1,7	1,8	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	27,8
Equipment for Central Repair Workshops	0,0	0,1	0,1	0,1	0,2	0,3	0,4	0,4	0,5	0,5	0,5	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	7,6
Renewal of Vehicles for Maintenance and Fault Clearing	0,0	0,0 0,1	0,0 0,1	0,0 0,1	0,0 0,2	0,0 0,3	0,0 0,3	0,0 0,4	0,0 0,4	0,0 0,4	0,0 0,4	0,0 0,5	0,0 0,5	0,0 0,5	0,0 0,5	0,0 0,5	0,0 0,5	0,0 0,5	0,0 0,5	0,0 6,3
Total Maintenance	1,2	2,4	3,6	4,8	9,7	12,2	14,3	16,8	19,6	21,4	23,1	24,8	24,8	24,8	24,8	24,8	24,8	24,8	24,8	327,4

Forecast Requirements - Signalling: Georgia

Annex 4.2-5

Figures in $US mill.

Description	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Depreciation:																				
Complete Signal Interlocking Locations	0,0	0,0	0,0	0,0	0,7	1,0	1,3	1,7	2,2	2,5	2,8	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	36,6
Installations Samtredia - Poti - Batumi 2	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	1,9
Signals	0,1	0,1	0,2	0,3	0,4	0,5	0,5	0,5	0,5	0,5	0,5	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	8,6
Electric Points Systems	0,0	0,1	0,1	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	5,2
Direct Current Circuits	0,0	0,1	0,1	0,2	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	6,6
Automatic Level Crossings	0,1	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,1	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	15,1
Cable Equipment	0,0	0,0	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	3,7
Equipment for Central Repair Workshops	0,0	0,0	0,0	0,0	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,0	0,0	2,2
Renewal of Vehicles for Maintenance and Fault Clearing	0,0	0,0	0,1	0,1	0,2	0,2	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	5,1
Total Depreciation	0,3	0,6	0,9	1,2	2,5	3,2	3,7	4,4	5,1	5,6	6,1	6,5	6,5	6,5	6,4	6,4	6,4	6,3	6,3	85,0

Forecast Requirements - Telecommunications Georgia

Annex 4.2-6

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
New Investments:																				
Cable Equipment	0,4	0,4	0,4	0,4	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	8,0
Transmitting Equipment	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	4,4
Telecommunication Exchange Equipt	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	4,2
Radio Transmitting Equipment	0,3	0,3	0,3	0,3	1,2	0,8	0,5	0,5	0,5	0,4	0,3	0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	5,7
Other Installations	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,4
Equipment for Central Repair Workshops	0,2	0,2	0,2	0,2	0,3	0,3	0,2	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,0
Renewal of Rolling Stock for Maintenance and Fault Clearing	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,6
Total New Investments	1,9	1,9	1,9	1,9	3,6	3,2	2,6	2,5	2,4	2,2	2,2	2,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	28,3
Maintenance Requirements:																				
Cable Equipment	0,1	0,2	0,3	0,4	0,6	0,8	1,0	1,2	1,4	1,6	1,8	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	25,4
Transmitting Equipment	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	0,9	1,0	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	15,2
Telecommunication Exchange Equipt	0,1	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	13,8
Radio Transmitting Equipment	0,1	0,2	0,2	0,3	0,6	0,8	0,9	1,0	1,2	1,3	1,3	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	19,2
Other Installations	0,1	0,1	0,2	0,2	0,3	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	8,3
Equipment for Central Repair Workshops	0,1	0,1	0,2	0,2	0,3	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	7,3
New Rolling Stock for Maintenance and Fault Clearing	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	5,1
Total Maintenance	0,4	0,9	1,4	1,8	2,7	3,5	4,2	4,8	5,4	6,0	6,5	7,1	7,1	7,1	7,1	7,1	7,1	7,1	7,1	94,3

Forecast Requirements - Telecommunications Georgia

Annex 4.2-6

Figures in $US mill.

Description	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Depreciation:																				
Cable Equipment	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	3,4
Transmitting Equipment	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	3,0
Telecommunication Exchange Equipt	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	2,8
Radio Transmitting Equipment	0,0	0,0	0,0	0,1	0,1	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	3,8
Other Installations	0,0	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,0	2,4
Equipment for Central Repair Workshops	0,0	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,0	0,0	0,0	2,0
New Rolling Stock for Maintenance and Fault Clearing	0,0	0,0	0,1	0,1	0,1	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	4,4
Total Depreciation	0,1	0,2	0,4	0,5	0,7	0,9	1,1	1,2	1,4	1,5	1,6	1,7	1,6	1,6	1,5	1,5	1,4	1,4	1,4	21,7

Financial Plan AGZD: Optimistic Variant

Annex 4.4-1

Figures in US$ millions

Year	Permanent Way	Bridges	Equipment	Rolling Stock	Workshops Equipment	Signalling	Telecomm.	Total Investments	Net Income before Depr.	Cash Flow
1998	14,40	1,64	4,60	2,70	1,05	3,60	3,30	31,29	11,80	-19,49
1999	14,40	1,64	9,76	2,30	4,65	3,60	3,30	39,65	45,23	-13,90
2000	14,40	1,64	6,84	4,98	4,65	3,20	3,30	39,01	78,67	25,75
2001	14,40	1,64	3,43	2,90	4,65	2,80	3,30	33,12	89,12	81,76
2002	8,00	0,91	3,41		4,65	22,00	4,50	43,47	99,58	137,87
2003	8,00	0,91	3,41			12,60	4,10	29,02	110,04	218,89
2004	8,00	0,91	0,55			10,50	3,70	23,66	120,50	315,73
2005	8,00	0,91	8,64			13,00	3,20	33,75	130,96	412,94
2006	8,00	0,91				14,90	2,80	26,61	141,42	527,75
2007						10,20	2,20	12,40	151,88	667,23
2008						6,50	2,20	8,70	162,34	820,86
2009						8,10	2,20	10,30	172,79	983,36
2010				85,24		5,70		90,94	183,25	1075,67
2011				28,00		5,70		33,70	196,51	1238,48
2012				48,00		8,10		56,10	209,77	1392,15
2013				56,00		5,70		61,70	223,02	1553,47
2014				56,00		5,70		61,70	236,28	1728,05
2015				95,24		8,10		103,34	249,54	1874,24
Total	97,60	11,11	40,64	381,36	19,65	150,00	38,10	738,46		
Res. Value	41,50	7,18	7,56	330,51	12,12	56,70	2,80			458,37
							Internal Rate of Return			128,04%

Financial Plan GRZD: Optimistic Variant

Annex 4.4-2

Figures in US$ millions

Year	Permanent Way	Bridges	Equipment	Rolling Stock	Workshops Equipment	Signalling	Telecomm.	Total Investments	Net Income before Depr.	Cash Flow
1998	18,06	3,04	2,60	2,10	3,75	4,80	1,90	36,26	5,05	-31,21
1999	18,06	3,04	3,15	2,10	5,88	4,80	1,90	38,94	7,26	-62,88
2000	18,06	3,04	11,08	0,70	7,50	4,80	1,90	47,08	9,48	-100,48
2001	18,06	3,04	2,87		2,50	4,80	1,90	33,17	11,22	-122,43
2002	20,18		0,91		2,28	19,60	3,60	46,57	12,97	-156,04
2003	20,18		0,91		2,00	10,20	3,20	36,49	14,71	-177,82
2004	20,18		0,55		2,00	8,50	2,60	33,83	16,45	-195,20
2005	20,18		8,48	4,50	2,00	9,80	2,50	47,46	18,19	-224,47
2006					2,00	11,40	2,40	15,80	19,93	-220,33
2007						7,00	2,20	9,20	21,68	-207,86
2008						6,90	2,20	9,10	23,42	-193,54
2009						6,90	2,20	9,10	25,16	-177,48
2010				40,90	6,00			46,90	26,90	-197,48
2011								0,00	30,63	-166,85
2012								0,00	34,35	-132,50
2013								0,00	38,08	-94,42
2014								0,00	41,80	-52,62
2015								0,00	45,53	-7,09
Total	152,96	12,16	30,55	50,31	35,91	99,50	28,50	409,89		
Res. Value	64,96	8,15	1,61	38,80	7,81	20,80	8,20			150,33
								Internal Rate of Return		0

Financial Plan AGZD: Pessimistic Variant

Annex 4.4-3

Figures in US$ millions

Year	Permanent Way	Bridges	Equipment	Rolling Stock	Workshops Equipt	Signalling	Telecomm.	Total Investments	Net Income before Depr.	Cash Flow
1998	14,40	1,64	4,60	2,70	0,94	3,60	3,30	31,18	3,62	-27,56
1999	14,40	1,64	9,76	2,31	4,65	3,60	3,30	39,66	4,95	-62,27
2000	14,40	1,64	6,84		4,65	3,20	3,30	34,03	6,28	-90,02
2001	14,40	1,64	3,43		4,65	2,80	3,30	30,22	9,08	-111,16
2002	8,00	0,91	3,41		4,65	22,00	4,50	43,47	11,87	-142,76
2003	8,00	0,91	3,41			12,60	4,10	29,02	14,66	-157,12
2004	8,00	0,91	0,55			10,50	3,70	23,66	17,46	-163,32
2005	8,00	0,91	8,64			13,00	3,20	33,75	20,25	-176,83
2006	8,00	0,91		28,00		14,90	2,80	54,61	23,04	-208,39
2007						10,20	2,20	12,40	25,83	-194,96
2008						6,50	2,20	8,70	28,63	-175,03
2009						8,10	2,20	10,30	31,42	-153,91
2010				40,00		5,70		45,70	34,21	-165,40
2011						5,70		5,70	33,84	-137,25
2012						8,10		8,10	33,47	-111,88
2013						5,70		5,70	33,10	-84,47
2014						5,70		5,70	32,74	-57,44
2015						8,10		8,10	32,37	-33,17
Total	97,60	11,11	40,64	73,01	19,54	150,00	38,10	430,00		
Res. Value	41,50	7,18	7,56	22,16	12,06	56,70	2,80			149,96
								Internal Rate of Return		0

Financial Plan GRZD: Pessimistic Variant

Annex 4.4-4

Figures in US$ millions

Year	Permanent Way	Bridges	Equipment	Rolling Stock	Workshops Equipment	Signalling	Telecomm.	Total Investments	Net Income before Depr.	Cash Flow
1998	18,06	3,04	2,60		3,37	4,80	1,90	33,77	0,02	-33,75
1999	18,06	3,04	3,15		5,50	4,80	1,90	36,45	0,11	-70,09
2000	18,06	3,04	11,08		7,50	4,80	1,90	46,38	0,20	-116,27
2001	18,06	3,04	2,87		2,50	4,80	1,90	33,17	0,23	-149,21
2002	20,18		0,91		2,28	19,60	3,60	46,57	0,27	-195,51
2003	20,18		0,91		2,00	10,20	3,20	36,49	0,31	-231,69
2004	20,18		0,55		2,00	8,50	2,60	33,83	0,34	-265,18
2005	20,18		8,48	0,70	2,00	9,80	2,50	43,66	0,38	-308,46
2006					2,00	11,40	2,40	15,80	0,41	-323,85
2007						7,00	2,20	9,20	0,45	-332,60
2008						6,90	2,20	9,10	0,48	-341,22
2009						6,90	2,20	9,10	0,52	-349,80
2010				3,90	6,00			9,90	0,56	-359,14
2011								0,00	0,69	-358,45
2012								0,00	0,83	-357,61
2013								0,00	0,97	-356,64
2014								0,00	1,11	-355,53
2015				1,50				1,50	1,25	-355,78
Total	152,96	12,16	30,55	6,10	35,15	99,50	28,50	364,92		
Res. Value	64,96	8,15	1,61	5,13	8,39	20,80	8,20			117,24
								Internal Rate of Return		0

Annex 4.4-5

Financial Plan AGZD: Optimistic Variant (Without Infrastructure)

Figures in US$ millions

Year	Rolling Stock	Workshops Equipment	Signalling	Telecomm.	Total Investments	Net Income before Depr.	Cash Flow
1998	2,70	1,05	3,60	3,30	10,65	8,85	-1,80
1999	2,30	4,65	3,60	3,30	13,85	50,47	34,82
2000	4,98	4,65	3,20	3,30	16,13	83,14	101,83
2001	2,90	4,65	2,80	3,30	13,65	93,15	181,33
2002		4,65	22,00	4,50	31,15	103,16	253,34
2003			12,60	4,10	16,70	113,17	349,81
2004			10,50	3,70	14,20	123,18	458,80
2005			13,00	3,20	16,20	133,20	575,80
2006			14,90	2,80	17,70	143,21	701,30
2007			10,20	2,20	12,40	153,22	842,12
2008			6,50	2,20	8,70	163,23	996,65
2009			8,10	2,20	10,30	173,24	1159,59
2010	85,24		5,70		90,94	183,25	1251,91
2011	28,00		5,70		33,70	196,51	1414,72
2012	48,00		8,10		56,10	209,77	1568,38
2013	56,00		5,70		61,70	223,02	1729,71
2014	56,00		5,70		61,70	236,28	1904,29
2015	95,24		8,10		103,34	249,54	2050,48
Total	381,36	19,65	150,00	38,10	589,11		
Res. Value	330,51	12,12	56,70	2,80			402,13
	Internal Rate of Return						2115,48%

Annex 4.4-6

Financial Plan GRZD: Optimistic Variant (Without Infrastructure)

Figures in US$ millions

Year	Rolling Stock	Workshops Equipment	Signalling	Telecomm.	Total Investments	Net Income before Depr.	Cash Flow
1998	2,10	3,75	4,80	1,90	12,56	10,00	-2,56
1999	2,10	5,88	4,80	1,90	14,69	12,21	-5,03
2000	0,70	7,50	4,80	1,90	14,90	14,43	-5,50
2001		2,50	4,80	1,90	9,20	17,34	2,64
2002		2,28	19,60	3,60	25,48	20,25	-2,59
2003		2,00	10,20	3,20	15,40	23,16	5,17
2004		2,00	8,50	2,60	13,10	26,07	18,14
2005	4,50	2,00	9,80	2,50	18,80	28,98	28,33
2006		2,00	11,40	2,40	15,80	31,89	44,42
2007			7,00	2,20	9,20	34,80	70,02
2008			6,90	2,20	9,10	37,71	98,64
2009			6,90	2,20	9,10	40,62	130,16
2010	40,90	6,00			46,90	43,53	126,80
2011					0,00	47,71	174,51
2012					0,00	51,90	226,41
2013					0,00	56,08	282,48
2014					0,00	60,26	342,74
2015					0,00	64,44	407,17
Total	50,31	35,91	99,50	28,50	214,22		
Res. Value	38,80	7,81	20,80	8,20			75,61
	Internal Rate of Return						61,11%

Annex 4.4-7

Financial Plan AGZD: Pessimistic Variant (Without Infrastructure)

Figures in US$ millions

Year	Rolling Stock	Workshops Equipt	Signalling	Telecomm.	Total Investments	Net Income before Depr.	Cash Flow
1998	2,70	0,94	3,60	3,30	10,54	8,10	-2,45
1999	2,31	4,65	3,60	3,30	13,86	9,43	-6,88
2000		4,65	3,20	3,30	11,15	10,76	-7,28
2001		4,65	2,80	3,30	10,75	14,35	-3,67
2002		4,65	22,00	4,50	31,15	17,95	-16,87
2003			12,60	4,10	16,70	21,55	-12,02
2004			10,50	3,70	14,20	25,15	-1,08
2005			13,00	3,20	16,20	28,74	11,46
2006	28,00		14,90	2,80	45,70	32,34	-1,90
2007			10,20	2,20	12,40	35,94	21,64
2008			6,50	2,20	8,70	39,53	52,48
2009			8,10	2,20	10,30	43,13	85,31
2010	40,00		5,70		45,70	46,73	86,34
2011			5,70		5,70	46,72	127,36
2012			8,10		8,10	46,71	165,97
2013			5,70		5,70	46,70	206,97
2014			5,70		5,70	46,69	247,97
2015			8,10		8,10	46,69	286,55
Total	73,01	19,54	150,00	38,10	280,65		
Res. Value	22,16	12,06	56,70	2,80			93,72
	Internal Rate of Return						35,85%

Annex 4.4-8

Financial Plan GRZD: Pessimistic Variant (Without Infrastructure)

Figures in US$ millions

Year	Rolling Stock	Workshops Equipment	Signalling	Telecomm.	Total Investments	Net Income before Depr.	Cash Flow
1998		3,37	4,80	1,90	10,07	4,97	-5,10
1999		5,50	4,80	1,90	12,20	5,06	-12,24
2000		7,50	4,80	1,90	14,20	5,15	-21,29
2001		2,50	4,80	1,90	9,20	6,35	-24,14
2002		2,28	19,60	3,60	25,48	7,56	-42,06
2003		2,00	10,20	3,20	15,40	8,76	-48,70
2004		2,00	8,50	2,60	13,10	9,96	-51,84
2005	0,70	2,00	9,80	2,50	15,00	11,17	-55,67
2006		2,00	11,40	2,40	15,80	12,37	-59,10
2007			7,00	2,20	9,20	13,58	-54,72
2008			6,90	2,20	9,10	14,78	-49,04
2009			6,90	2,20	9,10	15,98	-42,16
2010	3,90	6,00			9,90	17,19	-34,87
2011					0,00	17,78	-17,09
2012					0,00	18,38	1,29
2013					0,00	18,97	20,26
2014					0,00	19,56	39,82
2015	1,50				1,50	20,16	58,48
Total	6,10	35,15	99,50	28,50	169,25		
Res. Value	5,13	8,39	20,80	8,20			42,52
	Internal Rate of Return						0