ATTACHMENT G-2

Analysis made by Almaty Wastewater Treatment Plant Average Value for 1997

	Raw water			Clarified water			Treated water		
Temperatur °C	14.5	19.7	24.2	14.3	19.8	23.5	14.3	20	23.7
PH	7.2	7.9	8.5	7.2	7.8	8.4	6.7	7.6	8.6
Transperency	2.0	2.6	12.0	3.4	8.8	16.0		25.0	
Suspended substance	34.0	136.5	486.0	14.0	31.0	136.0	3.2	7.3	16.0
Dry residue	264.0	318.8	376.0	200.0	307.9	352.0	276.0	342.0	400.0
Ammonium Nitrogene	2.5	11.3	17.6	0.0	9.3	23.8	0.0	2.8	9.2
Nitrite	0.0	0.18	1.8	0.0	9.3	23.8	0.0	2.8	9.2
BOD_5	20.40	70.71	221.00	8.36	37.04	105.80	3.27	7.62	9.52
BOC	36.36	130.42	452.00	19.80	65.70	249.00	7.80	15.38	33.90
Phosphate	0.04	3.60	7.20	0.03	3.17	6.90	0.00	1.99	6.70
Hydrogen Sulfide	Not detected			Not detected			Not detected		
Iron	0.47	2.10	8.30	0.17	0.38	1.10	0.00	0.20	0.60
Phenol	0.00	0.0134	0.08	-		-	0.00	0.00025	0.00
Hydrogen Products	0.00	0.34	1.20	0.00	0.096	0.37	0.000	0.032	0.160
Chlorides	22.30	35.20	50.90	21.70	30.80	42.60	30.70	39.50	50.60
Sulphates	35.70	52.30	82.20	36.10	53.60	86.80	42.30	55.70	95.60
Dissolved O_2	-		-	1.00	2.74	5.18	3.60	4.80	7.40
Copper	0.00	0.076	0.14	0.00	0.025	0.12	0.00	0.010	0.09
Zink	0.009	0.180	0.410	0.000	0.031	0.013	0.000	0.020	0.040
Lead	0.000	0.013	0.080	0.000	0.003	0.007	0.000	0.001	0.004
$Chrom^{+6}$	0.00	0.0375	0.08	0.00	0.0020	0.01	Not detected		
$Chrom^{+3}$	0.000	0.022	0.060	0.000	0.0018	0.006	Not detected		
Cadmium	Not detected			Not detected			Not detected		
Nickel	Not detected			Not detected			Not detected		
BOD_{20}	33.0	62.16	192.2	23.7	34.48	95.2	4.9	9.11	13.8
Arsenic	Not detected			Not detected			Not detected		
Thiocyanates	0.00	0.06	0.12	0.00	0.04	0.12	0.00	0.017	0.08
Cobalt	Not detected			Not detected			Not detected		
Bacteriological Analysis	97500	429500	2100000	84000	229300	945000	1100	6150	14350
Mercury	0.000	0.0005	0.007	0.000	0.0001	0.0002	Not detected		

1): Minimum measured value
2): Maximum measured value
3): Average value (over the year)

ATTACHMENT G-3

INDUSTRIAL WASTE GENERATION
(according to Almaty Ecologostroy report - Year 1997 - tons)

Nr	Name of the Company generating waste	Total solid	Total liquid	Total waste	Ash	Vanadium Pentoxide	Vanadium	Soot	Magnesium Oxide	MgO_2 Dioxide	Dust	Suspended Substances	Sum
1	TETS-1	1,693.90	5,894.67	7,588.57	1,679.75	14.1490							7,588.57
2	LLP Almatyteplo-kommunenergo,	71.95	1335.15	1,407.10	59.50			12.4580					1,407.10
3	CJSC APC, Thermal Power Generation	2.19	709.79	711.98			2.130		0.0040				711.93
4	NZK, JSC APC, thermal energy gene.	2.26	670.47	672.73			2.215		0.0020				672.69
5	CJSC City Thermal Power Networks, APC	0.52	96.53	97.05			0.520		0.0020				97.05
6	Sanatorium Arman	2.28	84.52	86.80									84.52
7	JSC Teploenergo-obsluzhivaniye	10.51	56.54	67.05		0.1550		0.7500		0.01800	9.5890		67.05
8	Hotel Arman, Government Housing and utility	2.28	58.43	60.71				2.2600					60.69
9	Locomotive house TCH-28. Transportation, Repair	10.98	560.22	571.20				10.9800					571.20
10	JSC Airport of Almaty	3.89	330.37	334.26		0.3980		0.0040		0.00100	0.2160	3.2660	334.26
11	Locomotive House TCH-28. Transportation, Repair	12.91	205.90	218.81		0.2060		4.5290	0.0069		0.4600	7.1410	218.24
12	RGP Kazakhstan Temir Zholy (L VCHD-26)	52.77	109.64	162.41	42.53				0.0070		0.2800		152.45
13	LLP IRISTY - AEVRZ Electric	36.21	122.88	159.09		0.0020		0.1420		0.04800	2.6000	33.0940	158.77
14	JSC AZTM, Machine Building	44.98	37.83	82.80				1.6790					39.50
15	JSC Almaty Works Porshen, Vehicles Spare Parts	32.87	23.08	55.94				0.3850	0.0010		31.3200		54.78
16	National Center for Radioelectronics & Communica.	1.32	51.85	53.18		0.1190		0.8080			0.0583	0.3617	53.20
17	JSC Kurylys Materialy' production of brick	48.35	360.29	408.64		0.0004						0.6290	360.92
18	RGP Kazakhstan Temir Zholy Zholdorstroi	5.34	85.48	90.81				1.5920	0.0060		3.7398		90.81
19	JSC Asphaltobeton, boiler	25.83	24.31	50.14									24.31
20	LLP Almaty Oil Base, Purchase & Sale	1.74	51.50	53.24		0.0143					0.0004		51.51
21	Almaty Grain Elevator Joint Stock Company	59.82	53.64	113.46						0.00025			53.65
22	JSC Geotex, gephysics	65.59	47.71	113.30	65.59								113.30
	Total	2,188.49	1,0970.79	13,1589.27	1,847.37	15.0437	4.865	35.5870	0.0289	0.06725	48.2635	44.4917	2,356.00

ATTACHMENT G-4

LIST OF MEDICAL ESTABLISHMENT IN ALMATY CITY

I-CITY HEALTH CARE DEPARTMENT (MINISTRY OF HEALTH)

Nr	Medical Establishment	Nr of beds as given from Health Dept	Occupancy as given from Health Dept
1	Central Clinic Hospital	550	87%
2	City Clinic Hospital Nr 1	615	78%
3	City Clinic Hospital Nr 2	330	94%
4	City Clinic Hospital Nr 4	400	88%
5	City Clinic Hospital Nr 5	260	94%
6	City Clinic Hospital Nr 7	835	102%
7	CCH for Children Nr 1	300	87%
8	CCH for Children Nr 2	310	96%
9	Emergency Hospital	515	92%
10	City Infectional Hospital	160	85%
11	Infectional CCH for Children	405	84%
12	Perinatal Center	285	86%
13	Reproduction Center	55	89%
14	Diagnostics Center	80	55%
15	City Hospital Nr 6	80	80%
16	Maternity Nr 1	115	90%
17	Maternity Nr 2	90	84%
18	Maternity Nr 4	88	91%
19	Maternity Nr 5	120	70%
20	Cancer Hospital	170	91%
21	Lunatic Asylum	300	101%
22	Narcological center	265	101%
23	Venerological Hospital	150	82%
24	Turksib Riyon Phthisis Hospital	120	100%
25	Zhetysu Riyon Phthisis Hospital	40	102%
26	Medeu Riyon Phthisis Hospital	60	99%
27	Auezov Riyon Phthisis Hospital	—	—
TOTAL		6,698	89%

II- OBLAST HEALTH CARE DEPARTMENT (MINISTRY OF HEALTH)

Nr	Medical Establishment	Nr of beds as given from Health Dept	Occupancy as given from Health Dept
1	Clinical Hospital	350	86%
2	Clinical Hospital Children	150	84%
3	Clinical Cancer Hospital	85	92%
4	Hospital Venerological & Dermatological	100	100%
5	Hospital Psychiatry	65	110%
	TOTAL	750	94%

III- NATIONAL HEALTH CARE DEPARTMENT (MINISTRY OF HEALTH)

Nr	Medical Establishment	Nr of beds as given from Health Dept	Occupancy as given from Health Dept
1	Hospital for children	475	94%
2	Hospital for the disabled at Wars	240	59%
3	Psychiatric Hospital	400	101%
4	Children Sanitation Rehabilitation Centre	238	77%
5	Children Rehabilitation Centre "Balbulak"	60	94%
6	Cancer and Radiology Scientific Research Institute	500	99%
7	Scientific Research Institute of Eye Diseases	160	85%
8	Scientific Research Institute of Dermatology and Venerology	150	74%
9	Scientific Research Institute of Cardiology	240	82%
10	Scientific Centre of TBC	465	81%
11	Scientific Centre of Surgery	330	41%
12	Scientific Centre of Pediatrics and Children Surgery	210	79%
13	Scientific Centre of Urology	240	77%
14	National Centre of Mother and Child Health Protection	145	61%
15	Psychiatrics Hospital of Strict Monitoring over Patients	780	99%
	TOTAL	4,633	80%

IV- OTHER MINISTRIES

14 other medical establishments with 2,077 beds are depending on other ministries (such as Defense Ministry, KGB, Transport Ministry etc.)

ATTACHMENT G-5 (1/2)

RESULTS OF THE SURVEY ON MEDICAL WASTE AT 10 MEDICAL ESTABLISHMENTS

HOSPITAL	RAYON	TYPE	OCCUP	Q1	Q2	Q3.1	Q3.2	Q3.3	Q3.4	Q3.5	Q3.6	Q3.7	Q3.8	Q3.9	Q3.10	Q4	Q5.1	Q5.2	Q5.3	Q6	Q7	Q8	Q9	Q10	Q11	Q12
1	2	1	1	750	550	1	2	3	4	5	6	8	7			1	5	6	7	2	1	2	1	1	1990	1
2	2	2	2	1500	825	2	9	10	8	11						2				2	2		2			2
3	3	3	2	1000	520	17	18	1	19	20	21					2				2	2		1	2	1998	1
4	1	4	6	900	470	2	4	9	8	3	1	29				2				2	1	2	1	1	9999	2
5	3	5	4	625	312	8	2	5	6	25	7	20	26	27	28	2				2	2		2			2
6	1	6	6	190	115	29	8	20	22	23	24					2				2	2		1	3	9999	2
7	5	7	3	250	90	8	23	22	24							1	2	3		2	2		2			2
8	3	8	3	219	160	12	14	13	15							1	1			2	2		2			2
9	3	9	2	500	300	14	16	12								2				2	2		2			2
10	5	10	5	67	60	30	31	32	33	34						2				2	1	2	2			2

HOSPITAL	RAYON	TYPE	OCCUP	Q13.1	Q13.	Q13.3	Q14	Q15.1	Q15.1L	Q15.12	Q15.2	15.2	15.2	Q15.3	Q15.3	Q16A	Q16B	Q16C	Q16D	Q17	Q18.1	Q18.	18.	Q19.	Q19.2	Q20
1	2	1	1	1	2	3	1	1		1.5	3	15				1	1	1	1	2				1		2
2	2	2	2					1	3000		2	500				1	1	2	1	2				2	3	2
3	3	3	2	4			9	1		2	4	9999		5	9999	1	1	2	1	1	1	2	3	1		2
4	1	4	6					5	9999		1		5	3	1	1	1	1	1	1	2			5		2
5	3	5	4					1	10							2	2	2	1	2				1		2
6	1	6	6					1	1000		5	3				1	1	1	1	1	1	2	3	4		2
7	5	7	3					1	1000							1	1	1	1	2				1		2
8	3	8	3					1		10						2	2	2	1	2				1		2
9	3	9	2					3	100		1	200				2	2	2	2	2				1		2
10	5	10	5					6	0.004		3	5		1	30	2	2	2	2	2				3		2

HOSPITAL	RAYON	TYPE	OCCUP	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q29A	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	39	Q39B	Q40
1	2	1	1		2	2	1	1	1	1	1	2	1	3	1	20000	2000	1	2			2	2	3	1500
2	2	2	2		2	2	1	1	2	2	1	2	1	3	1	48000	300	3	2			1			300
3	3	3	2		2	2	2	2	2	2	2	2	2	2	1	48500	303	1	3			1			303
4	1	4	6		2	2	2	2	2	2	2	2	6	1	1	50000	460	1	3			2	2		9999
5	3	5	4		2	2	2	2	2	2	2	2	2	2	1	24243	9999	1	3			2	1	4	9999
6	1	6	6		2	1	2	2	2	2	2	2	5	2	1	16000	300	1	1	7	200	1			300
7	5	7	3		1	2	1	1	2	1	1	2	3	2	1	7168	448	1	2			1			200
8	3	8	3		2	1	2	2	2	2	2	2	1	3	1	12000	3000	1	2			1			3000
9	3	9	2		2	2	2	2	2	2	2	2	2	3	1	16096	335	1	1	3	999	1			200
10	5	10	5		1	2	2	1	2	1	2	2	4	4	1	4000	337	1	3			1			337

ATTACHMENT G-5 (2/2)

RESULTS OF THE SURVEY ON MEDICAL WASTE AT 10 MEDICAL ESTABLISHMENTS

HOSPITAL	RAYON	TYPE	OCCUP	Q41A	Q41B	Q42A	Q42B	Q42C	Q42D	Q43A	Q43B	Q43C	Q43D	Q44	Q44A	Q44B	Q44C	Q44D	44E_	44E_	Q44F
1	2	1	1	3		1	2	3	4	1	2	3	4	9							
2	2	2	2	2		2	6			3				9							
3	3	3	2	2		99				1	2	3	4	9							
4	1	4	6	1	5	5	6	2	13	1	2	3	4	9							
5	3	5	4	2		5	6			1	2	3	4	9							
6	1	6	6	5		5	6	11		1	2	4		9							
7	5	7	3	4		7	10			1	2	3	4	9							
8	3	8	3	1		6				1	2	3	4	9							
9	3	9	2	2		7				1	2	3	4	9							
10	5	10	5	2		11	12	5	6	1	3	4	5	2	0.1	2	0.25	9	2	2	1

HOSPITAL	RAYON	TYPE	OCCUP	Q45.1	Q45.	Q45.3	Q45.4	Q45.5	Q46.1	Q46.2	Q46.3	Q46.4	Q46.5	Q46.6	Q46.7	Q46.8	Q46.9	46.1	Q47	Q48.1	Q48.2
1	2	1	1	8	2	3	4	9	2	2	2	2	1	1	1	2	2	2	2		
2	2	2	2	9	5	1	10	6	1	1	1	1	1	1	1	2	1	1	2		
3	3	3	2	8	2	3	9	99	1	2	2	2	1	1	1	2	2	1	2		
4	1	4	6	1	5	8	9	99	2	2	2	2	2	1	2	2	2	1	2		
5	3	5	4	8	10	4	3	2	2	2	2	2	1	1	1	2	1	1	1	1	7
6	1	6	6	1	2	9	99	99	2	2	2	2	1	1	2	2	2	2	2		
7	5	7	3	1	9	5	7	99	1	1	2	2	1	1	1	2	2	1	1	1	2
8	3	8	3	2	7	8	9	10	2	2	2	2	1	1	1	2	1	1	2		
9	3	9	2	10	1	6	5	3	1	1	1	1	1	1	1	2	1	1	2		
10	5	10	5	2	7	9	8	6	1	1	2	2	1	1	1	1	2	1	1	1	2

HOSPITAL	RAYON	TYPE	OCCUP	Q49	Q50	Q50A	Q50B	Q51	Q52	A1	A2.1	A2.2	A3.1	A3.2	A4
1	2	1	1	2				2	10000000	12000	400	350	2	1	1
2	2	2	2	2				1		23000	750	750	2	2	5
3	3	3	2	1	5			1		20000	730	119	1	1	4
4	1	4	6	2				1		21000	500	400	2	2	5
5	3	5	4	1	1			1		4500	400	225	2	1	1
6	1	6	6	2				1		3620	150	40	2	2	5
7	5	7	3	1	1	5	6	1		99999	204	46	2	1	1
8	3	8	3	2				1		99999	110	109	2	1	3
9	3	9	2	2				1		99999	380	109	2	2	4
10	5	10	5	1	5			1		99999	55	12	2	2	1

ATTACHMENT G-6

MEDICAL WASTE QUANTITY (ACCORDING TO THE SURVEY)

I - CITY HEALTH CARE DEPARTMENT

No	Medical Establishment	No of Beds as given		Occupancy as given		Waste Quantity	
		Dept	Survey	Dept	Survey	t/year	(kg/day. bed)
1	Central Clinic Hospital	550	480	87%	87%	432	2.16
2	City Clinic Hospital Nr 1	615	385	78%		198	1.10
3	City Clinic Hospital Nr 2	330	280	94%		243	2.23
4	City Clinic Hospital Nr 4	400	270	88%		519	4.66
5	City Clinic Hospital Nr 5	260	185	94%		144	2.00
6	City Clinic Hospital Nr 7	835	835	102%	84%	432	1.19
7	CCH for Children Nr 1	300	271	87%		210	1.85
8	CCH for Children Nr 2	310	240	96%		144	1.59
9	Emergency Hospital	515	390	92%		375	2.41
10	City Infectional Hospital	160	160	85%		96	1.40
11	Infectional CCH for Children	405	365	84%		75	0.47
12	Perinatal Center	285	250	86%		120	1.13
13	Reproduction Center	55	60	89%		90	3.66
14	Diagnostics Center	80	80	55%		36	0.68
15	City Hospital Nr 6	80	80	80%		24	0.66
16	Maternity Nr 1	115	120	90%		90	1.85
17	Maternity Nr 2	90	90	84%		48	1.23
18	Maternity Nr 4	88	95	91%		36	0.95
19	Maternity Nr 5	120	100	70%		72	1.38
20	Cancer Hospital	170	156	91%		96	1.53
21	Lunatic Asylum	300	300	101%		108	0.99
22	Narcological center	265	260	101%		27	0.29
23	Venerological Hospital	150	120	82%		79	1.49
24	Turksib Riyon Phthisis Hospital	120	180	100%		90	1.37
25	Zhetysu Riyon Phthisis Hospital	40	60	102%		72	3.34
26	Medeu Riyon Phthisis Hospital	60	60	99%	100%	41	1.87
27	Auezov Riyon Phthisis Hospital						
	TOTAL	6,698	5872	89%		3,897	1.61

II- OBLAST HEALTH CARE DEPARTMENT (MINISTRY OF HEALTH)

No	Medical Establishment	No of Beds as given		Occupancy as given		Waste Quantity	
		Dept	Survey	Dept	Survey	t/year	(kg/day.bed)
1	Clinical Hospital	350	275	86%		240	1.61
2	Clinical Hospital Children	150	150	84%		106	1.61
3	Clinical Cancer Hospital	85	85	92%		54	1.61
4	Hospital Venerological & Dermatological	100	100	100%		59	1.61
5	Hospital Psychiatry	65	30	110%		35	1.61
	TOTAL	750	640	94%		469	1.61

III- NATIONAL HEALTH CARE DEPARTMENT (MINSITRY OF HEALTH)

No	Medical Establishment	No of Beds as given		Occupancy as given		Waste Quantity	
		Dept	Survey	Dept	Survey	t/year	(kg/day.bed)
1	Hospital for children	475	475	94%		298	1.61
2	Hospital for the disabled at Wars	240	240	59%		241	1.61
3	Psychiatric Hospital	400	400	101%		233	1.61
4	Children Sanitation Rehabilitation Centre	238	238	77%		182	1.61
5	Children Rehabilitation Centre "Balbulak"	60	75	94%		38	1.61
6	Cancer and Radiology Scientific Research Institute	500	500	99%		299	1.61
7	Scientific Research Institute of Eye Diseases	160	160	85%		110	1.61
8	Scientific Research Institute of Dermatology and Venerology	150	150	74%		119	1.61
9	Scientific Research Institute of Cardiology	240	240	82%		172	1.61
10	Scientific Centre of TBC	465	465	81%		340	1.61
11	Scientific Centre of Surgery	330	330	41%		476	1.61
12	Scientific Centre of Pediatrics and Children Surgery	210	210	79%		157	1.61
13	Scientific Centre of Urology	240	240	77%		184	1.61
14	National Centre of Mother and Child Health Protection	145	145	61%		140	1.61
15	Psychiatrics Hospital of Strict Monitoring over Patients	780	780	99%		463	1.61
	TOTAL	4,633	4,648	80%		3,452	1.61

SECTION H

FACILITY PLANNING

SECTION H: FACILITY PLANNING

1. BASIC DESIGN OF TRANSFER STATIONS

1.1 PLANNING CONDITIONS

West and Spasskaya transfer station are composed of the following major components.

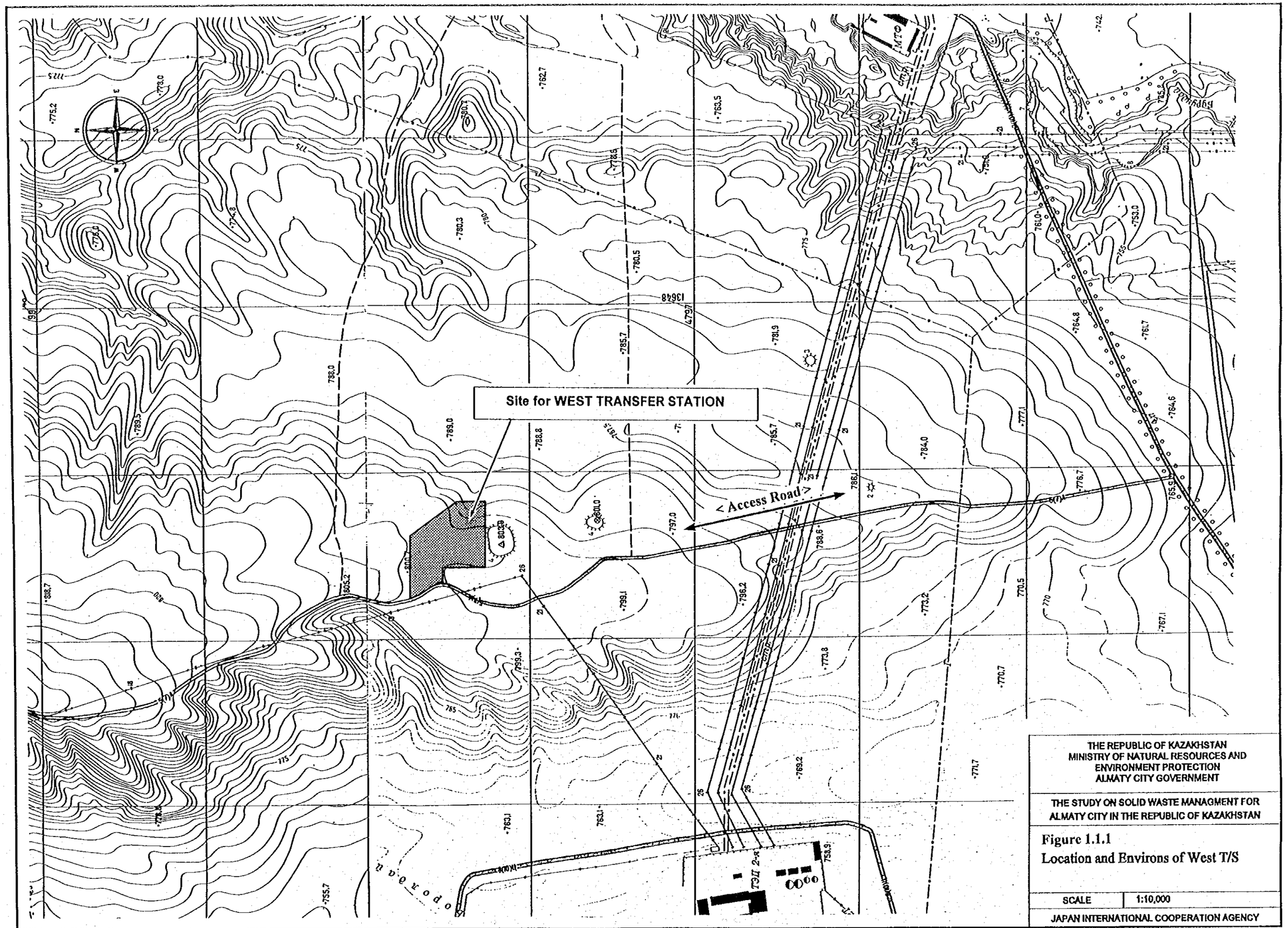
- Access road
- Receiving facility
- Site interior road
- Waste re-loading station
- Transfer vehicle parking
- Green belt/ buffer zone

Planning conditions of transfer stations are as follows.

Item	West T/S	Spasskaya T/S
Waste amount to be hauled-in	753 ton/day in 2005 782 ton/day in 2010	295 ton/day 318 ton/day
Design capacity of T/S	800 ton/day	480 ton/day
Waste amount at peak hour	113 ton/hour in 2005	44 ton/hour in 2005

Site location with surrounding environs and layout plan of West transfer station are shown in Figure 1.1.1 and Figure 1.1.2, respectively.

While, site location with surrounding environs and layout plan of Spasskaya transfer station are shown in Figure 1.1.3 and Figure 1.1.4, respectively.



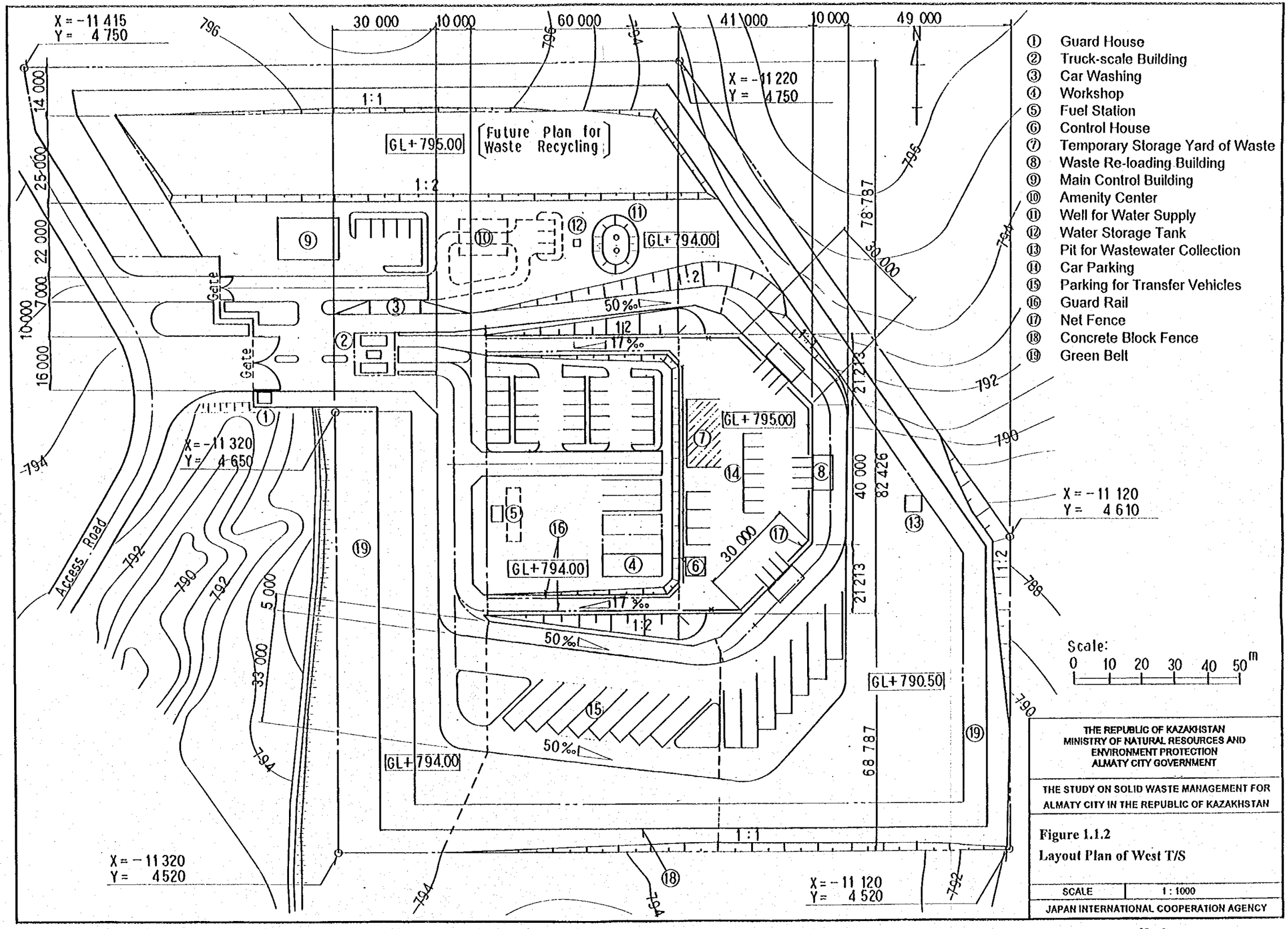
THE REPUBLIC OF KAZAKHSTAN
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION
ALMATY CITY GOVERNMENT

THE STUDY ON SOLID WASTE MANAGMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

Figure 1.1.1
Location and Environs of West T/S

SCALE	1:10,000

JAPAN INTERNATIONAL COOPERATION AGENCY



① Guard House
② Truck-scale Building
③ Car Washing
④ Workshop
⑤ Fuel Station
⑥ Control House
⑦ Temporary Storage Yard of Waste
⑧ Waste Re-loading Building
⑨ Main Control Building
⑩ Amenity Center
⑪ Well for Water Supply
⑫ Water Storage Tank
⑬ Pit for Wastewater Collection
⑭ Car Parking
⑮ Parking for Transfer Vehicles
⑯ Guard Rail
⑰ Net Fence
⑱ Concrete Block Fence
⑲ Green Belt

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Figure 1.1.2
Layout Plan of West T/S

SCALE	1 : 1000

JAPAN INTERNATIONAL COOPERATION AGENCY

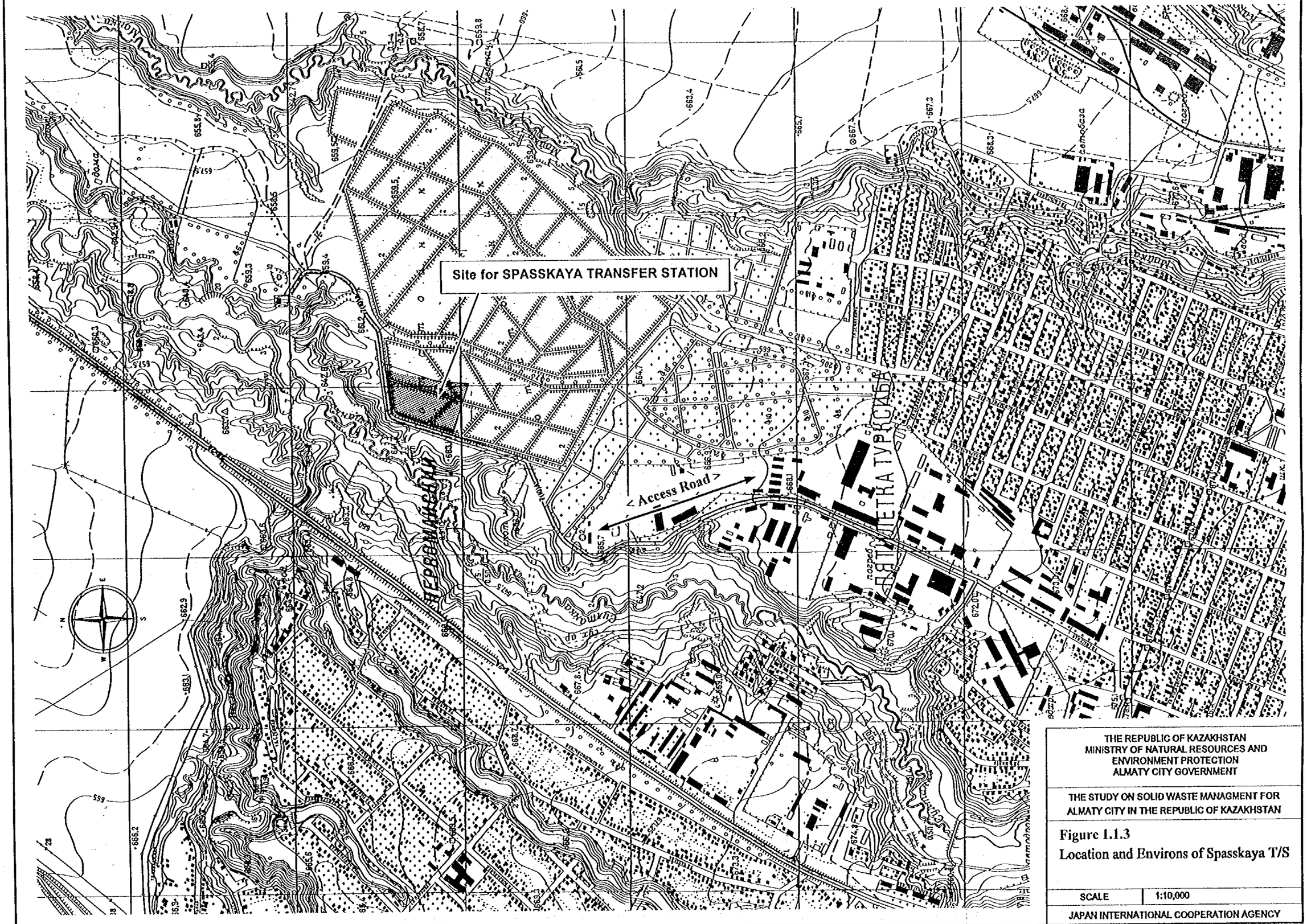

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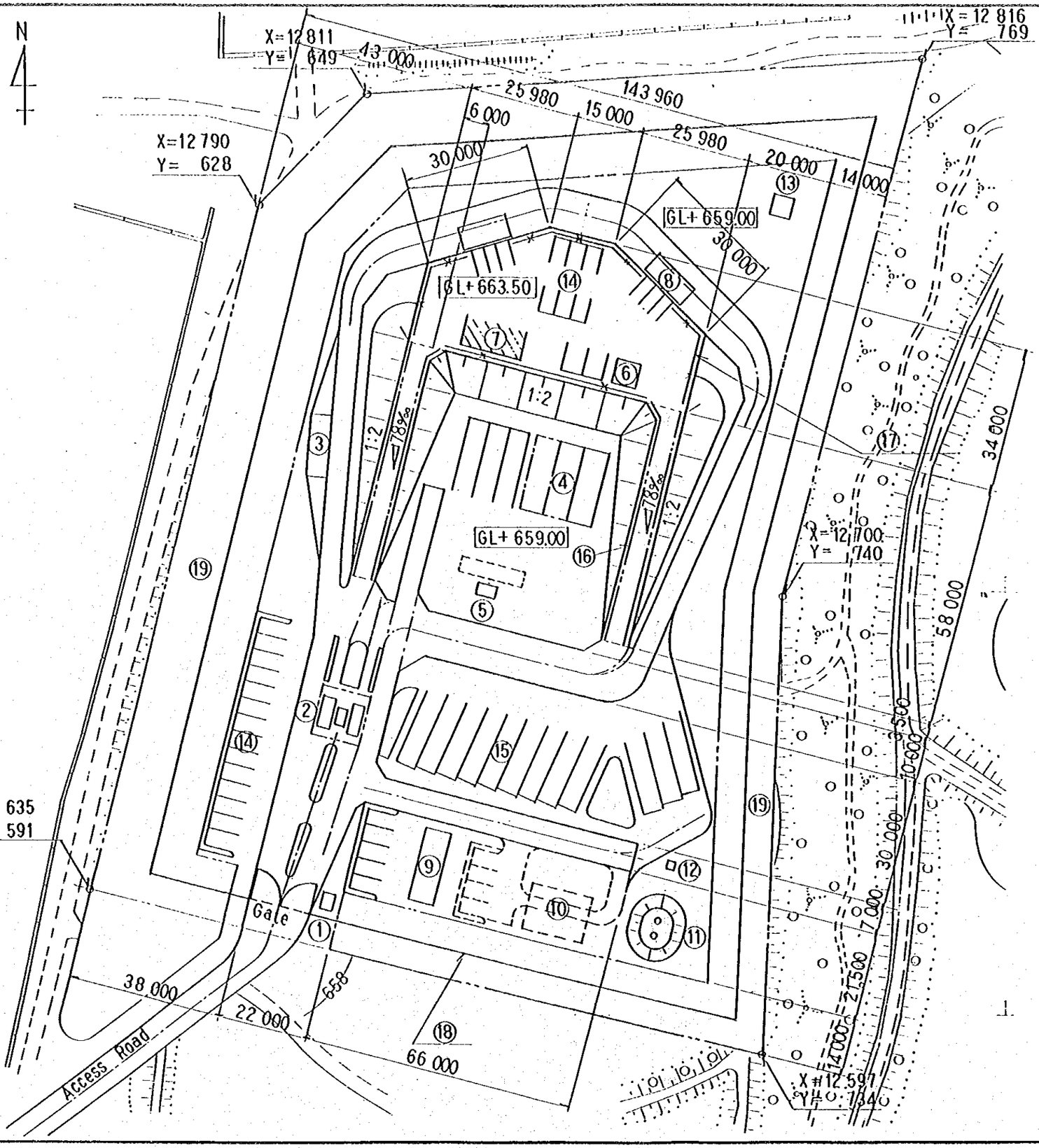
Figure 1.1.3
Location and Environs of Spasskaya T/S

SCALE	1:10,000

JAPAN INTERNATIONAL COOPERATION AGENCY



① Guard House
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⑭ Car Parking
⑮ Parking for Transfer Vehicles
⑯ Guard Rail
⑰ Net Fence
⑱ Concrete Block Fence
⑲ Green Belt

Scale :
0 10 20 30 40 50 m

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Figure 1.1.4
Layout Plan of Spasskaya T/S

SCALE	1 : 1000

JAPAN INTERNATIONAL COOPERATION AGENCY

1.2 FACILITY PLAN

1.2.1 Access Road

Access road has planned based on the Russian Standard of SNiP 2.07.01-89 "Urban and Rural Settlements Planning and Building". Applied road category of the access road by this standard is "local roads within scientific-industrial, industrial, utility and storage areas". Design conditions and dimensions of access road for both transfer stations are shown as follows.

- Design speed: 40 km/h
- Traffic lane width: 3.5 m
- Number of traffic lanes: 2 lanes
- Minimum curve radius: 50 m
- Maximum longitudinal gradient: 7 %
- Pedestrian way width: 1.5 m

While, access roads will not be newly constructed but improved (of existing roads), based on Russian Standard of VSN 46-72 "Instructions for Designing of Asphalt Road". The typical section of access road and improvement method of existing road for its access based on the standard is shown in Figure 1.2.1.

1.2.2 Site Interior Road

Site interior roads for West & Spasskaya transfer stations are basically planned for one-way traffic, 4.0m width for collection vehicles and 5.0m for waste transfer semi-trailers, respectively. For the lower level/ passing area of waste re-loading stations for semi-trailers (the level is GL+790.50 for West T/S and GL+659.00 for Spasskaya T/S), one-way and two lanes wide are adopted for the smooth waste re-loading and traffic of semi-trailers. While, interior road for an administrative area of each site will be provided. Layout plan of each transfer station is shown in Figure 1.1.1 and Figure 1.1.2, respectively.

1.2.3 Waste Re-loading Station

Three waste re-loading stations and two stations will be provided for each West and Spasskaya transfer station, respectively.

Two level arrangement has settled for each plan, level difference between lower and upper level of waste re-loading stations are designed for 4.5m (GL+790.50 and GL+659.00 for the lower and GL+795.00 and GL+663.50 for the upper of each Wast & Spasskaya transfer station), taking into account the height of waste transfer trailers which is approximately 4.0m. 0.5m clearance between these two levels has set for the smooth waste re-loading works. Details of waste re-loading station are shown in Figure 1.2.2.

While, temporary storage yard of waste will be provided at the upper level of each transfer station, its area is 200m^2 for West T/S and 100m^2 for Spasskaya T/S.

1.2.4 Truck-scale

Incoming waste full collection vehicles and outgoing empty vehicles shall be weighed by using truck-scales so as to obtain the following several important data for SWM.

- Checking waste amounts are the basic data for collection of tipping fees
- Understanding the working time and the waste collected by each collection vehicle, are the basic factors for planning effective collection routes and methods
- Understanding the waste amount transferred to and hauled-in at the disposal site will be the basic factor for future disposal planning

A total of two truck-scales will be provided in each transfer station, one for incoming traffic and the other for outgoing traffic. The location will be entrance road of certain distance for incoming vehicles. The specification of the truck-scale is described as follows.

- Weighing capacity: 30 ton/unit
- Load-cell type and four point support system
- Automatic digital counter
- Control post with card reader
- Connected computer with printer to input and process the data

1.2.5 Main Control Building

Main control buildings shall be constructed for the administration work of transfer stations. Floor areas are 216m^2 for West and 108m^2 for Spasskaya transfer station, and both are consist of two floors. The building will provide spaces for use by onsite personnel, including offices for management staff, meeting room, dining room, toilet, locker room, shower, store, etc. for all of the onsite workers. While, taking into account the cold and long winter season in Almaty, boiler is equipped in this building. Building frame-types, floor layout, etc. of main control building are designed based on Russian Architect Standard of SNIP 2.09.04-87, SNIP 2.03.13-88 and SNIP 2.03.11-85.

Plan of main control buildings for each transfer station are shown in Figure 1.2.3 and Figure 1.2.4, respectively.

1.2.6 Transfer Vehicle Parking

Onsite parking is provided for all of the waste transfer semi-trailers. In principle, taking into account the smooth in and out of trailers to and from parking area, forward in and out is adopted for its leading way.

In West transfer station, although only 14 transfer semi-trailer units will be operated, parking area will be provided for up to 17 units (including two of temporary parking area). While, in Spasskaya, 12 parking units will be provided for 7 semi-trailers.

Layouts of transfer vehicle parking of each transfer station are shown in Figure 1.1.1 and Figure 1.1.2, respectively.

1.2.7 Workshop

Onsite workshop equipped with 2 service bays will be provided in each transfer station in order to carry out minor maintenance activities, such as daily, weekly and monthly maintenance, tire inflation and replacement, engine cooling system maintenance, and/or other small repairs.

Plan of workshop building for West & Spaskaya transfer stations are shown in Figure 1.2.5.

1.2.8 Green Belt/ Buffer Zone

For the environmental protection measures, green belt/ buffer zone will be provided all-surrounding transfer stations, based on Russian standard of "Instructions for Sanitary Protection/ Green belt in Industrial Area, Moscow 1984". Along the local road adjacent to transfer stations, 23m width of green belt (including fence) shall be installed, while, in other directions, 14m width of it shall be provided. Location of green belts in each transfer station are shown in Figure 1.1.1 and Figure 1.1.2. While, details of green belt is shown in Figure 1.2.6.

1.2.9 Water Management

1) Wastewater Management

Wastewater which might be produced due to the operation of transfer stations, i.e. at the re-loading stations, car washing and other facilities, will be collected in the pit which located at the lowest area of each transfer station. Collected wastewater at the sites will be transported by water tankers to the treatment facilities in Karasai disposal site.

2) Surface Water Runoff

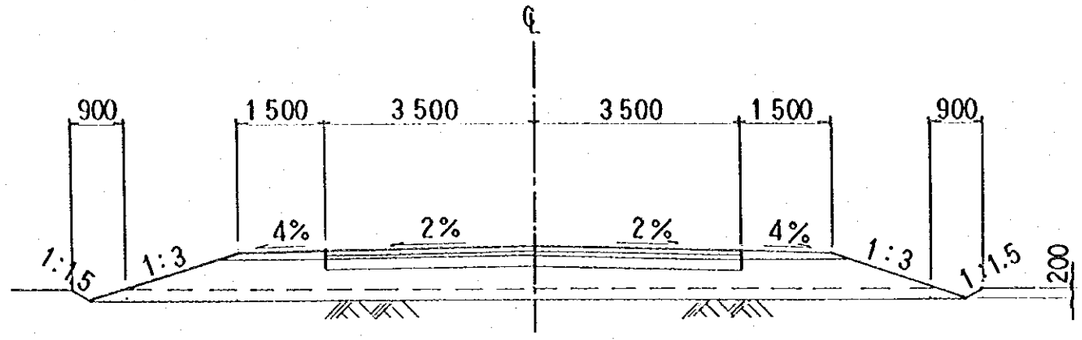
In case of West transfer station, storm-water which might be coming from an upper hill side of the north shall be collected by drainage system installed along with north and east side of transfer station. And it should be discharged to the lower area to the east.

While, in Spaskaya transfer station, storm-water will be discharged to tributary of Suttanks river which flow adjacent to the east of the site.

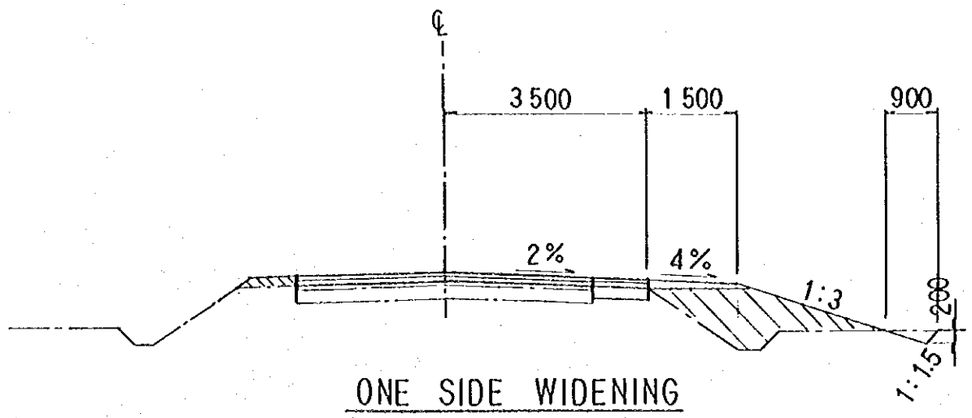
3) Water Supply

Municipal water supply system does not cover both sites of West and Spasskaya transfer stations. Two wells, each 300m depth and 150m^3 capacity, shall be installed at both transfer stations. Water tank and water supply piping, PVC pipe with 25mm diameter, will be equipped and installed at both sites. Water tank will be provided for the fire fighting purpose, also. While, one of two wells will be used for the periodical monitoring of under groundwater quality, also.

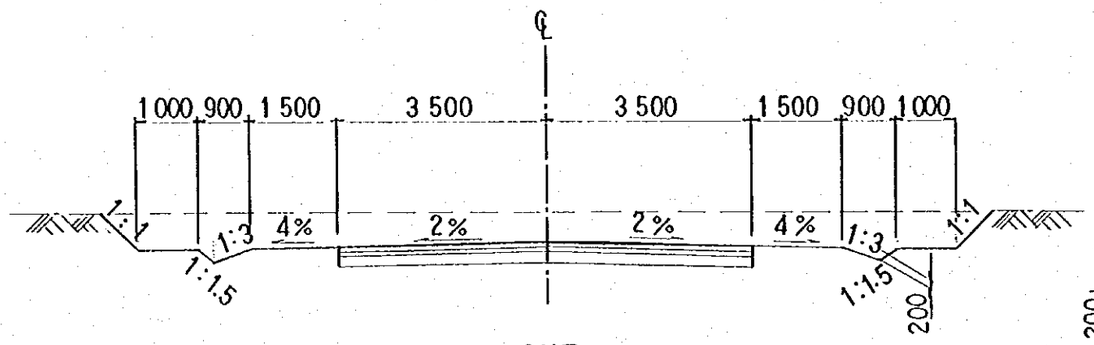
Water management system for both West & Spasskaya transfer stations are shown in Figure 1.2.7 and Figure 1.2.8, respectively.



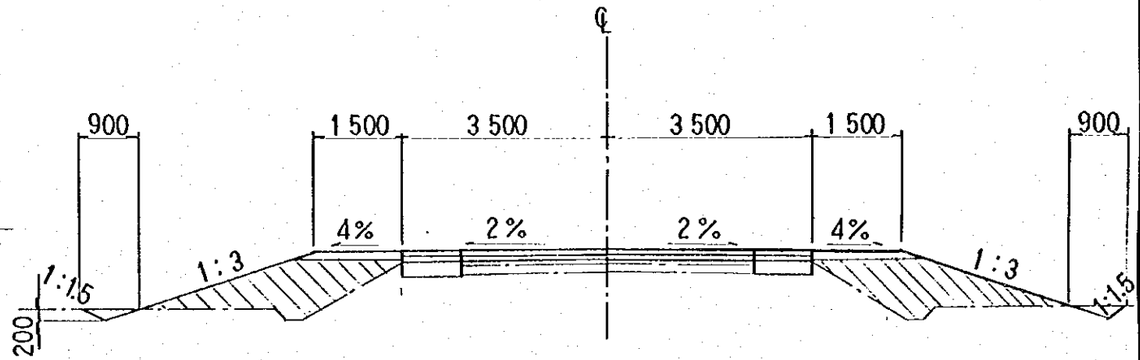
BANK



ONE SIDE WIDENING



CUT



BOTH SIDE WIDENING

TYPICAL SECTION OF ACCESS ROAD 1/100

(Russian Standard: SNIP 2.07.01-89)

IMPROVEMENT METHOD OF ACCESS ROAD 1/100

(Russian Standard: VSN 46-72)

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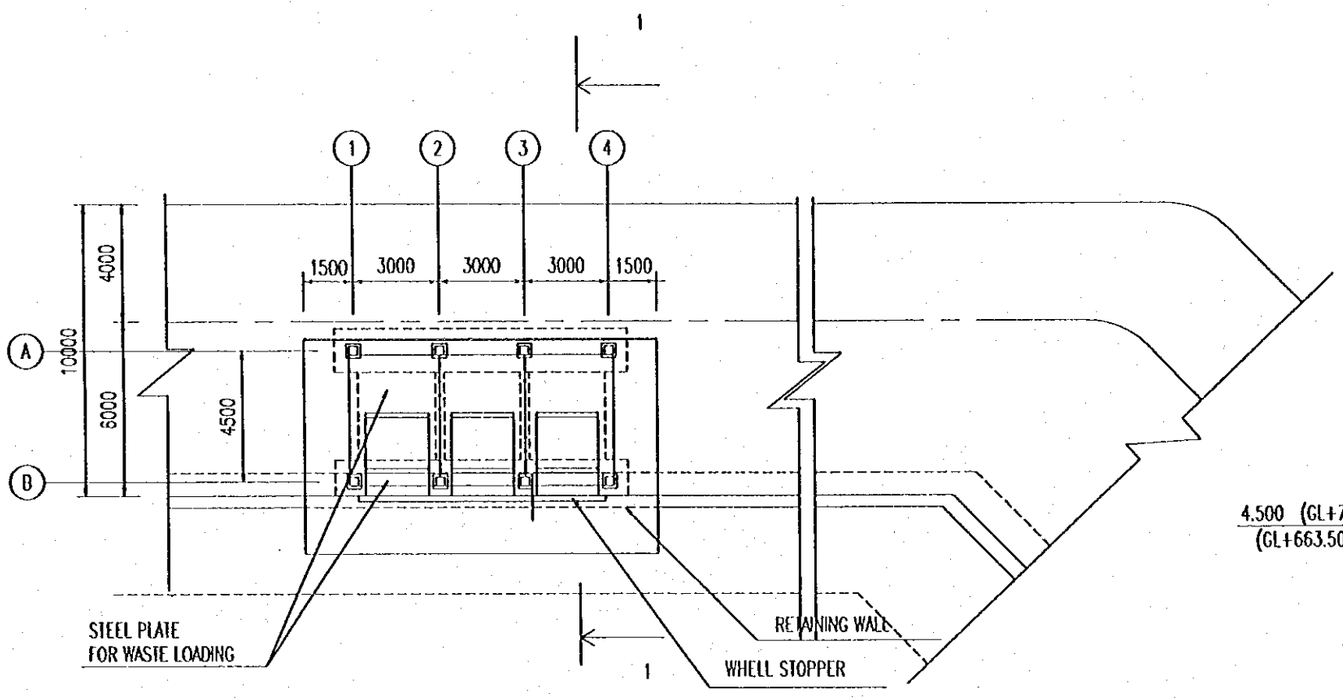
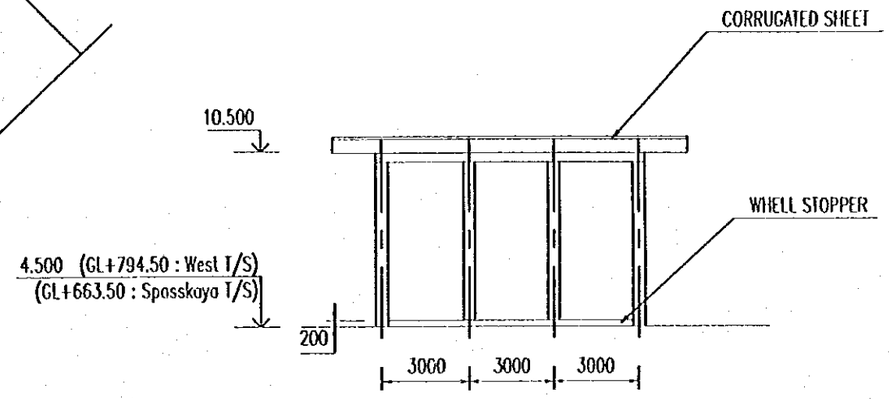
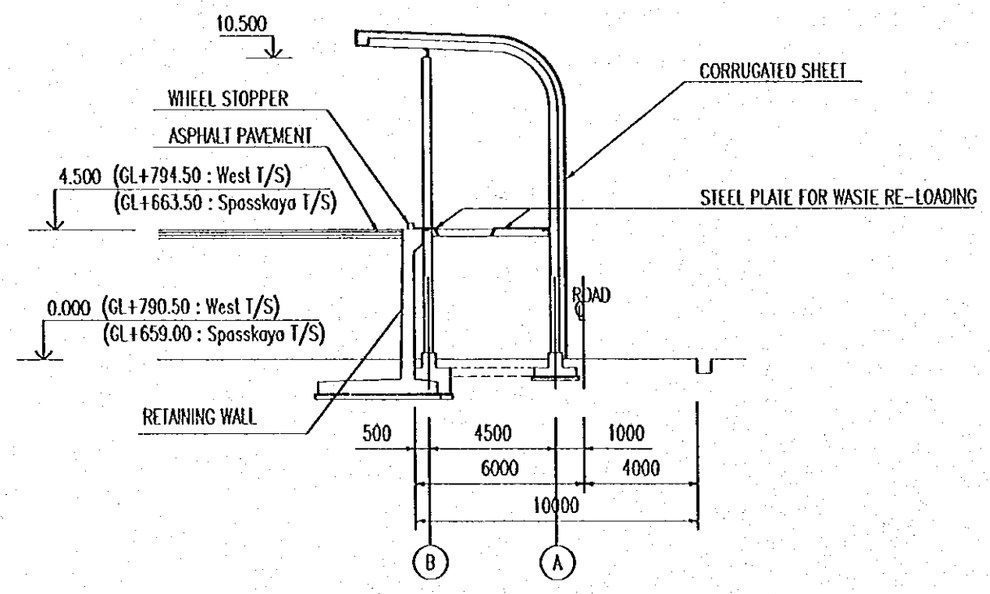
Figure 1.2.1 **Typical Section of Access Road for West & Spasskaya T/S**
SCALE 1 : 100
JAPAN INTERNATIONAL COOPERATION AGENCY



PLAN



ELEVATION 1–4



SECTION 1–1

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Figure 1.2.2
Waste Re-Loading Station of West & Spasskaya T/S

SCALE 1 : 200

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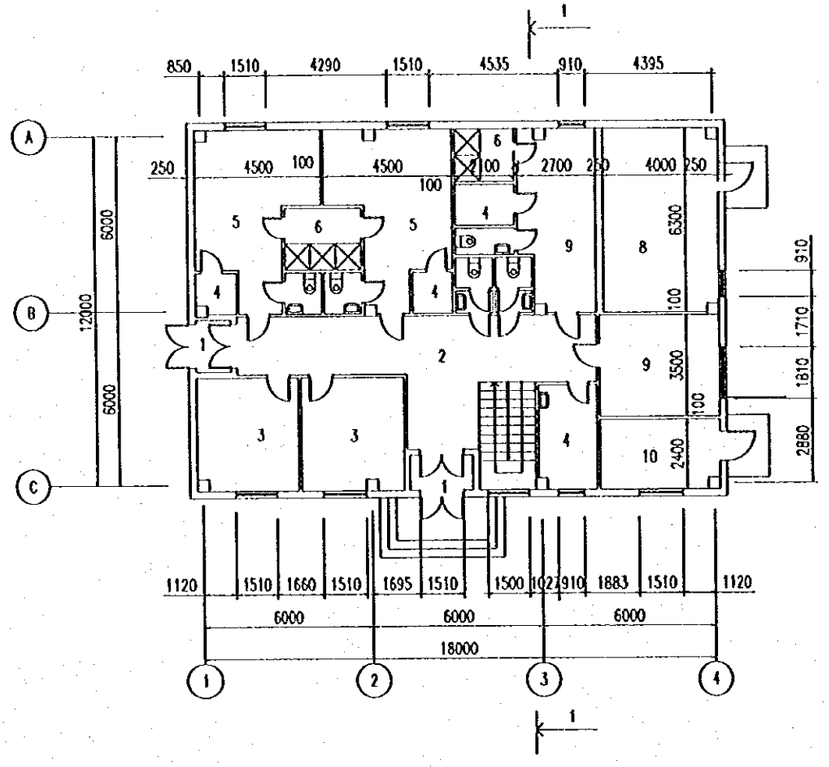
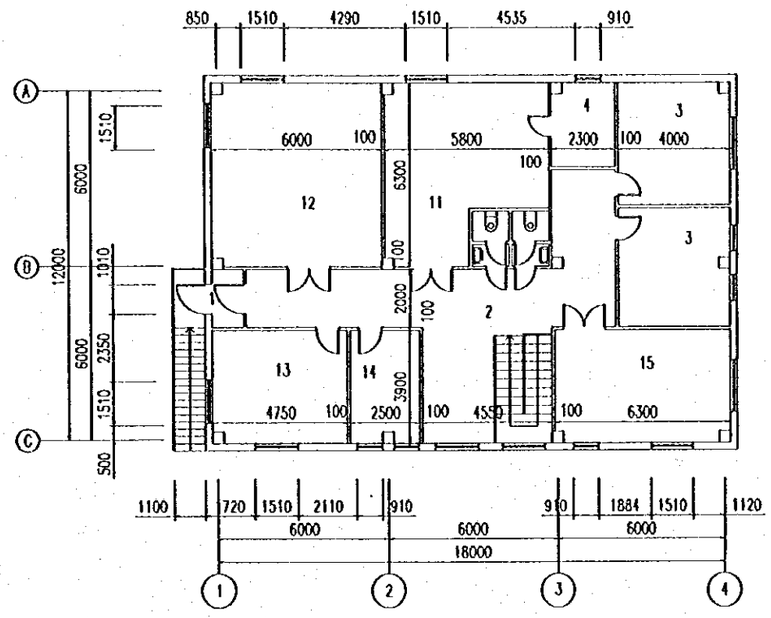
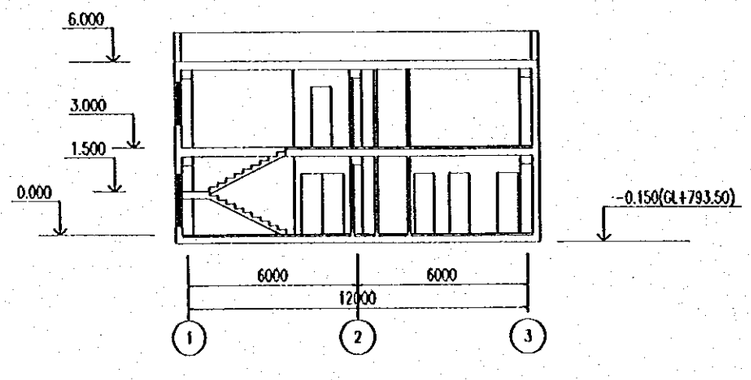


1 ST FLOOR PLAN



2 ND FLOOR PLAN



SECTION 1-1

1	ENTRANCE	9	SECURITY ROOM
2	CORRIDOR	10	FIRE EQUIPMENT STORE
3	OFFICE	11	DINING ROOM
4	STORE	12	MEETING ROOM
5	LOCKER ROOM FOR MEN	13	DIRECTOR OFFICE
6	SHOWER	14	SECRETARY
7	LOCKER ROOM FOR WOMEN	15	STAFF ROOM
8	BOILER ROOM		

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Figure 1.2.3
Main Control Building
Of West T/S : Plan

SCALE 1:200

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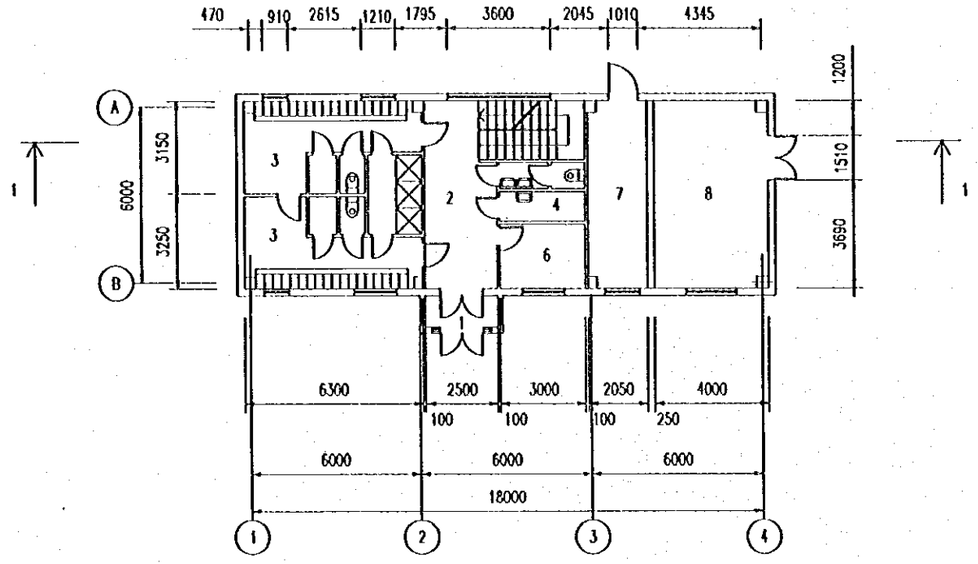
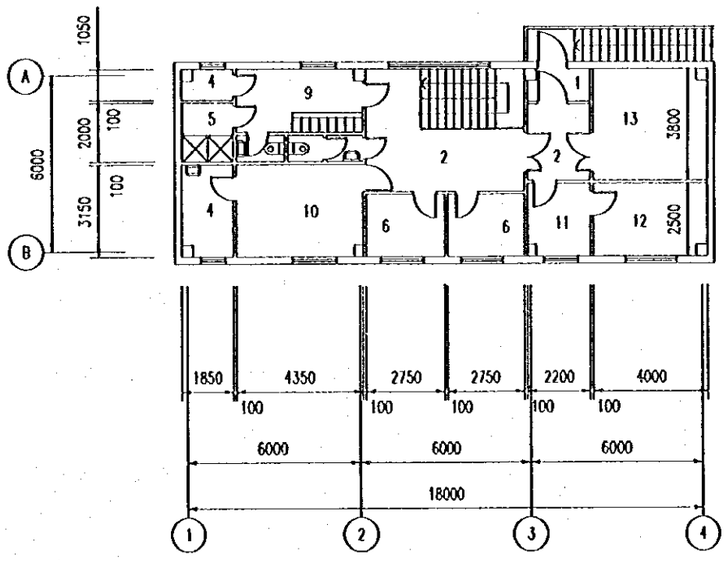
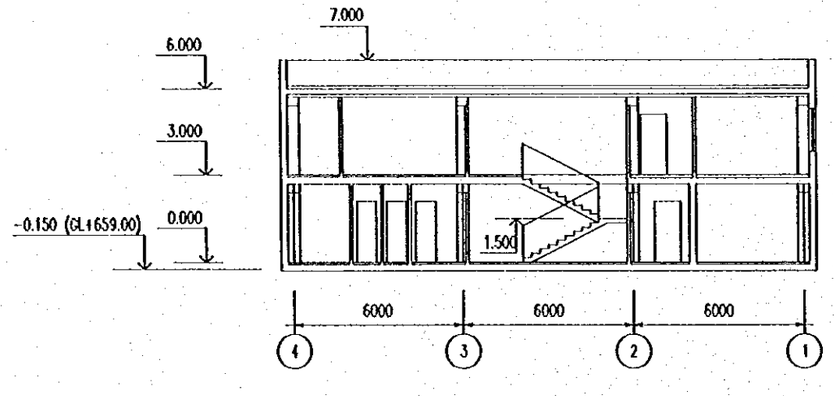


1 ST FLOOR LAYOUT



2 ND FLOOR LAYOUT



SECTION 1-1

1	ENTRANCE	8	BOILER ROOM
2	CORRIDOR	9	LOCKER ROOM FOR WOMEN
3	LOCKER ROOM FOR MEN	10	DINING ROOM
4	STORE	11	SECRETARY
5	SHOWER	12	DIRECTOR OFFICE
6	OFFICE	13	MEETING ROOM
7	FIRE EQUIPMENT STORE		

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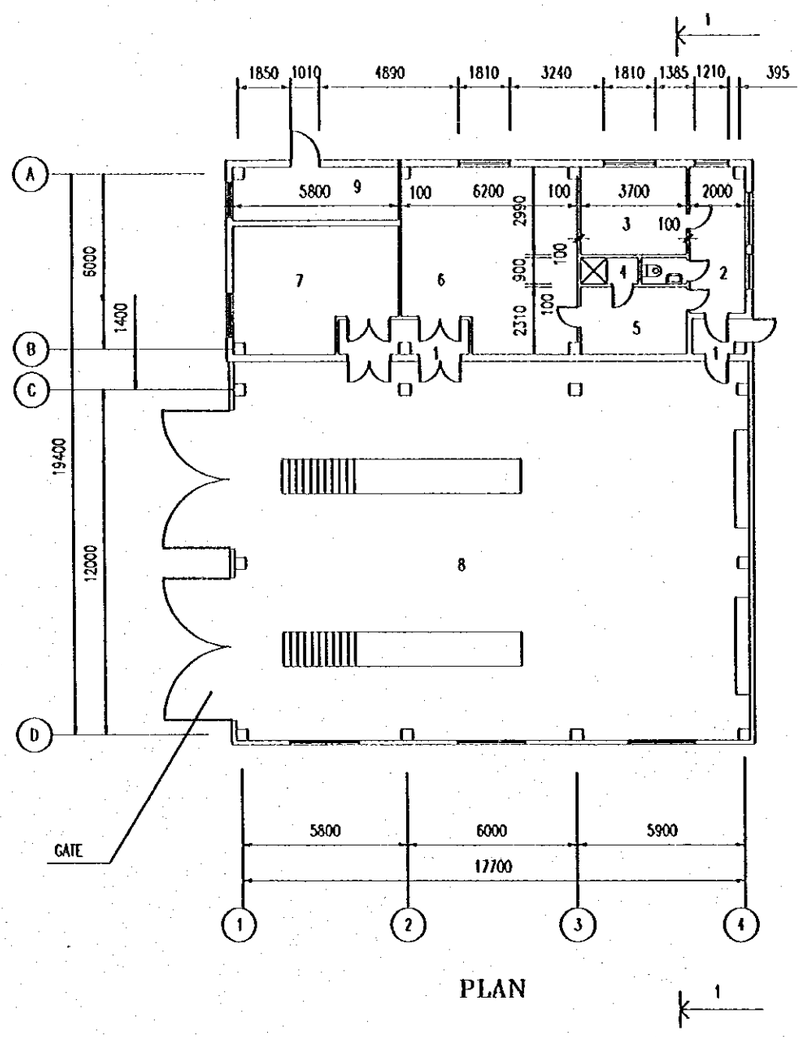
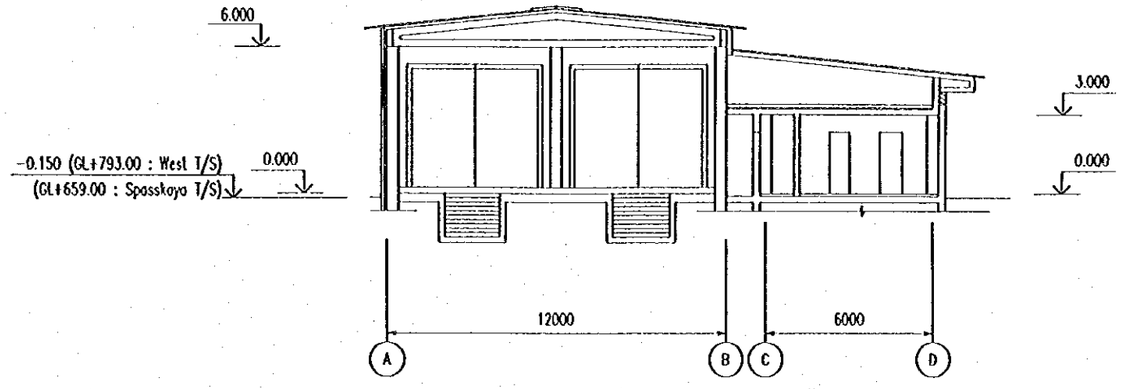
Figure 1.2.4
Main Control Building
Of Spasskaya T/S : Plan

SCALE 1:200

JAPAN INTERNATIONAL COOPERATION AGENCY

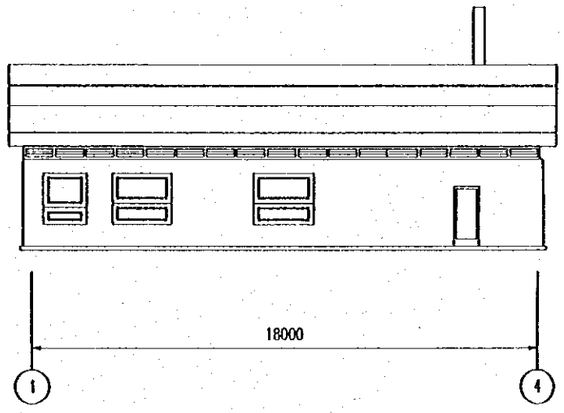


PLAN

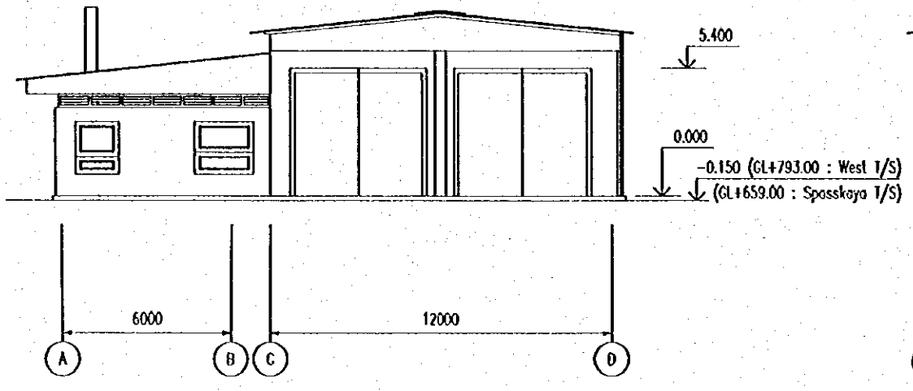


SECTION 1-1

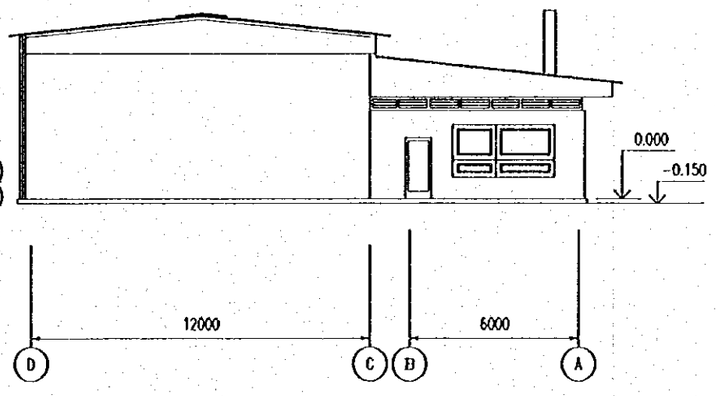
1	ENTRANCE
2	CORRIDOR
3	OFFICE
4	SHOWER
5	LOCKER ROOM
6	MAINTENANCE ROOM
7	STORE
8	WORKSHOP
9	BOILER



ELEVATION 4-1



ELEVATION A-D



ELEVATION D-A

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Figure 1.2.5
Workshop Building of West & Spasskaya T/S

SCALE 1 : 200

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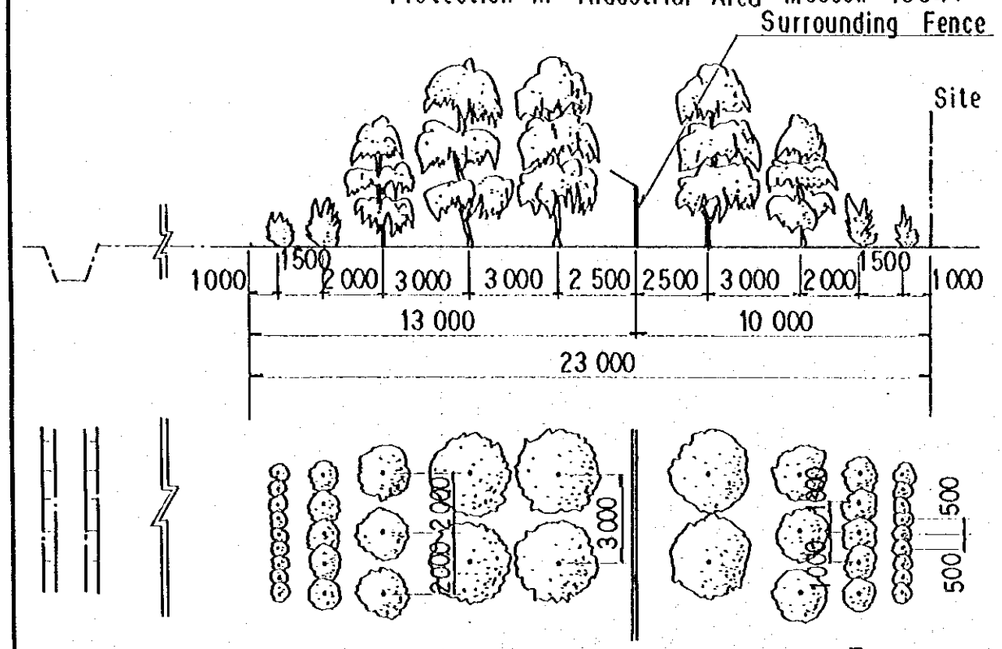
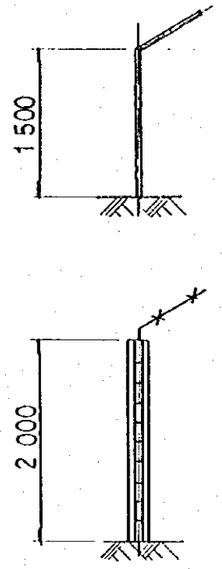
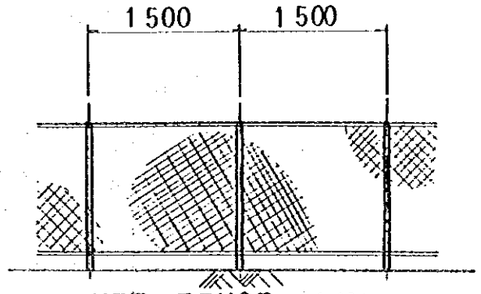
GREEN BELT/BUFFER ZONE

(Russian Standard of "Instruction for Sanitary Protection in Industrial Area Moscow 1984")

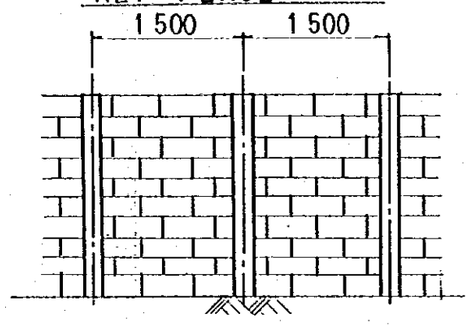


GREEN BELT-1 (W= 23[m])

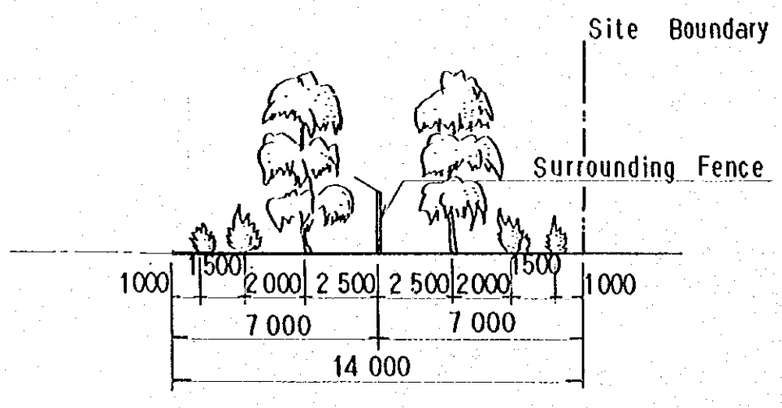




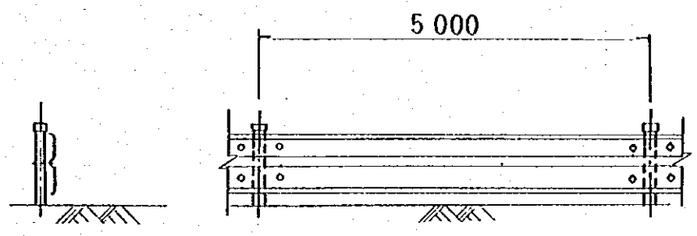
NET FENCE 1/60



CONCRETE BLOCK FENCE 1/60



GREEN BELT-2 (W=14[m])



GUARD RAIL 1/60

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Figure 1.2.6 **Green Belt and Fences for West & Spasskaya T/S**	
SCALE	
JAPAN INTERNATIONAL COOPERATION AGENCY	

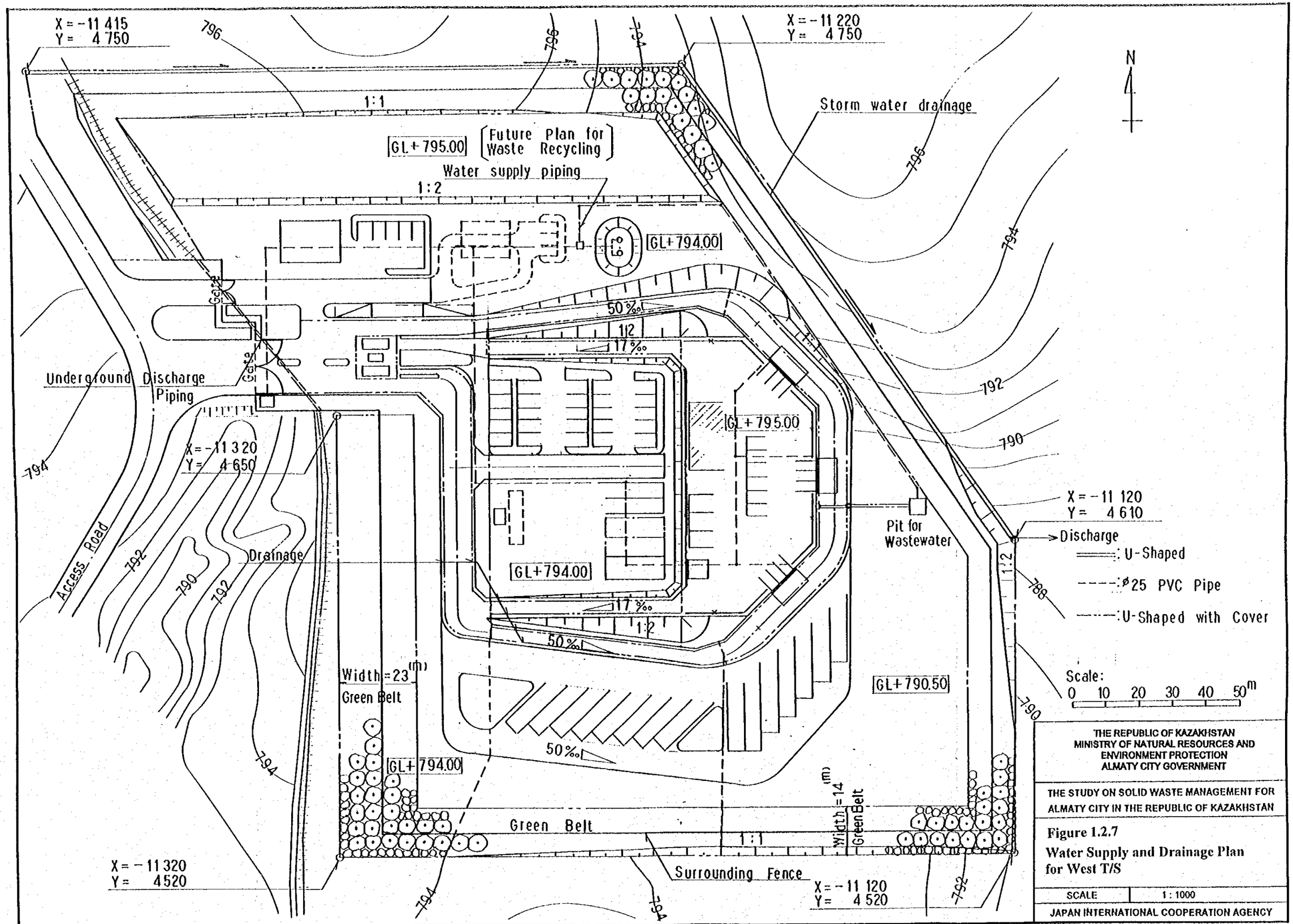

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Figure 1.2.7
Water Supply and Drainage Plan for West T/S

SCALE	1 : 1000

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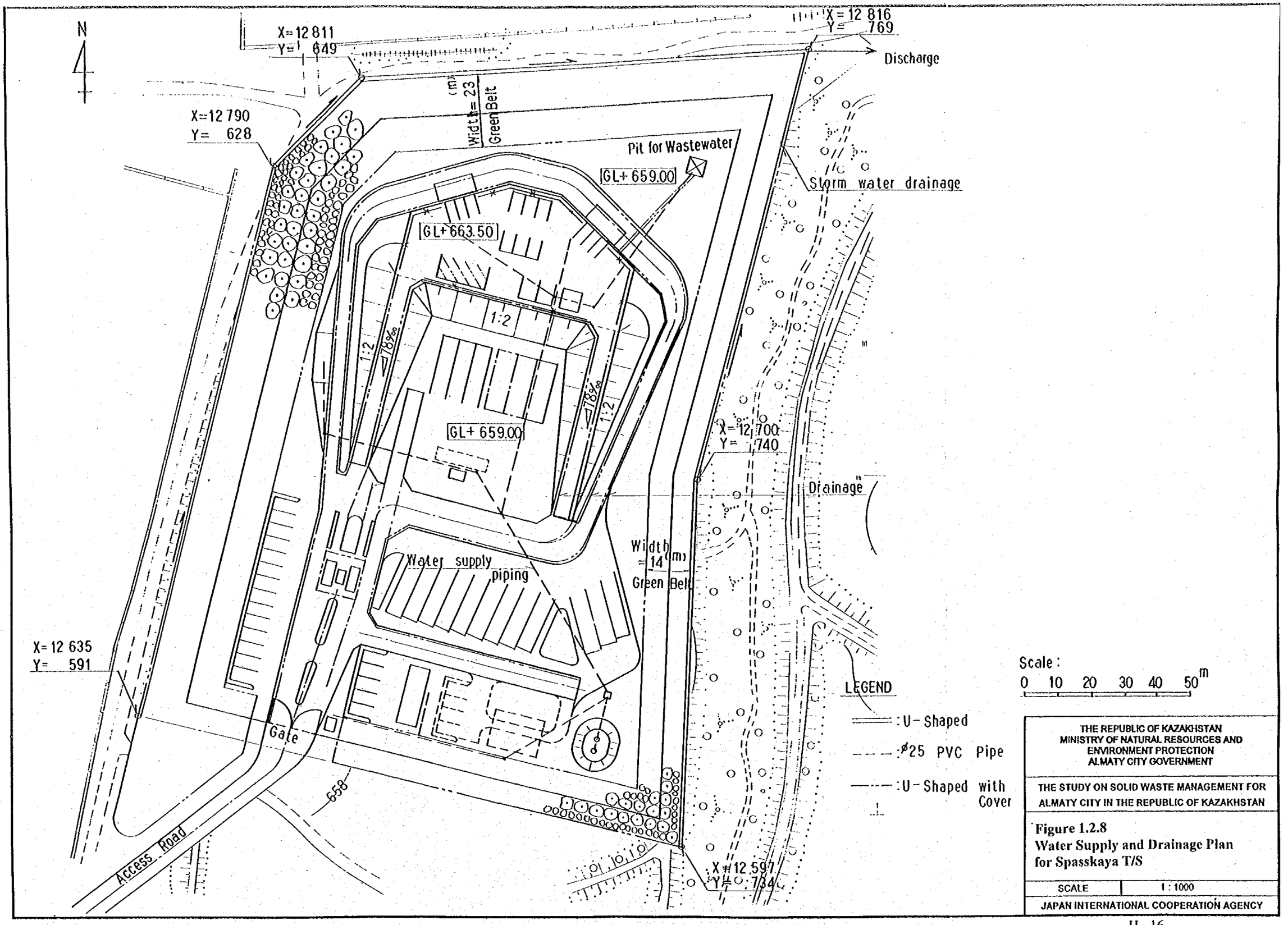

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Figure 1.2.8
Water Supply and Drainage Plan for Spasskaya T/S

SCALE	1 : 1000

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SECTION I

FIELD SURVEYS

SECTION I: FIELD SURVEYS

1. RESULT OF SOLID WASTE AMOUNT AND COMPOSITION SURVEY

1.1 INTRODUCTION

In order to obtain data on solid waste generated in Almaty City, the solid waste amount an composition survey has been carried out in March and August in 1999. Outline of the survey is shown in Table 1.1.1. Survey area is selected in Almalinskii, Bostandykskii and Turksibskii districts.

Table 1.1.1 Outline of the Solid Waste Amount and Composition Survey

Survey Items	Classification	Sample quantity
(1) Unit generation rate (1 week x 2 season)	a. Domestic waste	
	- Block house	20 hh x 3 area x 2 season
	- Two story block house	20 hh x 3 area x 2 season
	- Individual house	20 hh x 3 area x 2 season
	b. Commercial waste	
	- Restaurant, shops	24 shops x 2 season
	- Office	15 office x 2 season
	- Market	6 market x 2 season
	c. Street waste	3 place x 3 area x 2 season
(2) Solid waste composition	a. Domestic waste	
	- Block house	6 sample x 2 season
	- Two story block house	6 sample x 2 season
	- Individual house	6 sample x 2 season
	b. Commercial waste	
	- Restaurant, shops, office	6 sample x 2 season
	- Market	6 sample x 2 season
(3) Solid waste amount transported to transfer station and disposal sites	a. Karasai disposal site	1 week x 2 season
	b. Transfer station	1 week x 2 season
	c. Compost plant	1 week x 2 season
	d. Other disposal sites NIKA, BARYS, ENBEK, Canyo Reisovka, 70-th Raz-ezd, Zhetysy, Shanirak, Spasskaya, Kulagar	1 week x 2 season

1.2 SOLID WASTE GENERATION RATE

Result of survey is summarized in Table 1.2.1.

Table 1.2.1 Unit Generation Rate

Waste type	unit	Winter	Summer	Average
Domestic waste				
Block house	kg/day/capita	0.30 (0.18)	0.45 (0.29)	0.38
Low rise house	kg/day/capita	0.31 (0.19)	0.60 (0.45)	0.45
Individual house	kg/day/capita	0.87 (1.03)	0.42 (0.25)	0.65
Commercial waste				
Restaurant	kg/day/entity	11.1	8.8	10.0
Shops	kg/day/entity	2.5	2.9	2.7
Office	kg/day/entity	5.5	5.0	5.2
Market	kg/day/stall	2.0	4.3	3.2
Street waste	kg/km	57.1	93.2	75.2

Note: ( ) shows standard deviation.

1.3 SOLID WASTE COMPOSITION

Table 1.3.1 Solid Waste Composition

Waste composition	Domestic waste			Commercial waste			Market waste		
	Win.	Sum.	Ave.	Win.	Sum.	Ave.	Win.	Sum.	Ave.
Combustible									
Paper	17.6	18.0	17.8	37.8	33.4	35.6	23.7	18.3	21.0
Textile	1.8	2.5	2.2	3.4	1.7	2.6	0.9	0.6	0.8
Plastic	12.0	9.9	10.9	5.7	11.1	8.4	7.8	7.9	7.8
Leather	0.3	1.4	0.9	1.5	0.3	0.9	0.2	0.0	0.1
Leaves	1.2	3.5	2.3	0.2	2.0	1.1	0.8	11.0	5.9
Food	50.8	57.2	54.0	38.7	42.9	40.8	56.5	49.3	52.9
Sub total	83.7	92.4	88.1	87.2	91.4	89.3	89.9	87.1	88.5
Non combustible									
Metal	3.0	2.2	2.6	3.6	1.9	2.7	3.0	1.8	2.4
Glass	6.6	4.5	5.6	7.9	2.9	5.4	5.5	2.7	4.1
Ceramic	1.1	0.3	0.7	0.4	1.1	0.7	0.3	0.0	0.2
Sand	5.6	0.5	3.1	0.9	2.8	1.8	1.3	8.4	4.9
Sub total	16.3	7.5	11.9	12.8	8.6	10.7	10.1	12.9	11.5
Total	100	100	100	100	100	100	100	100	100
Density	0.31	0.34	0.32	0.22	0.22	0.22	0.24	0.45	0.34
Moisture content	40.7	45.6	43.1	34.2	37.3	35.7	44.9	41.2	43.0
Lower calorific value	1,695	1,768	1,731	2,028	2,032	2,030	1,703	1,740	1,722

1.4 FIELD SURVEYS DATA

The Field survey raw data are given in the following tables.

Table 1.4.1 Domestic Waste Field Survey Results (Winter) (1/2)

No.	Block house					Two story builiding					Individual house				
	Pers	Area	Weight	Volume	Unit R	Densit	Pers	Area	Weight	Voiume	Unit R	Densit	Pers	Area	Weight	Volume	Unit R	Densit
1	4	62	7	18.5	0.250	0.378	4	52	1.9	8.5	0.068	0.224	4	33	4.3	16.8	0.154	0.256
2	3	62	5.5	21.8	0.262	0.252	5	66	3.9	11.6	0.111	0.336	4	36	6.6	21.9	0.236	0.301
3	2	45	4.4	18.4	0.314	0.239	2	50	2.8	11.8	0.200	0.237	4	36	4.8	19.5	0.171	0.246
4	2	62	8	27.6	0.571	0.290	2	40	4.1	13.6	0.293	0.301	4	30	5.8	18.8	0.207	0.309
5	2	45	5.5	23.9	0.393	0.230	4	62	5.1	18.5	0.182	0.276	4	42	3.3	16.1	0.118	0.205
6	2	43	8.3	30	0.593	0.277	1	48	1.8	9.3	0.257	0.194	3	62	5	19.5	0.238	0.256
7	5	62	2.1	7.9	0.060	0.266	2	52	2.7	10.8	0.193	0.250	2	50	15.5	38.7	1.107	0.401
8	3	42	3.4	15.5	0.162	0.219	2	46	8.1	38.8	0.579	0.209	3	60	11.9	39	0.567	0.305
9	2	45	3.6	20.5	0.257	0.176	4	33	8	29	0.286	0.276	3	61	10.2	35.5	0.486	0.287
10	2	42	11.1	27	0.793	0.411	2	45	1.8	11.1	0.129	0.162	4	48	18.6	54.9	0.664	0.339
11	3	62	3.2	18	0.152	0.178	1	38	2.3	9.8	0.329	0.235	4	35	1.9	11.5	0.068	0.165
12	3	42	4.8	17.3	0.229	0.277	3	46	3	17.3	0.143	0.173	3	96	2.8	12.9	0.133	0.217
13	4	62	9.1	24	0.325	0.379	1	39	5.1	24	0.729	0.213	3	69	7.6	21	0.362	0.362
14	4	70	9.8	31.1	0.350	0.315	4	36	10	31.1	0.357	0.322	3	64	7.7	20.3	0.367	0.379
15	5	62	10.1	43.5	0.289	0.232	3	50	4.7	43.5	0.224	0.108	2	68	15.7	39.4	1.121	0.398
16	2	44	5.3	25	0.379	0.212	2	36	4.7	23.8	0.336	0.197	1	30	3.9	15	0.557	0.260
17	2	46	7.7	26	0.550	0.296	5	36	11	30.8	0.314	0.357	4	48	15.5	42	0.554	0.369
18	1	42	1.7	9.5	0.243	0.179	2	45	4.3	21	0.307	0.205	4	50	5.8	26.1	0.207	0.222
19	4	44	8	32.1	0.286	0.249	3	45	1.9	11.7	0.090	0.162	4	50	7.4	26.5	0.264	0.279
20	4	45	7.1	28.1	0.254	0.253	2	35	3.6	18.5	0.257	0.195	4	100	13	36	0.464	0.361
1	5	84	6.5	33.5	0.186	0.194	1	35	4.85	29.2	0.693	0.166	4	36	38.6	59.5	1.379	0.649
2	5	63	5.25	33.8	0.150	0.155	2	35	3.25	11.2	0.232	0.290	1	36	35.15	42.8	5.021	0.821
3	3	52	11.9	53.7	0.567	0.222	3	49	3.65	31	0.174	0.118	4	52	8.3	33.7	0.296	0.246
4	4	63	5.3	19.2	0.189	0.276	3	55	4.8	17.3	0.229	0.277	3	30	8.1	31.6	0.386	0.256
5	2	52	6.2	31.4	0.443	0.197	4	29	6.8	34.2	0.243	0.199	4	37	11.1	37.4	0.396	0.297
6	4	63	4.25	26.6	0.152	0.160	2	29	7.2	23.9	0.514	0.301	2	35	24.8	33.5	1.771	0.740
7	4	63	10.7	45.6	0.382	0.235	2	36	6.05	18.3	0.432	0.331	1	26.5	6.9	39.6	0.986	0.174
8	2	52	2.65	16.2	0.189	0.164	3	50.5	5.65	28.75	0.269	0.197	12	100	122.2	135.4	1.455	0.903
9	3	52	5.35	24.4	0.255	0.219	4	50.5	6.75	37.9	0.241	0.178	3	21.6	5.9	17.9	0.281	0.330
10	2	35.3	4	29.9	0.286	0.134	1	46	3.5	25	0.500	0.140	4	40	18.55	30.6	0.663	0.606

Table 1.4.1 Domestic Waste Field Survey Results (Winter) (2/2)

11	2	73	1.99	16.4	0.142	0.121	4	40	5.9	43.6	0.211	0.135	5	41.5	12.1	41	0.346	0.295
12	1	35	1.3	8.5	0.186	0.153	2	29	2.2	23.3	0.157	0.094	3	18	46.2	48.3	2.200	0.957
13	3	84	2.6	18.7	0.124	0.139	2	46.3	15.5	51.6	1.107	0.300	3	19	21.5	39.3	1.024	0.547
14	1	35	6.6	34.6	0.943	0.191	3	37	5.6	33.9	0.267	0.165	6	23.2	25	36.3	0.595	0.689
15	4	73	8.4	33.5	0.300	0.251	2	31	2.62	13.6	0.187	0.193	5	42.9	6.35	19.4	0.181	0.327
16	3	40.2	2.8	9.8	0.133	0.286	2	42	2.35	9.4	0.168	0.250	5	42.9	23.7	26.5	0.677	0.894
17	17	84	8.7	46.5	0.073	0.187	2	45	3.5	20.6	0.250	0.170	6	85	4.5	16.5	0.107	0.273
18	1	35	2.9	12.8	0.414	0.227	3	38	3.65	22	0.174	0.166	4	41	5	36.6	0.179	0.137
19	2	35	2.4	14.4	0.171	0.167	2	30	2.85	15.5	0.204	0.184	3	41	7.45	37.9	0.355	0.197
20	2	73	4.8	35.3	0.343	0.136	4	29	3.35	22	0.120	0.152	2	12	5.05	23	0.361	0.220
1	1	63	3.25	15.7	0.464	0.207	4	36.1	7.15	30.8	0.255	0.232	4	48	20.1	53.6	0.718	0.375
2	2	32	7.65	37	0.546	0.207	4	42.3	7.85	40	0.280	0.196	1	60	27.1	41.3	3.871	0.656
3	2	52.3	3.6	23.5	0.257	0.153	4	56	4.77	30.8	0.170	0.155	5	32	10.45	39.5	0.299	0.265
4	4	52.3	7.25	48	0.259	0.151	5	56	7.85	22.8	0.224	0.344	3	74	6.6	29	0.314	0.228
5	3	63	2.74	11.3	0.130	0.242	3	64	7.6	33.5	0.362	0.227	4	25	2	17.5	0.071	0.114
6	1	40.2	4.55	31.4	0.650	0.145	5	42.3	7.25	47.5	0.207	0.153	3	25	45.2	58.4	2.152	0.774
7	3	52.3	3.25	10.75	0.155	0.302	2	42.3	4.45	21.5	0.318	0.207	3	48	20.1	20.7	0.957	0.971
8	4	63	1.8	6.7	0.064	0.269	3	64	8.23	43.7	0.392	0.188	3	65	2.15	12.9	0.102	0.167
9	2	52.3	2.97	15	0.212	0.198	4	56	9.85	47.1	0.352	0.209	3	40	3.89	15.8	0.185	0.246
10	2	63	3.7	15.9	0.264	0.233	3	42.3	8	48.6	0.381	0.165	3	54	36.8	47	1.752	0.783
11	2	40.2	3.3	28.7	0.236	0.115	3	56	4.6	22.1	0.219	0.208	2	46.8	28.5	32.9	2.036	0.866
12	2	40.2	3.7	17.1	0.264	0.216	6	64	7.8	27.7	0.186	0.282	2	36	41.1	42.5	2.936	0.967
13	4	63	9.75	46.5	0.348	0.210	2	64	9.39	51.1	0.671	0.184	4	39	26.2	47.8	0.936	0.548
14	1	40.2	2	9	0.286	0.222	3	42.3	4.65	46.2	0.221	0.101	3	40	3	21.3	0.143	0.141
15	3	52.3	7.45	22.1	0.355	0.337	2	64	5.03	25.7	0.359	0.196	3	51	16.9	51.5	0.805	0.328
16	2	40.2	1.25	5.3	0.089	0.236	2	42.3	3.38	20.1	0.241	0.168	2	35	52.95	57.4	3.782	0.922
17	3	40.2	5.05	32.7	0.240	0.154	1	36.1	1.85	10.1	0.264	0.183	3	40	56.1	59.7	2.671	0.940
18	4	40.2	2.65	17.4	0.095	0.152	3	56	4.49	32.9	0.214	0.136	4	35.8	14.8	26.6	0.529	0.556
19	2	40.2	9.04	45.6	0.646	0.198	3	36.1	10.05	43.85	0.479	0.229	3	16	4.2	16.9	0.200	0.249
20	4	63	4.94	42.2	0.176	0.117	2	36.1	11.23	43.8	0.802	0.256	2	18	14.25	32.5	1.018	0.433
Tota	180	3168.6	320.18	1492.4	0.254	0.215	169	2680.5	326.29	1596.6	0.276	0.204	207	2677.2	1036.1	2043	0.715	0.507
Ave	3.0	51.5	6.3	23.3	0.336	0.265	2.7	45.0	4.5	19.7	0.269	0.232	3.4	53.4	8.4	26.6	0.402	0.296
Ave	3.5	57.3	5.2	27.2	0.281	0.191	2.6	39.1	5.0	25.6	0.319	0.200	4.0	39.0	21.8	39.3	0.933	0.478
Ave	2.6	49.7	4.5	24.1	0.287	0.203	3.2	49.9	6.8	34.5	0.330	0.201	3.0	41.4	21.6	36.2	1.274	0.527
Ave.	3.0	52.8	5.3	24.9	0.301	0.220	2.8	44.7	5.4	26.6	0.306	0.211	3.5	44.6	17.3	34.1	0.870	0.433

Table 1.4.2 Domestic Waste Field Survey Results (Summer) (1/2)

No.	Block house						Two story builiding						Individual house					
	Pers	Area	Weight	Volume	Unit R	Densit	Pers	Area	Weight	Volume	Unit R	Densit	Pers	Area	Weight	Volume	Unit R	Density
t 1	4	62.0	14.8	56.5	0.529	0.262	4	52.0	6.9	20.2	0.246	0.342	4	33.0	8.5	28.5	0.304	0.298
2	3	62.0	11.6	48.5	0.552	0.239	5	66.0	8.9	32.6	0.254	0.273	4	36.0	12.1	36.0	0.432	0.336
3	2	45.0	4.9	30.0	0.350	0.163	2	50.0	11.5	37.7	0.821	0.305	4	36.0	5.4	28.3	0.193	0.191
4	2	62.0	14.8	37.5	1.057	0.395	2	40.0	6.9	29.8	0.493	0.232	4	30.0	13.6	26.2	0.486	0.519
5	4	63.0	5.5	28.0	0.196	0.196	4	62.0	8.1	28.7	0.289	0.282	4	42.0	4.0	15.2	0.143	0.263
6	5	61.0	6.7	26.5	0.191	0.253	1	48.0	9.7	31.9	1.386	0.304	3	62.0	6.1	24.5	0.290	0.249
7	3	42.0	3.0	19.8	0.143	0.152	2	52.0	4.2	13.7	0.300	0.307	2	50.0	7.0	30.3	0.500	0.231
8	2	42.0	8.5	39.0	0.607	0.218	2	46.0	15.0	51.5	1.071	0.291	3	60.0	19.7	64.0	0.938	0.308
9	3	62.0	11.0	37.7	0.524	0.292	4	33.0	12.6	35.1	0.450	0.359	4	48.0	8.4	23.7	0.300	0.354
10	3	42.0	13.6	45.7	0.648	0.298	1	38.0	3.8	15.8	0.543	0.241	4	35.0	4.1	16.0	0.146	0.256
11	4	70.0	20.1	47.5	0.718	0.423	1	39.0	5.7	23.7	0.814	0.241	3	96.0	11.6	26.1	0.552	0.444
12	5	62.0	10.1	52.3	0.289	0.193	3	36.0	17.7	53.5	0.843	0.331	4	69.0	7.4	26.0	0.264	0.285
13	2	44.0	6.7	30.0	0.479	0.223	2	36.0	3.9	10.3	0.279	0.379	3	25.0	4.4	17.2	0.210	0.256
14	2	62.0	12.5	34.9	0.893	0.358	4	36.0	10.8	35.5	0.386	0.304	4	67.0	12.1	37.5	0.432	0.323
15	4	44.0	4.0	24.8	0.143	0.161	2	45.0	12.6	39.6	0.900	0.318	4	78.0	2.2	18.6	0.079	0.118
16	4	45.0	2.5	20.1	0.089	0.124	3	45.0	3.9	17.0	0.186	0.229	3	70.0	10.1	27.2	0.481	0.371
17	3	71.0	4.0	21.7	0.190	0.184	4	35.0	2.7	15.0	0.096	0.180	4	41.0	0.8	5.5	0.029	0.145
18	5	63.0	4.9	20.5	0.140	0.239	2	33.0	6.4	17.0	0.457	0.376	3	61.0	18.9	43.0	0.900	0.440
19	4	44.0	3.8	10.4	0.136	0.365	3	36.0	7.6	50.5	0.362	0.150	4	48.0	11.1	45.5	0.396	0.244
20	2	45.0	8.3	21.2	0.593	0.392	3	33.0	15.8	56.5	0.752	0.280	4	50.0	11.3	42.0	0.404	0.269
b 1	5	84.0	20.3	54.2	0.580	0.375	1	35.0	2.5	17.7	0.357	0.141	4	36.0	15.3	32.3	0.546	0.474
2	3	63.0	29.8	72.5	1.417	0.410	2	35.0	5.6	16.1	0.400	0.348	1	36.0	7.6	20.5	1.079	0.368
3	3	52.0	20.6	57.0	0.981	0.361	3	49.0	6.7	25.6	0.317	0.260	4	52.0	10.7	26.8	0.382	0.399
4	4	63.0	10.6	22.4	0.379	0.473	3	35.0	7.2	22.1	0.343	0.326	3	30.0	9.0	27.0	0.429	0.333
5	3	52.0	15.6	43.4	0.743	0.359	4	29.0	7.7	21.1	0.275	0.365	4	37.0	11.8	37.9	0.420	0.310
6	4	63.0	18.8	44.5	0.671	0.422	3	29.0	13.6	54.1	0.648	0.251	2	35.0	5.4	13.3	0.386	0.406
7	4	63.0	9.5	37.1	0.338	0.255	3	36.0	18.8	42.1	0.895	0.447	9	26.5	24.0	52.5	0.381	0.457
8	1	52.0	4.3	15.0	0.614	0.287	2	50.5	12.4	30.4	0.886	0.408	13	100.0	15.1	27.0	0.166	0.559
9	3	52.0	21.1	42.8	1.005	0.493	3	50.5	10.0	33.1	0.476	0.302	4	21.6	9.9	34.3	0.354	0.289
10	2	35.3	4.3	16.5	0.304	0.258	6	46.0	9.2	33.4	0.218	0.274	4	40.0	15.0	32.2	0.534	0.464

Table 1.4.2 Domestic Waste Field Survey Results (Summer) (2/2)

11	3	62.0	1.9	15.3	0.088	0.121	1	38.0	21.3	57.6	3.043	0.370	4	35.0	14.4	31.4	0.513	0.457						
12	3	42.0	4.6	22.0	0.219	0.209	3	46.0	7.6	22.8	0.362	0.334	4	96.0	5.6	13.5	0.198	0.411						
13	2	62.0	6.8	20.1	0.482	0.336	3	39.0	10.5	30.1	0.498	0.347	4	69.0	14.0	31.8	0.500	0.440						
14	3	70.0	7.2	20.8	0.343	0.346	2	36.0	9.5	18.7	0.675	0.505	4	64.0	7.3	26.2	0.259	0.277						
15	3	62.0	14.1	30.7	0.671	0.459	3	50.0	5.1	13.7	0.240	0.369	2	68.0	8.5	25.0	0.607	0.340						
16	3	40.2	3.2	16.5	0.150	0.191	2	42.0	20.0	41.8	1.429	0.478	4	42.9	7.7	22.8	0.273	0.336						
17	2	84.0	9.7	22.6	0.689	0.427	2	45.0	10.2	27.8	0.729	0.367	6	85.0	14.6	43.5	0.348	0.336						
18	1	35.0	4.9	18.1	0.700	0.271	2	38.0	10.6	24.2	0.754	0.436	4	41.0	7.6	30.0	0.271	0.253						
19	2	35.0	7.3	19.0	0.521	0.384	2	30.0	6.8	20.5	0.482	0.329	3	41.0	10.1	28.3	0.479	0.355						
20	2	73.0	14.2	37.2	1.014	0.382	4	29.0	13.0	46.0	0.464	0.283	2	12.0	3.8	18.2	0.271	0.209						
a'1	1	63.0	3.3	15.1	0.464	0.215	2	36.1	11.7	30.2	0.836	0.387	3	48.0	7.1	29.8	0.336	0.237						
2	1	36.0	5.7	15.2	0.814	0.375	4	42.3	14.7	37.2	0.525	0.395	4	60.0	11.1	35.1	0.396	0.316						
3	2	52.3	3.3	14.5	0.236	0.228	4	56.0	10.0	37.7	0.355	0.264	5	32.0	15.1	41.9	0.430	0.359						
4	3	52.3	11.6	45.9	0.552	0.253	3	56.0	9.4	33.2	0.448	0.283	3	74.0	11.3	26.2	0.538	0.431						
5	3	63.0	8.3	16.8	0.393	0.491	3	64.0	9.5	20.9	0.450	0.452	4	25.0	4.1	9.9	0.146	0.414						
6	1	40.2	4.5	13.5	0.643	0.333	5	42.3	16.5	59.9	0.471	0.275	3	25.0	13.3	27.7	0.631	0.478						
7	3	52.3	3.0	14.6	0.140	0.202	2	42.3	6.9	16.5	0.489	0.415	4	48.0	5.2	21.9	0.184	0.235						
8	4	63.0	10.6	35.7	0.379	0.297	3	64.0	5.9	26.4	0.281	0.223	3	65.0	6.0	14.7	0.286	0.408						
9	3	52.3	3.6	13.0	0.169	0.273	2	56.0	16.0	30.9	1.139	0.516	3	40.0	8.3	26.2	0.395	0.317						
10	2	63.0	3.1	22.9	0.218	0.133	3	42.3	20.0	60.9	0.952	0.328	3	54.0	10.6	21.9	0.505	0.484						
11	3	40.2	4.0	21.0	0.188	0.188	3	56.0	11.3	28.8	0.538	0.392	2	46.8	18.6	33.1	1.329	0.562						
12	2	40.2	6.9	13.3	0.489	0.515	6	64.0	5.3	19.4	0.125	0.271	2	36.0	15.4	29.4	1.096	0.522						
13	5	63.0	17.9	46.9	0.511	0.382	2	64.0	21.2	43.5	1.514	0.487	4	39.0	6.4	19.6	0.229	0.327						
14	4	40.2	9.4	9.4	0.336	1.000	3	42.3	4.5	20.6	0.214	0.218	3	40.0	4.7	18.7	0.221	0.249						
15	3	52.3	7.5	7.5	0.355	1.000	2	64.0	7.9	30.7	0.564	0.257	3	51.0	12.7	27.8	0.605	0.457						
16	2	40.2	1.6	6.5	0.111	0.238	2	42.3	7.4	25.7	0.525	0.286	3	35.0	5.3	14.8	0.252	0.358						
17	3	40.2	7.1	37.4	0.336	0.189	1	36.1	2.0	7.5	0.279	0.260	3	40.0	10.4	20.7	0.495	0.502						
18	5	40.2	9.6	20.2	0.274	0.475	3	56.0	9.5	37.8	0.452	0.251	4	35.0	14.1	24.5	0.504	0.576						
19	3	40.2	1.7	9.1	0.081	0.187	3	36.1	9.5	35.3	0.452	0.269	2	16.0	7.3	18.2	0.521	0.401						
20	6	63.0	6.3	30.3	0.150	0.208	2	36.1	13.4	41.8	0.957	0.321	2	18.0	3.1	12.7	0.221	0.244						
Tota	181	3,234.6	528.3	1,689.1	0.417	0.313	166	2,647.2	594.9	1,859.4	0.512	0.320	220	2,832.8	585.6	1,630.6	0.380	0.359						
Ave	3.3	54.7	8.6	32.6	0.423	0.257	2.7	43.1	8.7	30.8	0.546	0.286	3.6	51.9	8.9	29.1	0.374	0.295						
Ave	2.8	57.2	11.4	31.4	0.595	0.341	2.7	39.4	10.4	29.9	0.674	0.347	4.3	48.4	10.9	28.7	0.420	0.374						
Ave	3.0	49.9	6.4	20.4	0.342	0.359	2.9	49.9	10.6	32.2	0.578	0.328	3.2	41.4	9.5	23.7	0.466	0.394						
Ave	3.0	53.9	8.8	28.2	0.454	0.319	2.8	44.1	9.9	31.0	0.600	0.320	3.7	47.2	9.8	27.2	0.420	0.354						

Table 1.4.3 Other Waste Types Field Survey Results (Winter) (1/2)

	Location	Cod	Area m2	Emplo per	Weight kg	Volume l	Densit kg/l	Unit generation rate Floor (100m2 kg	l	Emplo /per kg	l
Restaurant	Almalinskii	1	360	12	245.7	1,083.0	0.227	9.75	42.98	2.93	12.89
	Bostand	1	300	24	114.0	1,007.0	0.113	5.43	47.95	0.68	5.99
	Turksibsikii	1	70	3	14.6	50.7	0.288	2.98	10.33	0.70	2.41
		2	81	2	2.1	9.3	0.226	0.37	1.65	0.15	0.66
		3	167	4	12.6	37.8	0.333	1.08	3.23	0.45	1.35
	Sub total		978	45	389.0	2,187.8	0.178	5.68	31.97	1.23	6.95
Shopping	Almalinskii	1	140	9	73.3	101.2	0.724	7.48	10.33	1.16	1.61
		2	350	19	11.5	478.2	0.024	0.47	19.52	0.09	3.60
		3	123	9	22.4	402.4	0.056	2.60	46.66	0.36	6.39
		4	44	5	15.7	297.4	0.053	5.10	96.56	0.45	8.50
		5	30	5	2.4	9.6	0.250	1.14	4.57	0.07	0.27
		6	120	5	34.4	278.4	0.123	4.09	33.14	0.98	7.95
		7	77	5	40.0	216.3	0.185	7.45	40.34	1.14	6.18
	Bostandukski	1	58	6	20.1	361.0	0.056	4.94	88.92	0.48	8.60
		2	100	7	8.3	192.3	0.043	1.19	27.47	0.17	3.92
		3	75	4	9.9	238.9	0.041	1.89	45.50	0.35	8.53
		4	200	25	20.0	890.0	0.022	1.43	63.57	0.11	5.09
		5	100	6	9.6	142.8	0.067	1.37	20.40	0.23	3.40
		6	101	13	12.8	139.7	0.092	1.81	19.80	0.14	1.54
		7	159	5	21.1	222.5	0.095	1.90	19.99	0.60	6.36
	Turksibsikii	1	136	3	3.2	54.5	0.059	0.34	5.72	0.15	2.60
		2	186	14	14.1	53.5	0.264	1.08	4.11	0.14	0.55
		3	185	2	2.7	14.6	0.185	0.21	1.13	0.19	1.04
		4	154	2	5.3	24.5	0.216	0.49	2.27	0.38	1.75
		5	15	1	1.1	4.5	0.244	1.05	4.29	0.16	0.64
	Sub total		2,353	145	327.8	4,122.3	0.080	1.99	25.03	0.32	4.06
								Floor (100m2		Stall (/stall)	
Market		Cod	Area	Stall	Weight	Volume	Densit	kg	l	kg	l
Market	Almalinskii	1	2,492	86	1,836.0	8,098.0	0.227	10.53	46.42	3.05	13.45
		2	2,600	110	2,350.0	11,847.0	0.198	12.91	65.09	3.05	15.39
	Bostandukski	1	929	64	350.7	2,613.0	0.134	5.39	40.18	0.78	5.83
		2	300	50	179.7	1,035.0	0.174	8.56	49.29	0.51	2.96
	Turksibsikii	1	1,440	50	182.0	947.0	0.192	1.81	9.39	0.52	2.71
		2	2,526	56	1,020.0	6,560.0	0.155	5.77	37.10	2.60	16.73
	Sub total		10,287	416	5,918.4	31,100.0	0.190	8.22	43.19	2.03	10.68
			Area	Emplo	Weight	Volume	Densit	Floor (100m2		Emplo /per	
Office		Cod	m2	per	kg	l	kg/l	kg	l	kg	l
Office	Almalinskii	1	479	11	19.2	374.0	0.051	0.57	11.16	0.25	4.86
		2	3,349	225	42.2	88.2	0.478	0.18	0.38	0.03	0.06
		3	10,866	1570	109.6	589.0	0.186	0.14	0.77	0.01	0.05
		4	246	30	31.8	185.3	0.172	1.85	10.77	0.15	0.88
		5	169	7	10.5	47.0	0.223	0.89	3.98	0.21	0.96
	Bostandukski	1	500	10	26.5	616.2	0.043	0.76	17.61	0.38	8.80
		2	3,084	225	33.2	763.3	0.043	0.15	3.54	0.02	0.48
		3	650	36	81.0	405.5	0.200	1.78	8.91	0.32	1.61
		4	500	8	4.0	62.2	0.064	0.11	1.78	0.07	1.11
		5	2,950	1249	40.0	119.5	0.335	0.19	0.58	0.00	0.01
	Turksibsikii	1	1,050	7	44.6	262.5	0.170	0.61	3.57	0.91	5.36
		2	1,800	35	29.1	142.7	0.204	0.23	1.13	0.12	0.58
		3	960	48	62.3	151.8	0.410	0.93	2.26	0.19	0.45
		4	240	60	13.3	69.5	0.191	0.79	4.14	0.03	0.17
		5	2,697	748	25.9	161.9	0.160	0.14	0.86	0.00	0.03
	Sub total		29,539	4269	573.2	4,038.6	0.142	0.28	1.95	0.02	0.14

Table 1.4.3 Other Waste Types Field Survey Results (Winter) (2/2)

Street sweeping		Cod	Lengt m	Swept lengty	Weight kg	Volume l	Densit kg/l	Road L./km		Swept L./km	
								kg	l	kg	l
Street sweeping	Almlinskii	1	2,820	160	90.9	316.8	0.287	4.60	16.05	81.16	282.86
		2	6,650	135	95.7	412.9	0.232	2.06	8.87	101.27	436.93
		3	170	170	39.6	366.0	0.108	33.28	307.56	33.28	307.56
	Bostandukski	1	1,750	180	42.0	216.2	0.194	3.43	17.65	33.33	171.59
		2	2,320	100	20.5	33.1	0.619	1.26	2.04	29.29	47.29
		3	2,850	130	48.5	344.8	0.141	2.43	17.28	53.30	378.90
	Turksibskii	1	11,400	200	95.0	267.6	0.355	1.19	3.35	67.86	191.14
		2	460	200	66.0	181.6	0.363	20.50	56.40	47.14	129.71
		3	110	110	54.9	160.0	0.343	71.30	207.79	71.30	207.79
	Sub total		28,530	1385	553.1	2,299.0	0.241	2.77	11.51	57.05	237.13

Table 1.4.4 Other Waste Types Field Survey Results (Summer) (1/2)

	Location	Cod	Area m2	Emplo per	Weight kg	Volume l	Densit kg/l	Unit generation rate Floor (100m2 kg	l	Emplo /per kg	l
Restaurant	Almalinskii	1	360	12	153.7	1,180.4	0.130	6.10	46.84	1.83	14.05
	Bostand	1	300	24	129.1	625.2	0.206	6.15	29.77	0.77	3.72
	Turksibsikii	1	70	3	9.8	44.0	0.223	2.00	8.97	0.47	2.10
		2	51	3	6.4	55.5	0.115	1.81	15.70	0.30	2.64
		3	167	4	10.7	47.0	0.228	0.91	4.02	0.38	1.68
	Sub total		948	46	309.7	1,952.1	0.159	4.67	29.43	0.96	6.06
Shopping	Almalinskii	1	140	9	45.7	995.0	0.046	4.66	101.53	0.73	15.79
		2	350	19	8.8	66.3	0.133	0.36	2.71	0.07	0.50
		3	123	9	37.8	355.8	0.106	4.38	41.26	0.60	5.65
		4	44	5	20.0	405.1	0.049	6.49	131.53	0.57	11.57
		5	30	2	7.4	165.0	0.045	3.52	78.57	0.53	11.79
		6	120	5	48.2	271.0	0.178	5.74	32.26	1.38	7.74
		7	77	5	27.3	366.0	0.075	5.09	68.26	0.78	10.46
	Bostandukski	1	58	6	30.3	138.5	0.219	7.46	34.11	0.72	3.30
		2	100	7	11.6	328.8	0.035	1.66	46.97	0.24	6.71
		3	75	4	7.8	162.6	0.048	1.49	30.97	0.28	5.81
		4	200	25	59.8	1,157.6	0.052	4.27	82.69	0.34	6.61
		5	100	6	8.0	141.6	0.056	1.14	20.23	0.19	3.37
		6	101	13	11.4	144.1	0.079	1.62	20.42	0.13	1.58
		7	159	5	15.6	72.4	0.215	1.40	6.50	0.44	2.07
	Turksibsikii	1	136	3	5.3	60.5	0.088	0.56	6.36	0.25	2.88
		2	186	14	15.1	53.5	0.282	1.16	4.11	0.15	0.55
		3	77	2	7.3	47.0	0.155	1.35	8.72	0.52	3.36
		4	31	2	10.0	65.0	0.154	4.61	29.95	0.71	4.64
		5	15	1	2.1	12.7	0.165	2.00	12.10	0.30	1.81
	Sub total		2,122	142	379.5	5,008.5	0.076	2.56	33.72	0.38	5.04
Market		Cod	Area	Stall	Weight	Volume	Densit	Floor (100m2 kg	l	Stall (/stall) kg	l
Market	Almalinskii	1	2,492	80	3,103.0	10,740.0	0.289	17.79	61.57	5.54	19.18
		2	2,600	110	5,134.0	9,285.0	0.553	28.21	51.02	6.67	12.06
	Bostandukski	1	929	55	497.0	1,498.0	0.332	7.64	23.04	1.29	3.89
		2	300	42	73.3	153.5	0.478	3.49	7.31	0.25	0.52
	Turksibsikii	1	452	37	57.8	251.0	0.230	1.83	7.93	0.22	0.97
		2	1,290	56	2,458.0	5,015.0	0.490	27.22	55.54	6.27	12.79
	Sub total		8,063	380	11,323.1	26,942.5	0.420	20.06	47.74	4.26	10.13
Office		Cod	Area m2	Emplo per	Weight kg	Volume l	Densit kg/l	Floor (100m2 kg	l	Emplo /per kg	l
Office	Almalinskii	1	479	11	6.2	118.1	0.052	0.18	3.52	0.08	1.53
		2	3,349	225	55.1	157.1	0.351	0.24	0.67	0.03	0.10
		3	10,866	1570	73.7	120.9	0.610	0.10	0.16	0.01	0.01
		4	2,600	42	69.7	204.9	0.340	0.38	1.13	0.24	0.70
		5	169	7	8.7	48.6	0.179	0.74	4.12	0.18	0.99
	Bostandukski	1	500	10	26.5	594.0	0.045	0.76	16.97	0.38	8.49
		2	3,084	190	51.3	325.1	0.158	0.24	1.51	0.04	0.24
		3	650	30	58.4	326.8	0.179	1.28	7.18	0.28	1.56
		4	500	8	10.4	80.0	0.130	0.30	2.29	0.19	1.43
		5	2,950	1249	48.0	206.0	0.233	0.23	1.00	0.01	0.02
	Turksibsikii	1	705	30	40.3	380.0	0.106	0.82	7.70	0.19	1.81
		2	450	30	34.8	201.0	0.173	1.10	6.38	0.17	0.96
		3	960	48	3.2	19.0	0.168	0.05	0.28	0.01	0.06
		4	309	25	19.9	271.0	0.073	0.92	12.53	0.11	1.55
		5	2,697	748	15.6	59.0	0.264	0.08	0.31	0.00	0.01
	Sub total		30,267	4223	521.8	3,111.5	0.168	0.25	1.47	0.02	0.11

Table 1.4.4 Other Waste Types Field Survey Results (Summer) (2/2)

Street sweeping		Cod	Lengt m	Swept lengty	Weight kg	Volume l	Densit kg/l	Road L./km		Swept L./km	
								kg	l	kg	l
Street sweeping	Almlinskii	1	2,820	160	63.3	231.1	0.274	3.21	11.71	56.52	206.34
		2	6,650	135	58.7	237.2	0.247	1.26	5.10	62.12	251.01
		3	170	170	115.7	229.5	0.504	97.23	192.86	97.23	192.86
	Bostandukski	1	1,750	180	38.9	257.4	0.151	3.18	21.01	30.87	204.29
		2	2,320	100	104.4	259.7	0.402	6.43	15.99	149.14	371.00
		3	2,850	130	65.0	411.8	0.158	3.26	20.64	71.43	452.53
	Turksibskii	1	11,400	200	301.7	980.8	0.308	3.78	12.29	215.50	700.57
		2	460	200	91.5	308.0	0.297	28.42	95.65	65.36	220.00
		3	110	110	64.5	224.2	0.288	83.77	291.17	83.77	291.17
	Sub total		28,530	1385	903.7	3,139.7	0.288	4.53	15.72	93.21	323.85