

No.36 Tsilqar

Information on Existing Water Sources (Aragatsotn)

Study for Improvement of
Rural Water Supply and
Sewage Systems in RA

No.36 Community Tsilqar
District Aragats
Marz Aragatsotn

No.36 Community Tsilqar
District Aragats
Marz Aragatsotn
Sampling date 30/Jul/2007

No	Water source	Latitude			Longitude			Atitude	Yield(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	43	25.6	44	12	47.7	2,259	0.3	0.4	0.4
2	Spring	40	43	26.3	44	12	46.1	2,238	0.1	0.1	0.1
3	Spring	40	43	26.7	44	12	40.7	2,219	0.1	0.2	0.2
4											
5											
6											
7											
8											
9											
10											
<i>Notes:</i>											
<i>Latitude, Longitude, Atitude:</i>		<i>Measured at site</i>									
<i>Yield (Min, Max):</i>		<i>Interviewed to the Community</i>									
<i>Yield (at site):</i>		<i>Measured / estimated at site in summer of 2007</i>									

Users Acceptnce for water quality	Acceptable
Notes	The community has no house-connections. The population uses 6 public taps.
Alternative sources if any	In case of repair of the spring intakes the flows will increase.

	Parameters analysed	Units	No.1 reservoir	No.2 Sayadi aghbyur	Guidelines	
					WHO	Armenia
a	pH		7.9	7.0	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	11.6	13		
c	TDS	Mg/L	84	79	1000	1000
1	Al:Aluminum	Mg/L	n.d	n.d	0.10	0.50
2	B:Boron	Mg/L	n.d	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	6	6	250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d	2	1
6	F:Fluoride	Mg/L	0.03	0.03	1.50	
7	Hardness	Mg/L	155	150	500	700
8	Fe:Iron	Mg/L	n.d	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	n.d	0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	2.3	3.1	50.0	45.0
13	SO4:Sulfate	Mg/L	45.0	12.0	250.0	500.0
14	Zn:Zink	Mg/L	<0.1	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d	0.0	0.1
16	Ba:Barium	Mg/L	<0.01	<0.01	0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d	NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d	0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001	0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002	0.00100	0.00050
21	Se:Selenium	Mg/L	0.001	<0.001	0.010	0.010
22	Sr:Strontium	Mg/L	n.d	n.d	NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml			-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml			0	0
26	Total bacteria	bacteria per 1 ml			-	50

No. 36 Marz Aragatsotn Community Tsilqar**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Unknown	
2	Intake	Possible	Unknown	
3	Transmission pipeline	Possible	Unknown	Pipeline is mostly far from the road
4	Reservoir	Fair	Possible	

2. INTAKE STRUCTURE

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°43'25.6"	44°12'47.7"	2,259	1961	reinforced concrete	0.4	Yes
2	Spring	40°43'26.3"	44°12'46.1"	2,238	1961	reinforced concrete	0.1	Yes
3	Spring	40°43'26.7"	44°12'40.7"	2,219	1961	reinforced concrete	0.2	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	500	65	Steel	0.25	1961	Medium	Yes
2	950	32	Steel	0.2	1961	Huge	Yes
	200	25	Steel		1961	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°43'15.6"	44°12'37.2"	2,187	reinforced concrete	Rectangular	12x4x3.5	150	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	No			

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	500	25	Steel	1961	Huge	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
6	1961		No	0	Yes

9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Aragatsotn
Number and Name of Community	No.36 Tsilqar
District	Aragats

No.	Question	Answer
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A: Baseline Data

A1	Actual population in 2001	550
A2	Actual population in 2007	570
A3	Number of households	123
A4.1	Elderly people	43
A4.2	Population in labor force (age from 16 to 62)	357
A4.3	Children	170
A5.1	Pensioners	50
A5.2	Unemployed	15
A5.3	Receiving benefits	22
A6	Average monthly income of household (AMD)	150,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	120

B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	800
	Annual Budget of the community 2005, in thousand AMD	1,000
	Annual Budget of the community 2006, in thousand AMD	1,500
	Annual Budget of the community 2007, in thousand AMD	2,000
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.

C: Socio-Economic Survey

C1	Major industries of the community:	dairy, meat, cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no

D: Water Usage and Water Demand Survey

D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	is not planned
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	50
D8	How many house connection household set the water meter	0
D9	Number of public taps	1
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	very pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household a day?	-

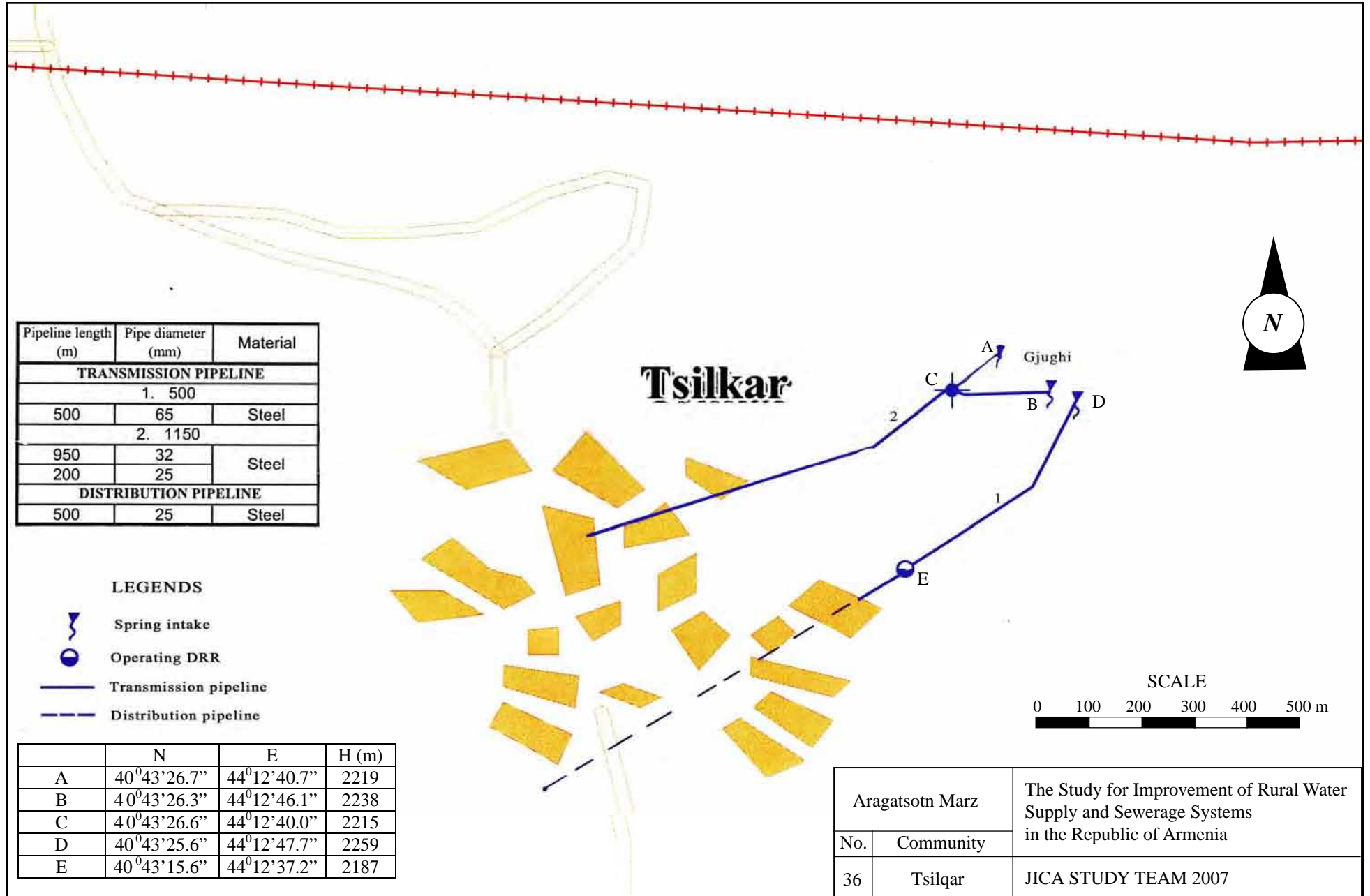
	D14.2	Estimate quantity of domestic water use of each household (litter per day)	400
	D15.1	How long the taps are open to provide the each household for filling	-
	D15.2	Estimate quantity of water for filling containers of each household (litter per	400
	D16	Drinking water monthly water fee per household	0
	D17	How often do you usually pay water fees?	-
	D18	Water fee structure 1-Flat rate, 2 Having water tariff	-
	D19	Where do you acquire the irrigation water?	from Tsilqar reservoir
	D20	Are you satisfied with irrigation water supply volume?	is not sufficient

E: Present Operation and Maintenance Works

E1	Name of responsible for water supply	nobody
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	1 deteriorated
E5	Quantity and present condition of the water supply facilities:	1 deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administration head
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	0
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	resident participation





F: Initial Environmental Examination (IEE)

F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 500		
500	65	Steel
2. 1150		
950	32	Steel
200	25	
DISTRIBUTION PIPELINE		
500	25	Steel

LEGENDS

-  Spring intake
-  Operating DRR
-  Transmission pipeline
-  Distribution pipeline

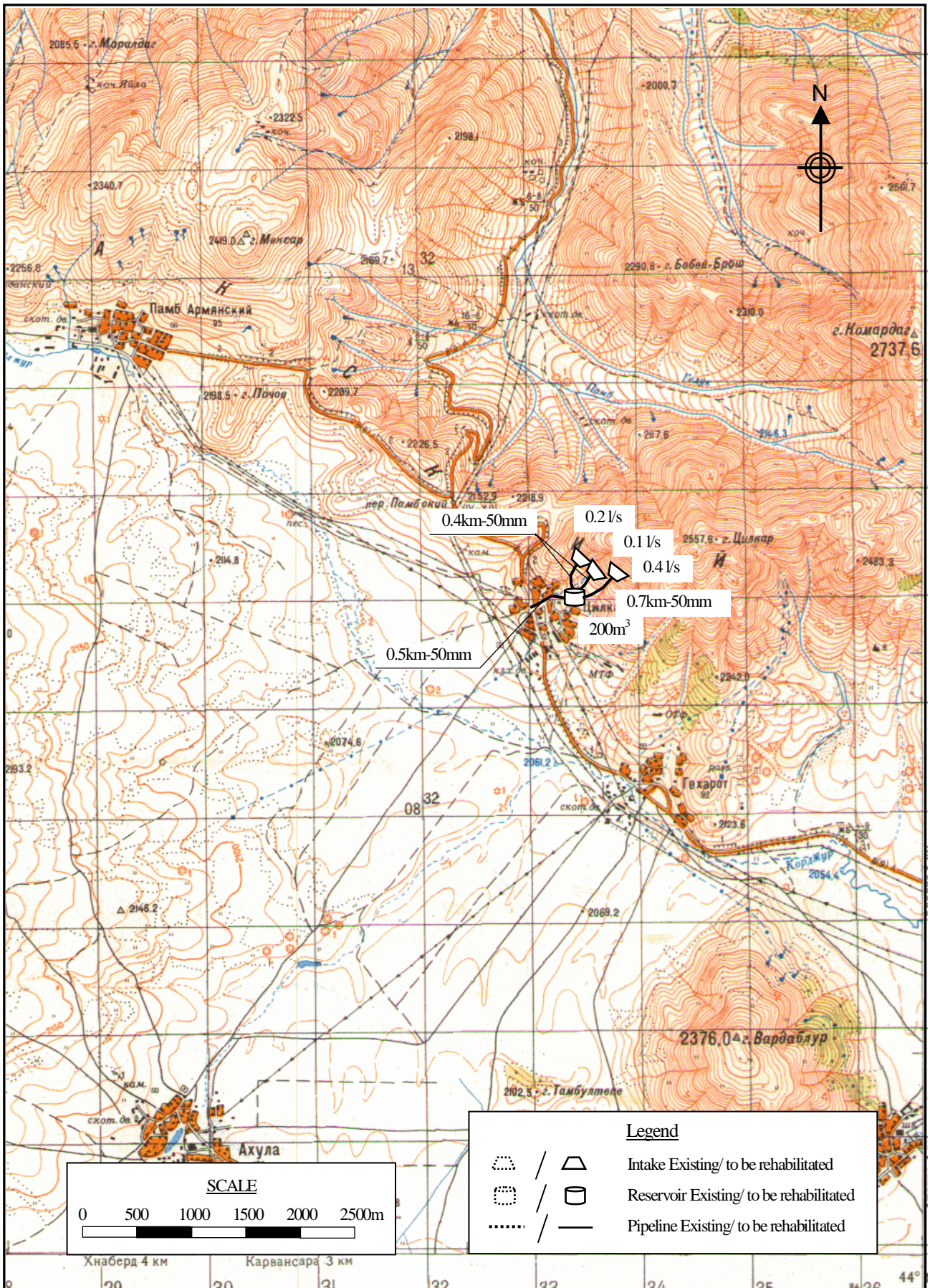
	N	E	H (m)
A	40°43'26.7"	44°12'40.7"	2219
B	40°43'26.3"	44°12'46.1"	2238
C	40°43'26.6"	44°12'40.0"	2215
D	40°43'25.6"	44°12'47.7"	2259
E	40°43'15.6"	44°12'37.2"	2187

Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
36	Tsilqar	JICA STUDY TEAM 2007

Marz : **Aragatsotn**
Name : **Tsilqar**

No.36

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
1	Population	570	persons	57.0
2	Factory	-	nos	0.0
3	School (pupils)	120	pupils	1.2
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	123	household	10.7
	Sub-total			68.9
	Unaccounted for water (20%)			13.8
1	Average Daily Water Demand		48.5	82.7 m3/day
2	Maximum Daily Water Demand			99.2 m3/day
3	Maximum Hourly Water Demand			13.4 m3/hr
B. WATER SUPPLY PLAN				
1	Water source type	Nr.	Total vol.	
	a Spring	3	0.7 lit/sec	60.5 m3/day
	Total			60.5 m3/day
	2 Additional water source			
	2 Required reservoir volume			161 m3
C. WATER SUPPLY FACILITIES REHABILITATION PLAN				
No	Item	Quantity	Unit	
1	Intake			
	1m3	3	nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter	1,100	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	200m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	500	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	73	nos	
6	Water meter installation	123	nos	
7	Public tap	2	nos	
8	Chlorination	1	nos	
9	Pumps	-	nos	



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia JICA STUDY TEAM
Marz	Aragatsotn	
No. 36	Tsilqar	

STUDY FOR IMPROVEMENT OF
RURAL WATER SUPPLY AND
SEWAGE SYSTEMS IN RA

Marz : **Aragatsotn**

No. : **36**

Name : **Tsilqar**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,103,100
2	Transmission Pipe	50mm	1,100	m	5,520	6,072,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					6,072,000
3	Reservoir	50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	1	nos	22,524,600	22,524,600
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					22,524,600
4	Distribution Pipe	50mm	500	m	5,520	2,760,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					2,760,000
5	House Connection		73	nos	74,000	5,402,000
6	Water Meter Installation		123	nos	80,000	9,840,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		200	m	3,600	720,000
Total					AMD	49,101,700
					Equivalent to USD	160,715
					Equivalent to JPY	16,955,451
					AMD	USD
	Investment Cost per household		123	HH	399,201	1,307
	Investment Cost per person		570	persons	86,143	282

No.37 Katnaghbyur

Information on Existing Water Sources (Aragatsotn)

Study for Improvement of
Rural Water Supply and
Sewage Systems in RA

No.37 Community Katnaghbyur
District Talin
Marz Aragatsotn

No.37 Community Katnaghbyur
District Talin
Marz Aragatsotn
Sampling date 22/Aug/2007

No	Water source	Latitude			Longitude			Atitude	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Miroyi spring	40	24	19.9	43	58	36.9	1,985	3.0	9.0	7.0
2	Jaghatsi spring	40	23	1.9	43	57	54.8	1,797	5.0	13.0	10.0
3	spring to Monnument	40	22	27.4	43	57	15.7	1,730	3.5	10.0	5.0
4	spring to School	40	22	38.2	43	57	18.9	1,743	0.4	0.6	0.5
5											
6											
7											
8											
9											
10											
<i>Notes:</i>											
<i>Latitude, Longitude, Atitude:</i>		<i>Measured at site</i>									
<i>Yield (Min, Max):</i>		<i>Interviewed to the Community</i>									
<i>Yield (at site):</i>		<i>Measured / estimated at site in summer of 2007</i>									

Users Acceptnce for water quality	Acceptable
Notes	Spring intakes are in deteriorated conditions.
Alternative sources if any	At 1km distance from Miroyi springs there is a prospective spring.

	Parameters analysed	Units	No.1 Hushardzami aghbyur	No.2 Jraghaci aghbyur	No.3 Miroi aghbyur	Guidelines	
						WHO	Armenia
<i>a</i>	pH		7.7	7.4	8	6.5-8	6.0 - 9.0
<i>b</i>	Temperature	Deg.C	9.8	10.1	9.4		
<i>c</i>	TDS	Mg/L	89	86	48	1000	1000
1	Al:Aluminum	Mg/L	n.d	n.d	n.d	0.10	0.50
2	B: Boron	Mg/L	n.d	n.d	n.d	0.70	0.50
3	Cl: Chloride	Mg/L	5	6	4	250	350
4	Cr: Chrome	Mg/L	n.d	n.d	<0.01	0.05	0.05
5	Cu: Copper	Mg/L	n.d	n.d	n.d	2	1
6	F: Fluoride	Mg/L	0.02	0.02	0.02	1.50	
7	Hardness	Mg/L	65	210	100	500	700
8	Fe: Iron	Mg/L	n.d	n.d	n.d	0.30	0.30
9	Mn: Manganese	Mg/L	n.d	n.d	n.d	0.40	0.10
10	Mo: Molibdenum	Mg/L	n.d	n.d	n.d	0.070	0.250
11	Ni: Nickel	Mg/L	n.d	n.d	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	1.8	1.8	50.0	45.0
13	SO4: Sulfate	Mg/L	2.0	5.0	4.0	250.0	500.0
14	Zn: Zink	Mg/L	n.d	n.d	n.d	3.0	5.0
15	As: Arsenic	Mg/L	n.d	n.d	n.d	0.0	0.1
16	Ba: Barium	Mg/L	<0.01	<0.01	<0.01	0.70	0.10
17	Be: Berillium	Mg/L	0.00005	0.00005	0.00005	NA	0.00020
18	Cd: Cadmium	Mg/L	n.d	n.d	n.d	0.0030	0.0010
19	Pb: Lead	Mg/L	<0.001	<0.001	<0.001	0.010	0.030
20	Hg: Mercury	Mg/L	<0.00005	<0.00005	<0.0002	0.00100	0.00050
21	Se: Selenium	Mg/L	n.d	n.d	n.d	0.010	0.010
22	Sr: Strontium	Mg/L	n.d	n.d	<0.7	NA	7.0
23	CN: Cyanide	Mg/L	n.d	n.d	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml		>2380		-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml		n.d		0	0
26	Total bacteria	bacteria per 1 ml		-		-	50

No. 37 Marz Aragatsotn Community Katnaghbyur**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
2	Intake	Possible	Possible	
3	Intake	Fair	Possible	
4	Intake	Fair	Possible	
5	Transmission pipeline	Possible	Possible	Pipeline is mostly far from the road
6	Reservoir			No reservoir

Water main

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°24'19.9"	43°58'36.9"	1,985	1960	Masonry	7.0	No
2	Spring	40°23'01.9"	43°57'54.8"	1,797	1963	Masonry	10.0	Yes
3	Spring	40°22'27.4"	43°57'15.7"	1,730	1948	Masonry	5.0	No
4	Spring	40°22'38.2"	43°57'18.9"	1,743	1961	Masonry	0.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,500	100	AsbestosCement	2.0	1960	Huge	Yes
2	1,700	200	AsbestosCement	3.5	1963	Huge	Yes
3	700	80	Steel	3.5	1948	Medium	Yes
	700	100	Steel		1948	Medium	Yes
4	600	50	Steel	0.4	1961	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	No							

5. CHLORINATION

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Intake	Powder	Once a year

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	450	50	Steel	1963	Little	Yes
2	500	100	Steel	1963	Little	Yes
3	400	100	AsbestosCement	1963	Medium	Yes
4	300	150	AsbestosCement	1963	Medium	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
3	1948	1963	No	0	Yes

9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Aragatsotn
Number and Name of Community	No.37 Katnaghbyur
District	Talin

No.	Question	Answer
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A: Baseline Data

A1	Actual population in 2001	1,347
A2	Actual population in 2007	1,347
A3	Number of households	304
A4.1	Elderly people	146
A4.2	Population in labor force (age from 16 to 62)	878
A4.3	Children	282
A5.1	Pensioners	275
A5.2	Unemployed	17
A5.3	Receiving benefits	105
A6	Average monthly income of household (AMD)	20,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	220

B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	1,100
	Annual Budget of the community 2005, in thousand AMD	1,200
	Annual Budget of the community 2006, in thousand AMD	2,200
	Annual Budget of the community 2007, in thousand AMD	800
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	50
	Amount spent in drinking water sector 2006, in thousand AMD	320
	Amount spent in drinking water sector 2007, in thousand AMD	400
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.

C: Socio-Economic Survey

C1	Major industries of the community:	cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no

D: Water Usage and Water Demand Survey

D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	275
D8	How many house connection household set the water meter	0
D9	Number of public taps	4
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly 6 hrs
D11	What time of day water is given?	7-10; 19-22
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	fully convenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household a day?	-

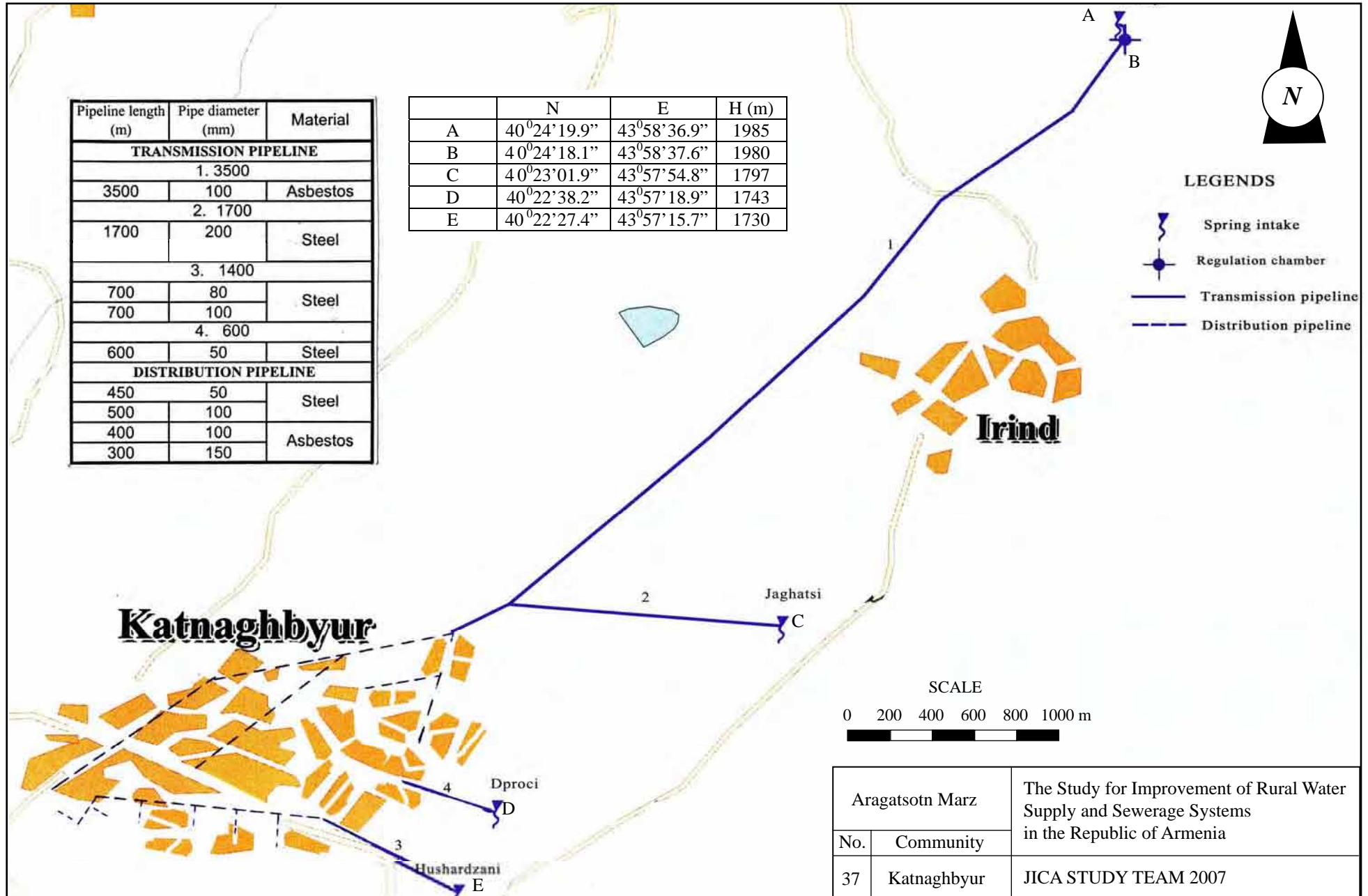
No.	Question	Answer
D14.2	Estimate quantity of domestic water use of each household (litter per day)	1,000
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	1,400
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flat rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	from reservoir
D20	Are you satisfied with irrigation water supply volume?	is not sufficient

E: Present Operation and Maintenance Works

E1	Name of responsible for water supply	Hakobyan Arkadi
E2	Position	water inspector
E3	Telephone	with the help of administration head
E4	Quantity and present condition of the water supply facilities: spring/ intake	3 deteriorated
E5	Quantity and present condition of the water supply facilities:	3 deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	specialist in the community with fee
E14	How you prepare O&M costs?	donation from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	400,000
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	400,000
E16	Do the residents participate in the O&M works?	earthwork, construction
E17	What kind of OM method is preferable to you?	resident participation

F: Initial Environmental Examination (IEE)

F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent







Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 3500		
3500	100	Asbestos
2. 1700		
1700	200	Steel
3. 1400		
700	80	Steel
700	100	
4. 600		
600	50	Steel
DISTRIBUTION PIPELINE		
450	50	Steel
500	100	
400	100	Asbestos
300	150	

	N	E	H (m)
A	40°24'19.9"	43°58'36.9"	1985
B	40°24'18.1"	43°58'37.6"	1980
C	40°23'01.9"	43°57'54.8"	1797
D	40°22'38.2"	43°57'18.9"	1743
E	40°22'27.4"	43°57'15.7"	1730



LEGENDS

-  Spring intake
-  Regulation chamber
-  Transmission pipeline
-  Distribution pipeline

SCALE

0 200 400 600 800 1000 m

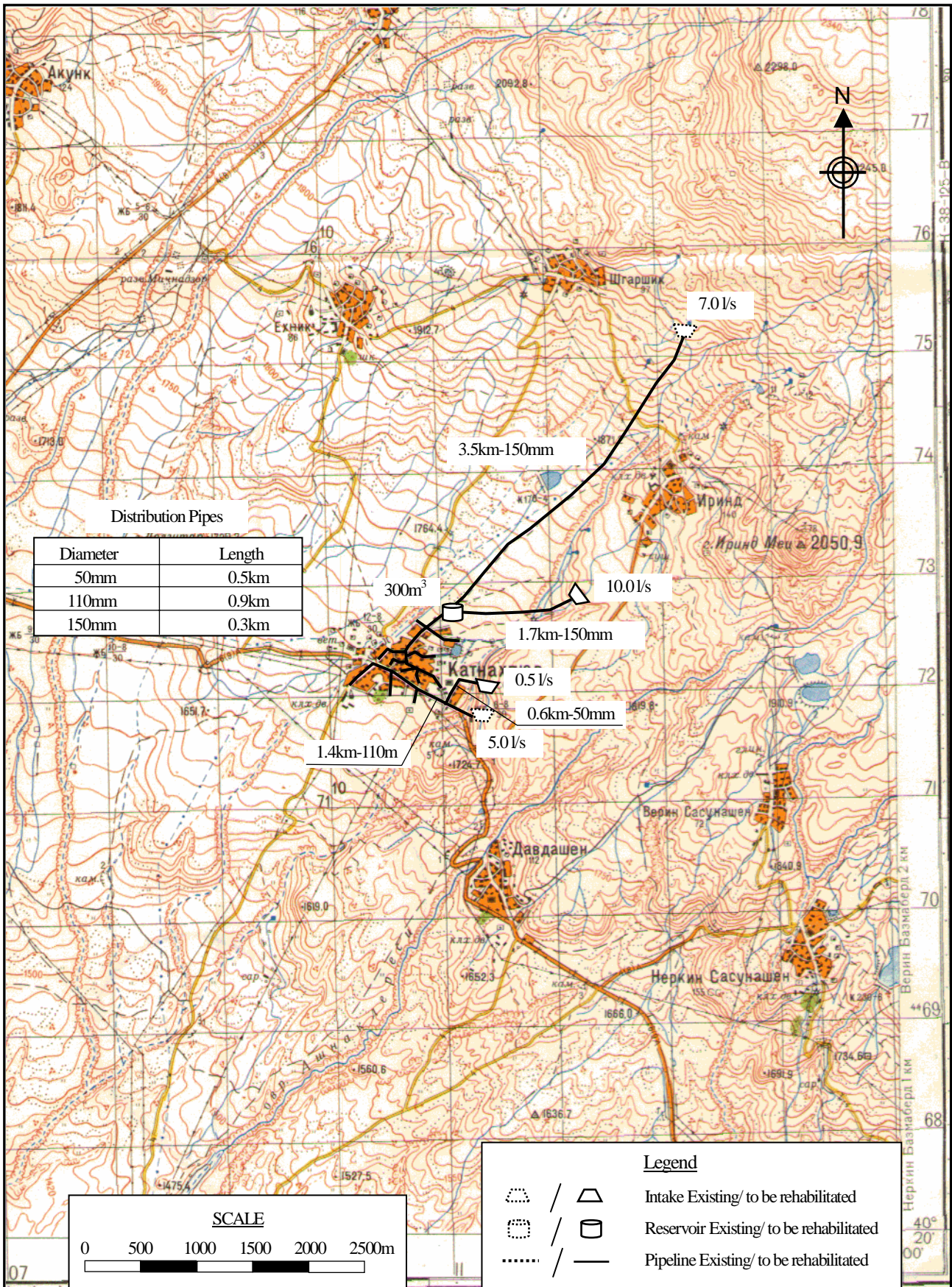
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
37	Katnaghbyur	JICA STUDY TEAM 2007

Marz : **Aragatsotn**
Name : **Katnaghbyur**

No.37

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
1	Population	1,347	persons	134.7
2	Factory	-	nos	0.0
3	School (pupils)	220	pupils	2.2
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	304	household	26.4
	Sub-total			163.3
	Unaccounted for water (20%)			32.7
1	Average Daily Water Demand			196.0 m3/day
2	Maximum Daily Water Demand			235.2 m3/day
3	Maximum Hourly Water Demand			25.5 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Spring	4	22.5 lit/sec	1,944.0 m3/day
	Total			1,944.0 m3/day
	2 Required reservoir volume			306 m3

C. WATER SUPPLY FACILITIES REHABILITATION PLAN				
No	Item	Quantity	Unit	
1	Intake			
	1m3	2	nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter	600	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	1,400	m	
	150mm diameter	5,200	m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	300m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	500	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	900	m	
	150mm diameter	300	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	29	nos	
6	Water meter installation	304	nos	
7	Public tap	4	nos	
8	Chlorination	1	nos	
9	Pumps	-	nos	



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 37	Katnaghbyur	JICA STUDY TEAM

STUDY FOR IMPROVEMENT OF
RURAL WATER SUPPLY AND
SEWAGE SYSTEMS IN RA

Marz : **Aragatsotn**
No. : **37**
Name : **Katnaghbyur**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3	2	nos	367,700	735,400
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					735,400
2	Transmission Pipe	50mm	600	m	5,520	3,312,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	1,400	m	9,680	13,552,000
		150mm	5,200	m	13,140	68,328,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					85,192,000
3	Reservoir	50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3	1	nos	29,630,400	29,630,400
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					29,630,400
4	Distribution Pipe	50mm	500	m	5,520	2,760,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	900	m	9,680	8,712,000
		150mm	300	m	13,140	3,942,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					15,414,000
5	House Connection		29	nos	74,000	2,146,000
6	Water Meter Installation		304	nos	80,000	24,320,000
7	Public Tap		4	nos	90,000	360,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		680	m	3,600	2,448,000
Total					AMD	160,745,800
					Equivalent to USD	526,138
					Equivalent to JPY	55,507,600
					AMD	USD
Investment Cost per household			304	HH	528,769	1,731
Investment Cost per person			1,347	persons	119,336	391

No.38 Karmrashen

Information on Existing Water Sources (Aragatsotn)

Study for Improvement of
Rural Water Supply and
Sewage Systems in RA

No.38 Community Karmarashen
District Talin
Marz Aragatsotn

No.38 Community Karmarashen
District Talin
Marz Aragatsotn
Sampling date 13/Sep/2007

No	Water source	Latitude			Longitude			Atitude	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Kanebzman spring	40	26	40.2	44	0	33.2	2,393	15.0	25.0	20.0
2	spring	40	26	20.4	43	57	42.3	2,078	2.0	4.0	7.0
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

<i>Latitude, Longitude, Atitude:</i>	<i>Measured at site</i>
<i>Yield (Min, Max):</i>	<i>Interviewed to the Community</i>
<i>Yield (at site):</i>	<i>Measured / estimated at site in summer of 2007</i>

Users Acceptnce for water quality	Acceptable
Notes	Most part of these spring discharges is used for irrigation. Only 4l/sec is taken for drinking purposes. No.51 Vosketas community also uses Kanebzman spring, 4.6l.sec.
Alternative sources if any	No alternative water sources are available

	Parameters analysed	Units	No.1 Qeshoghlan aghbyur	No.2 Kanebzman aghbyur	Guidelines	
					WHO	Armenia
a	pH		8	7.4	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	8.2	9.8		
c	TDS	Mg/L	37	20	1000	1000
1	Al:Aluminum	Mg/L	n.d	0.02	0.10	0.50
2	B:Boron	Mg/L	n.d	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	4	4	250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d	2	1
6	F:Fluoride	Mg/L	0.14	0.12	1.50	
7	Hardness	Mg/L	100	45	500	700
8	Fe:Iron	Mg/L	n.d	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	0.20	0.10	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	0.020	0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	0.9	50.0	45.0
13	SO4:Sulfate	Mg/L	4.0	2.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d	0.0	0.1
16	Ba:Barium	Mg/L	<0.01	<0.01	0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d	NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d	0.0030	0.0010
19	Pb:Lead	Mg/L	0.001	<0.001	0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002	0.00100	0.00050
21	Se:Selenium	Mg/L	n.d	n.d	0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	<0.7	NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml			-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml			0	0
26	Total bacteria	bacteria per 1 ml			-	50

No. 38 Marz Aragatsotn Community Karmrashen**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Difficult	Difficult	
2	Transmission pipeline	Difficult	Difficult	Pipeline is mostly far from the road
3	Reservoir			No reservoir

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°26'40,2"	44°00'33,2"	2,393	1989	Concrete	20.0	Yes
2	Spring	40°26'20,4"	43°57'42,3"	2,078	1955	Concrete	7.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,000	250	Steel	15.0	1998	Little	No
	2,000	150	Steel			Little	No
	1,900	400	Steel			Little	No
2	1,000	150	Steel	3.6	2003	No	No
3	800	150	AsbestosCement	2.45	1955	Huge	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	No							

5. CHLORINATION

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Intake	Powder	Twice per month

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,300	150	Steel	1975	Medium	Yes
2	200	65	Steel		Medium	Yes
3	300	50	Steel		Medium	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
3	1986		Yes	100	Yes

9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Aragatsotn
Number and Name of Community	No.38 Karmrashen
District	Talin

No.	Question	Answer
-----	----------	--------

A: Baseline Data

A1	Actual population in 2001	700
A2	Actual population in 2007	650
A3	Number of households	180
A4.1	Elderly people	80
A4.2	Population in labor force (age from 16 to 62)	410
A4.3	Children	160
A5.1	Pensioners	120
A5.2	Unemployed	0
A5.3	Receiving benefits	27
A6	Average monthly income of household (AMD)	15,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	150

B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	1,300
	Annual Budget of the community 2005, in thousand AMD	1,500
	Annual Budget of the community 2006, in thousand AMD	1,650
	Annual Budget of the community 2007, in thousand AMD	2,000
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	100
	Amount spent in drinking water sector 2005, in thousand AMD	100
	Amount spent in drinking water sector 2006, in thousand AMD	100
	Amount spent in drinking water sector 2007, in thousand AMD	100
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.

C: Socio-Economic Survey

C1	Major industries of the community:	dairy, meat, cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no

D: Water Usage and Water Demand Survey

D1	Does the community hold water use permit? 1-Yes, 2-No	yes
D2	Water use permit number	1126
D3	Date of expiry of water use permit	2006-2009
D4	Planned date of obtaining water use permit	
D5	Present condition of the water supply volume of Domestic use	almost sufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	180
D8	How many house connection household set the water meter	0
D9	Number of public taps	1
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	very pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household a day?	-

No.	Question	Answer
D14.2	Estimate quantity of domestic water use of each household (litter per day)	1,000
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	1,200
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flat rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	spring
D20	Are you satisfied with irrigation water supply volume?	is not sufficient

E: Present Operation and Maintenance Works

E1	Name of responsible for water supply	Sardaryan Rostom
E2	Position	water specialist
E3	Telephone	with the help of administration head
E4	Quantity and present condition of the water supply facilities: spring/ intake	1 rehabilitated-
E5	Quantity and present condition of the water supply facilities:	1 rehabilitated-
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	partially repaired
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	hired specialist from community
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	200,000
	Repair cost(AMD)	100,000
	Others(AMD)	0
	Total (AMD)	300,000
E16	Do the residents participate in the O&M works?	no
E17	What kind of OM method is preferable to you?	resident participation

F: Initial Environmental Examination (IEE)

F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	yes
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 4900		
1000	250	Steel
2000	150	
1900	400	
2. 1000		
1000	150	Steel
3. 800		
800	150	Asbestos
DISTRIBUTION PIPELINE		
2300	150	Steel
200	65	
300	50	

	N	E	H (m)
A	40°26'40.2"	44°00'33.2"	2393
B	40°26'20.4"	43°57'42.3"	2078



Vosketas



Karmrashen



Qeshoghlyants

B






3

2

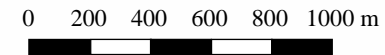
Kanbzman

A

LEGENDS

-  Spring intake
-  Break pressure chamber
-  Regulation chamber
-  Transmission pipeline
-  Distribution pipeline

SCALE



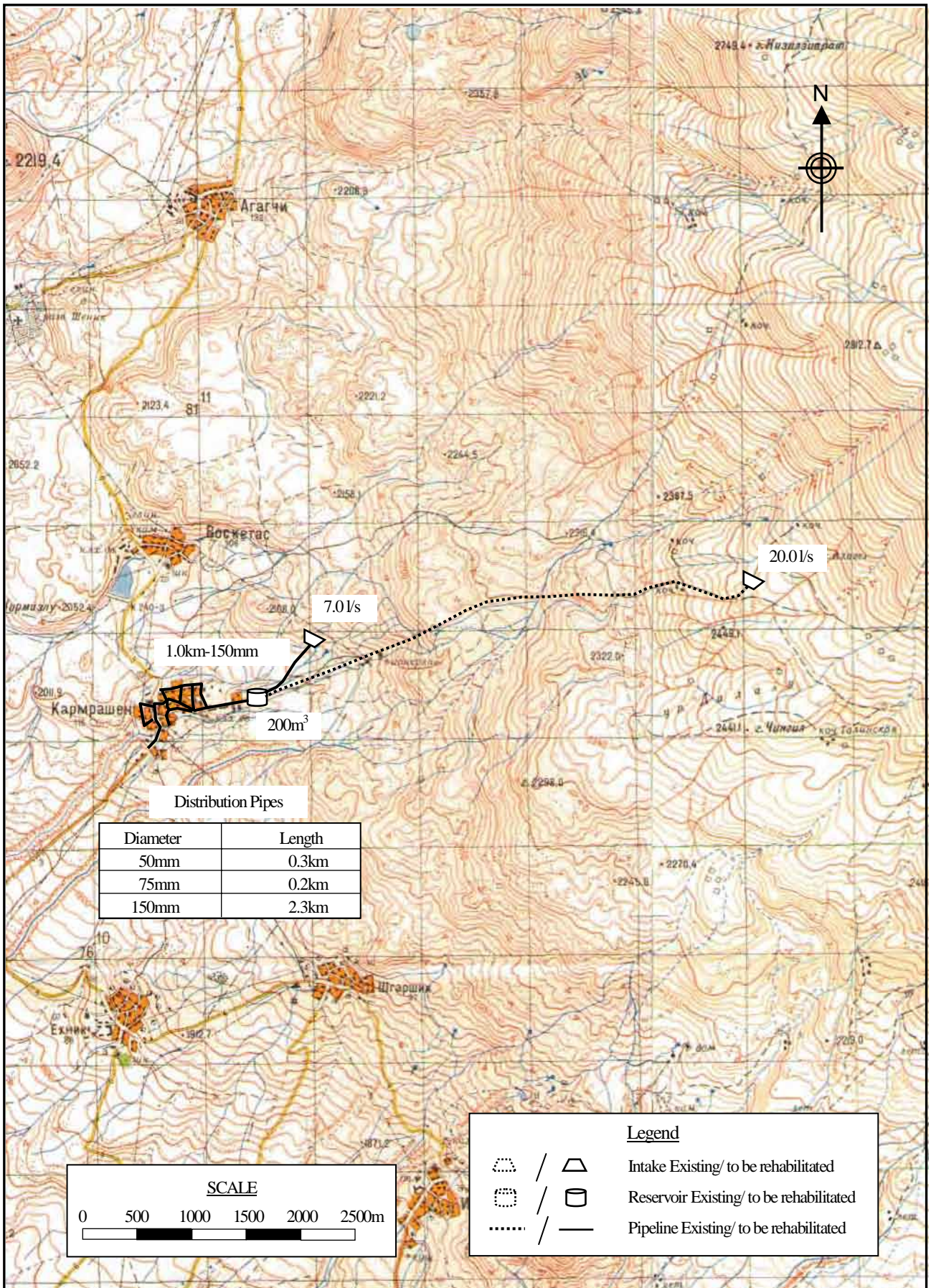
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
38	Karmarashen	JICA STUDY TEAM 2007

Marz : **Aragatsotn**
Name : **Kamrashen**

No.38

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
1	Population	650	persons	65.0
2	Factory	-	nos	0.0
3	School (pupils)	150	pupils	1.5
4	Medical Ambulance Station	-	nos	-
5	Policlinic	-	nos	-
6	Livestocks (87lit/household)	180	household	15.7
	Sub-total			82.2
	Unaccounted for water (20%)			16.4
1	Average Daily Water Demand			98.6 m3/day
2	Maximum Daily Water Demand			118.4 m3/day
3	Maximum Hourly Water Demand			16.0 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Spring	2	27.0	lit/sec
				2,332.8 m3/day
	Total			2,332.8 m3/day
	2 Required reservoir volume			192 m3

C. WATER SUPPLY FACILITIES REHABILITATION PLAN				
No	Item	Quantity	Unit	
1	Intake			
	1m3	1	nos	
	2m3	1	nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter	1,000	m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	200m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	300	m	
	75mm diameter	200	m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter	2,300	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection		nos	
6	Water meter installation	180	nos	
7	Public tap	2	nos	
8	Chlorination	1	nos	
9	Pumps	-	nos	



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 38	Karmarashen	
		JICA STUDY TEAM

STUDY FOR IMPROVEMENT OF
RURAL WATER SUPPLY AND
SEWAGE SYSTEMS IN RA

Marz : **Aragatsotn**
No. : **38**
Name : **Kamrashen**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3	1	nos	367,700	367,700
		2m3	1	nos	545,000	545,000
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					912,700
2	Transmission Pipe	50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	1,000	m	13,140	13,140,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					13,140,000
3	Reservoir	50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	1	nos	22,524,600	22,524,600
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					22,524,600
4	Distribution Pipe	50mm	300	m	5,520	1,656,000
		75mm	200	m	7,160	1,432,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	2,300	m	13,140	30,222,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					33,310,000
5	House Connection			nos	74,000	
6	Water Meter Installation		180	nos	80,000	14,400,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		1,120	m	3,600	4,032,000
Total					AMD	88,999,300
					Equivalent to USD	291,304
					Equivalent to JPY	30,732,607
					AMD	USD
Investment Cost per household			180	HH	494,441	1,618
Investment Cost per person			650	persons	136,922	448

