

No.5 Antaramej

Information on Existing Water Sources (Gegharkunik)

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

No.5 Community Antaramej
District Krasnoselsk
Marz Gegharkunik

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Sampling date 30/Jul/2007

No	Water source	Latitude			Longitude			Atitude (m)	Yield(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	Spring	40	39	10.8	45	3	10.1	1,825	1.0	1.0	1.0
2											
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	-
Notes	the reservoir has big leakages and is not filled
Alternative sources if any	1l/sec water amount can be added from the spring intakes' area

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		8.2	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	12.7		
c	TDS	Mg/L	202	1000	1000
1	Al:Aluminum	Mg/L	n.d.	0.10	0.50
2	B:Boron	Mg/L	n.d.	0.70	0.50
3	Cl:Chloride	Mg/L	4	250	350
4	Cr:Chrome	Mg/L	n.d.	0.05	0.05
5	Cu:Copper	Mg/L	n.d.	2	1
6	F:Fluoride	Mg/L	0.17	1.50	
7	Hardness	Mg/L	420	500	700
8	Fe:Iron	Mg/L	n.d.	0.30	0.30
9	Mn:Manganese	Mg/L	n.d.	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d.	0.070	0.250
11	Ni:Nickel	Mg/L	n.d.	0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	50.0	45.0
13	SO4:Sulfate	Mg/L	4.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d.	3.0	5.0
15	As:Arsenic	Mg/L	n.d.	0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.70	0.10
17	Be:Berillium	Mg/L	n.d.	NA	0.00020
18	Cd:Cadmium	Mg/L	0.0001	0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	0.00100	0.00050
21	Se:Selenium	Mg/L	n.d.	0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	NA	7.0
23	CN:Cyanide	Mg/L	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. 5 Marz Gegharkunik Community Antaramej**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
2	Transmission pipeline	Possible	Possible	Pipeline is generally along or close to the road
3	Reservoir	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°39'10.8"	45°03'10.1"	1,825	1960	Concrete	1.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	4,500	50	Steel	1.0	1960	Huge	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°41'02.6"	45°04'59.8"	1,606	Concrete	Rectangular	3x6x4	50	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	1,500	50	Steel	1960	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)
2	1960		No	0	Yes

9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Gegharkunik
Number and Name of Community	No.5 Antaramej
District	Kranoseisk

No.	Question	Answer
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A: Baseline Data

A1	Actual population in 2001	220
A2	Actual population in 2007	190
A3	Number of households	60
A4.1	Elderly people	60
A4.2	Population in labor force (age from 16 to 62)	110
A4.3	Children	57
A5.1	Pensioners	60
A5.2	Unemployed	0
A5.3	Receiving benefits	16
A6	Average monthly income of household (AMD)	25,000
A7	Number of medical ambulance station/first and health post	absent
A8	Number of beds in each medical ambulance station	0
A9	Number of school	1
A10	Number of pupils	52

B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	460
	Annual Budget of the community 2005, in thousand AMD	480
	Annual Budget of the community 2006, in thousand AMD	505
	Annual Budget of the community 2007, in thousand AMD	120
	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:	potatoes, dairy
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C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
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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	sufficient
D7	Number of house connection to drinking water system	6
D8	How many house connection household set the water meter	0
D9	Number of public taps	5
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?	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)	according to the supplied water

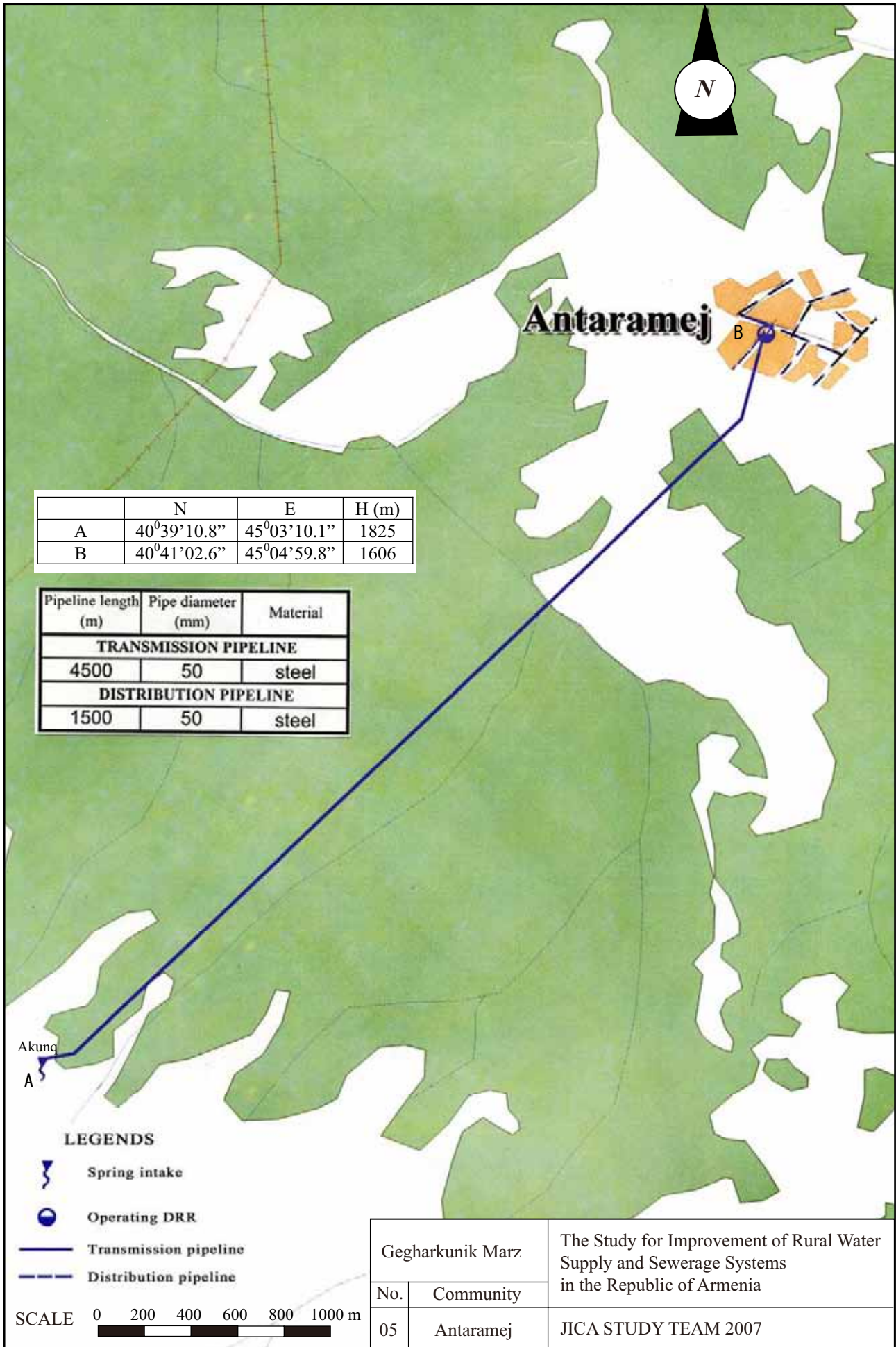
No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	according to the supplied water
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1.Flat rate, 2.Having water tariff	-
D19	Where do you acquire the irrigation water?	from spring
D20	Are you satisfied with irrigation water supply volume?	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: pipeline/transmission	1-deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-deteriorated
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
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 and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	none
E14	How you prepare O&M costs?	not collect
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?	water fee

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
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 ethnic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



	N	E	H (m)
A	40°39'10.8"	45°03'10.1"	1825
B	40°41'02.6"	45°04'59.8"	1606

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
4500	50	steel
DISTRIBUTION PIPELINE		
1500	50	steel

LEGENDS

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

SCALE 0 200 400 600 800 1000 m

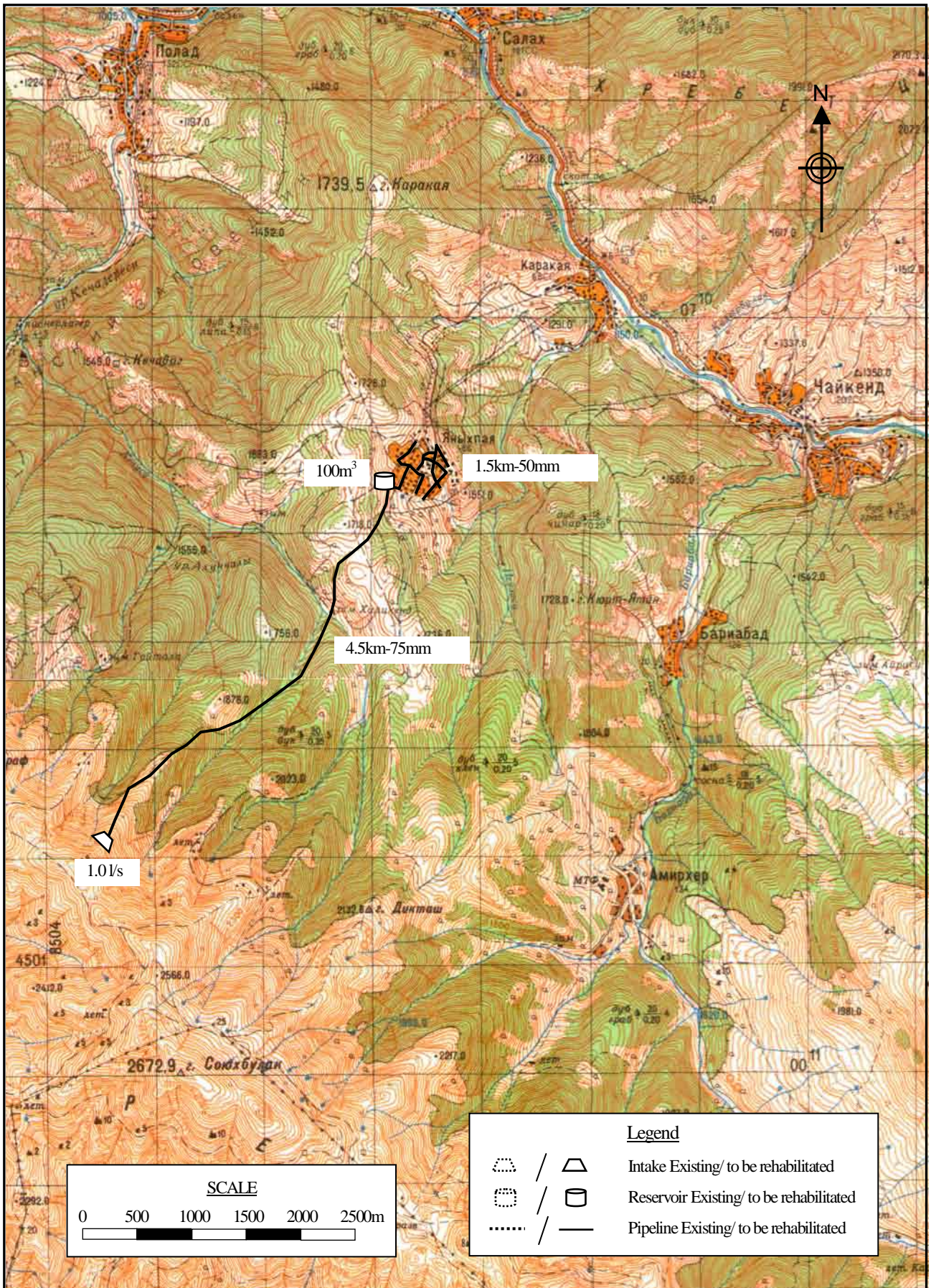
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
05	Antaramej	JICA STUDY TEAM 2007

Marz : **Gegharkunik**
Name : **Antaramej**

No.5

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
	1 Population	190	persons	19.0
	2 Factory	-	nos	0.0
	3 School (pupils)	52	pupils	0.5
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	7 Livestocks (87lit/household)	60	household	5.2
	Sub-total			24.7
	Unaccounted for water (20%)			4.9
1	Average Daily Water Demand			29.6 m3/day
2	Maximum Daily Water Demand			35.6 m3/day
3	Maximum Hourly Water Demand			8.7 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Spring	1	1.0	lit/sec
				86.4 m3/day
	Total			86.4 m3/day
	2 Required reservoir volume			104 m3

C. WATER SUPPLY FACILITIES REHABILITATION PLAN				
No	Item	Quantity	Unit	
1	Intake			
	1m3	1	nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter		m	
	75mm diameter	4,500	m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	100m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter	1,500	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	54	nos	
6	Water meter installation	60	nos	
7	Public tap	1	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	Gegharkunik	
No. 05	Antanamej	JICA STUDY TEAM

Marz : **Gegharkunik**

No. : **5**

Name : **Antaramej**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3	1	nos	367,700	367,700
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					367,700
2	Transmission Pipe	50mm		m	5,520	
		75mm	4,500	m	7,160	32,220,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					32,220,000
3	Reservoir	50m3		nos	8,363,900	
		100m3	1	nos	12,968,300	12,968,300
		150m3		nos	18,804,500	
		200m3		nos	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					12,968,300
4	Distribution Pipe	50mm	1,500	m	5,520	8,280,000
		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					8,280,000
5	House Connection		54	nos	74,000	3,996,000
6	Water Meter Installation		60	nos	80,000	4,800,000
7	Public Tap		1	nos	90,000	90,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		600	m	3,600	2,160,000
Total					AMD	65,382,000
					Equivalent to USD	214,002
					Equivalent to JPY	22,577,249
					AMD	USD
	Investment Cost per household		60	HH	1,089,700	3,567
	Investment Cost per person		190	persons	344,116	1,126

GEGHARKUNIK MARZ
Ijevan District
No 5 Antaramej

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

Item	Million AMD	Rate
1 Revenue		
Water fee revenue	50.19	32.9%
Subsidy	102.15	67.1%
Total	152.34	100.0%
2 Expenditure		
OM cost	35.29	23.2%
Loan repayment	95.72	62.8%
Interest paid	22.15	14.5%
Surplus cash	0.00	0.0%
Total	153.16	100.0%

B. FIRR CALCULATION

Description	Total	Year																																													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40						
A COST																																															
1. Investment Cost	85.06	3.82	2.73	3.58	51.91	22.07	0.53	0.42																																							
2. Operation and Maintenance Cost																																															
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24			
Chlorine	1.10			0.00	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03			
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Maintenance cost	7.71			0.00	0.15	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21			
Pump replacement	0.00																																														
Sub-total	17.93			0.24	0.41	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48			
Total Outflow	102.99	3.82	2.73	3.82	52.32	22.55	1.01	0.90	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48		
B BENEFIT																																															
1. Water Tariff	31.49	0.00	0.00	0.00	0.23	0.32	0.34	0.57	0.59	0.61	0.63	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
2. Subsidy	80.91	0.00	0.00	0.24	0.19	0.20	0.19	0.00	0.00	0.00	0.00	2.43	2.45	2.48	2.50	2.50	2.53	2.54	2.55	2.57	2.59	2.61	2.62	2.63	2.66	2.67	2.69	2.70	2.71	2.74	2.74	2.76	2.77	2.80	2.80	2.80	2.83	2.83	2.85	2.87	2.87	2.87	2.87	2.87	2.87		
Total Inflow	112.40	0.00	0.00	0.24	0.42	0.52	0.53	0.57	0.59	0.61	0.63	3.37	3.39	3.42	3.44	3.44	3.47	3.48	3.49	3.51	3.53	3.55	3.56	3.57	3.60	3.61	3.63	3.64	3.65	3.68	3.68	3.70	3.71	3.74	3.74	3.74	3.77	3.77	3.79	3.81	3.81	3.81	3.81	3.81	3.81		
NET BENEFIT	9.41	-3.82	-2.73	-3.6	-51.9	-22.0	-0.48	-0.33	0.11	0.13	0.15	2.89	2.91	2.94	2.96	2.96	2.99	3.00	3.01	3.03	3.05	3.07	3.08	3.09	3.12	3.13	3.15	3.16	3.17	3.20	3.20	3.22	3.23	3.26	3.26	3.26	3.29	3.29	3.31	3.33	3.33	3.33					
FIRR =	0.49%																																														

C. SENSITIVITY ANALYSIS

No.	Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1 Capital cost 10% up	-26.11	-4.20	-3.00	-3.9	-57.1	-24.2	-0.53	-0.37	0.11	0.13	0.15	2.89	2.91	2.94	2.96	2.96	2.99	3.00	3.01	3.03	3.05	3.07	3.08	3.09	3.12	3.13	3.15	3.16	3.17	3.20	3.20	3.22	3.23	3.26	3.26	3.26	3.29	3.29	3.31	3.33	3.33
	2 Capital cost 20% up	-34.04	-4.58	-3.28	-4.3	-62.3	-26.4	-0.59	-0.41	0.11	0.13	0.15	2.89	2.91	2.94	2.96	2.96	2.99	3.00	3.01	3.03	3.05	3.07	3.08	3.09	3.12	3.13	3.15	3.16	3.17	3.20	3.20	3.22	3.23	3.26	3.26	3.26	3.29	3.29	3.31	3.33	3.33
2	1 OM cost 10% up	-19.42	-3.82	-2.73	-3.6	-51.9	-22.1	-0.53	-0.38	0.06	0.08	0.10	2.84	2.86	2.89	2.91	2.91	2.94	2.95	2.96	2.98	3.00	3.02	3.03	3.04	3.07	3.08	3.10	3.11	3.12	3.15	3.15	3.17	3.18	3.21	3.21	3.21	3.24	3.24	3.26	3.28	3.28
	2 OM cost 20% up	-20.67	-3.82	-2.73	-3.6	-52.0	-22.1	-0.58	-0.43	0.01	0.03	0.05	2.79	2.81	2.84	2.86	2.86	2.89	2.90	2.91	2.93	2.95	2.97	2.98	2.99	3.02	3.03	3.05	3.06	3.07	3.10	3.10	3.12	3.13	3.16	3.16	3.16	3.19	3.19	3.21	3.23	3.23
3	1 Revenue 10% down	-25.54	-3.82	-2.73	-3.6	-51.9	-22.1	-0.53	-0.39	0.05	0.07	0.09	2.55	2.57	2.60	2.62	2.62	2.64	2.65	2.66	2.68	2.70	2.72	2.72	2.73	2.76	2.77	2.79	2.80	2.81	2.83	2.83	2.85	2.86	2.89	2.89	2.89	2.91	2.91	2.93	2.95	2.95
	2 Revenue 20% down	-32.90	-3.82	-2.73	-3.6	-52.0	-22.1	-0.59	-0.44	-0.01	0.01	0.02	2.22	2.23	2.26	2.27	2.27	2.30	2.30	2.31	2.33	2.34	2.36	2.37	2.38	2.40	2.41	2.42	2.43	2.44	2.46	2.46	2.48	2.49	2.51	2.51	2.51	2.54	2.54	2.55	2.57	2.57

No.	Description	FIRR	Sensitivity indicator	Switching value
1	1 Capital cost 10% up	0.04%	99.77	1.00%
	2 Capital cost 20% up	-0.35%	-23.83	-4.20%
2	1 OM cost 10% up	0.40%	2.30	43.44%
	2 OM cost 20% up	0.31%	6.02	16.61%
3	1 Revenue 10% down	-0.10%	-59.20	-1.69%
	2 Revenue 20% down	-0.75%	-16.52	-6.05%

No.6 Astghadzor

Information on Existing Water Sources (Gegharkunik)

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

No.6 Community Astghadzor
District Martuni
Marz Gegharkunik

No.6 Community Astghadzor
District Martuni
Marz Gegharkunik
Sampling date 10/Aug/2007

No	Water source	Latitude			Longitude			Atitude (m)	Yield(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	borehole	40	7	22.7	45	21	23.7	2,040	-	-	100.0
2	borehole	40	7	19.6	45	21	32.9	2,050	-	-	
3	borehole	40	7	21.4	45	21	41.1	2,049	-	-	
4	borehole	40	6	53.2	45	21	32.1	2,082	-	-	
5	borehole	40	7	9.0	45	21	14.2	2,059	-	-	
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	Leakage in the network - 80%
Alternative sources if any	there are free springs at 16,5km south from the village. Water discharge of which is 30l/sec.

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		7.5	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	8.9		
c	TDS	Mg/L	110	1000	1000
1	Al:Aluminum	Mg/L	n.d	0.10	0.50
2	B:Boron	Mg/L	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	7	250	350
4	Cr:Chrome	Mg/L	<0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	2	1
6	F:Fluoride	Mg/L	1.05	1.50	
7	Hardness	Mg/L	230	500	700
8	Fe:Iron	Mg/L	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	n.d	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	0.070	0.250
11	Ni:Nickel	Mg/L	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	4.0	50.0	45.0
13	SO4:Sulfate	Mg/L	5.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.70	0.10
17	Be:Berillium	Mg/L	0.00005	NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	0.00100	0.00050
21	Se:Selenium	Mg/L	n.d	0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	NA	7.0
23	CN:Cyanide	Mg/L	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml	<3	-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	nd	0	0
26	Total bacteria	bacteria per 1 ml	25	-	50

No. 6 Marz Gegharkunik Community Astghadzor**1. ACCESSIBILITY TO THE SITE**

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
2	Transmission pipeline			No transmission pipeline
3	Reservoir			No reservoir

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Groundwater	40°07'22.7"	45°21'23.7"	2,040	2000-2007	Concrete	100.0	No
2	Groundwater	40°07'19.6"	45°21'32.9"	2,050	2000-2007	Concrete		No
3	Groundwater	40°07'21.4"	45°21'41.1"	2,049	2000-2007	Concrete		No
4	Groundwater	40°07'53.2"	45°21'32.1"	2,082	2000-2007	Concrete		No
5	Groundwater	40°07'09.0"	45°21'14.2"	2,059	2000-2007	Concrete		No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	No						

4. RESERVOIR

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

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	20,000	100	Steel	2000	Huge	Yes
2	8,000	50	Steel		Huge	Yes
3	10,000	25-40	Steel		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)
Yes (5nos)	Commercial	Centrifugal	-	-	-	-	No

8. PUBLIC TAPS

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

9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
Yes	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Gegharkunik
Number and Name of Community	No.6 Astghadzor
District	Martini

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

A: Baseline Data

A1	Actual population in 2001	3,900
A2	Actual population in 2007	4,080
A3	Number of households	800
A4.1	Elderly people	420
A4.2	Population in labor force (age from 16 to 62)	2,846
A4.3	Children	1,241
A5.1	Pensioners	525
A5.2	Unemployed	300
A5.3	Receiving benefits	270
A6	Average monthly income of household (AMD)	30,000
A7	Number of medical ambulance station/first and health post	absent
A8	Number of beds in each medical ambulance station	0
A9	Number of school	1
A10	Number of pupils	720

B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	3,500
	Annual Budget of the community 2005, in thousand AMD	3,200
	Annual Budget of the community 2006, in thousand AMD	4,200
	Annual Budget of the community 2007, in thousand AMD	1,600
	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	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:	potatoes, cabbage, cereals, dairy, meat
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	1340
D3	Date of expiry of water use permit	03.09.07-03.09.10
D4	Planned date of obtaining water use permit	-
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	800
D8	How many house connection household set the water meter	0
D9	Number of public taps	6
D10.1	How is the regime of water supply in your community in the dry season?	irregularly - once in 3 days 2hrs
D10.2	How is the regime of water supply in your community in the wet season?	irregularly - once in 3 days 2hrs
D11	What time of day water is given?	09 ⁰⁰ -11 ⁰⁰
D12	Are you pleased with duration of domestic water supply?	generally displeased
D13	Are hours of water supply convenient?	generally inconvenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Laundry, bathing, etc) of each household a day?	1 hour
D14.2	Estimate quantity of domestic water use of each household (litter per day)	500

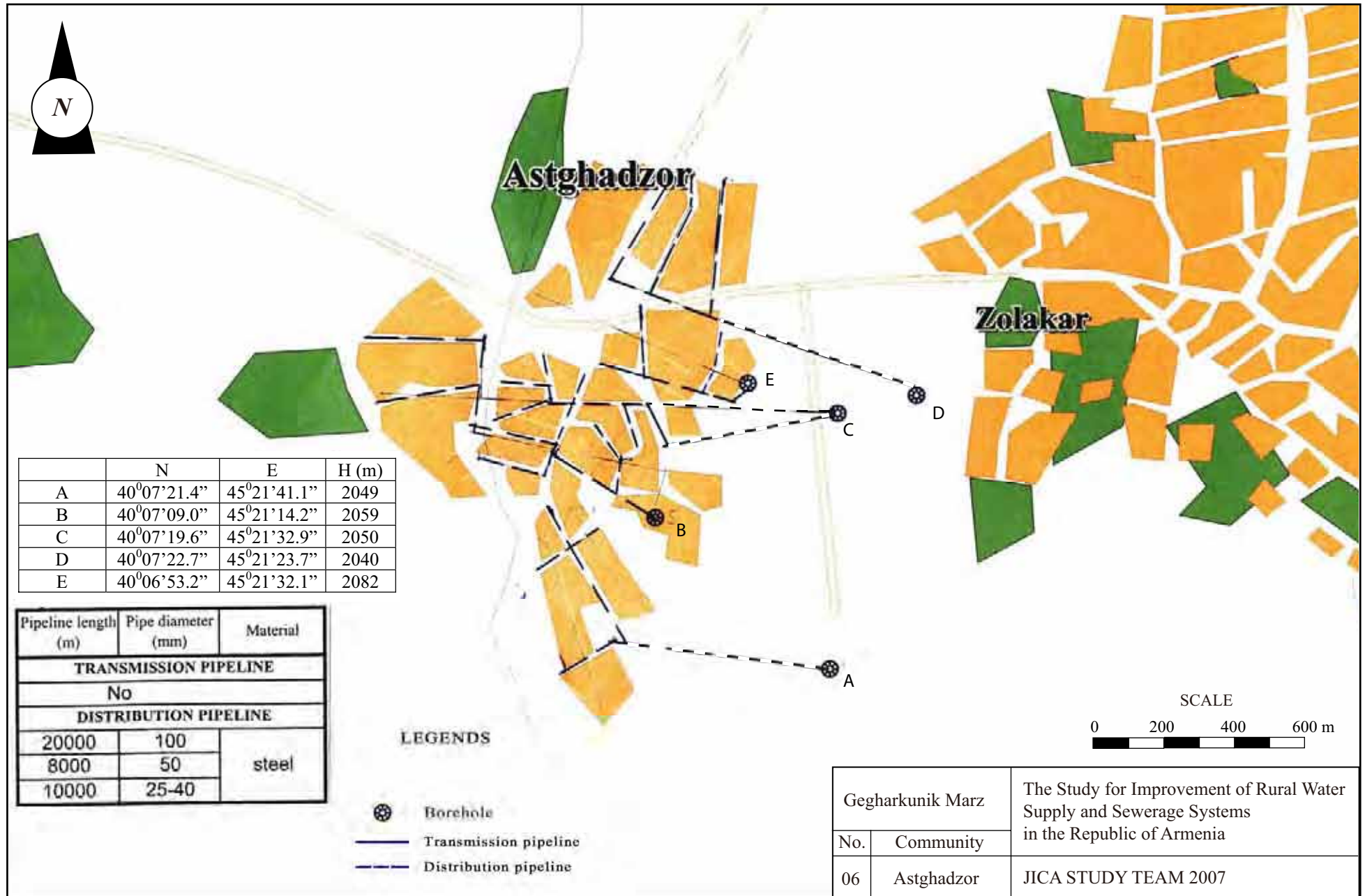
No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	1 hour
D15.2	Estimate quantity of water for filling containers of each household (litter per	70
D16	Drinking water monthly water fee per household	300 drams per capita/month
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1 Flat rate, 2 Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	deep well
D20	Are you satisfied with irrigation water supply volume?	insufficient.

E: Present Operation and Maintenance Works

E1	Name of responsible for water supply	Hakobyan Hrachik
E2	Position	service department head
E3	Telephone	(093)084880
E4	Quantity and present condition of the water supply facilities: spring/ intake	6 deep wells- 2-deteriorated, 4-rehab.
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	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	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	1-deteriorated
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and 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 from community (M. Petrosyan)
E14	How you prepare O&M costs?	water fee
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	120,000
	Labor cost (AMD)	720,000
	Repair cost(AMD)	500,000
	Others(AMD)	500,000
	Total (AMD)	1,840,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee

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 ethnic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



	N	E	H (m)
A	40°07'21.4"	45°21'41.1"	2049
B	40°07'09.0"	45°21'14.2"	2059
C	40°07'19.6"	45°21'32.9"	2050
D	40°07'22.7"	45°21'23.7"	2040
E	40°06'53.2"	45°21'32.1"	2082

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
No		
DISTRIBUTION PIPELINE		
20000	100	steel
8000	50	
10000	25-40	

LEGENDS

-  Borehole
-  Transmission pipeline
-  Distribution pipeline



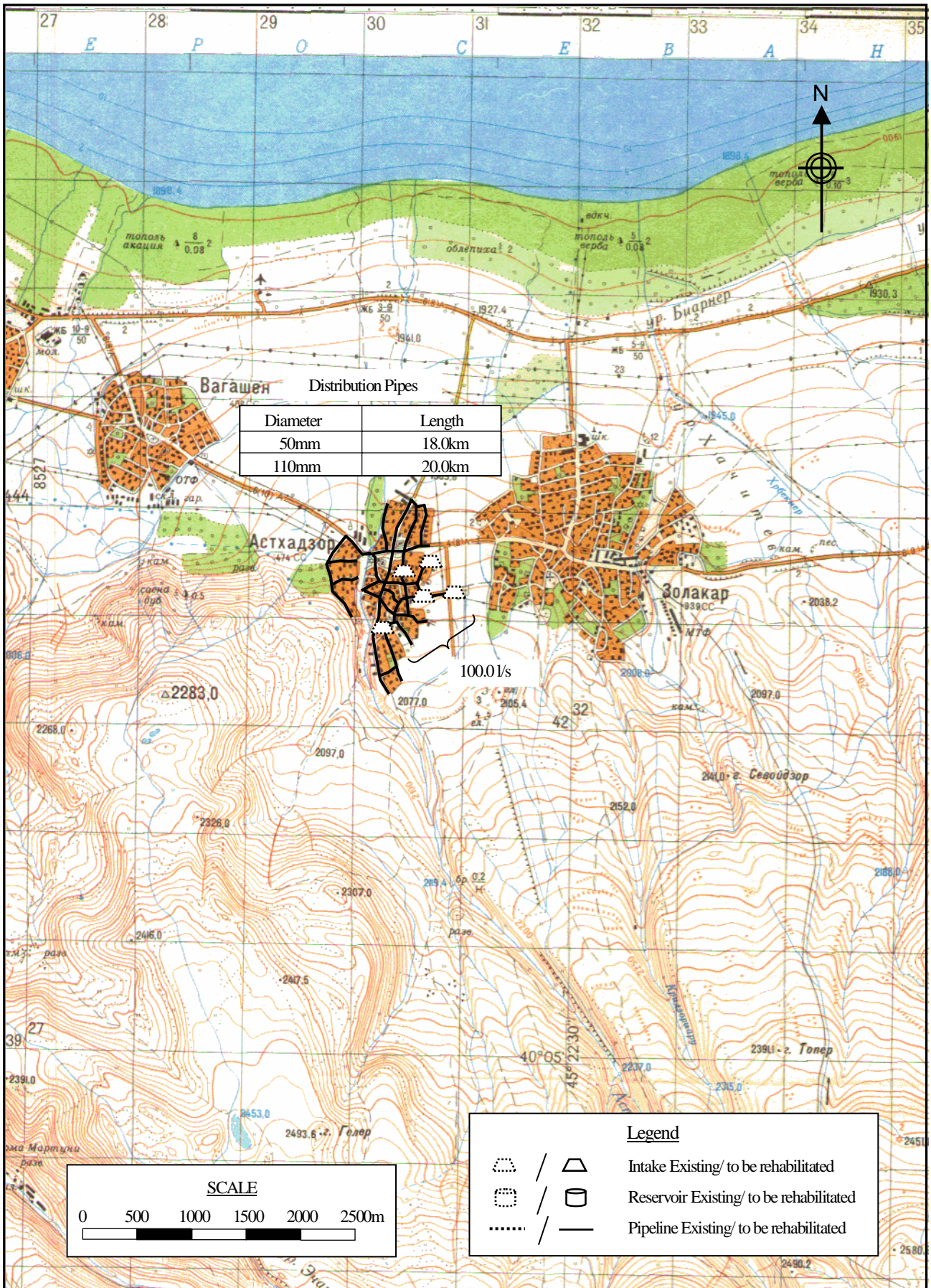
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
06	Astghadzor	JICA STUDY TEAM 2007

Marz : **Gegharkunik**
Name : **Astghadzor**

No.6

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
	1 Population	4,080	persons	408.0
	2 Factory	-	nos	0.0
	3 School (pupils)	720	pupils	7.2
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	7 Livestocks (87lit/household)	800	household	69.6
	Sub-total			484.8
	Unaccounted for water (20%)			97.0
1	Average Daily Water Demand			581.8 m3/day
2	Maximum Daily Water Demand			698.1 m3/day
3	Maximum Hourly Water Demand			56.7 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Borehole	5	100.0	lit/sec
				8640.0 m3/day
	Total			8640.0 m3/day
	2 Required reservoir volume			681 m3

C. WATER SUPPLY FACILITIES REHABILITATION PLAN				
No	Item	Quantity	Unit	
1	Intake			
	1m3		nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
4	Distribution pipe			
	50mm diameter	18,000	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	20,000	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	-	nos	
6	Water meter installation	800	nos	
7	Public tap	8	nos	
8	Chlorination	5	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	Gegharkunik	
No. 06	Astghadzor	
		JICA STUDY TEAM

Marz : **Gegharkunik**

No. : **6**

Name : **Astghadzor**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake	1m3		nos	367,700	
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					
2	Transmission Pipe	50mm		m	5,520	
		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					
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		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					
4	Distribution Pipe	50mm	18,000	m	5,520	99,360,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	20,000	m	9,680	193,600,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					292,960,000
5	House Connection			nos	74,000	
6	Water Meter Installation		800	nos	80,000	64,000,000
7	Public Tap		8	nos	90,000	720,000
8	Chlorilation Equipment		5	nos	500,000	2,500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		15,200	m	3,600	54,720,000
Total					AMD	414,900,000
					Equivalent to USD	1,358,013
					Equivalent to JPY	143,270,326
					AMD	USD
Investment Cost per household			800	HH	518,625	1,698
Investment Cost per person			4,080	persons	101,691	333

No.7 Artsvanist

Information on Existing Water Sources (Gegharkunik)

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

No.7 Community Artsvanist
District Martuni
Marz Gegharkunik

No.7 Community Artsvanist
District Martuni
Marz Gegharkunik
Sampling date 13/Aug/2007

No	Water source	Latitude			Longitude			Atitude (m)	Yield(L/sec)		
		deg	min	sec	deg	min	sec		Min	Max	At site
1	Springs	40	4	22.6	45	32	21.6	2,483	6.0	6.0	6.0
2	spring	40	4	46.7	45	32	3.8	2,351	4.0	4.0	4.0
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	
Alternative sources if any	3l/sec water amount can be taken from the free springs in the same area.

	Parameters analysed	Units	No.1	Guidelines	
				WHO	Armenia
a	pH		7.8	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	7.6		
c	TDS	Mg/L	26	1000	1000
1	Al:Aluminum	Mg/L	0.01	0.10	0.50
2	B: Boron	Mg/L	n.d	0.70	0.50
3	Cl: Chloride	Mg/L	4	250	350
4	Cr: Chrome	Mg/L	<0.01	0.05	0.05
5	Cu: Copper	Mg/L	n.d	2	1
6	F: Fluoride	Mg/L	0.68	1.50	
7	Hardness	Mg/L	50	500	700
8	Fe: Iron	Mg/L	0.04	0.30	0.30
9	Mn: Manganese	Mg/L	n.d	0.40	0.10
10	Mo: Molibdenum	Mg/L	n.d	0.070	0.250
11	Ni: Nickel	Mg/L	n.d	0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	50.0	45.0
13	SO4: Sulfate	Mg/L	2.0	250.0	500.0
14	Zn: Zink	Mg/L	n.d	3.0	5.0
15	As: Arsenic	Mg/L	n.d	0.0	0.1
16	Ba: Barium	Mg/L	0.01	0.70	0.10
17	Be: Berillium	Mg/L	0.00009	NA	0.00020
18	Cd: Cadmium	Mg/L	n.d	0.0030	0.0010
19	Pb: Lead	Mg/L	<0.001	0.010	0.030
20	Hg: Mercury	Mg/L	<0.0002	0.00100	0.00050
21	Se: Selenium	Mg/L	0.001	0.010	0.010
22	Sr: Strontium	Mg/L	n.d	NA	7.0
23	CN: Cyanide	Mg/L	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. 7 Marz Gegharkunik Community Artsvanist**1. ACCESSIBILITY TO THE SITE**

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°04'22.6"	45°32'21.6"	2,483	1952	Concrete	6.0	Yes
2	Spring	40°04'46.7"	45°32'03.8"	2,351	1970	Concrete	4.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	7,000	150	Steel	6.0	1952	Medium	Yes
2	1,000	100	Steel				
3	6,000	150	AsbestosCement				
4	12,000	100	Cast iron	4.0	1970	Little	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°08'38.6"	45°30'49.5"	2,012	Concrete	Rectangular	6x12x4	200	No
2	40°08'53.4"	45°30'20.1"	2,010	Concrete	Circle	D=6, H=4	100	No

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	1,500	125	Steel	1970	Little	No
2	5,000	100	Steel	1955	Huge	Yes
3	500	80	Steel		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)
8			No	0	Yes

9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	Gegharkunik
Number and Name of Community	No.7 Artsvanist
District	Martini

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

A: Baseline Data

A1	Actual population in 2001	3,100
A2	Actual population in 2007	3,195
A3	Number of households	700
A4.1	Elderly people	595
A4.2	Population in labor force (age from 16 to 62)	1,566
A4.3	Children	1,036
A5.1	Pensioners	440
A5.2	Unemployed	0
A5.3	Receiving benefits	26
A6	Average monthly income of household (AMD)	35,000
A7	Number of medical ambulance station/first and health post	absent
A8	Number of beds in each medical ambulance station	0
A9	Number of school	1
A10	Number of pupils	610

B: Budget

B1	Annual Budget of the community 2004, in thousand AMD	5,460
	Annual Budget of the community 2005, in thousand AMD	3,619
	Annual Budget of the community 2006, in thousand AMD	5,990
	Annual Budget of the community 2007, in thousand AMD	2,655
	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	1,680
	Amount spent in drinking water sector 2006, in thousand AMD	1,444
	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:	potatoes, 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	28
D3	Date of expiry of water use permit	08.08.06-08.08.09
D4	Planned date of obtaining water use permit	-
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	sufficient
D7	Number of house connection to drinking water system	140
D8	How many house connection household set the water meter	0
D9	Number of public taps	15
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?	-
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)	200

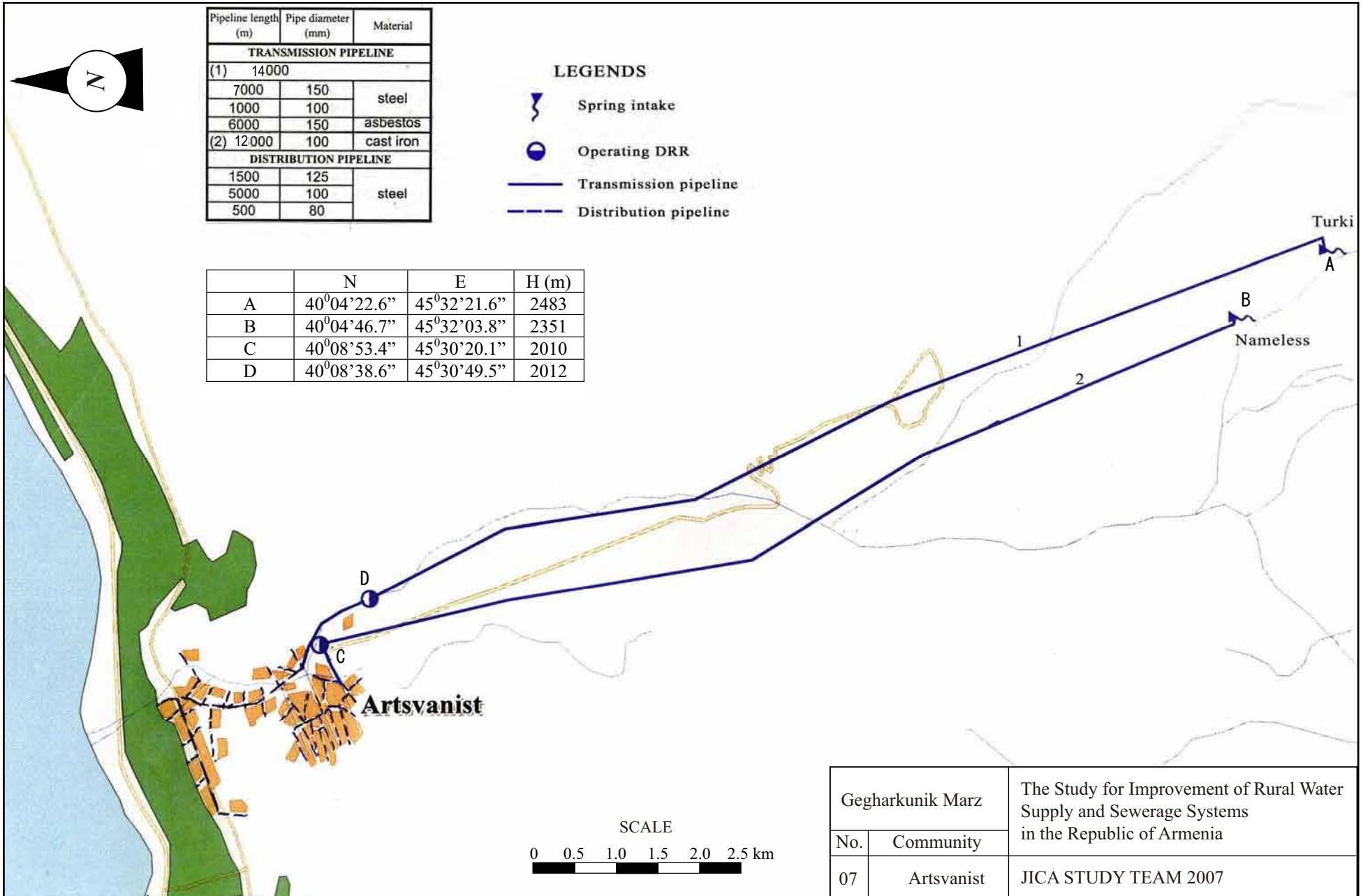
No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	300
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1.Flate rate, 2.Having water tariff	-
D19	Where do you acquire the irrigation water?	from spring
D20	Are you satisfied with irrigation water supply volume?	sufficient

E: Present Operation and Maintenance Works

E1	Name of responsible for water supply	Manukyan Albert
E2	Position	water distributor
E3	Telephone	with the help of administ. head
E4	Quantity and present condition of the water supply facilities: spring/ intake	6-partially rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	2-partially rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-good
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	partially 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 fromcommunity(A. Manukyan)
E14	How you prepare O&M costs?	administration budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	516,000
	Repair cost(AMD)	50,000
	Others(AMD)	0
	Total (AMD)	566,000
E16	Do the residents participate in the O&M works?	no
E17	What kind of OM method is preferable to you?	water fee





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



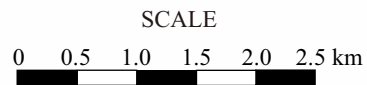
Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 14000		
7000	150	steel
1000	100	
6000	150	asbestos
(2) 12000	100	cast iron
DISTRIBUTION PIPELINE		
1500	125	steel
5000	100	
500	80	

LEGENDS

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

	N	E	H (m)
A	40°04'22.6"	45°32'21.6"	2483
B	40°04'46.7"	45°32'03.8"	2351
C	40°08'53.4"	45°30'20.1"	2010
D	40°08'38.6"	45°30'49.5"	2012

Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
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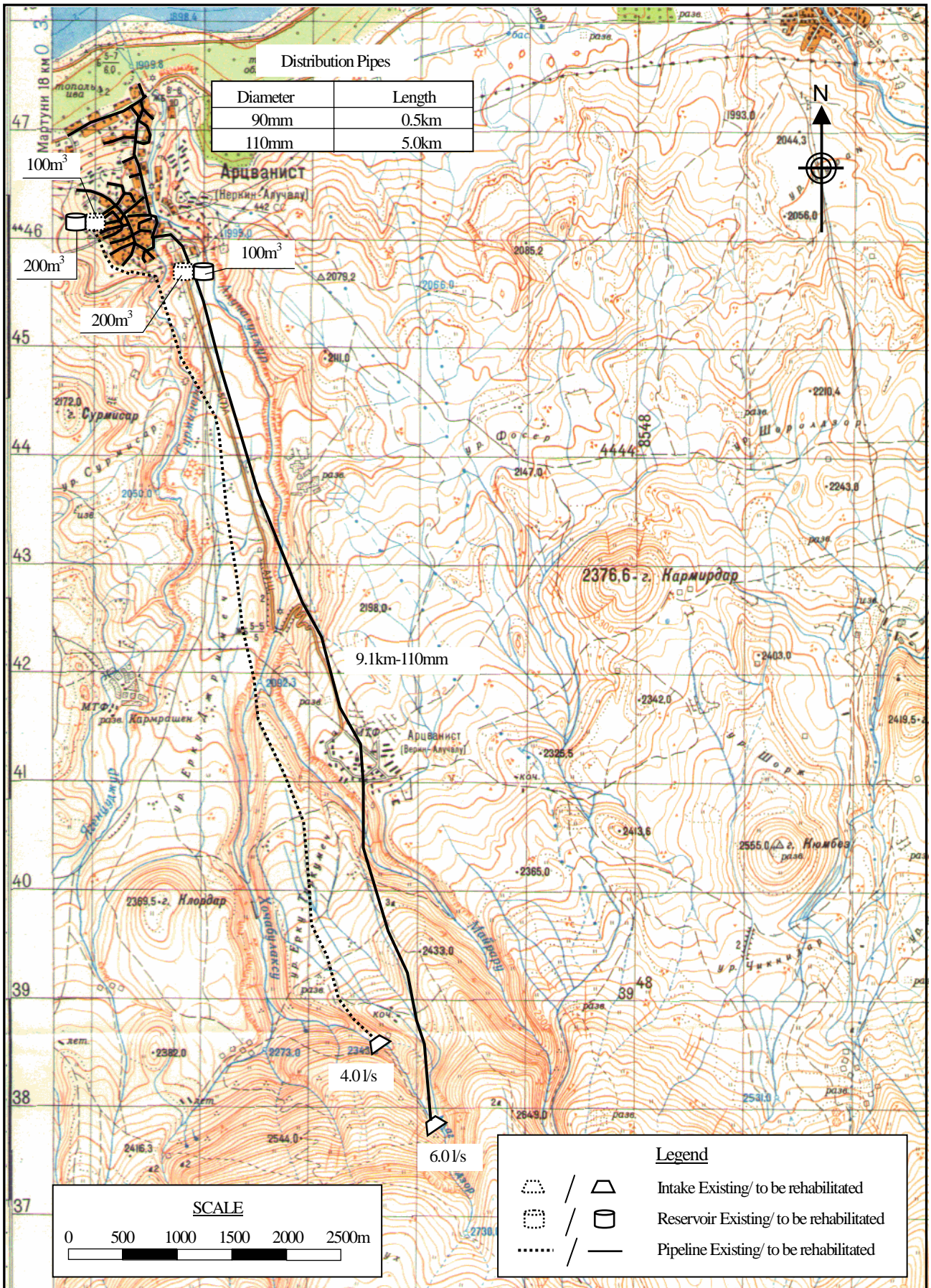
Marz : **Gegharkunik**
Name : **Artsvanist**

No.7

No.	Item	Quantity	Unit	Water demand (m3/d)
A. WATER DEMAND				
	1 Population	3,195	persons	319.5
	2 Factory	-	nos	0.0
	3 School (pupils)	610	pupils	6.1
	4 Medical Ambulance Station	-	nos	-
	5 Polyclinic	-	nos	-
	7 Livestocks (87lit/household)	700	household	60.9
	Sub-total			386.5
	Unaccounted for water (20%)			77.3
1	Average Daily Water Demand			463.8 m3/day
2	Maximum Daily Water Demand			556.6 m3/day
3	Maximum Hourly Water Demand			48.2 m3/hr
B. WATER SUPPLY PLAN				
	1 Water source type	Nr.	Total vol.	
	a Spring	2	10.0	lit/sec
				864.0 m3/day
	Total			864.0 m3/day
	2 Required reservoir volume			579 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		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	9,100	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	100m3 capacity	1	nos	For reservoir D
	200m3 capacity	1	nos	For reservoir C
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter	500	m	
	110mm diameter	5,000	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	560	nos	
6	Water meter installation	700	nos	
7	Public tap	7	nos	
8	Chlorination	2	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	Gegharkunik	
No. 07	Artsvanist	
		JICA STUDY TEAM

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

Marz : **Gegharkunik**

No. : **7**

Name : **Artsvanist**

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		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	9,100	m	9,680	88,088,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					88,088,000
3	Reservoir	50m3		nos	8,363,900	
		100m3	1	nos	12,968,300	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					35,492,900
4	Distribution Pipe	50mm		m	5,520	
		75mm		m	7,160	
		90mm	500	m	8,040	4,020,000
		110mm	5,000	m	9,680	48,400,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					52,420,000
5	House Connection		560	nos	74,000	41,440,000
6	Water Meter Installation		700	nos	80,000	56,000,000
7	Public Tap		7	nos	90,000	630,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage concrete surfa		2,200	m	3,600	7,920,000
Total					AMD	283,726,300
					Equivalent to USD	928,667
					Equivalent to JPY	97,974,354
					AMD	USD
Investment Cost per household			700	HH	405,323	1,327
Investment Cost per person			3,195	persons	88,803	291

