No.33 Sizavet

Information on Existing Water Sources (Shirak)

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

No.33 Community Sizavet
District Ashotsk
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	41	7	28.5	43	54	7.9	2,387	5.0	15.0	8.0
2	Borehole	41	6	12.6	43	49	56.9	2,082	-	-	16.0
3	Borehole	41	6	12.8	43	49	54.3	2,082	-	-	
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Acceptable
Notes	Two boreholes are located at 30m distance from each other.
Alternative sources if any	

No.33 Community Sizavet
District Ashotsk
Marz Shirak
Sampling date 10/Aug/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
a	pH		7.9	8.7			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	6.7	11.6				
c	TDS	Mg/L	21	164			1000	1000
1	Al:Aluminum	Mg/L	0.03	n.d			0.10	0.50
2	B:Boron	Mg/L	n.d	n.d			0.70	0.50
3	Cl:Chloride	Mg/L	4	6			250	350
4	Cr:Chrome	Mg/L	<0.01	n.d			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.36	0.16			1.50	
7	Hardness	Mg/L	50	120			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	1.8	2.2			50.0	45.0
13	SO4:Sulfate	Mg/L	2.0	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	0.00005	0.00006			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		n.d			-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml		n.d			0	0
26	Total bacteria	bacteria per 1 ml		n.d			-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.33 Community Sizavet
District Ashotsk
Marz Shirak

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not Identified	Not Identified
1	03	15	-	Not Identified	Not Identified
2	04	27	-	Not Identified	Not Identified
3	06	13	-	Not Identified	Not Identified
4	07	13	0,0,0,0	Not Identified	Not Identified
5	08	08	62,76,69,70	0,4;04;04;04; 0,0,0,0	Not Identified

No. 33 **Marz** Shirak **Community** Sizavet

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	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	41°07′28,5″	43°54′07,9″	2,387	1961	Concrete	8.0	Yes
2	Groundwater	41°06′12,6″	43°49′56,9″	2,082	1975	Steel	16.0	Yes
3	Groundwater	41°06′12,8″	43°49′54,3″			Steel		Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,000	160	AsbestosCement	8.0	1965	Medium	Yes
2	5,000	200	Steel		2001	Little	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	Yes	Intake	Powder	once per month

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	15,000	75	Steel/PE	1978	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)
Yes (2nos)	Commercial	Centrifugal	-	-	-	-	No

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
60	1978		No	0	Yes

9. DRAINAGE SYSTEM

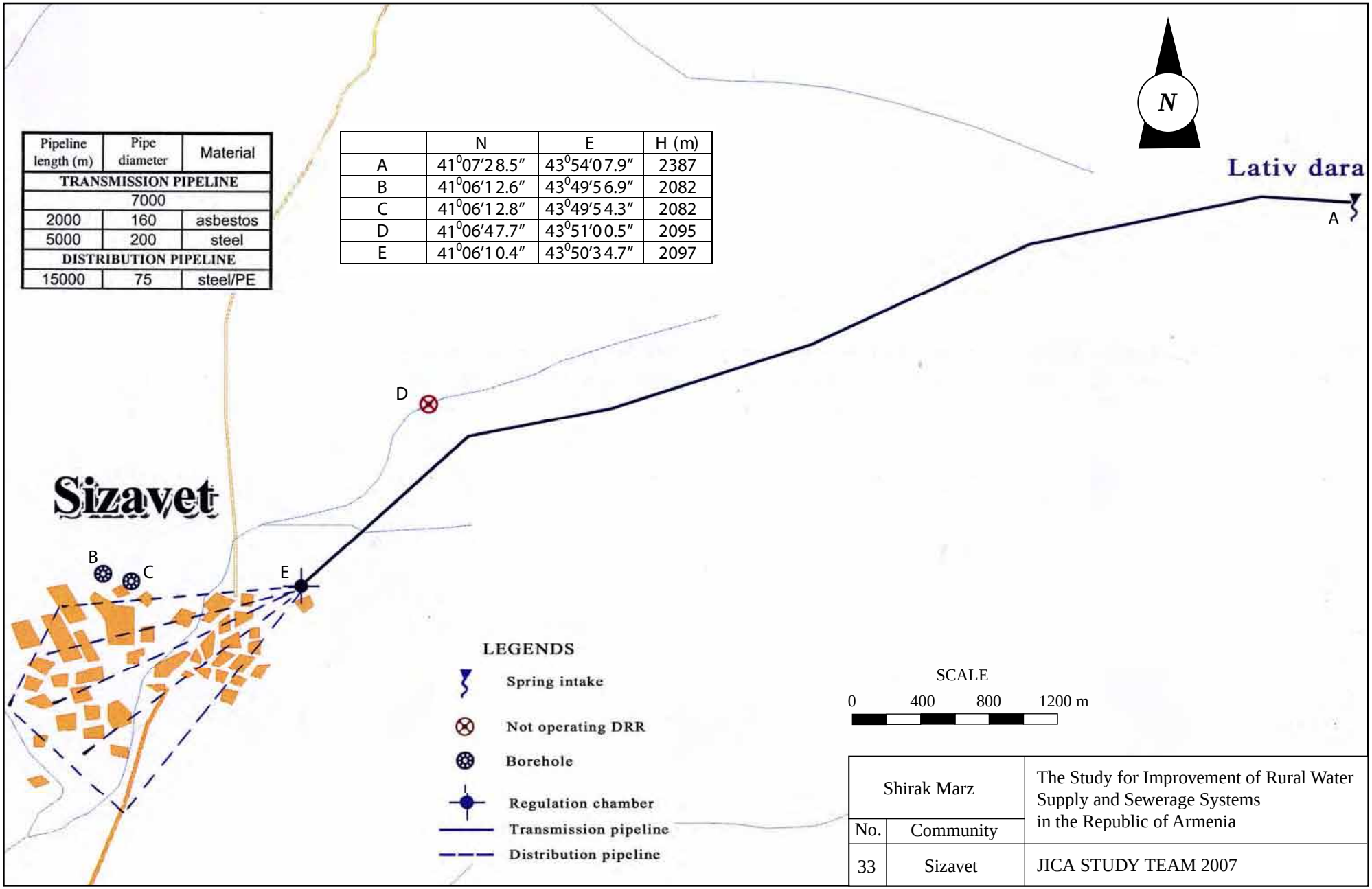
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.33 Sizavet**
District	**Ashotsk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	370
A2	Actual population in 2007	400
A3	Number of households	68
A4.1	Elderly people	40
A4.2	Population in labor force (age from 16 to 62)	360
A4.3	Children	100
A5.1	Pensioners	32
A5.2	Unemployed	0
A5.3	Receiving benefits	6
A6	Average monthly income of household (AMD)	25,000
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	84
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	0
	Annual Budget of the community 2005, in thousand AMD	0
	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	100
	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
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	sufficient
D6	Present condition of the water supply volume of Irrigation water	absent
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	10
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?	fully 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 houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300
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	1,000AMD HH/year
D17	How often do you usually pay water fees?	monthly
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	absent
D20	Are you satisfied with irrigation water supply volume?	insufficient
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	3-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	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	partially repaired
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?	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)	100,000
	Others(AMD)	0
	Total (AMD)	100,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	residents 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

Shirak
No.33 Sizavet



Pipeline length (m)	Pipe diameter	Material
TRANSMISSION PIPELINE		
7000		
2000	160	asbestos
5000	200	steel
DISTRIBUTION PIPELINE		
15000	75	steel/PE

	N	E	H (m)
A	41°07′28.5″	43°54′07.9″	2387
B	41°06′12.6″	43°49′56.9″	2082
C	41°06′12.8″	43°49′54.3″	2082
D	41°06′47.7″	43°51′00.5″	2095
E	41°06′10.4″	43°50′34.7″	2097

Shirak Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
33	Sizavet	JICA STUDY TEAM 2007

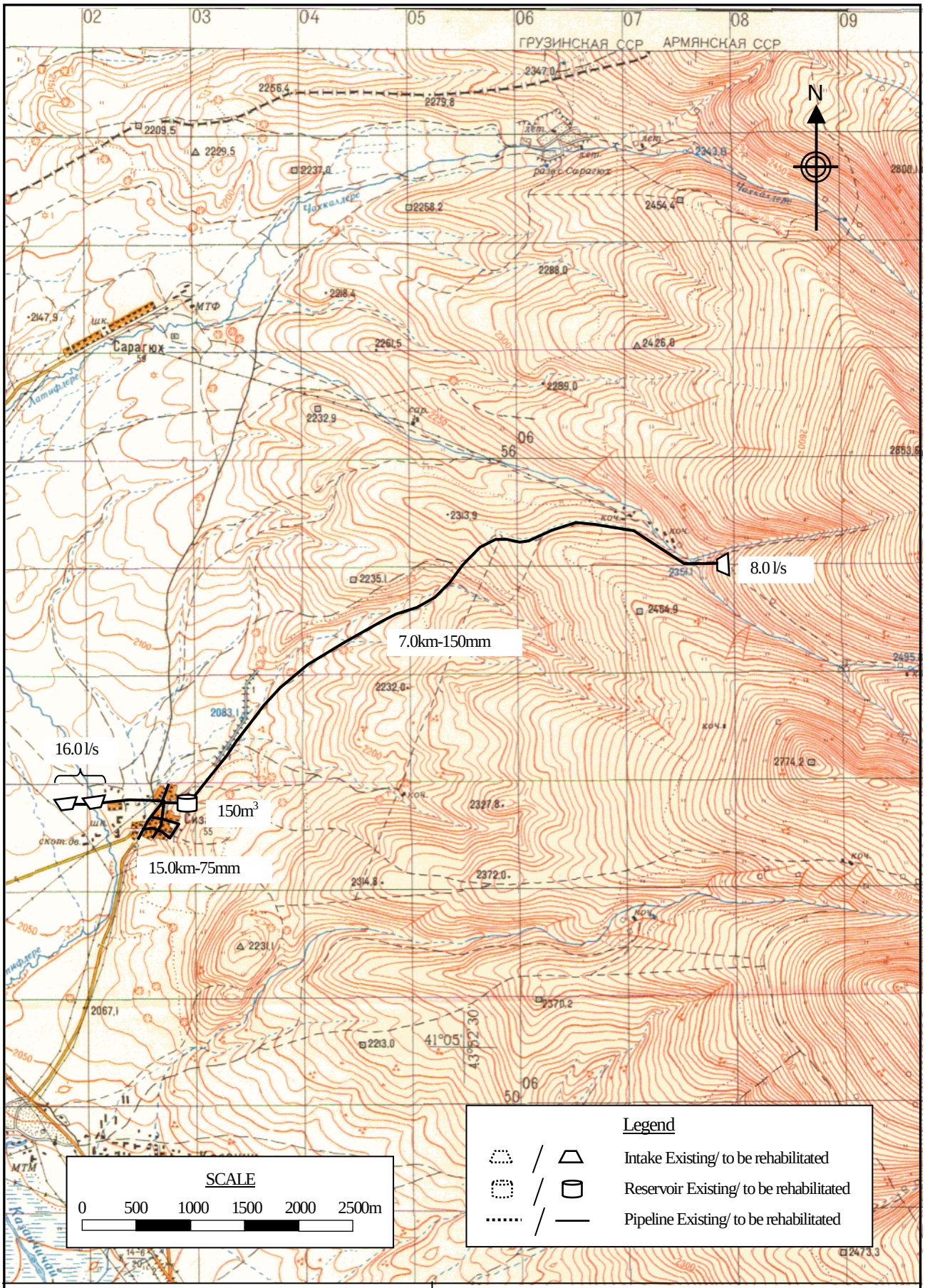
Marz : **Shirak** No.33
Name : **Sizabet**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	400	persons	40.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	84	pupils	0.8	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	68	household	5.9	
	Sub-total			46.7	
	Unaccouted for water (20%)			9.3	
1	Average Daily Water Demand			56.0	m3/day
2	Maximum Daily Water Demand			67.2	m3/day
3	Maximum Hourly Water Demand			12.7	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	8.0	lit/sec		691.2	m3/day
	b Borehole	1	16.0	lit/sec		1,382.4	m3/day
`	Total					2,073.6	m3/day
	2 Required reservoir volume					153	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		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter	7,000	m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	150m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter	15,000	m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	18	nos
6	Water meter installation	68	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	Shirak	
No. 33	Sizavet	JICA STUDY TEAM

Marz : **Shirak**
No. : **33**
Name : **Sizavet**

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		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	7,000	m	13,140	91,980,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					91,980,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3	1	nos	18,804,500	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					18,804,500
4	Distribution Pipe					
		50mm		m	5,520	
		75mm	15,000	m	7,160	107,400,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					107,400,000
5	House Connection		18	nos	74,000	1,332,000
6	Water Meter Installation		68	nos	80,000	5,440,000
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	6,000	m	3,600	21,600,000
	Total				AMD	248,249,600
					Equivalent to USD	812,548
					Equivalent to JPY	85,723,792
					AMD	USD
	Investment Cost per household		68	HH	3,650,729	11,949
	Investment Cost per person		400	persons	620,624	2,031

SHIRAK MARZ
Amasia District
No 33 Sizavet

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	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 Water Sales Revenue																																										
Consumption water volume	1000m3/yr		17.0																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		95.00	0.00	0.00	0.00	0.61	0.61	0.63	1.07	1.11	1.15	1.18	1.77	1.83	1.89	1.96	2.02	2.09	2.16	2.23	2.30	2.38	2.45	2.54	2.62	2.71	2.80	2.89	2.98	3.08	3.18	3.29	3.40	3.51	3.62	3.74	3.87	3.99	4.13	4.26	4.40	4.55
B Operating Costs																																										
1. Staff salary																																										
Inspectors	person				1																																					
Pump operators	person				0																																					
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		17.70			0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
2. Chlorine																																										
Pouring volume	kg/yr				103																																					
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		4.49			0.00	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.19	0.19	0.20	0.21
3. Electricity (for pump)		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
4. Maintenance cost		56.03			0.00	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.17	1.21	1.25	1.29	1.34	1.38	1.43	1.47	1.52	1.57	1.62	1.68	1.73	1.79	1.85	1.91	1.97	2.04	2.11	2.18	2.25	2.32	2.40	2.48	2.56
Pump repair					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
Pipe repair					0	0.8	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.17	1.21	1.25	1.29	1.34	1.38	1.43	1.47	1.52	1.57	1.62	1.68	1.73	1.79	1.85	1.91	1.97	2.04	2.11	2.18	2.25	2.32	2.40	2.48	2.56
5. Pump replacement		0.00																0.00															0.00									
Sub-total		78.22	0.00	0.00	0.24	1.11	1.15	1.18	1.22	1.26	1.31	1.35	1.39	1.43	1.49	1.53	1.58	1.63	1.69	1.74	1.79	1.87	1.92	1.98	2.05	2.11	2.19	2.26	2.33	2.41	2.49	2.58	2.66	2.75	2.84	2.94	3.03	3.13	3.23	3.34	3.45	3.57
C Gross Income (A-B)		16.78	0.00	0.00	-0.24	-0.50	-0.54	-0.55	-0.15	-0.15	-0.16	-0.17	0.38	0.40	0.40	0.43	0.44	0.46	0.47	0.49	0.51	0.51	0.53	0.56	0.57	0.60	0.61	0.63	0.65	0.67	0.69	0.71	0.74	0.76	0.78	0.80	0.84	0.86	0.90	0.92	0.95	0.98
D Depreciation cost		235.90						6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
E Interest paid		71.42	0.02	0.04	0.06	3.05	3.06	3.07	3.07	3.07	3.07	3.07	3.07	2.98	2.89	2.80	2.71	2.62	2.52	2.43	2.34	2.24	2.14	2.05	1.95	1.85	1.75	1.65	1.55	1.44	1.34	1.23	1.13	1.02	0.91	0.80	0.69	0.58	0.46	0.35	0.23	0.12
F Net Income		-290.54	-0.02	-0.04	-0.30	-3.55	-3.60	-10.36	-9.96	-9.96	-9.97	-9.98	-9.43	-9.32	-9.23	-9.11	-9.01	-8.90	-8.79	-8.68	-8.57	-8.47	-8.35	-8.23	-8.12	-7.99	-7.88	-7.76	-7.64	-7.51	-7.39	-7.26	-7.13	-7.00	-6.87	-6.74	-6.59	-6.46	-6.30	-6.17	-6.02	-5.88
G Tax and duties		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
H Net Income after deduction of TAX		-290.54	-0.02	-0.04	-0.30	-3.55	-3.60	-10.36	-9.96	-9.96	-9.97	-9.98	-9.43	-9.32	-9.23	-9.11	-9.01	-8.90	-8.79	-8.68	-8.57	-8.47	-8.35	-8.23	-8.12	-7.99	-7.88	-7.76	-7.64	-7.51	-7.39	-7.26	-7.13	-7.00	-6.87	-6.74	-6.59	-6.46	-6.30	-6.17	-6.02	-5.88
OM Cost Recovery Ratio (A/B)		121%	0%	0%	0%	55%	53%	53%	88%	88%	88%	87%	127%	128%	127%	128%	128%	128%	128%	128%	128%	127%	128%	128%	128%	128%	128%	128%	128%	128%	128%	128%	128%	127%	127%	128%	127%	128%	128%	128%	128%	127%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

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
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	-290.54	-0.02	-0.04	-0.30	-3.55	-3.60	-10.36	-9.96	-9.96	-9.97	-9.98	-9.43	-9.32	-9.23	-9.11	-9.01	-8.90	-8.79	-8.68	-8.57	-8.47	-8.35	-8.23	-8.12	-7.99	-7.88	-7.76	-7.64	-7.51	-7.39	-7.26	-7.13	-7.00	-6.87	-6.74	-6.59	-6.46	-6.30	-6.17	-6.02	-5.88
2. Depreciation cost	235.90	0.00	0.00	0.00	0.00	0.00	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
3. Interest Paid	71.42	0.02	0.04	0.06	3.05	3.06	3.07	3.07	3.07	3.07	3.07	3.07	2.98	2.89	2.80	2.71	2.62	2.52	2.43	2.34	2.24	2.14	2.05	1.95	1.85	1.75	1.65	1.55	1.44	1.34	1.23	1.13	1.02	0.91	0.80	0.69	0.58	0.46	0.35	0.23	0.12
Sub-total	16.78	0.00	0.00	-0.24	-0.50	-0.54	-0.55	-0.15	-0.15	-0.16	-0.17	0.38	0.40	0.40	0.43	0.44	0.46	0.47	0.49	0.51	0.51	0.53	0.56	0.57	0.60	0.61	0.63	0.65	0.67	0.69	0.71	0.74	0.76	0.78	0.80	0.84	0.86	0.90	0.92	0.95	0.98
B Finances																																									
1. Project Loan	306.73	2.36	1.67	2.24	298.85	0.97	0.36	0.28																																	
2. Local fund	104.96	0.79	0.56	0.74	102.63	0.17	0.04	0.03																																	
Sub-total	411.69	3.15	2.23	2.98	401.48	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	2.46	0.00	0.00	0.24	0.50	0.54	0.55	0.15	0.15	0.16	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	358.96	0.02	0.04	0.06	3.05	3.06	3.07	3.07	3.07	3.07	3.07	11.51	11.49	11.49	11.46	11.45	11.43	11.41	11.39	11.38	11.37	11.35	11.33	11.32	11.29	11.28	11.26	11.24	11.21	11.20	11.17	11.15	11.13	11.11	11.09	11.05	11.03	10.98	10.97	10.93	10.91
Sub-total	361.42	0.02	0.04	0.30	3.55	3.60	3.62	3.22	3.22	3.23	3.24	11.51	11.49	11.49	11.46	11.45	11.43	11.41	11.39	11.38	11.37	11.35	11.33	11.32	11.29	11.28	11.26	11.24	11.21	11.20	11.17	11.15	11.13	11.11	11.09	11.05	11.03	10.98	10.97	10.93	10.91
Total Cash Inflow	789.89	3.17	2.27	3.04	404.53	4.20	3.47	3.38	3.07	3.07	3.07	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.88	11.89	11.88	11.88	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.89	11.88	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.89	11.88	11.89
APPLICATION OF FUNDS																																								
D Project disbursement	411.69	3.15	2.23	2.98	401.48	1.14	0.40	0.31																																	
E Total debt services																																									
1. Loan repayment	306.78											8.82	8.91	9.00	9.09	9.18	9.27	9.36	9.45	9.55	9.64	9.74	9.84	9.94	10.04	10.14	10.24	10.34	10.44	10.55	10.65	10.76	10.87	10.98	11.09	11.20	11.31	11.42	11.54	11.65	11.77
2. Interest paid	71.42	0.02	0.04	0.06	3.05	3.06	3.07	3.07	3.07	3.07	3.07	3.07	2.98	2.89	2.80	2.71	2.62	2.52	2.43	2.34	2.24	2.14	2.05	1.95	1.85	1.75	1.65	1.55	1.44	1.34	1.23	1.13	1.02	0.91	0.80	0.69	0.58	0.46	0.35	0.23	0.12
Sub-total	378.20	0.02	0.04	0.06	3.05	3.06	3.07	3.07	3.07	3.07	3.07	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.88	11.89	11.88	11.88	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.89	11.88	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.89	11.88	11.89
Total Cash Outflow	789.89	3.17	2.27	3.04	404.53	4.20	3.47	3.38	3.07	3.07	3.07	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.88	11.89	11.88	11.88	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.89	11.88	11.89	11.89	11.89	11.89	11.89	11.89	11.88	11.89	11.88	11.89
F Net Surplus Cash (A+C2)-E	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
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%	5%	5%	5%	5%	5%	5%	6%	6%	6%	6%	6%	7%	7%	7%	7%	8%	8%	8%	8%
Cost recovery by water fee + subsidy ((A+C2)/E)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

SHIRAK MARZ
Amasia District
No 33 Sizavet

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	95.00	20.8%
	Subsidy	361.42	79.2%
	Total	456.42	100.0%
2	**Expenditure**		
	OM cost	78.22	17.1%
	Loan repayment	306.78	67.2%
	Interest paid	71.42	15.6%
	Surplus cash	0.00	0.0%
	Total	456.42	100.0%

B. FIRR CALCULATION **Unit: million AMD**

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	271.70	2.30	1.64	2.11	264.18	0.88	0.33	0.26																																
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
Chlorine	2.22			0.00	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
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
Mantenance cost	28.49			0.00	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Pump replacement																	0.00															0.00										
Sub-total	39.83			0.24	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Total Outflow	311.53	2.30	1.64	2.35	265.25	1.95	1.40	1.33	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
B BENEFIT																																								
1. Water Tariff	59.46	0.00	0.00	0.00	0.61	0.61	0.63	1.07	1.11	1.15	1.18	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
2. Subsidy	290.00	0.00	0.00	0.24	0.50	0.54	0.55	0.15	0.15	0.16	0.17	8.44	8.51	8.60	8.66	8.74	8.81	8.89	8.96	9.04	9.13	9.21	9.28	9.37	9.44	9.53	9.61	9.69	9.77	9.86	9.94	10.02	10.11	10.20	10.29	10.36	10.45	10.52	10.62	10.70	10.79
Total Inflow	349.46	0.00	0.00	0.24	1.11	1.15	1.18	1.22	1.26	1.31	1.35	10.21	10.28	10.37	10.43	10.51	10.58	10.66	10.73	10.81	10.90	10.98	11.05	11.14	11.21	11.30	11.38	11.46	11.54	11.63	11.71	11.79	11.88	11.97	12.06	12.13	12.22	12.29	12.39	12.47	12.56
NET BENEFIT	37.93	-2.30	-1.64	-2.1	-264.1	-0.8	-0.22	-0.11	0.19	0.24	0.28	9.14	9.21	9.30	9.36	9.44	9.51	9.59	9.66	9.74	9.83	9.91	9.98	10.07	10.14	10.23	10.31	10.39	10.47	10.56	10.64	10.72	10.81	10.90	10.99	11.06	11.15	11.22	11.32	11.40	11.49

FIRR = 0.60%

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	-79.64	-2.53	-1.80	-2.3	-290.6	-0.9	-0.25	-0.14	0.19	0.24	0.28	9.14	9.21	9.30	9.36	9.44	9.51	9.59	9.66	9.74	9.83	9.91	9.98	10.07	10.14	10.23	10.31	10.39	10.47	10.56	10.64	10.72	10.81	10.90	10.99	11.06	11.15	11.22	11.32	11.40	11.49
	2	Capital cost 20% up	-105.00	-2.76	-1.97	-2.5	-317.0	-1.0	-0.29	-0.16	0.19	0.24	0.28	9.14	9.21	9.30	9.36	9.44	9.51	9.59	9.66	9.74	9.83	9.91	9.98	10.07	10.14	10.23	10.31	10.39	10.47	10.56	10.64	10.72	10.81	10.90	10.99	11.06	11.15	11.22	11.32	11.40	11.49
2	1	OM cost 10% up	-57.04	-2.30	-1.64	-2.1	-264.2	-0.9	-0.33	-0.22	0.08	0.13	0.17	9.03	9.10	9.19	9.25	9.33	9.40	9.48	9.55	9.63	9.72	9.80	9.87	9.96	10.03	10.12	10.20	10.28	10.36	10.45	10.53	10.61	10.70	10.79	10.88	10.95	11.04	11.11	11.21	11.29	11.38
	2	OM cost 20% up	-59.82	-2.30	-1.64	-2.2	-264.4	-1.0	-0.43	-0.32	-0.02	0.03	0.07	8.93	9.00	9.09	9.15	9.23	9.30	9.38	9.45	9.53	9.62	9.70	9.77	9.86	9.93	10.02	10.10	10.18	10.26	10.35	10.43	10.51	10.60	10.69	10.78	10.85	10.94	11.01	11.11	11.19	11.28
3	1	Revenue 10% down	-76.98	-2.30	-1.64	-2.1	-264.3	-0.9	-0.34	-0.23	0.06	0.11	0.15	8.12	8.18	8.26	8.32	8.39	8.45	8.52	8.59	8.66	8.74	8.81	8.88	8.96	9.02	9.10	9.17	9.24	9.32	9.40	9.47	9.54	9.62	9.70	9.78	9.85	9.93	9.99	10.08	10.15	10.23
	2	Revenue 20% down	-99.69	-2.30	-1.64	-2.2	-264.4	-1.0	-0.46	-0.35	-0.06	-0.02	0.01	7.10	7.15	7.23	7.27	7.34	7.39	7.46	7.51	7.58	7.65	7.71	7.77	7.84	7.90	7.97	8.03	8.10	8.16	8.23	8.30	8.36	8.43	8.51	8.58	8.63	8.71	8.76	8.84	8.91	8.98

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.16%	27.31	3.66%
	2	Capital cost 20% up	-0.23%	-35.78	-2.80%
2	1	OM cost 10% up	0.54%	1.14	87.46%
	2	OM cost 20% up	0.48%	2.59	38.60%
3	1	Revenue 10% down	0.05%	111.44	0.90%
	2	Revenue 20% down	-0.56%	-20.78	-4.81%

No.34 Tzoghamarg

Information on Existing Water Sources (Shirak)

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

No.34 Community Tzoghamarg
District Ashotsk
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	57	5.2	43	52	17.6	1,970	1.0	4.0	2.7
2	Spring	40	57	5.0	43	52	18.3	1,969	0.5	2.0	1.5
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Acceptable
Notes	
Alternative sources if any	

No.34 Community Tzoghamarg
District Ashotsk
Marz Shirak
Sampling date 03/Aug/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		8.2				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	13.1					
c	TDS	Mg/L	96				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	6				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	0.36				1.50	
7	Hardness	Mg/L	200				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	5.3				50.0	45.0
13	SO4:Sulfate	Mg/L	3.0				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	0.0003				0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d				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	n.d				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d				0	0
26	Total bacteria	bacteria per 1 ml	n.d				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.34 Community Tzoghamarg
District Ashotsk
Marz Shirak

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not Identified	Not Identified
1	06	15	20,60,55,60	0,9;2,3;2,3;2,3	Not Identified
2	07	27	63,73	2,3;2,3	Not Identified

No. 34 **Marz** Shirak **Community** Tsoghamarg

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	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°57′05,2″	43°52′17,6″	1,970	1970	Concrete	2.7	Yes
2	Spring	40°57′05,0″	43°52′18,3″	1,969	1970	Concrete	1.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,140	100	Steel	2.2	1990	Little	Yes
2	1,040	100	Steel	1.2		Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°57′03,7″	43°52′17,1″	1,971	Concrete	Rectangular	5×4×3	30	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	4,000	100	Polyethylene	1991	Little	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		1991	Yes	100	No

9. DRAINAGE SYSTEM

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

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

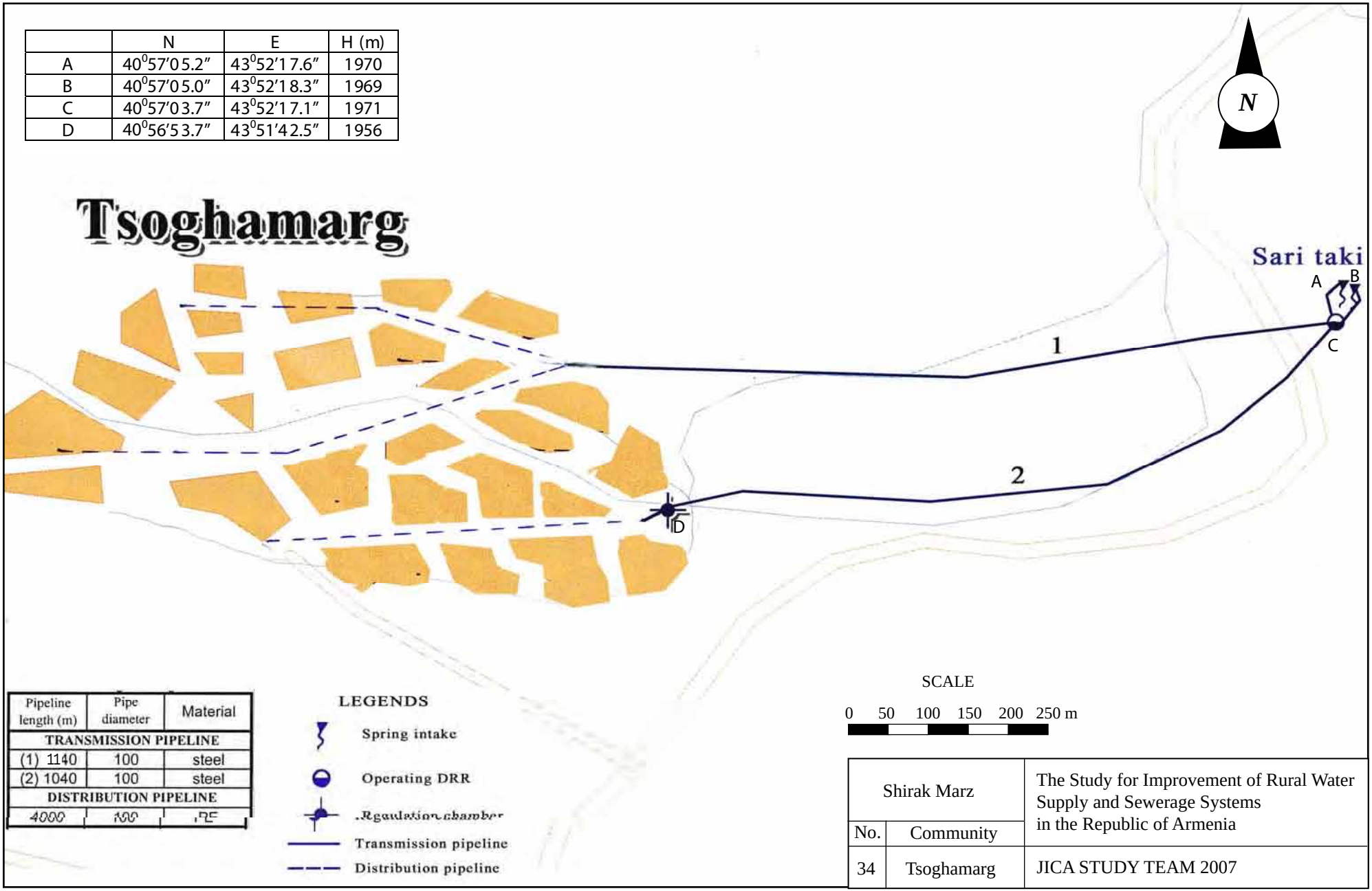
Marz	**Shirak**
Number and Name of Community	**No.34 Tzoghamarg**
District	**Ashotsk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	530
A2	Actual population in 2007	564
A3	Number of households	119
A4.1	Elderly people	80
A4.2	Population in labor force (age from 16 to 62)	338
A4.3	Children	146
A5.1	Pensioners	82
A5.2	Unemployed	0
A5.3	Receiving benefits	7
A6	Average monthly income of household (AMD)	300,000
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	124
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,752
	Annual Budget of the community 2005, in thousand AMD	3,742
	Annual Budget of the community 2006, in thousand AMD	6,809
	Annual Budget of the community 2007, in thousand AMD	9,562
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	50
	Amount spent in drinking water sector 2005, in thousand AMD	80
	Amount spent in drinking water sector 2006, in thousand AMD	60
	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	yes
D2	Water use permit number	1028
D3	Date of expiry of water use permit	13.02.06-13.02.09
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	sufficient
D7	Number of house connection to drinking water system	119
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?	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?	fully 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 houshold a day?	-
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	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	500
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate 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	Hovsepyan Bagrat
E2	Position	administration head
E3	Telephone	(094) 840210
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-deteriorated
E5	Quantity and present condition of the water supply facilities:	1-deteriorated, 1-
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1deteriorated. 1-rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution	partially repaired
E8	Quantity and present condition of the water supply facilities: public tap	partially repaired
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?	administration head
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)	0
	Repair cost(AMD)	60,000
	Others(AMD)	0
	Total (AMD)	60,000
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	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.34 Tzoghamarg

	N	E	H (m)
A	40°57′05.2″	43°52′17.6″	1970
B	40°57′05.0″	43°52′18.3″	1969
C	40°57′03.7″	43°52′17.1″	1971
D	40°56′53.7″	43°51′42.5″	1956



Pipeline length (m)	Pipe diameter	Material
TRANSMISSION PIPELINE		
(1) 1140	100	steel
(2) 1040	100	steel
DISTRIBUTION PIPELINE		
4000	100	PE

LEGENDS

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

SCALE

0 50 100 150 200 250 m

Shirak Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
34	Tsoghamarg	JICA STUDY TEAM 2007

Marz : **Shirak** No.34
Name : **Tzoghamarg**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	564	persons	56.4	
	2 Factory	-	nos	0.0	
	3 School (pupils)	124	pupils	1.2	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	119	household	10.4	
	Sub-total			68.0	
	Unaccouted for water (20%)			13.6	
1	Average Daily Water Demand			81.6	m3/day
2	Maximum Daily Water Demand			97.9	m3/day
3	Maximum Hourly Water Demand			13.3	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	2	4.2	lit/sec		362.9	m3/day
`	Total					362.9	m3/day
	2 Required reservoir volume					159	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		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	150m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	5,200	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	-	nos	
6	Water meter installation	119	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	Shirak	
No. 34	Tsoghamarg	JICA STUDY TEAM

Marz : **Shirak**
No. : **34**
Name : **Tzoghamarg**

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		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	1	nos	18,804,500	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					18,804,500
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	5,200	m	9,680	50,336,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					50,336,000
5	House Connection			nos	74,000	
6	Water Meter Installation		119	nos	80,000	9,520,000
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	2,080	m	3,600	7,488,000
	Total				AMD	87,563,900
					Equivalent to USD	286,606
					Equivalent to JPY	30,236,945
					AMD	USD
	Investment Cost per household		119	HH	735,831	2,408
	Investment Cost per person		564	persons	155,255	508

SHIRAK MARZ
Amasia District
No 34 Tzoghamarg

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	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 Water Sales Revenue																																										
Consumption water volume	1000m3/yr		24.8																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		138.32	0.00	0.00	0.00	0.89	0.89	0.92	1.56	1.62	1.67	1.72	2.58	2.67	2.76	2.85	2.94	3.04	3.14	3.24	3.35	3.46	3.57	3.69	3.81	3.94	4.07	4.20	4.34	4.49	4.63	4.79	4.95	5.11	5.28	5.45	5.63	5.82	6.01	6.21	6.41	6.62
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				1																																				
Pump operators	person				0																																				
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		17.70			0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
2. Chlorine																																									
Pouring volume	kg/yr				149																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		6.52			0.00	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30
3. Electricity (for pump)		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
4. Maintenance cost		16.00			0.00	0.23	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.29	0.30	0.31	0.32	0.34	0.35	0.36	0.37	0.38	0.39	0.41	0.42	0.44	0.45	0.46	0.48	0.50	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.64	0.66	0.69	0.71	0.73
Pump repair					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
Pipe repair					0	0.23	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.29	0.30	0.31	0.32	0.34	0.35	0.36	0.37	0.38	0.39	0.41	0.42	0.44	0.45	0.46	0.48	0.50	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.64	0.66	0.69	0.71	0.73
5. Pump replacement		0.00																0.00															0.00									
Sub-total		40.22	0.00	0.00	0.24	0.57	0.59	0.60	0.62	0.65	0.67	0.69	0.72	0.73	0.75	0.78	0.80	0.85	0.87	0.90	0.92	0.96	0.98	1.02	1.05	1.09	1.12	1.16	1.19	1.24	1.28	1.32	1.37	1.41	1.46	1.50	1.55	1.60	1.65	1.72	1.77	1.83
C Gross Income (A-B)		98.10	0.00	0.00	-0.24	0.32	0.30	0.32	0.94	0.97	1.00	1.03	1.86	1.94	2.01	2.07	2.14	2.19	2.27	2.34	2.43	2.50	2.59	2.67	2.76	2.85	2.95	3.04	3.15	3.25	3.35	3.47	3.58	3.70	3.82	3.95	4.08	4.22	4.36	4.49	4.64	4.79
D Depreciation cost		83.30						2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
E Interest paid		26.77	0.02	0.04	0.06	1.13	1.14	1.15	1.15	1.15	1.15	1.15	1.15	1.11	1.08	1.05	1.01	0.98	0.94	0.91	0.87	0.84	0.80	0.77	0.73	0.69	0.65	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
F Net Income		-11.97	-0.02	-0.04	-0.30	-0.81	-0.84	-3.21	-2.59	-2.56	-2.53	-2.50	-1.67	-1.55	-1.45	-1.36	-1.25	-1.17	-1.05	-0.95	-0.82	-0.72	-0.59	-0.48	-0.35	-0.22	-0.08	0.04	0.19	0.33	0.47	0.63	0.78	0.94	1.10	1.27	1.44	1.62	1.81	1.98	2.17	2.37
G Tax and duties		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
H Net Income after deduction of TAX		-11.97	-0.02	-0.04	-0.30	-0.81	-0.84	-3.21	-2.59	-2.56	-2.53	-2.50	-1.67	-1.55	-1.45	-1.36	-1.25	-1.17	-1.05	-0.95	-0.82	-0.72	-0.59	-0.48	-0.35	-0.22	-0.08	0.04	0.19	0.33	0.47	0.63	0.78	0.94	1.10	1.27	1.44	1.62	1.81	1.98	2.17	2.37
OM Cost Recovery Ratio (A/B)		344%	0%	0%	0%	156%	151%	153%	252%	249%	249%	249%	358%	366%	368%	365%	368%	358%	361%	360%	364%	360%	364%	362%	363%	361%	363%	362%	365%	362%	362%	363%	361%	362%	362%	363%	363%	364%	364%	361%	362%	362%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

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
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	-11.97	-0.02	-0.04	-0.30	-0.81	-0.84	-3.21	-2.59	-2.56	-2.53	-2.50	-1.67	-1.55	-1.45	-1.36	-1.25	-1.17	-1.05	-0.95	-0.82	-0.72	-0.59	-0.48	-0.35	-0.22	-0.08	0.04	0.19	0.33	0.47	0.63	0.78	0.94	1.10	1.27	1.44	1.62	1.81	1.98	2.17	2.37
2. Depreciation cost	83.30	0.00	0.00	0.00	0.00	0.00	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
3. Interest Paid	26.77	0.02	0.04	0.06	1.13	1.14	1.15	1.15	1.15	1.15	1.15	1.15	1.11	1.08	1.05	1.01	0.98	0.94	0.91	0.87	0.84	0.80	0.77	0.73	0.69	0.65	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
Sub-total	98.10	0.00	0.00	-0.24	0.32	0.30	0.32	0.94	0.97	1.00	1.03	1.86	1.94	2.01	2.07	2.14	2.19	2.27	2.34	2.43	2.50	2.59	2.67	2.76	2.85	2.95	3.04	3.15	3.25	3.35	3.47	3.58	3.70	3.82	3.95	4.08	4.22	4.36	4.49	4.64	4.79
B Finances																																									
1. Project Loan	114.70	2.36	1.67	2.24	106.82	0.97	0.36	0.28																																	
2. Local fund	38.99	0.79	0.56	0.74	36.66	0.17	0.04	0.03																																	
Sub-total	153.69	3.15	2.23	2.98	143.48	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.24	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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
2. Subsidy for debt services	43.73	0.02	0.04	0.06	0.81	0.84	0.83	0.21	0.18	0.15	0.12	2.59	2.50	2.43	2.38	2.30	2.26	2.17	2.11	2.01	1.95	1.85	1.78	1.69	1.59	1.49	1.41	1.30	1.20	1.09	0.97	0.86	0.74	0.62	0.50	0.37	0.23	0.08	0.00	0.00	0.00
Sub-total	43.97	0.02	0.04	0.30	0.81	0.84	0.83	0.21	0.18	0.15	0.12	2.59	2.50	2.43	2.38	2.30	2.26	2.17	2.11	2.01	1.95	1.85	1.78	1.69	1.59	1.49	1.41	1.30	1.20	1.09	0.97	0.86	0.74	0.62	0.50	0.37	0.23	0.08	0.00	0.00	0.00
Total Cash Inflow	295.76	3.17	2.27	3.04	144.61	2.28	1.55	1.46	1.15	1.15	1.15	4.45	4.44	4.44	4.45	4.44	4.45	4.44	4.45	4.44	4.45	4.44	4.45	4.45	4.44	4.44	4.45	4.45	4.45	4.44	4.44	4.44	4.44	4.44	4.45	4.45	4.45	4.44	4.49	4.64	4.79
APPLICATION OF FUNDS																																								
D Project disbursement	153.69	3.15	2.23	2.98	143.48	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	114.71											3.30	3.33	3.36	3.40	3.43	3.47	3.50	3.54	3.57	3.61	3.64	3.68	3.72	3.75	3.79	3.83	3.87	3.91	3.94	3.98	4.02	4.06	4.10	4.15	4.19	4.23	4.27	4.31	4.36	4.40
2. Interest paid	26.77	0.02	0.04	0.06	1.13	1.14	1.15	1.15	1.15	1.15	1.15	1.15	1.11	1.08	1.05	1.01	0.98	0.94	0.91	0.87	0.84	0.80	0.77	0.73	0.69	0.65	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
Sub-total	141.48	0.02	0.04	0.06	1.13	1.14	1.15	1.15	1.15	1.15	1.15	4.45	4.44	4.44	4.45	4.44	4.45	4.44	4.45	4.44	4.45	4.44	4.45	4.45	4.44	4.44	4.45	4.45	4.45	4.44	4.44	4.44	4.44	4.44	4.45	4.45	4.45	4.44	4.44	4.45	4.44
Total Cash Outflow	295.17	3.17	2.27	3.04	144.61	2.28	1.55	1.46	1.15	1.15	1.15	4.45	4.44	4.44	4.45	4.44	4.45	4.44	4.45	4.44	4.45	4.44	4.45	4.45	4.44	4.44	4.45	4.45	4.45	4.44	4.44	4.44	4.44	4.44	4.45	4.45	4.45	4.44	4.44	4.45	4.44
F Net Surplus Cash (A+C2)-E	0.59	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	0.05	0.19	0.35
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	69%	0%	0%	0%	28%	26%	28%	82%	84%	87%	90%	42%	44%	45%	47%	48%	49%	51%	53%	55%	56%	58%	60%	62%	64%	66%	68%	71%	73%	75%	78%	81%	83%	86%	89%	92%	95%	98%	101%	104%	108%
Cost recovery by water fee + subsidy ((A+C2)/E)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	104%	108%

SHIRAK MARZ
Amasia District
No 34 Tzoghamarg

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	138.32	75.9%
	Subsidy	43.97	24.1%
	Total	182.29	100.0%
2	**Expenditure**		
	OM cost	40.22	22.1%
	Loan repayment	114.71	62.9%
	Interest paid	26.77	14.7%
	Surplus cash	0.59	0.3%
	Total	182.29	100.0%

B. FIRR CALCULATION **Unit: million AMD**

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	102.01	2.30	1.64	2.11	94.49	0.88	0.33	0.26																																
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
Chlorine	3.33			0.00	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
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
Mantenance cost	8.14			0.00	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Pump replacement																	0.00															0.00									
Sub-total	20.59			0.24	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Total Outflow	122.60	2.30	1.64	2.35	95.04	1.43	0.88	0.81	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
B BENEFIT																																								
1. Water Tariff	86.67	0.00	0.00	0.00	0.89	0.89	0.92	1.56	1.62	1.67	1.72	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58
2. Subsidy	22.43	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.44	1.39	1.35	1.33	1.29	1.28	1.23	1.20	1.14	1.11	1.05	1.01	0.96	0.90	0.84	0.79	0.72	0.66	0.59	0.51	0.44	0.36	0.28	0.20	0.11	0.01	0.00	0.00	0.00
Total Inflow	109.10	0.00	0.00	0.24	0.89	0.89	0.92	1.56	1.62	1.67	1.72	4.02	3.97	3.93	3.91	3.87	3.86	3.81	3.78	3.72	3.69	3.63	3.59	3.54	3.48	3.42	3.37	3.30	3.24	3.17	3.09	3.02	2.94	2.86	2.78	2.69	2.59	2.58	2.58	2.58
NET BENEFIT	-13.50	-2.30	-1.64	-2.1	-94.2	-0.5	0.04	0.75	1.07	1.12	1.17	3.47	3.42	3.38	3.36	3.32	3.31	3.26	3.23	3.17	3.14	3.08	3.04	2.99	2.93	2.87	2.82	2.75	2.69	2.62	2.54	2.47	2.39	2.31	2.23	2.14	2.04	2.03	2.03	2.03

FIRR = -0.73%

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	-44.75	-2.53	-1.80	-2.3	-103.6	-0.6	0.01	0.72	1.07	1.12	1.17	3.47	3.42	3.38	3.36	3.32	3.31	3.26	3.23	3.17	3.14	3.08	3.04	2.99	2.93	2.87	2.82	2.75	2.69	2.62	2.54	2.47	2.39	2.31	2.23	2.14	2.04	2.03	2.03	2.03
	2	Capital cost 20% up	-54.28	-2.76	-1.97	-2.5	-113.0	-0.7	-0.03	0.70	1.07	1.12	1.17	3.47	3.42	3.38	3.36	3.32	3.31	3.26	3.23	3.17	3.14	3.08	3.04	2.99	2.93	2.87	2.82	2.75	2.69	2.62	2.54	2.47	2.39	2.31	2.23	2.14	2.04	2.03	2.03	2.03
2	1	OM cost 10% up	-36.65	-2.30	-1.64	-2.1	-94.2	-0.6	-0.02	0.70	1.02	1.07	1.12	3.42	3.37	3.33	3.31	3.27	3.26	3.21	3.18	3.12	3.09	3.03	2.99	2.94	2.88	2.82	2.77	2.70	2.64	2.57	2.49	2.42	2.34	2.26	2.18	2.09	1.99	1.98	1.98	1.98
	2	OM cost 20% up	-38.09	-2.30	-1.64	-2.2	-94.3	-0.7	-0.07	0.64	0.96	1.01	1.06	3.36	3.31	3.27	3.25	3.21	3.20	3.15	3.12	3.06	3.03	2.97	2.93	2.88	2.82	2.76	2.71	2.64	2.58	2.51	2.43	2.36	2.28	2.20	2.12	2.03	1.93	1.92	1.92	1.92
3	1	Revenue 10% down	-42.66	-2.30	-1.64	-2.1	-94.2	-0.6	-0.05	0.59	0.91	0.95	1.00	3.07	3.02	2.99	2.97	2.93	2.92	2.88	2.85	2.80	2.77	2.72	2.68	2.64	2.58	2.53	2.48	2.42	2.37	2.30	2.23	2.17	2.10	2.02	1.95	1.87	1.78	1.77	1.77	1.77
	2	Revenue 20% down	-50.11	-2.30	-1.64	-2.2	-94.3	-0.7	-0.14	0.44	0.75	0.79	0.83	2.67	2.63	2.59	2.58	2.55	2.54	2.50	2.47	2.43	2.40	2.35	2.32	2.28	2.23	2.19	2.15	2.09	2.04	1.99	1.92	1.87	1.80	1.74	1.67	1.60	1.52	1.51	1.51	1.51

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-1.20%	-3.94	-25.37%
	2	Capital cost 20% up	-1.63%	-5.52	-18.12%
2	1	OM cost 10% up	-0.85%	-1.38	-72.23%
	2	OM cost 20% up	-0.97%	-2.45	-40.88%
3	1	Revenue 10% down	-1.38%	-4.71	-21.22%
	2	Revenue 20% down	-2.10%	-6.53	-15.32%

No.35 Poqr Sariar

Information on Existing Water Sources (Shirak)

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

No.35 Community Poqr Sariar
District Ashotsk
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	57	35.9	44	1	7.8	2,190	3.0	9.0	6.5
2	Spring	40	57	32.5	44	1	6.8	2,202			
3	Spring	40	57	6.3	44	1	15.9	2,132			
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Acceptable
Notes	
Alternative sources if any	

No.35 Community Poqr Sariar
District Ashotsk
Marz Shirak
Sampling date 30/Jul/2007

	Parameters analysed	Units	No.1	No.2	No.3		Guidelines	
							WHO	Armenia
a	pH		8.3	8.3	8.2		6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10.2	9.4	11.2			
c	TDS	Mg/L	139	125	165		1000	1000
1	Al:Aluminum	Mg/L	0.01	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	4	4	7		250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01	n.d		0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d	n.d		2	1
6	F:Fluoride	Mg/L	0.34	0.39	0.26		1.50	
7	Hardness	Mg/L	300	275	370		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	1.8	1.8	1.3		50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	3.0	3.0		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	0.02	0.02	0.02		0.70	0.10
17	Be:Berillium	Mg/L	0.00005	0.00006	0.00006		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	<0.0002	<0.0002	<0.00005		0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001	<0.001		0.010	0.010
22	Sr:Strontium	Mg/L	0.1	0.1	0.1		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	n.d				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	n.d				0	0
26	Total bacteria	bacteria per 1 ml	n.d				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.35 Community Poqr Sariar
District Ashotsk
Marz Shirak

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not Identified	Not Identified
1	05	18	78,113	23,23,23,23,23,23,23,0,0,	Not Identified
2	07	16	-	Not Identified	Not Identified
3	08	27	97,88,107,9274,62,70,92	0,9;04;0,9;2,3	Not Identified

No. 35 **Marz** Shirak **Community** Pogr Sariar

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
	Intake	Possible	Possible	
2	Transmission pipeline	Possible	Difficult	Pipeline is mostly far from 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°57′35,9″	44°01′07,8″	2,190	1989	Concrete	6.5	Yes
2	Spring	40°57′32,5″	44°01′06,8″	2,202		Concrete		Yes
3	Spring	40°57′06,3″	44°01′15,9″	2,132		Concrete		Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	9,000	100	Polyethylene	1.0	1989	Little	Yes
2	1,000	100	Steel	1.3		Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°55′58,7″	43°59′59″	2,020	Steel	Circle	d=1m,l=20m	64	Yes

5. CHLORINATION

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Powder	1time per 4month

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,500	50	Polyethylene	1989	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)
7	1989		Yes	100	No

9. DRAINAGE SYSTEM

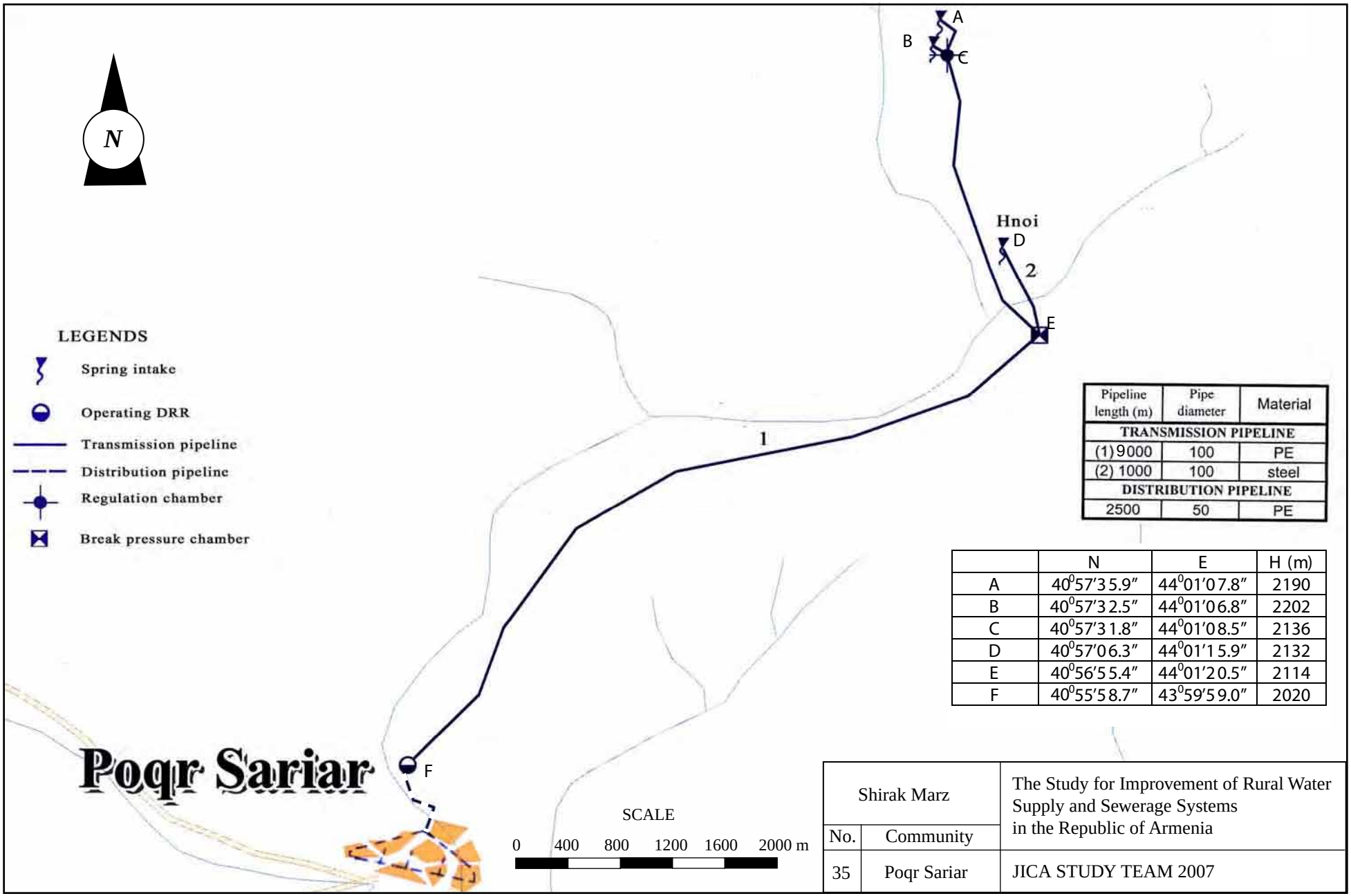
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.35 Poqr Sariar**
District	**Ashotsk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	310
A2	Actual population in 2007	285
A3	Number of households	62
A4.1	Elderly people	35
A4.2	Population in labor force (age from 16 to 62)	173
A4.3	Children	77
A5.1	Pensioners	0
A5.2	Unemployed	0
A5.3	Receiving benefits	9
A6	Average monthly income of household (AMD)	80,000
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	95
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	6,746
	Annual Budget of the community 2005, in thousand AMD	6,880
	Annual Budget of the community 2006, in thousand AMD	7,694
	Annual Budget of the community 2007, in thousand AMD	8,041
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	20
	Amount spent in drinking water sector 2005, in thousand AMD	600
	Amount spent in drinking water sector 2006, in thousand AMD	50
	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
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	1073
D3	Date of expiry of water use permit	03.05.06-03.05.09
D4	Planned date of obtaining water use permit	-
D5	Present condition of the water supply volume of Domestic use	sufficient³ñ
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	40
D8	How many house connection household set the water meter	0
D9	Number of public taps	16
D10.1	How is the regime of water supply in your community in the dry season?	irregularly
D10.2	How is the regime of water supply in your community in the wet season?	irregularly
D11	What time of day water is given?	9.00-16.00, 9.00-16.00
D12	Are you pleased with duration of domestic water supply?	fully pleased
D13	Are hours of water supply convenient?	mainly convenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	200
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	200
D16	Drinking water monthly water fee per household	300AMD per capita/ month
D17	How often do you usually pay water fees?	monthly
D18	Water fee structure 1Flate rate, 2 Having water tariff	flat rate
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	2-deteriorated
E5	Quantity and present condition of the water supply facilities:	2-partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	4-rehabilitated
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	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?	community
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)	0
	Repair cost(AMD)	50,000
	Others(AMD)	0
	Total (AMD)	50,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	residents 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

Shirak
No.35 Poqr Sariar



Pipeline length (m)	Pipe diameter	Material
TRANSMISSION PIPELINE		
(1) 9000	100	PE
(2) 1000	100	steel
DISTRIBUTION PIPELINE		
2500	50	PE

	N	E	H (m)
A	40°57′35.9″	44°01′07.8″	2190
B	40°57′32.5″	44°01′06.8″	2202
C	40°57′31.8″	44°01′08.5″	2136
D	40°57′06.3″	44°01′15.9″	2132
E	40°56′55.4″	44°01′20.5″	2114
F	40°55′58.7″	43°59′59.0″	2020

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