No.20 Hovit

Information on Existing Water Sources (Shirak)

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

No.20 Community Hovit
District Akhuryan
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Springs	40	46	31.2	44	0	52.5	1,807	1.0	5.0	2.0
2											
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	There are 4-5 small springs in an area.

No.20 Community Hovit
District Akhuryan
Marz Shirak
Sampling date 17/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.9				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	11.9					
c	TDS	Mg/L	174				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	n.d				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.12				1.50	
7	Hardness	Mg/L	330				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	1.8				50.0	45.0
13	SO4:Sulfate	Mg/L	8.0				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	0.04				0.70	0.10
17	Be:Berillium	Mg/L	n.d				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

Information on Existing Water Sources
Existing Bacteriological Test

No.20 Community Dzorashen
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	02	05	0,0,0,40	Not Identified	Not Identified
2	04	10	72,70,76,76,72,70,80	Not Identified	Not Identified
3	06	15	68	0;0;0;2,3	Not Identified
4	07	13	0;0	2,3;2,3;2,3;2,3;2,3;2,3;2,3;2,3	Not Identified
5	08	15	70,84,82,76,80,0	2,3; 2,3;2,3;2,3;2,3;0;0;0	Not Identified

No. 20 **Marz** Shirak **Community** Hovit

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°46′31,2″	44°00′52,5″	1,807	1970	Concrete	2.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,500	50	Steel	1.5	1970	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°46′14,6″	44°00′01,8″	1,691	Steel	Circle	d=4m,l=8m	10	Yes

5. CHLORINATION

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	500	20	Steel	1970	Medium	Yes
2	800	50	Steel	1970	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)
12	1970	1990	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

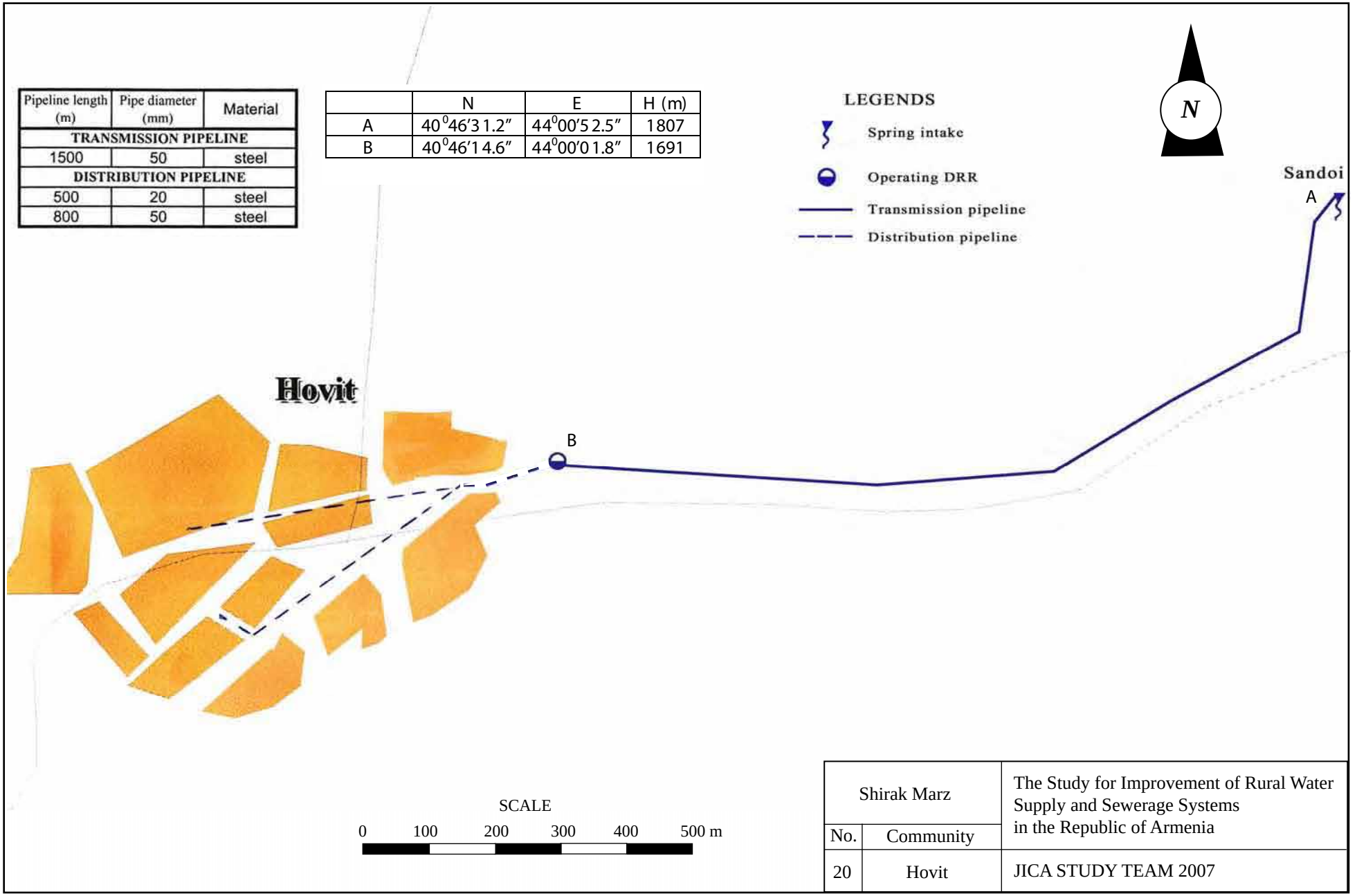
Marz	**Shirak**
Number and Name of Community	**No.20 Hovit**
District	**Akhurian**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	550
A2	Actual population in 2007	570
A3	Number of households	133
A4.1	Elderly people	85
A4.2	Population in labor force (age from 16 to 62)	305
A4.3	Children	180
A5.1	Pensioners	95
A5.2	Unemployed	2
A5.3	Receiving benefits	48
A6	Average monthly income of household (AMD)	30,000
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	127
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	533
	Annual Budget of the community 2005, in thousand AMD	893
	Annual Budget of the community 2006, in thousand AMD	1,264
	Annual Budget of the community 2007, in thousand AMD	1,156
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	150
	Amount spent in drinking water sector 2005, in thousand AMD	200
	Amount spent in drinking water sector 2006, in thousand AMD	200
	Amount spent in drinking water sector 2007, in thousand AMD	150
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	cereals, livestock
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	1397
D3	Date of expiry of water use permit	till 07.05.10
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	absent
D7	Number of house connection to drinking water system	120
D8	How many house connection household set the water meter	0
D9	Number of public taps	3 ·operational
D10.1	How is the regime of water supply in your community in the dry season?	regularly 2-3hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly 3-4hrs
D11	What time of day water is given?	10.00-13.00, 10.00-12.00, 20.00-22.00
D12	Are you pleased with duration of domestic water supply?	mainly displeased
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
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	600
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?	absent
D20	Are you satisfied with irrigation water supply volume?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Petrosyan Samvel
E2	Position	administration head
E3	Telephone	(091) 463295
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-deteriorated, 1-rehabilitated
E5	Quantity and present condition of the water supply facilities:	1-partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-deteriorated, 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	absent
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, community
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administration head
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	200,000
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 ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.20 Hovit

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1500	50	steel
DISTRIBUTION PIPELINE		
500	20	steel
800	50	steel

	N	E	H (m)
A	40°46'31.2"	44°00'52.5"	1807
B	40°46'14.6"	44°00'01.8"	1691



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

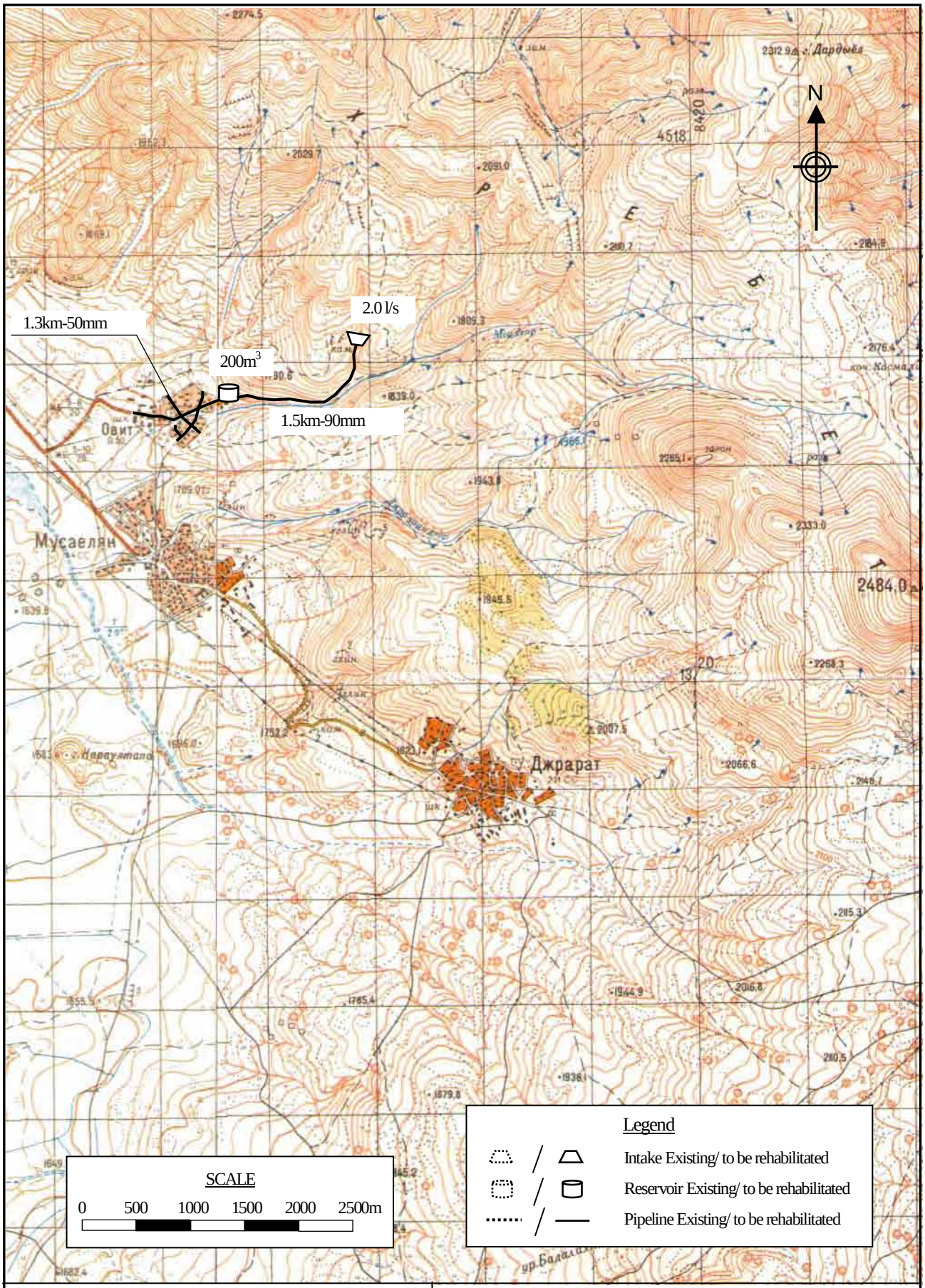
Marz : **Shirak** No.20
Name : **Hovit**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
1	Population	570	persons	57.0	
2	Factory	-	nos	0.0	
3	School (pupils)	127	pupils	1.3	
4	Medical Ambulance Station	-	nos	-	
5	Policlinic	-	nos	-	
6	Livestocks (87lit/household)	133	household	11.6	
	Sub-total			69.9	
	Unaccouted for water (20%)			14.0	
1	Average Daily Water Demand			83.9	m3/day
2	Maximum Daily Water Demand			100.7	m3/day
3	Maximum Hourly Water Demand			13.6	m3/hr

B	**WATER SUPPLY PLAN**						
1	Water source type	Nr.	Total vol.				
a	Spring	1	2.0	lit/sec		172.8	m3/day
`	Total					172.8	m3/day
2	Required reservoir volume					164	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		m
	90mm diameter	1,500	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	200m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	1,300	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	13	nos
6	Water meter installation	133	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. 20	Hovit	JICA STUDY TEAM

Marz : **Shirak**
No. : **20**
Name : **Hovit**

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		m	7,160	
		90mm	1,500	m	8,040	12,060,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					12,060,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	1	nos	22,524,600	22,524,600
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					22,524,600
4	Distribution Pipe					
		50mm	1,300	m	5,520	7,176,000
		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					7,176,000
5	House Connection		13	nos	74,000	962,000
6	Water Meter Installation		133	nos	80,000	10,640,000
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	520	m	3,600	1,872,000
	Total				AMD	56,282,300
					Equivalent to USD	184,218
					Equivalent to JPY	19,435,005
					AMD	USD
	Investment Cost per household		133	HH	423,175	1,385
	Investment Cost per person		570	persons	98,741	323

SHIRAK MARZ
Gyumri District
No 20 Hovit

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		25.5																																							
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		143.10	0.00	0.00	0.92	0.92	0.92	0.95	1.61	1.66	1.72	1.77	2.66	2.74	2.83	2.93	3.02	3.12	3.23	3.33	3.44	3.56	3.67	3.80	3.92	4.05	4.18	4.32	4.46	4.61	4.76	4.92	5.08	5.25	5.42	5.60	5.79	5.98	6.18	6.38	6.59	6.81
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				154																																					
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		6.83			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	0.31
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		7.36			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	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33
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					0.1	0.1	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	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33
5. Pump replacement		0.00																0.00															0.00									
Sub-total		31.89	0.00	0.00	0.43	0.45	0.47	0.47	0.49	0.51	0.52	0.55	0.56	0.57	0.60	0.61	0.64	0.66	0.69	0.70	0.73	0.75	0.78	0.80	0.83	0.85	0.88	0.91	0.94	0.98	1.00	1.04	1.08	1.12	1.14	1.18	1.22	1.26	1.30	1.35	1.39	1.44
C Gross Income (A-B)		111.21	0.00	0.00	0.49	0.47	0.45	0.48	1.12	1.15	1.20	1.22	2.10	2.17	2.23	2.32	2.38	2.46	2.54	2.63	2.71	2.81	2.89	3.00	3.09	3.20	3.30	3.41	3.52	3.63	3.76	3.88	4.00	4.13	4.28	4.42	4.57	4.72	4.88	5.03	5.20	5.37
D Depreciation cost		53.55						1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
E Interest paid		18.21	0.02	0.04	0.71	0.73	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.73	0.71	0.69	0.66	0.64	0.62	0.60	0.57	0.55	0.53	0.50	0.48	0.45	0.43	0.40	0.38	0.35	0.33	0.30	0.28	0.25	0.22	0.20	0.17	0.14	0.11	0.09	0.06	0.03
F Net Income		39.45	-0.02	-0.04	-0.22	-0.26	-0.29	-1.80	-1.16	-1.13	-1.08	-1.06	-0.18	-0.09	-0.01	0.10	0.19	0.29	0.39	0.50	0.61	0.73	0.83	0.97	1.08	1.22	1.34	1.48	1.61	1.75	1.90	2.05	2.19	2.35	2.53	2.69	2.87	3.05	3.24	3.41	3.61	3.81
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		39.45	-0.02	-0.04	-0.22	-0.26	-0.29	-1.80	-1.16	-1.13	-1.08	-1.06	-0.18	-0.09	-0.01	0.10	0.19	0.29	0.39	0.50	0.61	0.73	0.83	0.97	1.08	1.22	1.34	1.48	1.61	1.75	1.90	2.05	2.19	2.35	2.53	2.69	2.87	3.05	3.24	3.41	3.61	3.81
OM Cost Recovery Ratio (A/B)		449%	0%	0%	214%	204%	196%	202%	329%	325%	331%	322%	475%	481%	472%	480%	472%	473%	468%	476%	471%	475%	471%	475%	472%	476%	475%	475%	474%	470%	476%	473%	470%	469%	475%	475%	475%	475%	475%	473%	474%	473%

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	39.45	-0.02	-0.04	-0.22	-0.26	-0.29	-1.80	-1.16	-1.13	-1.08	-1.06	-0.18	-0.09	-0.01	0.10	0.19	0.29	0.39	0.50	0.61	0.73	0.83	0.97	1.08	1.22	1.34	1.48	1.61	1.75	1.90	2.05	2.19	2.35	2.53	2.69	2.87	3.05	3.24	3.41	3.61	3.81
2. Depreciation cost	53.55	0.00	0.00	0.00	0.00	0.00	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
3. Interest Paid	18.21	0.02	0.04	0.71	0.73	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.73	0.71	0.69	0.66	0.64	0.62	0.60	0.57	0.55	0.53	0.50	0.48	0.45	0.43	0.40	0.38	0.35	0.33	0.30	0.28	0.25	0.22	0.20	0.17	0.14	0.11	0.09	0.06	0.03
Sub-total	111.21	0.00	0.00	0.49	0.47	0.45	0.48	1.12	1.15	1.20	1.22	2.10	2.17	2.23	2.32	2.38	2.46	2.54	2.63	2.71	2.81	2.89	3.00	3.09	3.20	3.30	3.41	3.52	3.63	3.76	3.88	4.00	4.13	4.28	4.42	4.57	4.72	4.88	5.03	5.20	5.37
B Finances																																									
1. Project Loan	75.09	2.36	1.67	67.36	2.09	0.97	0.36	0.28																																	
2. Local fund	25.10	0.79	0.56	22.81	0.70	0.17	0.04	0.03																																	
Sub-total	100.19	3.15	2.23	90.17	2.79	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	5.87	0.02	0.04	0.22	0.26	0.29	0.27	0.00	0.00	0.00	0.00	0.81	0.74	0.68	0.59	0.53	0.45	0.37	0.28	0.20	0.10	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	5.87	0.02	0.04	0.22	0.26	0.29	0.27	0.00	0.00	0.00	0.00	0.81	0.74	0.68	0.59	0.53	0.45	0.37	0.28	0.20	0.10	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	217.27	3.17	2.27	90.88	3.52	1.88	1.15	1.43	1.15	1.20	1.22	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	3.00	3.09	3.20	3.30	3.41	3.52	3.63	3.76	3.88	4.00	4.13	4.28	4.42	4.57	4.72	4.88	5.03	5.20	5.37
APPLICATION OF FUNDS																																								
D Project disbursement	100.19	3.15	2.23	90.17	2.79	1.14	0.40	0.31																																	
E Total debt services																																									
1. Loan repayment	75.08											2.16	2.18	2.20	2.22	2.25	2.27	2.29	2.31	2.34	2.36	2.38	2.41	2.43	2.46	2.48	2.51	2.53	2.56	2.58	2.61	2.63	2.66	2.69	2.71	2.74	2.77	2.80	2.82	2.85	2.88
2. Interest paid	18.21	0.02	0.04	0.71	0.73	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.73	0.71	0.69	0.66	0.64	0.62	0.60	0.57	0.55	0.53	0.50	0.48	0.45	0.43	0.40	0.38	0.35	0.33	0.30	0.28	0.25	0.22	0.20	0.17	0.14	0.11	0.09	0.06	0.03
Sub-total	93.29	0.02	0.04	0.71	0.73	0.74	0.75	0.75	0.75	0.75	0.75	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91
Total Cash Outflow	193.48	3.17	2.27	90.88	3.52	1.88	1.15	1.06	0.75	0.75	0.75	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91
F Net Surplus Cash (A+C2)-E	23.79	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.40	0.45	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.18	0.29	0.39	0.50	0.61	0.72	0.85	0.97	1.09	1.22	1.37	1.51	1.66	1.81	1.97	2.12	2.29	2.46
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	119%	0%	0%	69%	64%	61%	64%	149%	153%	160%	163%	72%	75%	77%	80%	82%	85%	87%	90%	93%	97%	99%	103%	106%	110%	113%	117%	121%	125%	129%	133%	137%	142%	147%	152%	157%	162%	168%	173%	179%	185%
Cost recovery by water fee + subsidy ((A+C2)/E)	126%	100%	100%	100%	100%	100%	100%	149%	153%	160%	163%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	103%	106%	110%	113%	117%	121%	125%	129%	133%	137%	142%	147%	152%	157%	162%	168%	173%	179%	185%

SHIRAK MARZ
Gyumri District
No 20 Hovit

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	143.10	96.1%
	Subsidy	5.87	3.9%
	Total	148.97	100.0%
2	**Expenditure**		
	OM cost	31.89	21.4%
	Loan repayment	75.08	50.4%
	Interest paid	18.21	12.2%
	Surplus cash	23.79	16.0%
	Total	148.97	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	68.83	2.30	1.64	61.49	1.93	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	3.79			0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
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	3.80			0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Pump replacement																	0.00															0.00										
Sub-total	16.71			0.43	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Total Outflow	85.54	2.30	1.64	61.92	2.37	1.32	0.77	0.70	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
B BENEFIT																																								
1. Water Tariff	90.27	0.00	0.00	0.92	0.92	0.92	0.95	1.61	1.66	1.72	1.77	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
2. Subsidy	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	90.34	0.00	0.00	0.92	0.92	0.92	0.95	1.61	1.66	1.72	1.77	2.72	2.67	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
NET BENEFIT	4.80	-2.30	-1.64	-61.0	-1.5	-0.4	0.18	0.91	1.22	1.28	1.33	2.28	2.23	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22

FIRR = **0.33%**

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	-22.43	-2.53	-1.80	-67.1	-1.6	-0.5	0.15	0.88	1.22	1.28	1.33	2.28	2.23	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22
	2	Capital cost 20% up	-28.97	-2.76	-1.97	-73.3	-1.8	-0.6	0.11	0.86	1.22	1.28	1.33	2.28	2.23	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22
2	1	OM cost 10% up	-17.07	-2.30	-1.64	-61.0	-1.5	-0.4	0.14	0.87	1.18	1.24	1.29	2.24	2.19	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18
	2	OM cost 20% up	-18.24	-2.30	-1.64	-61.1	-1.5	-0.5	0.09	0.82	1.13	1.19	1.24	2.19	2.14	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
3	1	Revenue 10% down	-22.01	-2.30	-1.64	-61.1	-1.5	-0.5	0.09	0.75	1.05	1.11	1.15	2.01	1.96	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
	2	Revenue 20% down	-28.13	-2.30	-1.64	-61.2	-1.6	-0.6	-0.01	0.59	0.89	0.94	0.98	1.74	1.70	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.13%	-34.48	-2.90%
	2	Capital cost 20% up	-0.54%	-16.01	-6.25%
2	1	OM cost 10% up	0.21%	5.25	19.04%
	2	OM cost 20% up	0.10%	22.54	4.44%
3	1	Revenue 10% down	-0.30%	-20.84	-4.80%
	2	Revenue 20% down	-1.00%	-13.29	-7.53%

No.21 Dzorashen

Information on Existing Water Sources (Shirak)

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

No.21 Community Dzorashen
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	58	9.0	44	3	55.9	2,330	2.0	7.0	5.0
2											
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	Water leakage in water supply system are 30%
Alternative sources if any	

No.21 Community Dzorashen
District Ashotsk
Marz Shirak
Sampling date 01/Aug/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
a	pH		8.1	8.2			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	8.4	16.8				
c	TDS	Mg/L	70	86			1000	1000
1	Al:Aluminum	Mg/L	n.d	n.d			0.10	0.50
2	B:Boron	Mg/L	n.d	n.d			0.70	0.50
3	Cl:Chloride	Mg/L	4	4			250	350
4	Cr:Chrome	Mg/L	n.d	n.d			0.05	0.05
5	Cu:Copper	Mg/L	0	n.d			2	1
6	F:Fluoride	Mg/L	0.10	0.61			1.50	
7	Hardness	Mg/L	220	230			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	<0.02	<0.02			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	3.1	3.5			50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	3.0			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	0.02	0.03			0.70	0.10
17	Be:Berillium	Mg/L	0.00006	0.00005			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	0.1	0.1			NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.21 Community Dzorashen
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	-	Not Identified	Not Identified
2	06	16	-	Not Identified	Not Identified
3	08	27	-	Not Identified	Not Identified

No. 21 **Marz** Shirak **Community** Dzorashen

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Difficult	
2	Transmission pipeline	Fair	Possible	Pipeline is mostly far from the road
3	Reservoir	Possible	Possible	the reservoir is not operating

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°58′09,0″	44°03′55,9″	2,330	1990	Concrete	5.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	5,000	100	Polyethylene	3.5	1990	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°56′09,0″	44°04′13,9″	1,953	Steel	Circle	5× d=1m,l=20	80	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	2,000	100	Polyethylene	1990	no	No

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)
0				0	

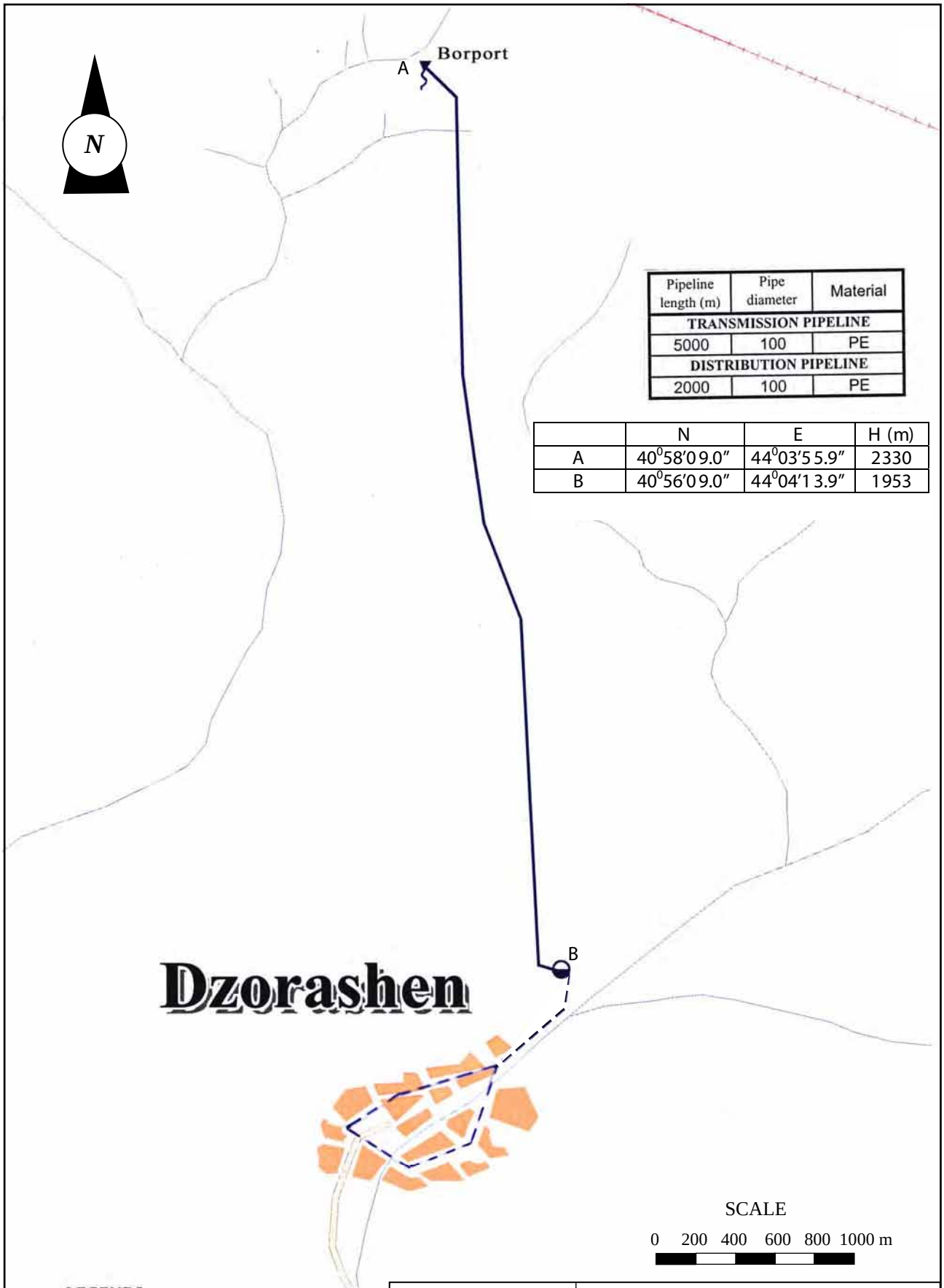
9. DRAINAGE SYSTEM

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.21 Dzorashen**
District	**Ashotsk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	281
A2	Actual population in 2007	290
A3	Number of households	63
A4.1	Elderly people	65
A4.2	Population in labor force (age from 16 to 62)	157
A4.3	Children	68
A5.1	Pensioners	67
A5.2	Unemployed	2
A5.3	Receiving benefits	3
A6	Average monthly income of household (AMD)	20,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	52
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	450
	Annual Budget of the community 2005, in thousand AMD	460
	Annual Budget of the community 2006, in thousand AMD	700
	Annual Budget of the community 2007, in thousand AMD	670
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	430
	Amount spent in drinking water sector 2005, in thousand AMD	400
	Amount spent in drinking water sector 2006, in thousand AMD	500
	Amount spent in drinking water sector 2007, in thousand AMD	800
	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, potatoes
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	1323
D3	Date of expiry of water use permit	13.02.07-13.02.10
D4	Planned date of obtaining water use permit	-
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	53
D8	How many house connection household set the water meter	0
D9	Number of public taps	3
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)	350
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	350
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?	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	6-deteriorated
E5	Quantity and present condition of the water supply facilities:	1-partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	9-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?	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)	800,000
	Others(AMD)	0
	Total (AMD)	800,000
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



Pipeline length (m)	Pipe diameter	Material
TRANSMISSION PIPELINE		
5000	100	PE
DISTRIBUTION PIPELINE		
2000	100	PE

	N	E	H (m)
A	$40^0$58′09.0″	$44^0$03′55.9″	2330
B	$40^0$56′09.0″	$44^0$04′13.9″	1953

SCALE

0 200 400 600 800 1000 m

LEGENDS

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

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

No.22 Akhuryan Kayaran

Information on Existing Water Sources (Shirak)

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

No.22 Community Akhuryan kayaran
District Akhuryan
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Existing pipeline	40	44	25.1	43	48	29.0	1,483	0.1	1.0	0.2
2											
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.22 Community Akhuryan kayaran
District Akhuryan
Marz Shirak
Sampling date 16/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.6				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	16					
c	TDS	Mg/L	71				1000	1000
1	Al:Aluminum	Mg/L	0.02				0.10	0.50
2	B:Boron	Mg/L	n.d				0.70	0.50
3	Cl:Chloride	Mg/L	64				250	350
4	Cr:Chrome	Mg/L	n.d				0.05	0.05
5	Cu:Copper	Mg/L	0				2	1
6	F:Fluoride	Mg/L	0.15				1.50	
7	Hardness	Mg/L	115				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	2.2				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	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

Information on Existing Water Sources
Existing Bacteriological Test

No.22 Community Akhuryan Kayaran
District Akhuryan
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
			No data	No data	No data

No. 22 **Marz** Shirak **Community** Akhuryan Kayaran

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			No reservoir

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Existing pipeline	40°44′25,1″	43°48′29,0″	1,483	1956	Steel	0.2	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,500	50	Steel	0.2	1956	no	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	No					

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	1956		Yes	100	Yes

9. DRAINAGE SYSTEM

Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
Yes	Yes	Only for French sector

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.22 Akhuryan Kayaran**
District	**Akhurian**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	15
A2	Actual population in 2007	19
A3	Number of households	5
A4.1	Elderly people	2
A4.2	Population in labor force (age from 16 to 62)	13
A4.3	Children	4
A5.1	Pensioners	2
A5.2	Unemployed	0
A5.3	Receiving benefits	1
A6	Average monthly income of household (AMD)	20,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	0
A10	Number of pupils	0
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	24
	Annual Budget of the community 2005, in thousand AMD	24
	Annual Budget of the community 2006, in thousand AMD	24
	Annual Budget of the community 2007, in thousand AMD	24
	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, cereals, cabbage
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	sufficient
D7	Number of house connection to drinking water system	5
D8	How many house connection household set the water meter	0
D9	Number of public taps	1
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	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)	150
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	150
D16	Drinking water monthly water fee per household	250AMD 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 river
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	absent
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	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?	Arm water sewerage company
E11	Who is engaged in the water supply facilities repairing works?	Arm water sewerage company
E12	How do you repair the water supply facilities?	hired specialist
E13	Who is in charge of the repair work in the community?	(Arm water sewerage company)
E14	How you prepare O&M costs?	(Arm water sewerage company)
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	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.22 Akhuryan Kayaran

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

	N	E	H (m)
A	40°44′25.1″	43°48′29.0″	1483
B	40°44′20.1″	43°47′42.0″	1479

Gharibjanyan
(Akhuryan kayaran)

LEGENDS

- Tap
- Connection to water main
- Transmission 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	
22	Akhuryan Kayaran	JICA STUDY TEAM 2007

Marz : **Shirak** No.22
Name : **Akhuryan Kayaran**

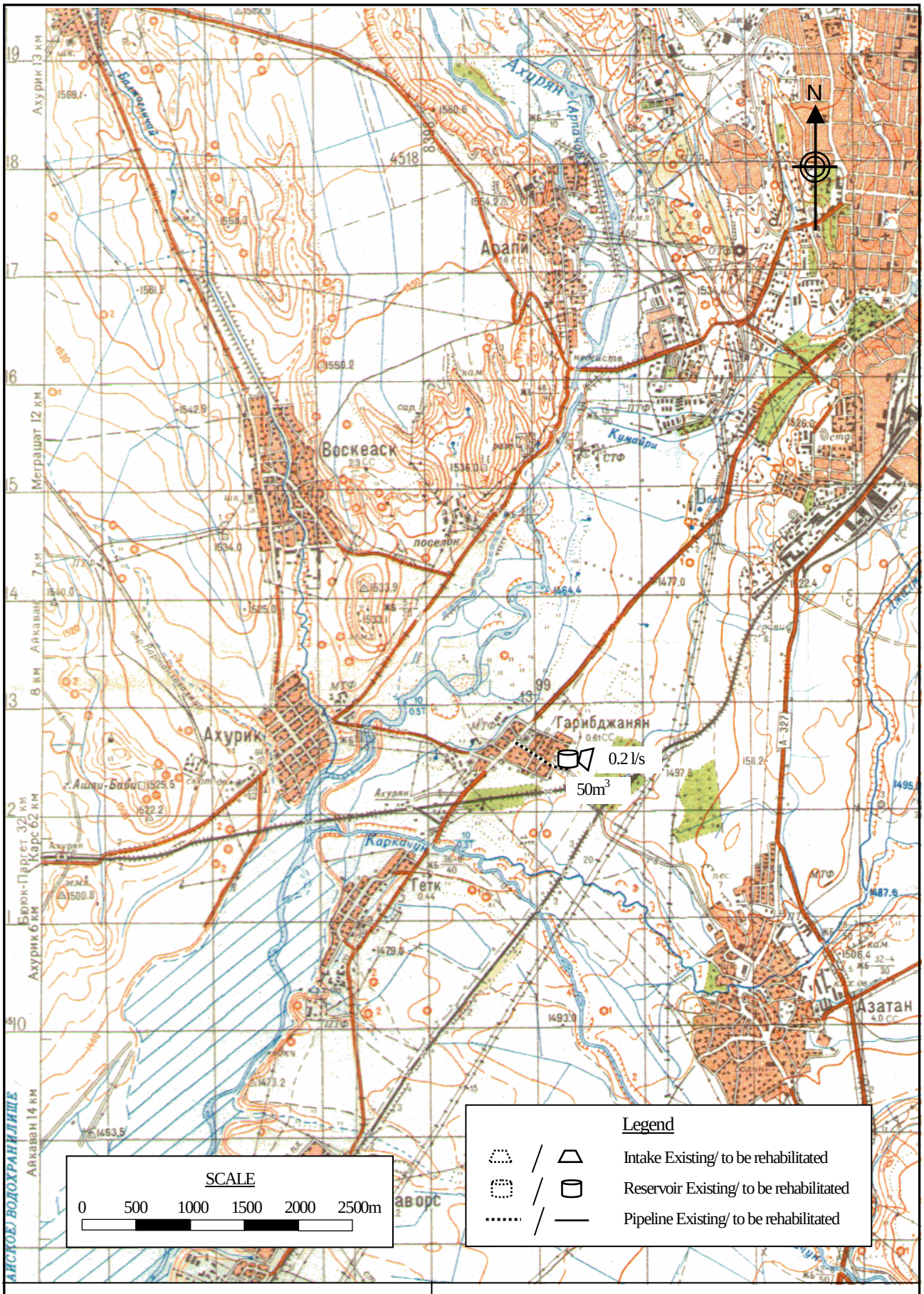
No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	19	persons	1.9	
	2 Factory	-	nos	0.0	
	3 School (pupils)	-	pupils	0.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	5	household	0.4	
	Sub-total			2.3	
	Unaccouted for water (20%)			0.5	
1	Average Daily Water Demand			2.8	m3/day
2	Maximum Daily Water Demand			3.3	m3/day
3	Maximum Hourly Water Demand			0.8	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
1	Water source type					
a	Existing water main	1	0.2	lit/sec	17.3	m3/day
`	Total				17.3	m3/day
2	Required reservoir volume				10	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		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	50m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	-	nos
6	Water meter installation	5	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. 22	Akhuryan Kayaran	JICA STUDY TEAM

Marz : **Shirak**
No. : **22**
Name : **Akhuryan Kayaran**

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		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	1	nos	8,363,900	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					8,363,900
4	Distribution 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					
5	House Connection			nos	74,000	
6	Water Meter Installation		5	nos	80,000	400,000
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		m	3,600	
	Total				AMD	9,721,600
					Equivalent to USD	31,820
					Equivalent to JPY	3,356,994
					AMD	USD
	Investment Cost per household		5	HH	1,944,320	6,364
	Investment Cost per person		19	persons	511,663	1,675

SHIRAK MARZ
Gyumri District
No 22 Akhuryan Kayaran

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		0.8																																							
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		4.70	0.00	0.00	0.03	0.03	0.03	0.03	0.05	0.05	0.06	0.06	0.09	0.09	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	0.20	0.20	0.21	0.22	0.22
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				6																																				
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		0.27			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
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		3.70			0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	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
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					0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	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
5. Pump replacement		0.00																0.00															0.00									
Sub-total		21.67	0.00	0.00	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.39	0.40	0.42	0.43	0.46	0.47	0.48	0.49	0.52	0.53	0.54	0.57	0.58	0.60	0.63	0.64	0.66	0.69	0.71	0.73	0.76	0.78	0.81	0.83	0.86	0.88	0.92	0.94	0.98
C Gross Income (A-B)		-16.97	0.00	0.00	-0.26	-0.27	-0.28	-0.29	-0.28	-0.29	-0.29	-0.30	-0.28	-0.30	-0.31	-0.32	-0.33	-0.36	-0.36	-0.37	-0.38	-0.40	-0.41	-0.42	-0.44	-0.45	-0.46	-0.49	-0.49	-0.51	-0.53	-0.55	-0.56	-0.59	-0.60	-0.63	-0.64	-0.66	-0.68	-0.71	-0.72	-0.76
D Depreciation cost		9.10						0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
E Interest paid		5.12	0.02	0.04	0.17	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.19	0.19	0.18	0.17	0.17	0.16	0.16	0.15	0.14	0.13	0.13	0.12	0.11	0.11	0.10	0.09	0.09	0.08	0.07	0.06	0.06	0.05	0.04	0.03	0.02	0.02	0.01
F Net Income		-31.19	-0.02	-0.04	-0.43	-0.46	-0.48	-0.76	-0.75	-0.76	-0.76	-0.77	-0.75	-0.77	-0.77	-0.77	-0.78	-0.80	-0.79	-0.80	-0.80	-0.82	-0.82	-0.82	-0.83	-0.84	-0.84	-0.86	-0.86	-0.87	-0.88	-0.90	-0.90	-0.92	-0.92	-0.95	-0.95	-0.96	-0.97	-0.99	-1.00	-1.03
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		-31.19	-0.02	-0.04	-0.43	-0.46	-0.48	-0.76	-0.75	-0.76	-0.76	-0.77	-0.75	-0.77	-0.77	-0.77	-0.78	-0.80	-0.79	-0.80	-0.80	-0.82	-0.82	-0.82	-0.83	-0.84	-0.84	-0.86	-0.86	-0.87	-0.88	-0.90	-0.90	-0.92	-0.92	-0.95	-0.95	-0.96	-0.97	-0.99	-1.00	-1.03
OM Cost Recovery Ratio (A/B)		22%	0%	0%	10%	10%	10%	9%	15%	15%	17%	17%	24%	23%	23%	24%	23%	22%	23%	23%	22%	23%	23%	22%	23%	22%	23%	22%	23%	23%	23%	23%	23%	22%	23%	22%	23%	23%	23%	23%	23%	22%

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	-31.19	-0.02	-0.04	-0.43	-0.46	-0.48	-0.76	-0.75	-0.76	-0.76	-0.77	-0.75	-0.77	-0.77	-0.77	-0.78	-0.80	-0.79	-0.80	-0.80	-0.82	-0.82	-0.82	-0.83	-0.84	-0.84	-0.86	-0.86	-0.87	-0.88	-0.90	-0.90	-0.92	-0.92	-0.95	-0.95	-0.96	-0.97	-0.99	-1.00	-1.03
2. Depreciation cost	9.10	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
3. Interest Paid	5.12	0.02	0.04	0.17	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.19	0.19	0.18	0.17	0.17	0.16	0.16	0.15	0.14	0.13	0.13	0.12	0.11	0.11	0.10	0.09	0.09	0.08	0.07	0.06	0.06	0.05	0.04	0.03	0.02	0.02	0.01
Sub-total	-16.97	0.00	0.00	-0.26	-0.27	-0.28	-0.29	-0.28	-0.29	-0.29	-0.30	-0.28	-0.30	-0.31	-0.32	-0.33	-0.36	-0.36	-0.37	-0.38	-0.40	-0.41	-0.42	-0.44	-0.45	-0.46	-0.49	-0.49	-0.51	-0.53	-0.55	-0.56	-0.59	-0.60	-0.63	-0.64	-0.66	-0.68	-0.71	-0.72	-0.76
B Finances																																									
1. Project Loan	21.22	2.36	1.67	13.49	2.09	0.97	0.36	0.28																																	
2. Local fund	6.85	0.79	0.56	4.56	0.70	0.17	0.04	0.03																																	
Sub-total	28.07	3.15	2.23	18.05	2.79	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	16.97	0.00	0.00	0.26	0.27	0.28	0.29	0.28	0.29	0.29	0.30	0.28	0.30	0.31	0.32	0.33	0.36	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.46	0.49	0.49	0.51	0.53	0.55	0.56	0.59	0.60	0.63	0.64	0.66	0.68	0.71	0.72	0.76
2. Subsidy for debt services	26.33	0.02	0.04	0.17	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.83	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.83	0.82
Sub-total	43.30	0.02	0.04	0.43	0.46	0.48	0.50	0.49	0.50	0.50	0.51	1.10	1.13	1.13	1.14	1.15	1.18	1.18	1.19	1.20	1.23	1.23	1.24	1.26	1.27	1.28	1.31	1.32	1.33	1.35	1.38	1.38	1.41	1.42	1.46	1.46	1.48	1.50	1.53	1.55	1.58
Total Cash Inflow	54.40	3.17	2.27	18.22	2.98	1.34	0.61	0.52	0.21	0.21	0.21	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.83	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.83	0.82	
APPLICATION OF FUNDS																																								
D Project disbursement	28.07	3.15	2.23	18.05	2.79	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	21.21											0.61	0.62	0.62	0.63	0.63	0.64	0.65	0.65	0.66	0.67	0.67	0.68	0.69	0.69	0.70	0.71	0.72	0.72	0.73	0.74	0.74	0.75	0.76	0.77	0.77	0.78	0.79	0.80	0.81	0.81
2. Interest paid	5.12	0.02	0.04	0.17	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.19	0.19	0.18	0.17	0.17	0.16	0.16	0.15	0.14	0.13	0.13	0.12	0.11	0.11	0.10	0.09	0.09	0.08	0.07	0.06	0.06	0.05	0.04	0.03	0.02	0.02	0.01
Sub-total	26.33	0.02	0.04	0.17	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.83	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.83	0.82
Total Cash Outflow	54.40	3.17	2.27	18.22	2.98	1.34	0.61	0.52	0.21	0.21	0.21	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.83	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.83	0.82
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)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
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
Gyumri District
No 22 Akhuryan Kayaran

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	4.70	9.8%
	Subsidy	43.30	90.2%
	Total	48.00	100.0%
2	**Expenditure**		
	OM cost	21.67	45.1%
	Loan repayment	21.21	44.2%
	Interest paid	5.12	10.7%
	Surplus cash	0.00	0.0%
	Total	48.00	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	19.71	2.30	1.64	12.37	1.93	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
Chlorine	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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
Mantenance cost	1.90			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Pump replacement																	0.00															0.00								
Sub-total	11.02			0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Total Outflow	30.73	2.30	1.64	12.66	2.22	1.17	0.62	0.55	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
B BENEFIT																																							
1. Water Tariff	3.04	0.00	0.00	0.03	0.03	0.03	0.03	0.05	0.05	0.06	0.06	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
2. Subsidy	38.18	0.00	0.00	0.26	0.27	0.28	0.29	0.28	0.29	0.29	0.30	0.89	0.92	0.93	0.95	0.96	1.00	1.01	1.02	1.04	1.07	1.08	1.10	1.13	1.14	1.16	1.20	1.21	1.23	1.26	1.29	1.30	1.34	1.36	1.40	1.41	1.44	1.47	1.51	1.53	1.57
Total Inflow	41.22	0.00	0.00	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.98	1.01	1.02	1.04	1.05	1.09	1.10	1.11	1.13	1.16	1.17	1.19	1.22	1.23	1.25	1.29	1.30	1.32	1.35	1.38	1.39	1.43	1.45	1.49	1.50	1.53	1.56	1.60	1.62	1.66
NET BENEFIT	10.49	-2.30	-1.64	-12.4	-1.9	-0.9	-0.30	-0.22	0.05	0.06	0.07	0.69	0.72	0.73	0.75	0.76	0.80	0.81	0.82	0.84	0.87	0.88	0.90	0.93	0.94	0.96	1.00	1.01	1.03	1.06	1.09	1.10	1.14	1.16	1.20	1.21	1.24	1.27	1.31	1.33	1.37

FIRR = 1.84%

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	-1.48	-2.53	-1.80	-13.6	-2.1	-0.9	-0.33	-0.25	0.05	0.06	0.07	0.69	0.72	0.73	0.75	0.76	0.80	0.81	0.82	0.84	0.87	0.88	0.90	0.93	0.94	0.96	1.00	1.01	1.03	1.06	1.09	1.10	1.14	1.16	1.20	1.21	1.24	1.27	1.31	1.33	1.37
	2	Capital cost 20% up	-3.35	-2.76	-1.97	-14.8	-2.3	-1.0	-0.37	-0.27	0.05	0.06	0.07	0.69	0.72	0.73	0.75	0.76	0.80	0.81	0.82	0.84	0.87	0.88	0.90	0.93	0.94	0.96	1.00	1.01	1.03	1.06	1.09	1.10	1.14	1.16	1.20	1.21	1.24	1.27	1.31	1.33	1.37
2	1	OM cost 10% up	-0.38	-2.30	-1.64	-12.4	-1.9	-0.9	-0.33	-0.25	0.02	0.03	0.04	0.66	0.69	0.70	0.72	0.73	0.77	0.78	0.79	0.81	0.84	0.85	0.87	0.90	0.91	0.93	0.97	0.98	1.00	1.03	1.06	1.07	1.11	1.13	1.17	1.18	1.21	1.24	1.28	1.30	1.34
	2	OM cost 20% up	-1.15	-2.30	-1.64	-12.4	-2.0	-0.9	-0.36	-0.28	-0.01	0.00	0.01	0.63	0.66	0.67	0.69	0.70	0.74	0.75	0.76	0.78	0.81	0.82	0.84	0.87	0.88	0.90	0.94	0.95	0.97	1.00	1.03	1.04	1.08	1.10	1.14	1.15	1.18	1.21	1.25	1.27	1.31
3	1	Revenue 10% down	-2.29	-2.30	-1.64	-12.4	-2.0	-0.9	-0.33	-0.25	0.02	0.03	0.03	0.59	0.62	0.63	0.65	0.66	0.69	0.70	0.71	0.73	0.75	0.76	0.78	0.81	0.82	0.84	0.87	0.88	0.90	0.93	0.95	0.96	1.00	1.02	1.05	1.06	1.09	1.11	1.15	1.17	1.20
	2	Revenue 20% down	-4.98	-2.30	-1.64	-12.4	-2.0	-0.9	-0.36	-0.29	-0.02	-0.01	0.00	0.49	0.52	0.53	0.54	0.55	0.58	0.59	0.60	0.61	0.64	0.65	0.66	0.69	0.69	0.71	0.74	0.75	0.77	0.79	0.81	0.82	0.85	0.87	0.90	0.91	0.93	0.96	0.99	1.01	1.04

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	1.42%	2.99	33.44%
	2	Capital cost 20% up	1.04%	7.76	12.89%
2	1	OM cost 10% up	1.66%	1.11	90.37%
	2	OM cost 20% up	1.47%	2.51	39.92%
3	1	Revenue 10% down	1.18%	5.62	17.79%
	2	Revenue 20% down	0.44%	31.69	3.16%

No.23 Mets Sariar

Information on Existing Water Sources (Shirak)

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

No.23 Community Mets 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	53	35.8	43	55	30.8	1,967	0.5	3.0	
2	spring	40	53	25.7	43	56	45.2	1,965	0.2	3.0	
3	spring	40	54	27.0	43	56	26.2	2,200	-	-	1.8
4	spring	40	54	5.9	43	56	58.2	2,083	-	-	
5	spring	40	53	36.0	43	55	44.8	1,964	-	-	
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	A total of 5 small spring intakes exist within 500m. There is a not operating reservoir with 300m3 capacity.
Alternative sources if any	

No.23 Community Mets Sariar
District Ashotsk
Marz Shirak
Sampling date 25/Jul/2007

		Parameters analysed	Units	No.1	No.2	No.3		Guidelines	
								WHO	Armenia
2	*a*	pH		8	8.1	8.1		6.5-8	6.0 - 9.0
	b	Temperature	Deg.C	11	15.7	13.2			
	c	TDS	Mg/L	82	116	146		1000	1000
	1	Al:Aluminum	Mg/L	0.01	0.01	0.01		0.10	0.50
	2	B:Boron	Mg/L	n.d	n.d	n.d		0.70	0.50
	3	Cl:Chloride	Mg/L	6	5	5		250	350
	4	Cr:Chrome	Mg/L	n.d	n.d	n.d		0.05	0.05
	5	Cu:Copper	Mg/L	n.d	n.d	n.d		2	1
	6	F:Fluoride	Mg/L	0.07	0.07	0.10		1.50	
	7	Hardness	Mg/L	305	200	300		500	700
	8	Fe:Iron	Mg/L	0.02	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	0.005		0.020	0.100
	12	Nitrate(NO3+)	Mg/L	4.0	2.7	1.8		50.0	45.0
	13	SO4:Sulfate	Mg/L	4.5	5.0	5.0		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	0.03	0.02	0.07		0.70	0.10
	17	Be:Berillium	Mg/L	n.d	n.d	n.d		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	<0.0002		0.00100	0.00050
	21	Se:Selenium	Mg/L	<0.001	<0.001	<0.001		0.010	0.010
	22	Sr:Strontium	Mg/L	0.2	0.2	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					-	0
	25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
	26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.23 Community Mets 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	02	02	-	Not Identified	Not Identified
2	04	09	-	0,4;0,4;0,9;0;0;0;0;0	Not Identified
3	07	25	76,88,86,90	0,4;0,4;0,4;0,4	Not Identified
4	08	27	68,50,58,62,66,72,58,54	0,9;0,9;0,4;0,4;0,4;0,4;4;0,4;0	Not Identified

No. 23 **Marz** Shirak **Community** Mets Sariar

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
	Intake	Possible	Difficult	
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°53′35,8″	43°55′30,8″	1,967	1967	Masonry	1.8	Yes
2	Spring	40°53′36.0″	43°55′44,8″	1,964	2001	Concrete		No
3	Spring	40°54′27.0″	43°56′26,2″	2,200	2001	Concrete		No
4	Spring	40°54′05,9″	43°56′58,2″	2,083	2003	Concrete		No
5	Spring	40°53′25.7″	43°56′45,2″	1,965	2003	Concrete		No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,500	76	Steel	0.2	1967	Little	Yes
2	2,500	100	Steel	0.2	1970	Medium	Yes
3	1,000	76	Steel	0.1	2001	no	No
4	1,000	50	Steel	0.3	2000	no	No
5	3,000	76	Steel	0.2	2000	no	No
6	1,500	50	Steel	0.2	2003	no	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°53′16,6″	43°56′26,1″	1,924	Concrete	Rectangular	6×4×3	100	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	3,000	100	Steel	1950	Little	Yes
2	1,000	76	Steel	1950	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)
2	1950		No	0	Yes

9. DRAINAGE SYSTEM

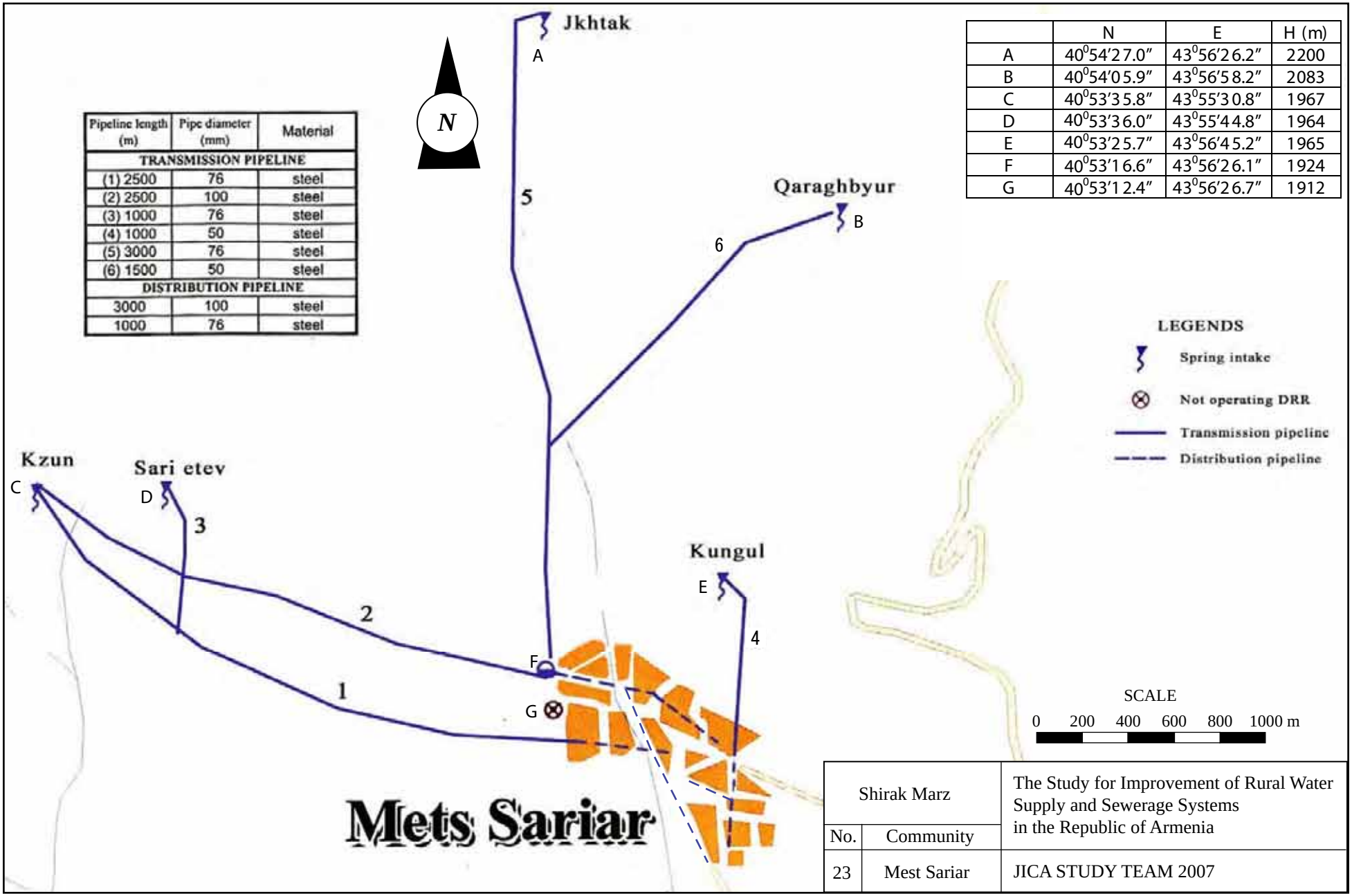
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
Yes	Yes	DN250

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.23 Mets Sariar**
District	**Ashotsk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	429
A2	Actual population in 2007	475
A3	Number of households	96
A4.1	Elderly people	68
A4.2	Population in labor force (age from 16 to 62)	257
A4.3	Children	150
A5.1	Pensioners	72
A5.2	Unemployed	0
A5.3	Receiving benefits	17
A6	Average monthly income of household (AMD)	40,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	120
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	150
	Annual Budget of the community 2005, in thousand AMD	280
	Annual Budget of the community 2006, in thousand AMD	300
	Annual Budget of the community 2007, in thousand AMD	600
	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	20
	Amount spent in drinking water sector 2006, in thousand AMD	60
	Amount spent in drinking water sector 2007, in thousand AMD	70
	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	1327
D3	Date of expiry of water use permit	13.02.07-13.02.10
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	96
D8	How many house connection household set the water meter	0
D9	Number of public taps	2
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	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?	own water chamber
D20	Are you satisfied with irrigation water supply volume?	sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Zagaryan Aftandil
E2	Position	water distributor
E3	Telephone	with the help of administration haed
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-rehabilitated
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)	1-rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution	rehabilitated
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?	hired specialist from
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)	70,000
	Repair cost(AMD)	70,000
	Others(AMD)	0
	Total (AMD)	140,000
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 ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.23 Mets Sariar



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 2500	76	steel
(2) 2500	100	steel
(3) 1000	76	steel
(4) 1000	50	steel
(5) 3000	76	steel
(6) 1500	50	steel
DISTRIBUTION PIPELINE		
3000	100	steel
1000	76	steel

	N	E	H (m)
A	40°54′27.0″	43°56′26.2″	2200
B	40°54′05.9″	43°56′58.2″	2083
C	40°53′35.8″	43°55′30.8″	1967
D	40°53′36.0″	43°55′44.8″	1964
E	40°53′25.7″	43°56′45.2″	1965
F	40°53′16.6″	43°56′26.1″	1924
G	40°53′12.4″	43°56′26.7″	1912

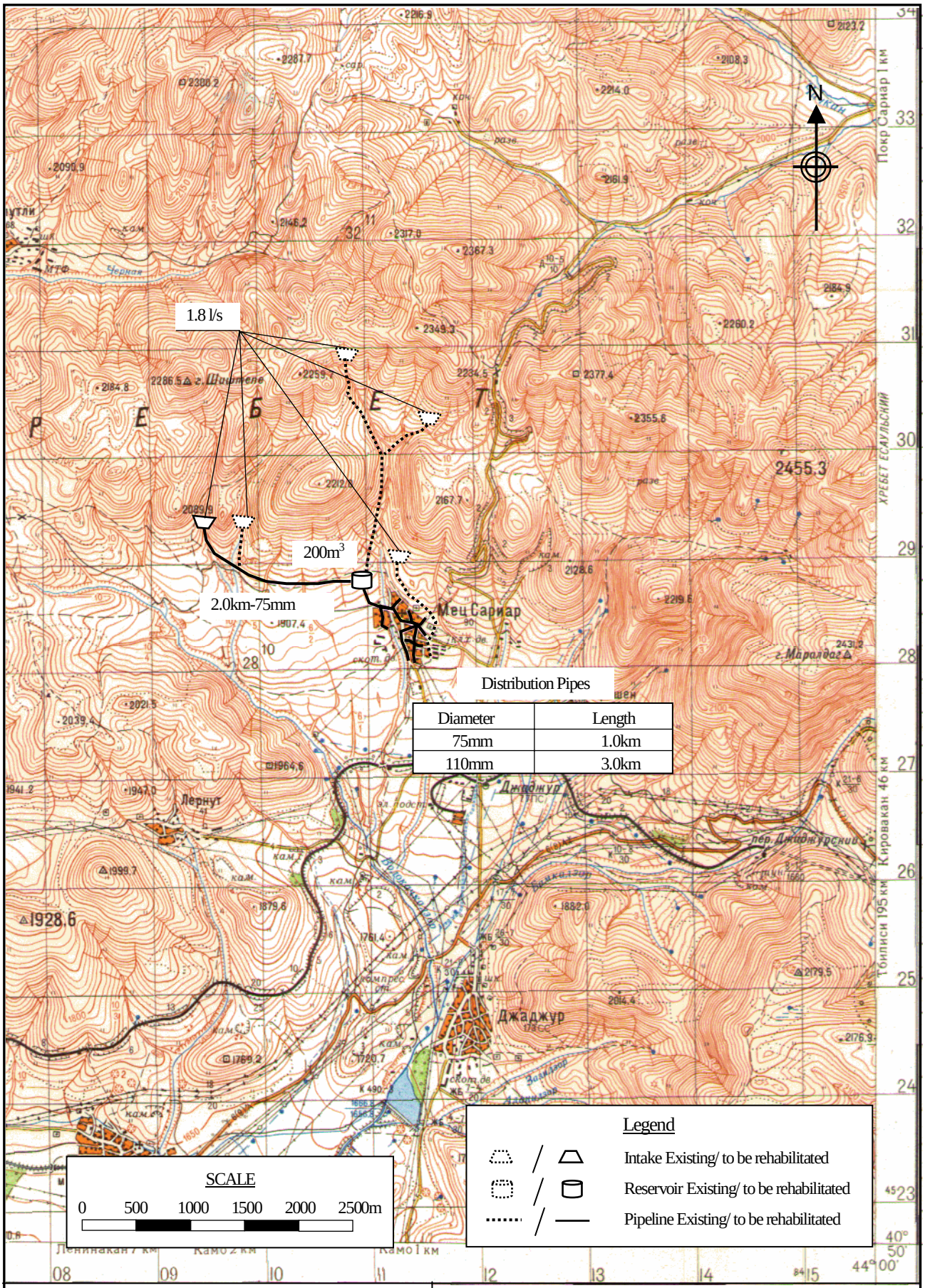
Shirak Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
23	Mest Sariar	JICA STUDY TEAM 2007

Marz : **Shirak** No.23
Name : **Mets Sariar**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	475	persons	47.5	
	2 Factory	-	nos	0.0	
	3 School (pupils)	120	pupils	1.2	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	96	household	8.4	
	Sub-total			57.1	
	Unaccouted for water (20%)			11.4	
1	Average Daily Water Demand		40.0	68.5	m3/day
2	Maximum Daily Water Demand			82.2	m3/day
3	Maximum Hourly Water Demand			15.6	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	5	1.8	lit/sec		155.5	m3/day
`	Total					155.5	m3/day
	2 Required reservoir volume					187	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	2,000	m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	200m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter	1,000	m
	90mm diameter		m
	110mm diameter	3,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	-	nos
6	Water meter installation	96	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. 23	Mets Sariar	JICA STUDY TEAM

Marz : **Shirak**
No. : **23**
Name : **Mets Sariar**

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	2,000	m	7,160	14,320,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					14,320,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	1	nos	22,524,600	22,524,600
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					22,524,600
4	Distribution Pipe					
		50mm		m	5,520	
		75mm	1,000	m	7,160	7,160,000
		90mm		m	8,040	
		110mm	3,000	m	9,680	29,040,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					36,200,000
5	House Connection			nos	74,000	
6	Water Meter Installation		96	nos	80,000	7,680,000
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	1,600	m	3,600	5,760,000
	Total				AMD	87,442,300
					Equivalent to USD	286,208
					Equivalent to JPY	30,194,955
					AMD	USD
	Investment Cost per household		96	HH	910,857	2,981
	Investment Cost per person		475	persons	184,089	603

SHIRAK MARZ
Gyumri District
No 23 Mets Sariar

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		20.8																																							
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		116.91	0.00	0.00	0.75	0.75	0.75	0.78	1.31	1.36	1.40	1.45	2.17	2.24	2.31	2.39	2.47	2.55	2.64	2.72	2.81	2.91	3.00	3.10	3.20	3.31	3.42	3.53	3.65	3.77	3.89	4.02	4.15	4.29	4.43	4.58	4.73	4.88	5.05	5.21	5.38	5.56
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				126																																				
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		5.57			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	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	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
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		39.87			0.54	0.56	0.58	0.60	0.61	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.22	1.26	1.30	1.34	1.38	1.43	1.48	1.53	1.58	1.63	1.68	1.74	1.80
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					0.54	0.56	0.58	0.60	0.61	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.22	1.26	1.30	1.34	1.38	1.43	1.48	1.53	1.58	1.63	1.68	1.74	1.80
5. Pump replacement		0.00																0.00															0.00										
Sub-total		63.14	0.00	0.00	0.86	0.89	0.92	0.94	0.97	1.01	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.31	1.35	1.39	1.44	1.49	1.54	1.58	1.63	1.69	1.74	1.81	1.86	1.93	2.00	2.06	2.13	2.19	2.27	2.35	2.42	2.50	2.58	2.67	2.75	2.85
C Gross Income (A-B)		53.77	0.00	0.00	-0.11	-0.14	-0.17	-0.16	0.34	0.35	0.36	0.38	1.06	1.10	1.13	1.17	1.21	1.24	1.29	1.33	1.37	1.42	1.46	1.52	1.57	1.62	1.68	1.72	1.79	1.84	1.89	1.96	2.02	2.10	2.16	2.23	2.31	2.38	2.47	2.54	2.63	2.71
D Depreciation cost		82.95						2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
E Interest paid		26.92	0.02	0.04	1.07	1.09	1.10	1.11	1.11	1.11	1.11	1.11	1.11	1.08	1.05	1.01	0.98	0.95	0.91	0.88	0.85	0.81	0.78	0.74	0.71	0.67	0.63	0.60	0.56	0.52	0.48	0.45	0.41	0.37	0.33	0.29	0.25	0.21	0.17	0.13	0.08	0.04
F Net Income		-56.10	-0.02	-0.04	-1.18	-1.23	-1.27	-3.64	-3.14	-3.13	-3.12	-3.10	-2.42	-2.35	-2.29	-2.21	-2.14	-2.08	-1.99	-1.92	-1.85	-1.76	-1.69	-1.59	-1.51	-1.42	-1.32	-1.25	-1.14	-1.05	-0.96	-0.86	-0.76	-0.64	-0.54	-0.43	-0.31	-0.20	-0.07	0.04	0.18	0.30
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		-56.10	-0.02	-0.04	-1.18	-1.23	-1.27	-3.64	-3.14	-3.13	-3.12	-3.10	-2.42	-2.35	-2.29	-2.21	-2.14	-2.08	-1.99	-1.92	-1.85	-1.76	-1.69	-1.59	-1.51	-1.42	-1.32	-1.25	-1.14	-1.05	-0.96	-0.86	-0.76	-0.64	-0.54	-0.43	-0.31	-0.20	-0.07	0.04	0.18	0.30
OM Cost Recovery Ratio (A/B)		185%	0%	0%	87%	84%	82%	83%	135%	135%	135%	136%	195%	196%	196%	196%	196%	195%	196%	196%	195%	195%	195%	196%	196%	196%	197%	195%	196%	195%	195%	195%	195%	196%	195%	195%	195%	195%	196%	195%	196%	195%

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	-56.10	-0.02	-0.04	-1.18	-1.23	-1.27	-3.64	-3.14	-3.13	-3.12	-3.10	-2.42	-2.35	-2.29	-2.21	-2.14	-2.08	-1.99	-1.92	-1.85	-1.76	-1.69	-1.59	-1.51	-1.42	-1.32	-1.25	-1.14	-1.05	-0.96	-0.86	-0.76	-0.64	-0.54	-0.43	-0.31	-0.20	-0.07	0.04	0.18	0.30
2. Depreciation cost	82.95	0.00	0.00	0.00	0.00	0.00	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
3. Interest Paid	26.92	0.02	0.04	1.07	1.09	1.10	1.11	1.11	1.11	1.11	1.11	1.11	1.08	1.05	1.01	0.98	0.95	0.91	0.88	0.85	0.81	0.78	0.74	0.71	0.67	0.63	0.60	0.56	0.52	0.48	0.45	0.41	0.37	0.33	0.29	0.25	0.21	0.17	0.13	0.08	0.04
Sub-total	53.77	0.00	0.00	-0.11	-0.14	-0.17	-0.16	0.34	0.35	0.36	0.38	1.06	1.10	1.13	1.17	1.21	1.24	1.29	1.33	1.37	1.42	1.46	1.52	1.57	1.62	1.68	1.72	1.79	1.84	1.89	1.96	2.02	2.10	2.16	2.23	2.31	2.38	2.47	2.54	2.63	2.71
B Finances																																									
1. Project Loan	111.14	2.36	1.67	103.41	2.09	0.97	0.36	0.28																																	
2. Local fund	37.33	0.79	0.56	35.04	0.70	0.17	0.04	0.03																																	
Sub-total	148.47	3.15	2.23	138.45	2.79	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.58	0.00	0.00	0.11	0.14	0.17	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	83.73	0.02	0.04	1.07	1.09	1.10	1.11	0.77	0.76	0.75	0.73	3.25	3.21	3.18	3.13	3.10	3.07	3.01	2.98	2.94	2.88	2.85	2.78	2.74	2.69	2.62	2.59	2.52	2.46	2.41	2.35	2.29	2.21	2.15	2.08	2.00	1.93	1.84	1.77	1.67	1.59
Sub-total	84.31	0.02	0.04	1.18	1.23	1.27	1.27	0.77	0.76	0.75	0.73	3.25	3.21	3.18	3.13	3.10	3.07	3.01	2.98	2.94	2.88	2.85	2.78	2.74	2.69	2.62	2.59	2.52	2.46	2.41	2.35	2.29	2.21	2.15	2.08	2.00	1.93	1.84	1.77	1.67	1.59
Total Cash Inflow	286.55	3.17	2.27	139.52	3.88	2.24	1.51	1.42	1.11	1.11	1.11	4.31	4.31	4.31	4.30	4.31	4.31	4.30	4.31	4.31	4.30	4.31	4.30	4.31	4.31	4.30	4.31	4.31	4.30	4.30	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.30	4.30	
APPLICATION OF FUNDS																																								
D Project disbursement	148.47	3.15	2.23	138.45	2.79	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	111.16											3.20	3.23	3.26	3.29	3.33	3.36	3.39	3.43	3.46	3.49	3.53	3.56	3.60	3.64	3.67	3.71	3.75	3.78	3.82	3.86	3.90	3.94	3.98	4.02	4.06	4.10	4.14	4.18	4.22	4.26
2. Interest paid	26.92	0.02	0.04	1.07	1.09	1.10	1.11	1.11	1.11	1.11	1.11	1.11	1.08	1.05	1.01	0.98	0.95	0.91	0.88	0.85	0.81	0.78	0.74	0.71	0.67	0.63	0.60	0.56	0.52	0.48	0.45	0.41	0.37	0.33	0.29	0.25	0.21	0.17	0.13	0.08	0.04
Sub-total	138.08	0.02	0.04	1.07	1.09	1.10	1.11	1.11	1.11	1.11	1.11	4.31	4.31	4.31	4.30	4.31	4.31	4.30	4.31	4.31	4.30	4.31	4.30	4.31	4.31	4.30	4.31	4.31	4.30	4.30	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.30	4.30	
Total Cash Outflow	286.55	3.17	2.27	139.52	3.88	2.24	1.51	1.42	1.11	1.11	1.11	4.31	4.31	4.31	4.30	4.31	4.31	4.30	4.31	4.31	4.30	4.31	4.30	4.31	4.31	4.30	4.31	4.31	4.30	4.30	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.30	4.30	
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)	39%	0%	0%	0%	0%	0%	0%	31%	32%	32%	34%	25%	26%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	36%	38%	39%	40%	42%	43%	44%	45%	47%	49%	50%	52%	54%	55%	57%	59%	61%	63%
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
Gyumri District
No 23 Mets Sariar

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	116.91	58.1%
	Subsidy	84.31	41.9%
	Total	201.22	100.0%
2	**Expenditure**		
	OM cost	63.14	31.4%
	Loan repayment	111.16	55.2%
	Interest paid	26.92	13.4%
	Surplus cash	0.00	0.0%
	Total	201.22	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	101.71	2.30	1.64	94.37	1.93	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	3.04			0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
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	20.52			0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Pump replacement																	0.00															0.00									
Sub-total	32.68			0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Total Outflow	134.39	2.30	1.64	95.23	2.79	1.74	1.19	1.12	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
B BENEFIT																																								
1. Water Tariff	73.65	0.00	0.00	0.75	0.75	0.75	0.78	1.31	1.36	1.40	1.45	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17
2. Subsidy	58.82	0.00	0.00	0.11	0.14	0.17	0.16	0.00	0.00	0.00	0.00	2.14	2.13	2.13	2.12	2.12	2.12	2.10	2.10	2.09	2.07	2.07	2.04	2.03	2.02	1.99	1.99	1.96	1.94	1.93	1.90	1.88	1.84	1.82	1.79	1.75	1.72	1.67	1.64	1.59	1.55
Total Inflow	132.47	0.00	0.00	0.86	0.89	0.92	0.94	1.31	1.36	1.40	1.45	4.31	4.30	4.30	4.29	4.29	4.29	4.27	4.27	4.26	4.24	4.24	4.21	4.20	4.19	4.16	4.16	4.13	4.11	4.10	4.07	4.05	4.01	3.99	3.96	3.92	3.89	3.84	3.81	3.76	3.72
NET BENEFIT	-1.92	-2.30	-1.64	-94.4	-1.9	-0.8	-0.25	0.19	0.50	0.54	0.59	3.45	3.44	3.44	3.43	3.43	3.43	3.41	3.41	3.40	3.38	3.38	3.35	3.34	3.33	3.30	3.30	3.27	3.25	3.24	3.21	3.19	3.15	3.13	3.10	3.06	3.03	2.98	2.95	2.90	2.86

FIRR = -0.09%

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	-40.41	-2.53	-1.80	-103.8	-2.1	-0.9	-0.28	0.16	0.50	0.54	0.59	3.45	3.44	3.44	3.43	3.43	3.43	3.41	3.41	3.40	3.38	3.38	3.35	3.34	3.33	3.30	3.30	3.27	3.25	3.24	3.21	3.19	3.15	3.13	3.10	3.06	3.03	2.98	2.95	2.90	2.86
	2	Capital cost 20% up	-50.07	-2.76	-1.97	-113.2	-2.3	-1.0	-0.32	0.14	0.50	0.54	0.59	3.45	3.44	3.44	3.43	3.43	3.43	3.41	3.41	3.40	3.38	3.38	3.35	3.34	3.33	3.30	3.30	3.27	3.25	3.24	3.21	3.19	3.15	3.13	3.10	3.06	3.03	2.98	2.95	2.90	2.86
2	1	OM cost 10% up	-33.05	-2.30	-1.64	-94.5	-2.0	-0.9	-0.34	0.10	0.41	0.45	0.50	3.36	3.35	3.35	3.34	3.34	3.34	3.32	3.32	3.31	3.29	3.29	3.26	3.25	3.24	3.21	3.21	3.18	3.16	3.15	3.12	3.10	3.06	3.04	3.01	2.97	2.94	2.89	2.86	2.81	2.77
	2	OM cost 20% up	-35.34	-2.30	-1.64	-94.5	-2.1	-1.0	-0.42	0.02	0.33	0.37	0.42	3.28	3.27	3.27	3.26	3.26	3.26	3.24	3.24	3.23	3.21	3.21	3.18	3.17	3.16	3.13	3.13	3.10	3.08	3.07	3.04	3.02	2.98	2.96	2.93	2.89	2.86	2.81	2.78	2.73	2.69
3	1	Revenue 10% down	-39.63	-2.30	-1.64	-94.5	-2.0	-0.9	-0.34	0.06	0.36	0.40	0.45	3.02	3.01	3.01	3.00	3.00	3.00	2.98	2.98	2.97	2.96	2.96	2.93	2.92	2.91	2.88	2.88	2.86	2.84	2.83	2.80	2.79	2.75	2.73	2.70	2.67	2.64	2.60	2.57	2.52	2.49
	2	Revenue 20% down	-48.50	-2.30	-1.64	-94.5	-2.1	-1.0	-0.44	-0.07	0.23	0.26	0.30	2.59	2.58	2.58	2.57	2.57	2.57	2.56	2.56	2.55	2.53	2.53	2.51	2.50	2.49	2.47	2.47	2.44	2.43	2.42	2.40	2.38	2.35	2.33	2.31	2.28	2.25	2.21	2.19	2.15	2.12

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.52%	-8.32	-12.02%
	2	Capital cost 20% up	-0.91%	-9.04	-11.07%
2	1	OM cost 10% up	-0.24%	-6.33	-15.80%
	2	OM cost 20% up	-0.39%	-7.77	-12.87%
3	1	Revenue 10% down	-0.73%	-8.80	-11.37%
	2	Revenue 20% down	-1.45%	-9.39	-10.65%

No.24 Musaelyan

Information on Existing Water Sources (Shirak)

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

No.24 Community Musayelyan
District Akhuryan
Marz Shirak

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	3 Springs	-	-	-	-	-	-	-	3.0	5.0	8.5
2											
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	The 15km long road to the spring intakes is impassable.
Alternative sources if any	

No.24 Community Musayelyan
District Akhuryan
Marz Shirak
Sampling date 13/Jul/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
a	pH		7.9	7.9			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	11.1	11.9				
c	TDS	Mg/L	34	81			1000	1000
1	Al:Aluminum	Mg/L	0.02	0.01			0.10	0.50
2	B:Boron	Mg/L	n.d	n.d			0.70	0.50
3	Cl:Chloride	Mg/L	4	5			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	0.12	0.15			1.50	
7	Hardness	Mg/L	65	150			500	700
8	Fe:Iron	Mg/L	n.d	n.d			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d			0.40	0.10
10	Mo:Molibdenum	Mg/L	0.090	0.030			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	2.2	2.2			50.0	45.0
13	SO4:Sulfate	Mg/L	9.0	4.5			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	0.00			0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d			NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d			0.0030	0.0010
19	Pb:Lead	Mg/L	0.001	0.001			0.010	0.030
20	Hg:Mercury	Mg/L	n.d	<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	0.1			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.24 Community Musaelyan
District Akhuryan
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	02	05	0,0	0;0,4;0,4;0	Not Identified
2	04	10	20,10,20,20	0;0;0,9;0,9;0,9;0,9;0,9;0,9	Not Identified
3	06	15	6,102,108,108	0,9;0,9;0,9;0,9	Not Identified
4	07	13	96,98,102,104,10	0,9;0,9;0,9;0,9;0,9;0,9;0,9;0,9	Not Identified
5	08	15	76-82	0,9-2,3	Not Identified
6			90;90;80;80;70;70;0,90,80,0		

No. 24 **Marz** Shirak **Community** Musaelyan

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake Intake Intake	Inpossible	Inpossible	Inpossible to find the intakes
2	Transmission pipeline	Difficult	Difficult	Difficult to find the pipeline route
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 Spring Spring	-	-	-	1952	Masonry	8.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	10,000	150	AsbestosCement	6.6	1950	Little	Yes
	1,000	100	Polyethylene	6.9	1985	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°45′36,5″	43°59′53,6″	1,716	Concrete	Rectangular	12×12×4	400	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Powder	twice per year

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	100	100	Steel	1950	Little	Yes
2	100	100	steel/iron	1985	Little	Yes
3	100	100	steel/iron	1952	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)
0				0	

9. DRAINAGE SYSTEM

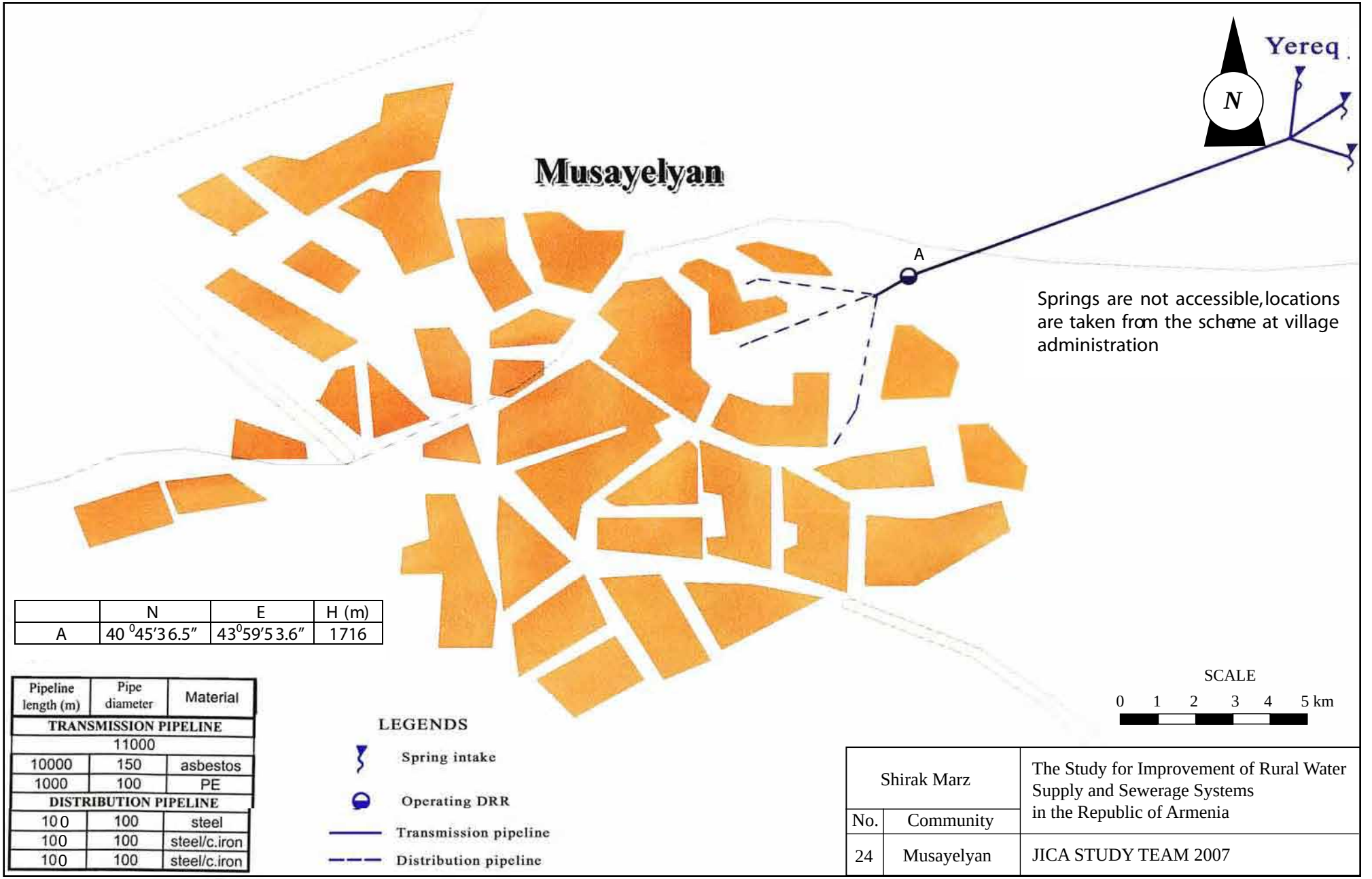
Existence (Y/N)	Rehabilitation Necessity (Y/N)	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Shirak**
Number and Name of Community	**No.24 Musaelyan**
District	**Akhurian**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,894
A2	Actual population in 2007	1,842
A3	Number of households	497
A4.1	Elderly people	199
A4.2	Population in labor force (age from 16 to 62)	966
A4.3	Children	730
A5.1	Pensioners	252
A5.2	Unemployed	3
A5.3	Receiving benefits	130
A6	Average monthly income of household (AMD)	50,000
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	344
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	3,850
	Annual Budget of the community 2005, in thousand AMD	1,585
	Annual Budget of the community 2006, in thousand AMD	2,992
	Annual Budget of the community 2007, in thousand AMD	1,150
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	550
	Amount spent in drinking water sector 2005, in thousand AMD	550
	Amount spent in drinking water sector 2006, in thousand AMD	550
	Amount spent in drinking water sector 2007, in thousand AMD	450
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	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	1395
D3	Date of expiry of water use permit	07.05.10
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	absent
D7	Number of house connection to drinking water system	497
D8	How many house connection household set the water meter	0
D9	Number of public taps	2
D10.1	How is the regime of water supply in your community in the dry season?	regularly-4hrs
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?	8.00-12.00
D12	Are you pleased with duration of domestic water supply?	mainly displeased
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
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	1,000
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?	absent
D20	Are you satisfied with irrigation water supply volume?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Baghdasaryan Arsen
E2	Position	administration head
E3	Telephone	(091) 529574
E4	Quantity and present condition of the water supply facilities: spring/ intake	5-rehabilitated
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)	1-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?	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)	240,000
	Repair cost(AMD)	300,000
	Others(AMD)	0
	Total (AMD)	540,000
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 ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Shirak
No.24 Musaelyan



	N	E	H (m)
A	40 °45′36.5″	43°59′53.6″	1716

Pipeline length (m)	Pipe diameter	Material
TRANSMISSION PIPELINE		
11000		
10000	150	asbestos
1000	100	PE
DISTRIBUTION PIPELINE		
100	100	steel
100	100	steel/c.iron
100	100	steel/c.iron

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

Marz : **Shirak** No.24
Name : **Musaelyan**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	1,842	persons	184.2	
	2 Factory	-	nos	0.0	
	3 School (pupils)	344	pupils	3.4	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	497	household	43.2	
	Sub-total			230.8	
	Unaccouted for water (20%)			46.2	
1	Average Daily Water Demand		166.4	277.0	m3/day
2	Maximum Daily Water Demand			332.4	m3/day
3	Maximum Hourly Water Demand			32.4	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	3	8.5	lit/sec		734.4	m3/day
`	Total					734.4	m3/day
	2 Required reservoir volume					389	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	8,300	m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	400m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	300	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	-	nos
6	Water meter installation	497	nos
7	Public tap	5	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. 24	Musaelyan	JICA STUDY TEAM

Marz : **Shirak**
No. : **24**
Name : **Musaelyan**

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	8,300	m	13,140	109,062,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					109,062,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3	1	nos	36,388,000	36,388,000
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					36,388,000
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	300	m	9,680	2,904,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					2,904,000
5	House Connection			nos	74,000	
6	Water Meter Installation		497	nos	80,000	39,760,000
7	Public Tap		5	nos	90,000	450,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	120	m	3,600	432,000
	Total				AMD	190,599,100
					Equivalent to USD	623,851
					Equivalent to JPY	65,816,330
					AMD	USD
	Investment Cost per household		497	HH	383,499	1,255
	Investment Cost per person		1,842	persons	103,474	339

SHIRAK MARZ
Gyumri District
No 24 Musaelyan

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		84.2																																							
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		472.54	0.00	0.00	3.03	3.03	3.03	3.13	5.31	5.48	5.66	5.85	8.77	9.06	9.36	9.67	9.98	10.31	10.65	11.01	11.37	11.74	12.13	12.53	12.95	13.37	13.81	14.27	14.74	15.23	15.73	16.25	16.79	17.34	17.91	18.50	19.11	19.74	20.39	21.07	21.76	22.48
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				506																																				
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		22.38			0.30	0.31	0.32	0.33	0.35	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51	0.53	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.71	0.73	0.75	0.78	0.80	0.83	0.86	0.89	0.92	0.95	0.98	1.01
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		29.51			0.40	0.41	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.72	0.74	0.77	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.03	1.06	1.09	1.13	1.17	1.21	1.25	1.29	1.33
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					0.4	0.41	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.72	0.74	0.77	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.03	1.06	1.09	1.13	1.17	1.21	1.25	1.29	1.33
5. Pump replacement		0.00																0.00															0.00									
Sub-total		69.59	0.00	0.00	0.94	0.97	1.01	1.03	1.08	1.11	1.15	1.18	1.22	1.27	1.30	1.34	1.39	1.44	1.49	1.53	1.58	1.64	1.69	1.74	1.81	1.86	1.93	1.99	2.05	2.12	2.20	2.27	2.34	2.43	2.50	2.58	2.67	2.76	2.85	2.95	3.04	3.14
C Gross Income (A-B)		402.95	0.00	0.00	2.09	2.06	2.02	2.10	4.23	4.37	4.51	4.67	7.55	7.79	8.06	8.33	8.59	8.87	9.16	9.48	9.79	10.10	10.44	10.79	11.14	11.51	11.88	12.28	12.69	13.11	13.53	13.98	14.45	14.91	15.41	15.92	16.44	16.98	17.54	18.12	18.72	19.34
D Depreciation cost		180.95						5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17
E Interest paid		55.91	0.02	0.04	2.26	2.29	2.29	2.31	2.31	2.31	2.31	2.31	2.31	2.24	2.17	2.10	2.04	1.97	1.90	1.83	1.76	1.68	1.61	1.54	1.46	1.39	1.31	1.24	1.16	1.08	1.01	0.93	0.85	0.77	0.68	0.60	0.52	0.43	0.35	0.26	0.18	0.09
F Net Income		166.09	-0.02	-0.04	-0.17	-0.23	-0.27	-5.38	-3.25	-3.11	-2.97	-2.81	0.07	0.38	0.72	1.06	1.38	1.73	2.09	2.48	2.86	3.25	3.66	4.08	4.51	4.95	5.40	5.87	6.36	6.86	7.35	7.88	8.43	8.97	9.56	10.15	10.75	11.38	12.02	12.69	13.37	14.08
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		166.09	-0.02	-0.04	-0.17	-0.23	-0.27	-5.38	-3.25	-3.11	-2.97	-2.81	0.07	0.38	0.72	1.06	1.38	1.73	2.09	2.48	2.86	3.25	3.66	4.08	4.51	4.95	5.40	5.87	6.36	6.86	7.35	7.88	8.43	8.97	9.56	10.15	10.75	11.38	12.02	12.69	13.37	14.08
OM Cost Recovery Ratio (A/B)		679%	0%	0%	322%	312%	300%	304%	492%	494%	492%	496%	719%	713%	720%	722%	718%	716%	715%	720%	720%	716%	718%	720%	715%	719%	716%	717%	719%	718%	715%	716%	718%	714%	716%	717%	716%	715%	715%	714%	716%	716%

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	166.09	-0.02	-0.04	-0.17	-0.23	-0.27	-5.38	-3.25	-3.11	-2.97	-2.81	0.07	0.38	0.72	1.06	1.38	1.73	2.09	2.48	2.86	3.25	3.66	4.08	4.51	4.95	5.40	5.87	6.36	6.86	7.35	7.88	8.43	8.97	9.56	10.15	10.75	11.38	12.02	12.69	13.37	14.08
2. Depreciation cost	180.95	0.00	0.00	0.00	0.00	0.00	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17
3. Interest Paid	55.91	0.02	0.04	2.26	2.29	2.29	2.31	2.31	2.31	2.31	2.31	2.31	2.24	2.17	2.10	2.04	1.97	1.90	1.83	1.76	1.68	1.61	1.54	1.46	1.39	1.31	1.24	1.16	1.08	1.01	0.93	0.85	0.77	0.68	0.60	0.52	0.43	0.35	0.26	0.18	0.09
Sub-total	402.95	0.00	0.00	2.09	2.06	2.02	2.10	4.23	4.37	4.51	4.67	7.55	7.79	8.06	8.33	8.59	8.87	9.16	9.48	9.79	10.10	10.44	10.79	11.14	11.51	11.88	12.28	12.69	13.11	13.53	13.98	14.45	14.91	15.41	15.92	16.44	16.98	17.54	18.12	18.72	19.34
B Finances																																									
1. Project Loan	230.51	2.36	1.67	222.78	2.09	0.97	0.36	0.28																																	
2. Local fund	77.76	0.79	0.56	75.47	0.70	0.17	0.04	0.03																																	
Sub-total	308.27	3.15	2.23	298.25	2.79	1.14	0.40	0.31																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	5.35	0.02	0.04	0.17	0.23	0.27	0.21	0.00	0.00	0.00	0.00	1.39	1.14	0.87	0.60	0.35	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	5.35	0.02	0.04	0.17	0.23	0.27	0.21	0.00	0.00	0.00	0.00	1.39	1.14	0.87	0.60	0.35	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	716.57	3.17	2.27	300.51	5.08	3.43	2.71	4.54	4.37	4.51	4.67	8.94	8.93	8.93	8.93	8.94	8.93	9.16	9.48	9.79	10.10	10.44	10.79	11.14	11.51	11.88	12.28	12.69	13.11	13.53	13.98	14.45	14.91	15.41	15.92	16.44	16.98	17.54	18.12	18.72	19.34
APPLICATION OF FUNDS																																								
D Project disbursement	308.27	3.15	2.23	298.25	2.79	1.14	0.40	0.31																																	
E Total debt services																																								
1. Loan repayment	230.52											6.63	6.69	6.76	6.83	6.90	6.96	7.03	7.10	7.18	7.25	7.32	7.39	7.47	7.54	7.62	7.69	7.77	7.85	7.93	8.01	8.09	8.17	8.25	8.33	8.41	8.50	8.58	8.67	8.76	8.84
2. Interest paid	55.91	0.02	0.04	2.26	2.29	2.29	2.31	2.31	2.31	2.31	2.31	2.31	2.24	2.17	2.10	2.04	1.97	1.90	1.83	1.76	1.68	1.61	1.54	1.46	1.39	1.31	1.24	1.16	1.08	1.01	0.93	0.85	0.77	0.68	0.60	0.52	0.43	0.35	0.26	0.18	0.09
Sub-total	286.43	0.02	0.04	2.26	2.29	2.29	2.31	2.31	2.31	2.31	2.31	8.94	8.93	8.93	8.93	8.94	8.93	8.93	8.93	8.94	8.93	8.93	8.93	8.93	8.93	8.93	8.93	8.93	8.93	8.94	8.94	8.94	8.94	8.93	8.93	8.93	8.93	8.93	8.93	8.94	8.93
Total Cash Outflow	594.70	3.17	2.27	300.51	5.08	3.43	2.71	2.62	2.31	2.31	2.31	8.94	8.93	8.93	8.93	8.94	8.93	8.93	8.93	8.94	8.93	8.93	8.93	8.93	8.93	8.93	8.93	8.93	8.93	8.94	8.94	8.94	8.94	8.93	8.93	8.93	8.93	8.93	8.93	8.94	8.93
F Net Surplus Cash (A+C2)-E	121.87	0.00	0.00	0.00	0.00	0.00	0.00	1.92	2.06	2.20	2.36	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.55	0.85	1.17	1.51	1.86	2.21	2.58	2.95	3.35	3.76	4.18	4.59	5.04	5.51	5.97	6.48	6.99	7.51	8.05	8.61	9.19	9.78	10.41
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	141%	0%	0%	92%	90%	88%	91%	183%	189%	195%	202%	84%	87%	90%	93%	96%	99%	103%	106%	110%	113%	117%	121%	125%	129%	133%	138%	142%	147%	151%	156%	162%	167%	173%	178%	184%	190%	196%	203%	209%	217%
Cost recovery by water fee + subsidy ((A+C2)/E)	143%	100%	100%	100%	100%	100%	100%	183%	189%	195%	202%	100%	100%	100%	100%	100%	100%	103%	106%	110%	113%	117%	121%	125%	129%	133%	138%	142%	147%	151%	156%	162%	167%	173%	178%	184%	190%	196%	203%	209%	217%

SHIRAK MARZ
Gyumri District
No 24 Musaelyan

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	472.54	98.9%
	Subsidy	5.35	1.1%
	Total	477.89	100.0%
2	**Expenditure**		
	OM cost	69.59	14.6%
	Loan repayment	230.52	48.2%
	Interest paid	55.91	11.7%
	Surplus cash	121.87	25.5%
	Total	477.89	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	210.55	2.30	1.64	203.21	1.93	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	11.77			0.30	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
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	15.20			0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Pump replacement																	0.00															0.00									
Sub-total	36.09			0.94	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Total Outflow	246.64	2.30	1.64	204.15	2.88	1.83	1.28	1.21	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
B BENEFIT																																								
1. Water Tariff	297.62	0.00	0.00	3.03	3.03	3.03	3.13	5.31	5.48	5.66	5.85	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77
2. Subsidy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	297.62	0.00	0.00	3.03	3.03	3.03	3.13	5.31	5.48	5.66	5.85	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77
NET BENEFIT	50.98	-2.30	-1.64	-201.1	0.1	1.2	1.85	4.10	4.53	4.71	4.90	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82

FIRR = 1.08%

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	-43.69	-2.53	-1.80	-221.4	0.0	1.1	1.82	4.07	4.53	4.71	4.90	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82
	2	Capital cost 20% up	-63.68	-2.76	-1.97	-241.8	-0.2	1.0	1.78	4.05	4.53	4.71	4.90	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82
2	1	OM cost 10% up	-26.23	-2.30	-1.64	-201.2	0.1	1.1	1.76	4.01	4.44	4.62	4.81	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73	7.73
	2	OM cost 20% up	-28.76	-2.30	-1.64	-201.3	0.0	1.0	1.66	3.91	4.34	4.52	4.71	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63
3	1	Revenue 10% down	-43.85	-2.30	-1.64	-201.4	-0.2	0.9	1.54	3.57	3.98	4.14	4.32	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94
	2	Revenue 20% down	-64.00	-2.30	-1.64	-201.7	-0.5	0.6	1.22	3.04	3.43	3.58	3.73	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.60%	8.10	12.35%
	2	Capital cost 20% up	0.17%	54.54	1.83%
2	1	OM cost 10% up	1.01%	0.72	138.04%
	2	OM cost 20% up	0.94%	1.57	63.78%
3	1	Revenue 10% down	0.47%	13.03	7.68%
	2	Revenue 20% down	-0.20%	-64.52	-1.55%