No.57 Vardenut

Information on Existing Water Sources (Aragatsotn)

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

No.57 Community Vardenut
District Aparan
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Khachaghbyur Spring	40	28	43.2	44	19	56.2	2,027	1.5	5.0	3.0
2	Sevaghbyur spring	40	28	7.8	44	19	4.0	2183	1.0	3.0	1.5
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Acceptable
Notes	The internal network is in deteriorated conditions, there is estimated 40% leakage.
Alternative sources if any	No alternative water sources are available

No.57 Community Vardenut
District Aparan
Marz Aragatsotn
Sampling date 07/Aug/2007

	Parameters analysed	Units	No.1 Khachaghbyur	No.2 Sez aghbyur			Guidelines	
							WHO	Armenia
a	pH		7.4	7.5			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	7.2	8.6				
c	TDS	Mg/L	35	22			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	0.01	<0.01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.02	0.08			1.50	
7	Hardness	Mg/L	75	40			500	700
8	Fe:Iron	Mg/L	n.d	n.d			0.30	0.30
9	Mn:Manganese	Mg/L	0.10	0.10			0.40	0.10
10	Mo:Molibdenum	Mg/L	0.030	<0.02			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8	1.3			50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	2.0			250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d			3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d			0.0	0.1
16	Ba:Barium	Mg/L	<0.01	<0.01			0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d			NA	0.00020
18	Cd:Cadmium	Mg/L	0.0001	0.0001			0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001			0.010	0.030
20	Hg:Mercury	Mg/L	<0.00005	<0.0002			0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001			0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	n.d			NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.57 Community Vardenut
District Aparan
Marz Aragatsotn

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	2			0.0	Not Identified
2	3			4.3/3; 0.9/1	Not Identified
3	4			1.5/2; 0.9/1; 2.3/1	Not Identified
4	5			2.3/1; 2.1/1; 4.3/1	Not Identified
5	6			2.4/2; 4.3/2; 9/2	Identified in 6 sample

No. 57 **Marz** Aragatsotn **Community** Vardenut

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°28'43.2″	44°19'56.2″	2,027	1962	reinforced concrete	3.0	Yes
2	Spring	40°28'07.8″	44°19'04.0″	2,183	1996	Concrete	1.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,000	150	cast iron	2.0	1961	Medium	Yes
2	3,000	100	Steel	1.2	1996	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°28'28.8″	44°21'22.0″	1,951	reinforced concrete	Rectangular	18x6x3	300	Yes

5. CHLORINATION

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	160	150	Steel	1993	Little	No
2	440	125	Steel	1993	Little	No
3	2,050	100	Steel	1961	Medium	Yes
4	2,100	80	Steel	1961	Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
3	1993		Yes	80	Yes

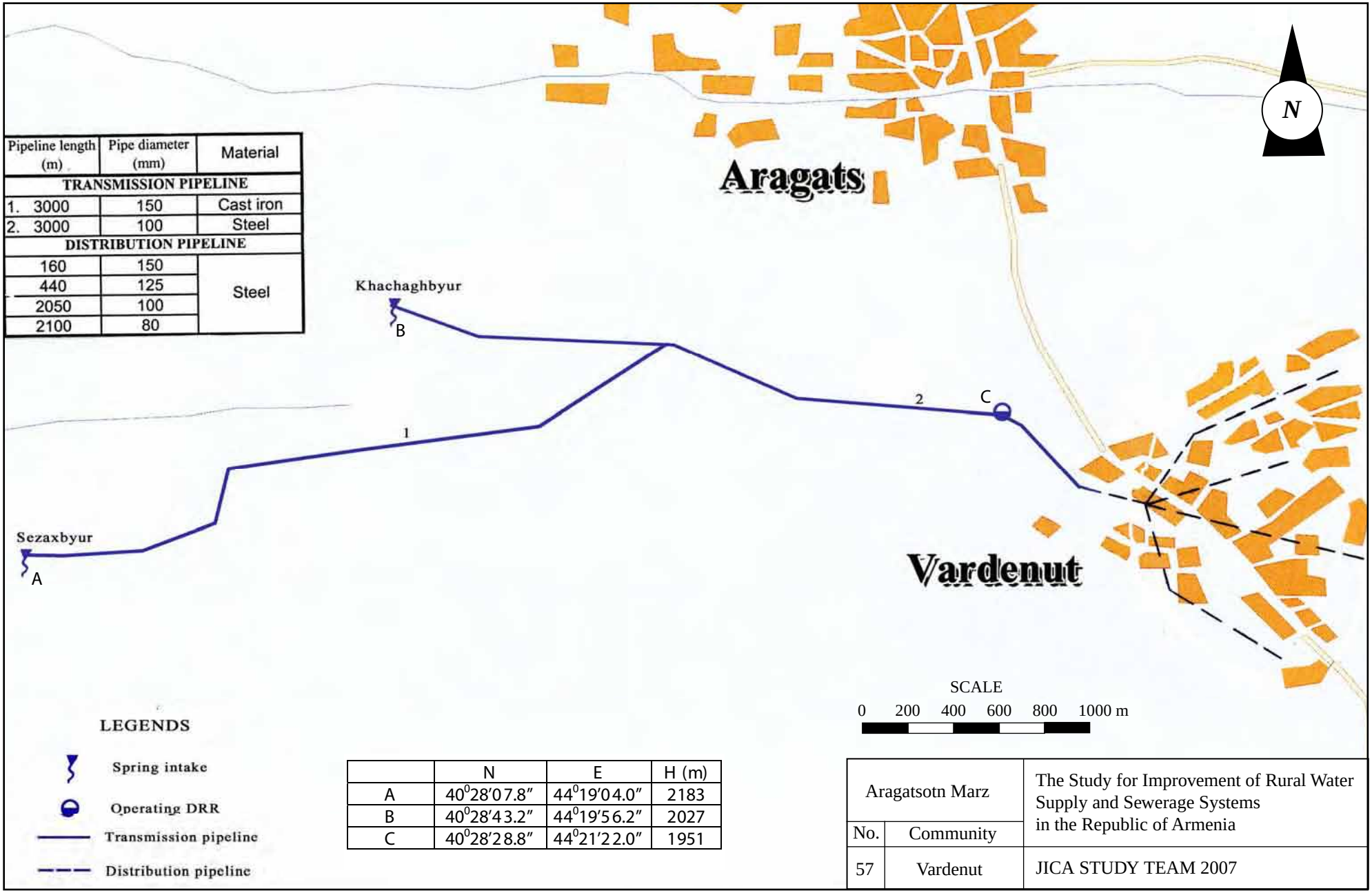
9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.57 Vardenut**
District	**Aparan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	854
A2	Actual population in 2007	935
A3	Number of households	302
A4.1	Elderly people	142
A4.2	Population in labor force (age from 16 to 62)	544
A4.3	Children	241
A5.1	Pensioners	142
A5.2	Unemployed	0
A5.3	Receiving benefits	26
A6	Average monthly income of household (AMD)	10,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	220
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	2,720
	Annual Budget of the community 2005, in thousand AMD	1,845
	Annual Budget of the community 2006, in thousand AMD	2,980
	Annual Budget of the community 2007, in thousand AMD	722
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	400
	Amount spent in drinking water sector 2005, in thousand AMD	400
	Amount spent in drinking water sector 2006, in thousand AMD	400
	Amount spent in drinking water sector 2007, in thousand AMD	400
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, vegetables
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	250
D8	How many house connection household set the water meter	0
D9	Number of public taps	4
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly12 hrs
D11	What time of day water is given?	9-21;
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)	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	500
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	river
D20	Are you satisfied with irrigation water supply volume?	is not sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Avetisyan Vachik
E2	Position	inspector coordinator
E3	Telephone	with the help of administration head
E4	Quantity and present condition of the water supply facilities: spring/ intake	2 partially repaired
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 partially repaired
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	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?	administration
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	volunteers from community
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	400,000
	Others(AMD)	0
	Total (AMD)	400,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	difficult to answer
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.	yes
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	yes
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 3000	150	Cast iron
2. 3000	100	Steel
DISTRIBUTION PIPELINE		
160	150	Steel
440	125	
2050	100	
2100	80	

	N	E	H (m)
A	40°28′07.8″	44°19′04.0″	2183
B	40°28′43.2″	44°19′56.2″	2027
C	40°28′28.8″	44°21′22.0″	1951

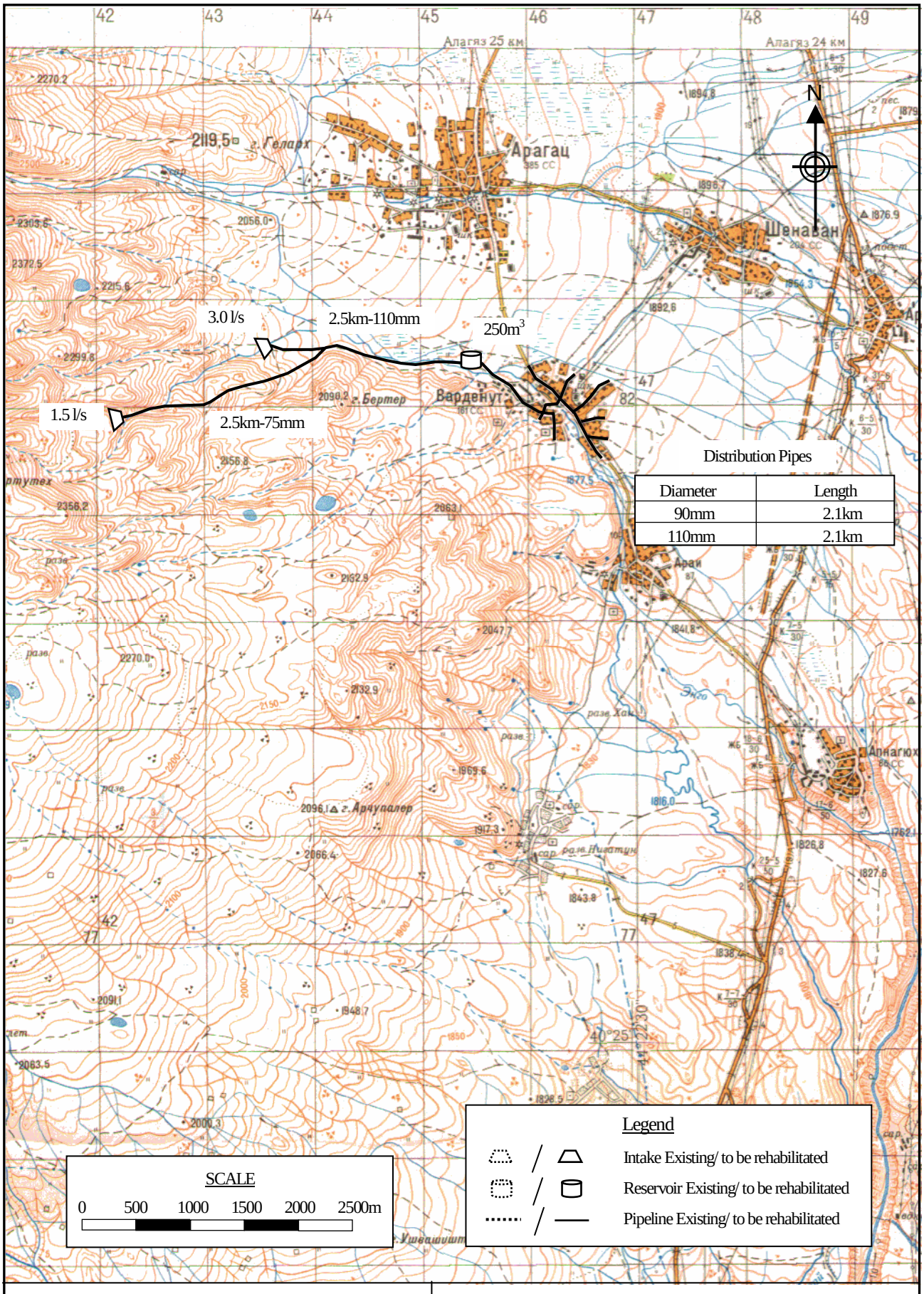
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
57	Vardenut	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.57
Name : **Vardenut**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	935	persons	93.5	
	2 Factory	-	nos	0.0	
	3 School (pupils)	220	pupils	2.2	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	302	household	26.3	
	Sub-total			122.0	
	Unaccouted for water (20%)			24.4	
1	Average Daily Water Demand			146.4	m3/day
2	Maximum Daily Water Demand			175.7	m3/day
3	Maximum Hourly Water Demand			20.9	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	2	4.5	lit/sec		388.8	m3/day
`	Total					388.8	m3/day
	2 Required reservoir volume					251	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
	No Item	Quantity	Unit
	1 Intake		
	1m3	2	nos
	2m3		nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter	2,500	m
	90mm diameter		m
	110mm diameter	2,500	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	250m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	2,100	m
	110mm diameter	2,100	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	5 House connection	52	nos
	6 Water meter installation	302	nos
	7 Public tap	4	nos
	8 Chlorination	1	nos
	9 Pumps	-	nos



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 57	Vardenut	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **57**
Name : **Vardenut**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	2	nos	367,700	735,400
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					735,400
2	Transmission Pipe					
		50mm		m	5,520	
		75mm	2,500	m	7,160	17,900,000
		90mm		m	8,040	
		110mm	2,500	m	9,680	24,200,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					42,100,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3	1	nos	25,952,800	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					25,952,800
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	2,100	m	8,040	16,884,000
		110mm	2,100	m	9,680	20,328,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					37,212,000
5	House Connection		52	nos	74,000	3,848,000
6	Water Meter Installation		302	nos	80,000	24,160,000
7	Public Tap		4	nos	90,000	360,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,680	m	3,600	6,048,000
	Total				AMD	140,916,200
					Equivalent to USD	461,234
					Equivalent to JPY	48,660,183
					AMD	USD
	Investment Cost per household		302	HH	466,610	1,527
	Investment Cost per person		935	persons	150,713	493

ARAGATSOTN MARZ
Aparan District
No 57 Vardenut

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		44.5																																							
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		248.55	0.00	0.00	0.66	1.31	1.60	1.66	2.81	2.90	2.99	3.09	4.63	4.79	4.95	5.11	5.28	5.45	5.63	5.82	6.01	6.21	6.41	6.62	6.84	7.07	7.30	7.54	7.79	8.05	8.31	8.59	8.87	9.17	9.47	9.78	10.10	10.44	10.78	11.14	11.50	11.88
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				268																																				
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		11.76			0.07	0.14	0.17	0.18	0.18	0.19	0.20	0.20	0.21	0.22	0.22	0.23	0.24	0.25	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.49	0.50	0.52	0.53
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		27.72			0.15	0.32	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	0.70	0.73	0.75	0.78	0.80	0.83	0.86	0.88	0.91	0.94	0.97	1.01	1.04	1.07	1.11	1.15	1.18	1.22	1.26
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					0.15	0.32	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	0.70	0.73	0.75	0.78	0.80	0.83	0.86	0.88	0.91	0.94	0.97	1.01	1.04	1.07	1.11	1.15	1.18	1.22	1.26
5. Pump replacement		0.00																0.00															0.00									
Sub-total		57.18	0.00	0.00	0.46	0.71	0.84	0.86	0.88	0.92	0.95	0.98	1.01	1.05	1.08	1.11	1.15	1.20	1.23	1.27	1.31	1.36	1.40	1.44	1.50	1.54	1.60	1.65	1.70	1.76	1.81	1.88	1.94	2.00	2.08	2.14	2.20	2.28	2.36	2.43	2.51	2.59
C Gross Income (A-B)		191.38	0.00	0.00	0.20	0.60	0.76	0.80	1.93	1.98	2.04	2.11	3.62	3.74	3.87	4.00	4.13	4.25	4.40	4.55	4.70	4.85	5.01	5.18	5.34	5.53	5.70	5.89	6.09	6.29	6.50	6.71	6.93	7.17	7.39	7.64	7.90	8.16	8.42	8.71	8.99	9.29
D Depreciation cost		133.70						3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82
E Interest paid		41.63	0.02	0.04	0.73	1.44	1.76	1.77	1.77	1.77	1.77	1.77	1.77	1.72	1.67	1.62	1.57	1.51	1.46	1.40	1.35	1.30	1.24	1.18	1.13	1.07	1.01	0.95	0.89	0.83	0.77	0.71	0.65	0.59	0.53	0.46	0.40	0.33	0.27	0.20	0.14	0.07
F Net Income		16.05	-0.02	-0.04	-0.53	-0.84	-1.00	-4.79	-3.66	-3.61	-3.55	-3.48	-1.97	-1.80	-1.62	-1.44	-1.26	-1.08	-0.88	-0.67	-0.47	-0.27	-0.05	0.18	0.39	0.64	0.87	1.12	1.38	1.64	1.91	2.18	2.46	2.76	3.04	3.36	3.68	4.01	4.33	4.69	5.03	5.40
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		16.05	-0.02	-0.04	-0.53	-0.84	-1.00	-4.79	-3.66	-3.61	-3.55	-3.48	-1.97	-1.80	-1.62	-1.44	-1.26	-1.08	-0.88	-0.67	-0.47	-0.27	-0.05	0.18	0.39	0.64	0.87	1.12	1.38	1.64	1.91	2.18	2.46	2.76	3.04	3.36	3.68	4.01	4.33	4.69	5.03	5.40
OM Cost Recovery Ratio (A/B)		435%	0%	0%	145%	185%	190%	193%	319%	315%	315%	315%	458%	456%	458%	460%	459%	454%	458%	458%	459%	457%	458%	460%	456%	459%	456%	457%	458%	457%	459%	457%	457%	459%	455%	457%	459%	458%	457%	458%	458%	459%

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	16.05	-0.02	-0.04	-0.53	-0.84	-1.00	-4.79	-3.66	-3.61	-3.55	-3.48	-1.97	-1.80	-1.62	-1.44	-1.26	-1.08	-0.88	-0.67	-0.47	-0.27	-0.05	0.18	0.39	0.64	0.87	1.12	1.38	1.64	1.91	2.18	2.46	2.76	3.04	3.36	3.68	4.01	4.33	4.69	5.03	5.40
2. Depreciation cost	133.70	0.00	0.00	0.00	0.00	0.00	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82
3. Interest Paid	41.63	0.02	0.04	0.73	1.44	1.76	1.77	1.77	1.77	1.77	1.77	1.77	1.72	1.67	1.62	1.57	1.51	1.46	1.40	1.35	1.30	1.24	1.18	1.13	1.07	1.01	0.95	0.89	0.83	0.77	0.71	0.65	0.59	0.53	0.46	0.40	0.33	0.27	0.20	0.14	0.07
Sub-total	191.38	0.00	0.00	0.20	0.60	0.76	0.80	1.93	1.98	2.04	2.11	3.62	3.74	3.87	4.00	4.13	4.25	4.40	4.55	4.70	4.85	5.01	5.18	5.34	5.53	5.70	5.89	6.09	6.29	6.50	6.71	6.93	7.17	7.39	7.64	7.90	8.16	8.42	8.71	8.99	9.29
B Finances																																									
1. Project Loan	177.25	2.36	1.67	69.09	71.19	32.30	0.36	0.28																																	
2. Local fund	60.63	0.79	0.56	23.41	24.43	11.23	0.12	0.09																																	
Sub-total	237.88	3.15	2.23	92.50	95.62	43.53	0.48	0.37																																	
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	40.40	0.02	0.04	0.53	0.84	1.00	0.97	0.00	0.00	0.00	0.00	3.25	3.13	3.00	2.87	2.74	2.62	2.47	2.31	2.17	2.02	1.86	1.68	1.53	1.34	1.17	0.98	0.77	0.57	0.36	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	40.40	0.02	0.04	0.53	0.84	1.00	0.97	0.00	0.00	0.00	0.00	3.25	3.13	3.00	2.87	2.74	2.62	2.47	2.31	2.17	2.02	1.86	1.68	1.53	1.34	1.17	0.98	0.77	0.57	0.36	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	469.65	3.17	2.27	93.23	97.06	45.29	2.25	2.30	1.98	2.04	2.11	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.87	6.86	6.86	6.86	6.87	6.93	7.17	7.39	7.64	7.90	8.16	8.42	8.71	8.99	9.29
APPLICATION OF FUNDS																																								
D Project disbursement	237.88	3.15	2.23	92.50	95.62	43.53	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	177.25											5.10	5.15	5.20	5.25	5.30	5.36	5.41	5.46	5.52	5.57	5.63	5.68	5.74	5.80	5.86	5.92	5.97	6.03	6.09	6.16	6.22	6.28	6.34	6.41	6.47	6.53	6.60	6.67	6.73	6.80
2. Interest paid	41.63	0.02	0.04	0.73	1.44	1.76	1.77	1.77	1.77	1.77	1.77	1.77	1.72	1.67	1.62	1.57	1.51	1.46	1.40	1.35	1.30	1.24	1.18	1.13	1.07	1.01	0.95	0.89	0.83	0.77	0.71	0.65	0.59	0.53	0.46	0.40	0.33	0.27	0.20	0.14	0.07
Sub-total	218.88	0.02	0.04	0.73	1.44	1.76	1.77	1.77	1.77	1.77	1.77	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.87	6.86	6.86	6.86	6.87	6.87	6.87	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.87
Total Cash Outflow	456.76	3.17	2.27	93.23	97.06	45.29	2.25	2.14	1.77	1.77	1.77	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.87	6.86	6.86	6.86	6.87	6.87	6.87	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.87
F Net Surplus Cash (A+C2)-E	12.89	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.21	0.27	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.30	0.52	0.77	1.03	1.30	1.55	1.84	2.12	2.42
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	87%	0%	0%	28%	42%	43%	45%	109%	112%	115%	119%	53%	54%	56%	58%	60%	62%	64%	66%	68%	71%	73%	76%	78%	80%	83%	86%	89%	92%	95%	98%	101%	104%	108%	111%	115%	119%	123%	127%	131%	135%
Cost recovery by water fee + subsidy ((A+C2)/E)	106%	100%	100%	100%	100%	100%	100%	109%	112%	115%	119%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	104%	108%	111%	115%	119%	123%	127%	131%	135%

ARAGATSOTN MARZ
Aparan District
No 57 Vardenut

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	248.55	86.0%
	Subsidy	40.40	14.0%
	Total	288.95	100.0%
2	**Expenditure**		
	OM cost	57.18	19.8%
	Loan repayment	177.25	61.3%
	Interest paid	41.63	14.4%
	Surplus cash	12.89	4.5%
	Total	288.95	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	158.34	2.30	1.64	63.07	63.00	27.74	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	6.33			0.07	0.14	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
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	14.14			0.15	0.31	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Pump replacement																	0.00															0.00									
Sub-total	29.59			0.46	0.69	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Total Outflow	187.93	2.30	1.64	63.53	63.69	28.53	1.12	1.05	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
B BENEFIT																																								
1. Water Tariff	155.92	0.00	0.00	0.66	1.31	1.60	1.66	2.81	2.90	2.99	3.09	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
2. Subsidy	13.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.48	1.41	1.33	1.25	1.17	1.11	1.01	0.91	0.82	0.72	0.62	0.50	0.40	0.27	0.16	0.03	0.00	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	169.11	0.00	0.00	0.66	1.31	1.60	1.66	2.81	2.90	2.99	3.09	6.11	6.04	5.96	5.88	5.80	5.74	5.64	5.54	5.45	5.35	5.25	5.13	5.03	4.90	4.79	4.66	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
NET BENEFIT	-18.82	-2.30	-1.64	-62.9	-62.4	-26.9	0.54	1.76	2.11	2.20	2.30	5.32	5.25	5.17	5.09	5.01	4.95	4.85	4.75	4.66	4.56	4.46	4.34	4.24	4.11	4.00	3.87	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84

FIRR = -0.64%

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	-68.70	-2.53	-1.80	-69.2	-68.7	-29.7	0.51	1.73	2.11	2.20	2.30	5.32	5.25	5.17	5.09	5.01	4.95	4.85	4.75	4.66	4.56	4.46	4.34	4.24	4.11	4.00	3.87	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84
	2	Capital cost 20% up	-83.54	-2.76	-1.97	-75.5	-75.0	-32.5	0.47	1.71	2.11	2.20	2.30	5.32	5.25	5.17	5.09	5.01	4.95	4.85	4.75	4.66	4.56	4.46	4.34	4.24	4.11	4.00	3.87	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84
2	1	OM cost 10% up	-55.92	-2.30	-1.64	-62.9	-62.5	-27.0	0.46	1.68	2.03	2.12	2.22	5.24	5.17	5.09	5.01	4.93	4.87	4.77	4.67	4.58	4.48	4.38	4.26	4.16	4.03	3.92	3.79	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76
	2	OM cost 20% up	-57.98	-2.30	-1.64	-63.0	-62.5	-27.1	0.38	1.60	1.95	2.04	2.14	5.16	5.09	5.01	4.93	4.85	4.79	4.69	4.59	4.50	4.40	4.30	4.18	4.08	3.95	3.84	3.71	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68
3	1	Revenue 10% down	-65.38	-2.30	-1.64	-62.9	-62.5	-27.1	0.37	1.48	1.82	1.90	1.99	4.71	4.65	4.57	4.50	4.43	4.38	4.29	4.20	4.12	4.03	3.94	3.83	3.74	3.62	3.52	3.40	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38
	2	Revenue 20% down	-76.90	-2.30	-1.64	-63.0	-62.6	-27.3	0.21	1.20	1.53	1.60	1.68	4.10	4.04	3.98	3.91	3.85	3.80	3.72	3.64	3.57	3.49	3.41	3.31	3.23	3.13	3.04	2.94	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

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-1.10%	-4.22	-23.69%
	2	Capital cost 20% up	-1.52%	-5.80	-17.24%
2	1	OM cost 10% up	-0.74%	-1.41	-70.87%
	2	OM cost 20% up	-0.85%	-2.49	-40.24%
3	1	Revenue 10% down	-1.27%	-4.96	-20.17%
	2	Revenue 20% down	-1.96%	-6.74	-14.84%

No.58 Verin Sasunik

Information on Existing Water Sources (Aragatsotn)

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

No.58 Community Verin Sasunik
District Ashtarak
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	20	4.5	44	9	44.0	1,686	-	0.8	
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	-
Notes	Venin Sasunik takes water from Kapuyt (blue) spring in No.5 Avan rural community with taking 0.8 L/sec.
Alternative sources if any	No alternative water sources are available

No.58 Community Verin Sasunik
District Ashtarak
Marz Aragatsotn
Sampling date

	Parameters analysed	Units					Guidelines	
							WHO	Armenia
a	pH						6.5-8	6.0 - 9.0
b	Temperature	Deg.C						
c	TDS	Mg/L					1000	1000
1	Al:Aluminum	Mg/L					0.10	0.50
2	B:Boron	Mg/L					0.70	0.50
3	Cl:Chloride	Mg/L					250	350
4	Cr:Chrome	Mg/L					0.05	0.05
5	Cu:Copper	Mg/L					2	1
6	F:Fluoride	Mg/L					1.50	
7	Hardness	Mg/L					500	700
8	Fe:Iron	Mg/L					0.30	0.30
9	Mn:Manganese	Mg/L					0.40	0.10
10	Mo:Molibdenum	Mg/L					0.070	0.250
11	Ni:Nickel	Mg/L					0.020	0.100
12	Nitrate(NO3+)	Mg/L					50.0	45.0
13	SO4:Sulfate	Mg/L					250.0	500.0
14	Zn:Zink	Mg/L					3.0	5.0
15	As:Arsenic	Mg/L					0.0	0.1
16	Ba:Barium	Mg/L					0.70	0.10
17	Be:Berillium	Mg/L					NA	0.00020
18	Cd:Cadmium	Mg/L					0.0030	0.0010
19	Pb:Lead	Mg/L					0.010	0.030
20	Hg:Mercury	Mg/L					0.00100	0.00050
21	Se:Selenium	Mg/L					0.010	0.010
22	Sr:Strontium	Mg/L					NA	7.0
23	CN:Cyanide	Mg/L					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.58 Community Verin Sasunik
District Ashtarak
Marz Aragatsotn

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	2		1-2	Not Identified	Not Identified
2	3	23	0-1	Not Identified	Not Identified
3	3	28	6-20	0.4-2.3	Not Identified
4	4		1-6	0.3-0.7	Not Identified
5	5		0-1	Not Identified	Not Identified
6	6		10-16	0.7-1.5	Not Identified
7	7		0-2	Not Identified	Not Identified
8	8	16	2		Not Identified

No. **58** **Marz** Aragatsotn **Community** Verin Sasunik

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°20'04.5"	44°09'44.0"	1686	2007	Concrete	0.8	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,500	80	Steel		2007	No	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	No							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)
1	-	2007	Yes	100	No

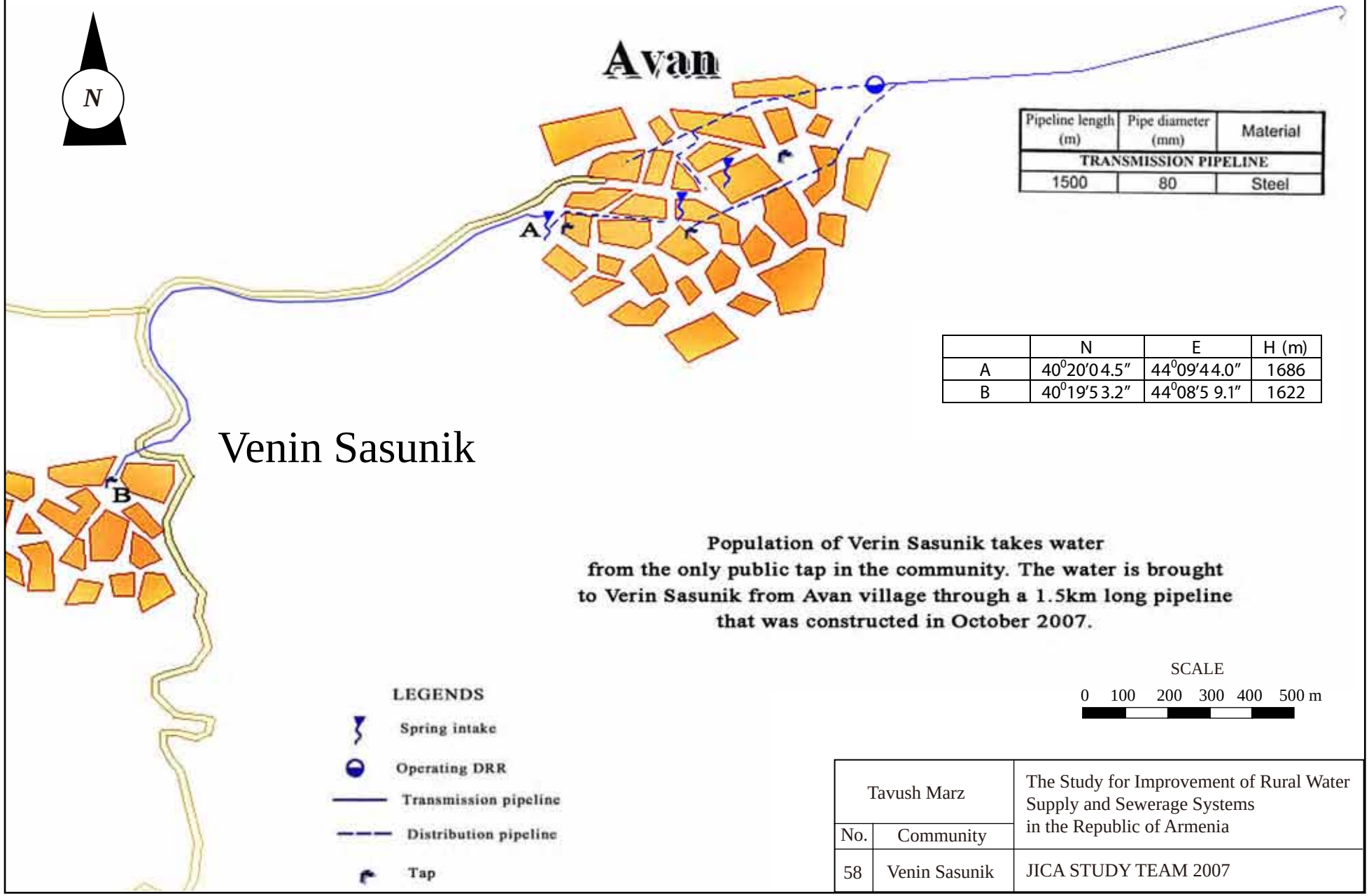
9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.58 Verin Sasunik**
District	**Ashtarak**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	200
A2	Actual population in 2007	200
A3	Number of households	80
A4.1	Elderly people	60
A4.2	Population in labor force (age from 16 to 62)	120
A4.3	Children	20
A5.1	Pensioners	40
A5.2	Unemployed	7
A5.3	Receiving benefits	12
A6	Average monthly income of household (AMD)	6,000
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	200
	Annual Budget of the community 2005, in thousand AMD	221
	Annual Budget of the community 2006, in thousand AMD	225
	Annual Budget of the community 2007, in thousand AMD	240
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	do not know
D5	Present condition of the water supply volume of Domestic use	absent
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	0
D8	How many house connection household set the water meter	0
D9	Number of public taps	0
D10.1	How is the regime of water supply in your community in the dry season?	no water at all
D10.2	How is the regime of water supply in your community in the wet season?	no water at all
D11	What time of day water is given?	-
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)	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?	absent
D20	Are you satisfied with irrigation water supply volume?	is not sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	nobody
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	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 pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	absent
E11	Who is engaged in the water supply facilities repairing works?	nobody
E12	How do you repair the water supply facilities?	in no way
E13	Who is in charge of the repair work in the community?	-
E14	How you prepare O&M costs?	no collection
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?	no
E17	What kind of OM method is preferable to you?	difficult to answer
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1500	80	Steel

	N	E	H (m)
A	40°20′04.5″	44°09′44.0″	1686
B	40°19′53.2″	44°08′59.1″	1622

Population of Verin Sasunik takes water from the only public tap in the community. The water is brought to Verin Sasunik from Avan village through a 1.5km long pipeline that was constructed in October 2007.

SCALE

0 100 200 300 400 500 m

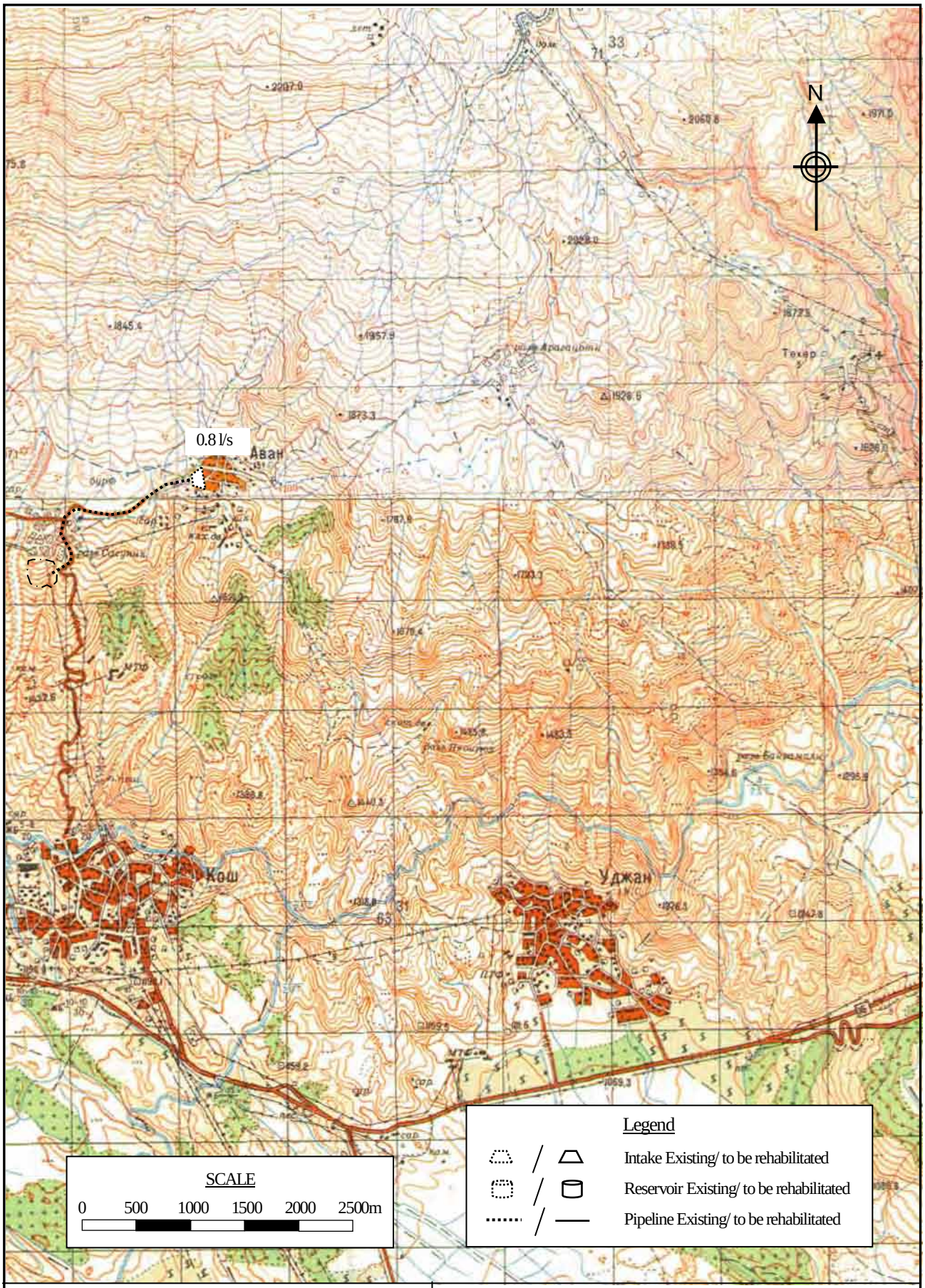
Tavush Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
58	Venin Sasunik	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.58
Name : **Verin Sasunik**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	200	persons	20.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	-	pupils	0.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	80	household	7.0	
	Sub-total			27.0	
	Unaccouted for water (20%)			5.4	
1	Average Daily Water Demand			32.4	m3/day
2	Maximum Daily Water Demand			38.9	m3/day
3	Maximum Hourly Water Demand			8.4	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	0.8	lit/sec		69.1	m3/day
`	Total					69.1	m3/day
	2 Required reservoir volume					101	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
No	Item	Quantity	Unit
1	Intake		
	1m3		nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	80	nos
6	Water meter installation	80	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	Aragatsotn	
No. 58	Verin Sasunik	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **58**
Name : **Verin Sasunik**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					
4	Distribution Pipe					
		50mm		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		80	nos	74,000	5,920,000
6	Water Meter Installation		80	nos	80,000	6,400,000
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	12,910,000
					Equivalent to USD	42,256
					Equivalent to JPY	4,457,990
					AMD	USD
	Investment Cost per household		80	HH	161,375	528
	Investment Cost per person		200	persons	64,550	211

ARAGATSOTN MARZ
Talin District
No 58 Verin Sasunik

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		9.9																																							
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		55.04	0.00	0.00	0.16	0.31	0.35	0.37	0.62	0.64	0.66	0.68	1.03	1.06	1.09	1.13	1.17	1.21	1.25	1.29	1.33	1.37	1.42	1.47	1.51	1.56	1.62	1.67	1.72	1.78	1.84	1.90	1.96	2.03	2.10	2.16	2.24	2.31	2.39	2.46	2.55	2.63
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				60																																				
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		2.64			0.02	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	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
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		3.67			0.02	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					0.02	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		24.01	0.00	0.00	0.28	0.34	0.35	0.36	0.37	0.38	0.39	0.41	0.42	0.44	0.45	0.46	0.47	0.50	0.52	0.53	0.54	0.57	0.58	0.60	0.63	0.64	0.66	0.70	0.71	0.73	0.76	0.79	0.81	0.84	0.87	0.90	0.92	0.96	0.98	1.02	1.05	1.09
C Gross Income (A-B)		31.03	0.00	0.00	-0.12	-0.03	0.00	0.01	0.25	0.26	0.27	0.27	0.61	0.62	0.64	0.67	0.70	0.71	0.73	0.76	0.79	0.80	0.84	0.87	0.88	0.92	0.96	0.97	1.01	1.05	1.08	1.11	1.15	1.19	1.23	1.26	1.32	1.35	1.41	1.44	1.50	1.54
D Depreciation cost		12.25						0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
E Interest paid		6.00	0.02	0.04	0.12	0.22	0.24	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.20	0.19	0.18	0.18	0.17	0.16	0.15	0.14	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.04	0.03	0.02	0.01
F Net Income		12.78	-0.02	-0.04	-0.24	-0.25	-0.24	-0.59	-0.35	-0.34	-0.33	-0.33	0.01	0.02	0.05	0.09	0.13	0.14	0.17	0.21	0.25	0.27	0.31	0.35	0.37	0.42	0.47	0.48	0.53	0.58	0.62	0.66	0.71	0.76	0.81	0.84	0.91	0.95	1.02	1.06	1.13	1.18
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		12.78	-0.02	-0.04	-0.24	-0.25	-0.24	-0.59	-0.35	-0.34	-0.33	-0.33	0.01	0.02	0.05	0.09	0.13	0.14	0.17	0.21	0.25	0.27	0.31	0.35	0.37	0.42	0.47	0.48	0.53	0.58	0.62	0.66	0.71	0.76	0.81	0.84	0.91	0.95	1.02	1.06	1.13	1.18
OM Cost Recovery Ratio (A/B)		229%	0%	0%	58%	92%	100%	103%	168%	168%	169%	166%	245%	241%	242%	246%	249%	242%	240%	243%	246%	240%	245%	245%	240%	244%	245%	239%	242%	244%	242%	241%	242%	242%	241%	240%	243%	241%	244%	241%	243%	241%

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	12.78	-0.02	-0.04	-0.24	-0.25	-0.24	-0.59	-0.35	-0.34	-0.33	-0.33	0.01	0.02	0.05	0.09	0.13	0.14	0.17	0.21	0.25	0.27	0.31	0.35	0.37	0.42	0.47	0.48	0.53	0.58	0.62	0.66	0.71	0.76	0.81	0.84	0.91	0.95	1.02	1.06	1.13	1.18
2. Depreciation cost	12.25	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
3. Interest Paid	6.00	0.02	0.04	0.12	0.22	0.24	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.20	0.19	0.18	0.18	0.17	0.16	0.15	0.14	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.04	0.03	0.02	0.01
Sub-total	31.03	0.00	0.00	-0.12	-0.03	0.00	0.01	0.25	0.26	0.27	0.27	0.61	0.62	0.64	0.67	0.70	0.71	0.73	0.76	0.79	0.80	0.84	0.87	0.88	0.92	0.96	0.97	1.01	1.05	1.08	1.11	1.15	1.19	1.23	1.26	1.32	1.35	1.41	1.44	1.50	1.54
B Finances																																									
1. Project Loan	25.23	2.36	1.67	8.80	8.88	2.88	0.36	0.28																																	
2. Local fund	8.56	0.79	0.56	2.96	3.03	1.01	0.12	0.09																																	
Sub-total	33.79	3.15	2.23	11.76	11.91	3.89	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.14	0.00	0.00	0.12	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	4.07	0.02	0.04	0.12	0.22	0.24	0.24	0.00	0.00	0.00	0.00	0.37	0.36	0.34	0.31	0.28	0.27	0.25	0.22	0.19	0.17	0.14	0.11	0.10	0.06	0.01	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
Sub-total	4.21	0.02	0.04	0.24	0.25	0.24	0.24	0.00	0.00	0.00	0.00	0.37	0.36	0.34	0.31	0.28	0.27	0.25	0.22	0.19	0.17	0.14	0.11	0.10	0.06	0.01	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
Total Cash Inflow	69.03	3.17	2.27	11.88	12.13	4.13	0.73	0.62	0.26	0.27	0.27	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.97	0.98	1.01	1.05	1.08	1.11	1.15	1.19	1.23	1.26	1.32	1.35	1.41	1.44	1.50	1.54
APPLICATION OF FUNDS																																									
D Project disbursement	33.79	3.15	2.23	11.76	11.91	3.89	0.48	0.37																																	
E Total debt services																																									
1. Loan repayment	25.25											0.73	0.73	0.74	0.75	0.76	0.76	0.77	0.78	0.79	0.79	0.80	0.81	0.82	0.83	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97
2. Interest paid	6.00	0.02	0.04	0.12	0.22	0.24	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.20	0.19	0.18	0.18	0.17	0.16	0.15	0.14	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.04	0.03	0.02	0.01
Sub-total	31.25	0.02	0.04	0.12	0.22	0.24	0.25	0.25	0.25	0.25	0.25	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Total Cash Outflow	65.04	3.17	2.27	11.88	12.13	4.13	0.73	0.62	0.25	0.25	0.25	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98
F Net Surplus Cash (A+C2)-E	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	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	0.03	0.07	0.10	0.13	0.17	0.22	0.26	0.28	0.34	0.37	0.43	0.46	0.52	0.56
Project Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	99%	0%	0%	0%	0%	0%	4%	100%	104%	108%	108%	62%	63%	65%	68%	71%	72%	74%	78%	81%	82%	86%	89%	90%	94%	99%	99%	103%	107%	110%	113%	117%	123%	127%	129%	135%	138%	144%	147%	153%	157%
Cost recovery by water fee + subsidy ((A+C2)/E)	113%	100%	100%	100%	100%	100%	100%	100%	104%	108%	108%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	103%	107%	110%	113%	117%	123%	127%	129%	135%	138%	144%	147%	153%	157%

ARAGATSOTN MARZ
Talin District
No 58 Verin Sasunik

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	55.04	92.9%
	Subsidy	4.21	7.1%
	Total	59.25	100.0%
2	**Expenditure**		
	OM cost	24.01	40.5%
	Loan repayment	25.25	42.6%
	Interest paid	6.00	10.1%
	Surplus cash	3.99	6.7%
	Total	59.25	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	23.08	2.30	1.64	8.10	7.93	2.52	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	1.49			0.02	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
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	1.86			0.02	0.04	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	12.47			0.28	0.31	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total Outflow	35.55	2.30	1.64	8.38	8.24	2.85	0.66	0.59	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
B BENEFIT																																								
1. Water Tariff	34.69	0.00	0.00	0.16	0.31	0.35	0.37	0.62	0.64	0.66	0.68	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
2. Subsidy	0.72	0.00	0.00	0.12	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.11	0.10	0.08	0.06	0.05	0.04	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	0.00	0.00
Total Inflow	35.41	0.00	0.00	0.28	0.34	0.35	0.37	0.62	0.64	0.66	0.68	1.15	1.14	1.13	1.11	1.09	1.08	1.07	1.05	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
NET BENEFIT	-0.14	-2.30	-1.64	-8.1	-7.9	-2.5	-0.29	0.03	0.31	0.33	0.35	0.82	0.81	0.80	0.78	0.76	0.75	0.74	0.72	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

FIRR = -0.03%

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	-8.67	-2.53	-1.80	-8.9	-8.7	-2.8	-0.32	0.00	0.31	0.33	0.35	0.82	0.81	0.80	0.78	0.76	0.75	0.74	0.72	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	2	Capital cost 20% up	-10.84	-2.76	-1.97	-9.7	-9.5	-3.0	-0.36	-0.02	0.31	0.33	0.35	0.82	0.81	0.80	0.78	0.76	0.75	0.74	0.72	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
2	1	OM cost 10% up	-7.36	-2.30	-1.64	-8.1	-7.9	-2.5	-0.32	0.00	0.28	0.30	0.32	0.79	0.78	0.77	0.75	0.73	0.72	0.71	0.69	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
	2	OM cost 20% up	-8.23	-2.30	-1.64	-8.2	-8.0	-2.6	-0.36	-0.04	0.24	0.26	0.28	0.75	0.74	0.73	0.71	0.69	0.68	0.67	0.65	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
3	1	Revenue 10% down	-8.89	-2.30	-1.64	-8.1	-7.9	-2.5	-0.33	-0.03	0.25	0.26	0.28	0.71	0.70	0.69	0.67	0.65	0.64	0.63	0.62	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	2	Revenue 20% down	-11.29	-2.30	-1.64	-8.2	-8.0	-2.6	-0.36	-0.09	0.18	0.20	0.21	0.59	0.58	0.57	0.56	0.54	0.53	0.53	0.51	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.48%	-9.40	-10.64%
	2	Capital cost 20% up	-0.89%	-9.67	-10.34%
2	1	OM cost 10% up	-0.29%	-9.01	-11.10%
	2	OM cost 20% up	-0.57%	-9.49	-10.54%
3	1	Revenue 10% down	-0.81%	-9.64	-10.37%
	2	Revenue 20% down	-1.70%	-9.83	-10.17%

No.59 Tegher

Information on Existing Water Sources (Aragatsotn)

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

No.59 Community Tegher
District Ashtarak
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	21	35.7	44	12	50.4	2,006	2.0	15.0	3.0
2	springs	40	21	29.5	44	12	39.3	2,039	0.4	1.0	0.5
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Acceptable
Notes	The water mains and the internal network is in deteriorated conditions, there are leaks.
Alternative sources if any	There are water resources potential in Azat spring area.

No.59 Community Tegher
District Ashtarak
Marz Aragatsotn
Sampling date 29/Aug/2007

	Parameters analysed	Units	No.1 Petoi aghbyur	No.2 Aghatci aghbyur			Guidelines	
							WHO	Armenia
a	pH		7.8	7.5			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10	17.7				
c	TDS	Mg/L	28	34			1000	1000
1	Al:Aluminum	Mg/L	n.d	0.01			0.10	0.50
2	B:Boron	Mg/L	<0.2	<0.2			0.70	0.50
3	Cl:Chloride	Mg/L	4	4			250	350
4	Cr:Chrome	Mg/L	0.01	0.01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.11	0.15			1.50	
7	Hardness	Mg/L	80	70			500	700
8	Fe:Iron	Mg/L	n.d	n.d			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	0.10			0.40	0.10
10	Mo:Molibdenum	Mg/L	0.050	0.030			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	0.007			0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8	2.2			50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	2.0			250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d			3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d			0.0	0.1
16	Ba:Barium	Mg/L	<0.01	<0.01			0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d			NA	0.00020
18	Cd:Cadmium	Mg/L	0.0002	0.0002			0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001			0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002			0.00100	0.00050
21	Se:Selenium	Mg/L	n.d	n.d			0.010	0.010
22	Sr:Strontium	Mg/L	n.d	<0.7			NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml		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.59 Community Tegher
District Ashtarak
Marz Aragatsotn

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	8	13	101-161	0.9	Not Identified

No. 59 **Marz** Aragatsotn **Community** Tegher

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°21'35.7″	44°12'50,4″	2,006	2002	reinforced concrete	3.0	No
2	Spring	40°21'29,5″	44°12'39,3″	2,039		reinforced concrete	0.5	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	700	150	Steel	2.7	1970	Little	Yes
2	1,000	50	Steel	0.45		Little	Yes
3	4,000	150	Steel	2.67		Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°20'50,5″	44°14'02,4″	1,763	reinforced concrete	Rectangular	4x5x3	50	Yes

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	120	80	Steel	1970	Little	Yes
2	3,500	50	Steel		Medium	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
7		2002	Yes	100	No

9. DRAINAGE SYSTEM

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

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

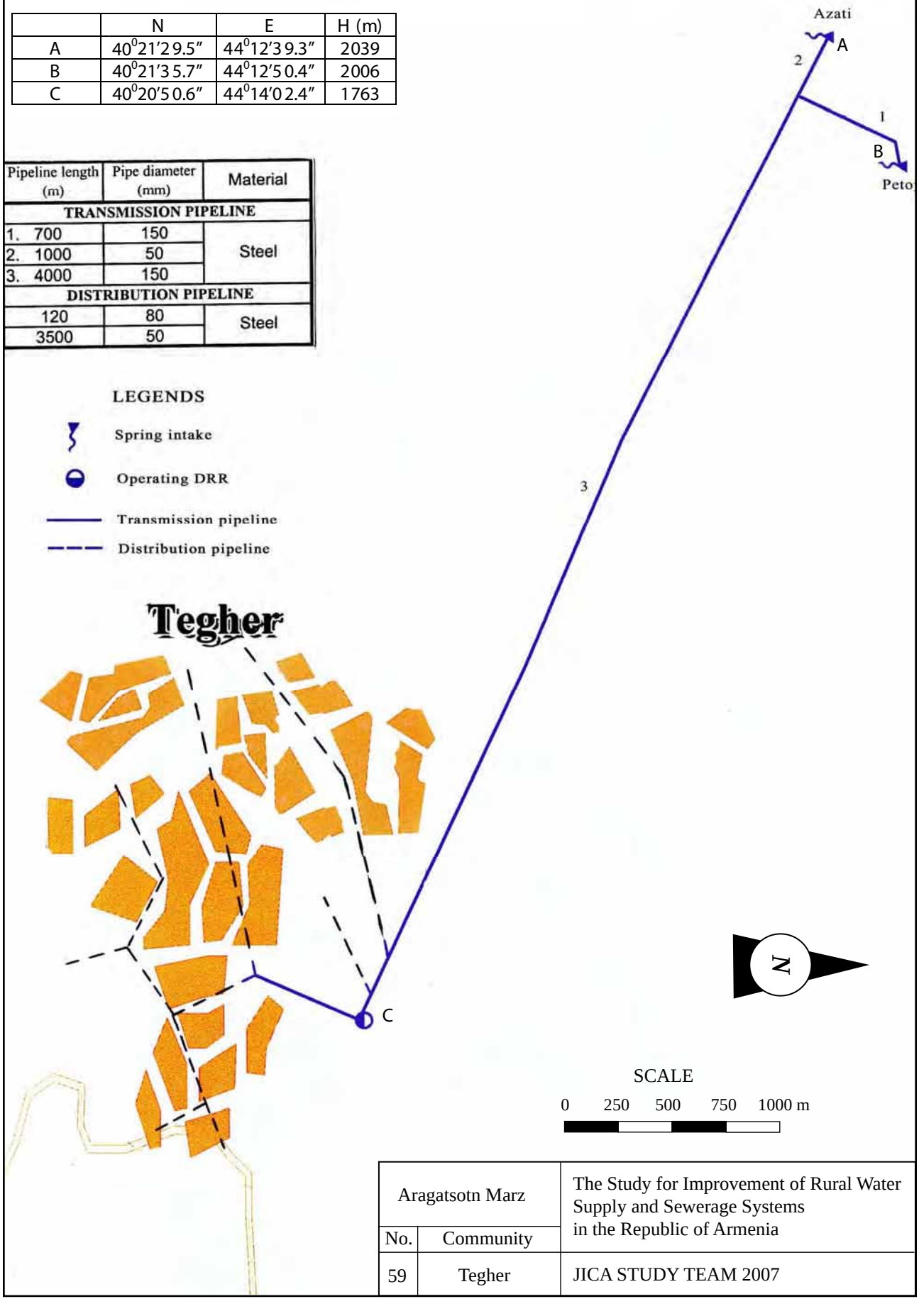
Marz	**Aragatsotn**
Number and Name of Community	**No.59 Tegher**
District	**Ashtarak**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	248
A2	Actual population in 2007	248
A3	Number of households	111
A4.1	Elderly people	22
A4.2	Population in labor force (age from 16 to 62)	74
A4.3	Children	34
A5.1	Pensioners	44
A5.2	Unemployed	0
A5.3	Receiving benefits	14
A6	Average monthly income of household (AMD)	15,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	absent
A10	Number of pupils	0
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	700
	Annual Budget of the community 2005, in thousand AMD	500
	Annual Budget of the community 2006, in thousand AMD	600
	Annual Budget of the community 2007, in thousand AMD	130
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, fruit
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	is not planned
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	sufficient
D7	Number of house connection to drinking water system	10
D8	How many house connection household set the water meter	0
D9	Number of public taps	10
D10.1	How is the regime of water supply in your community in the dry season?	no water at all
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?	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)	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	500
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	pipeline
D20	Are you satisfied with irrigation water supply volume?	sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Avetisyan Hamlet
E2	Position	administration head
E3	Telephone	(093)554922
E4	Quantity and present condition of the water supply facilities: spring/ intake	3 deteriorated
E5	Quantity and present condition of the water supply facilities:	1 deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	volunteers from community
E14	How you prepare O&M costs?	community budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	0
E16	Do the residents participate in the O&M works?	earthwork,
E17	What kind of OM method is preferable to you?	difficult to answer
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Aragatsotn
No.59 Tegher

	N	E	H (m)
A	40°21′29.5″	44°12′39.3″	2039
B	40°21′35.7″	44°12′50.4″	2006
C	40°20′50.6″	44°14′02.4″	1763

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 700	150	Steel
2. 1000	50	
3. 4000	150	
DISTRIBUTION PIPELINE		
120	80	Steel
3500	50	



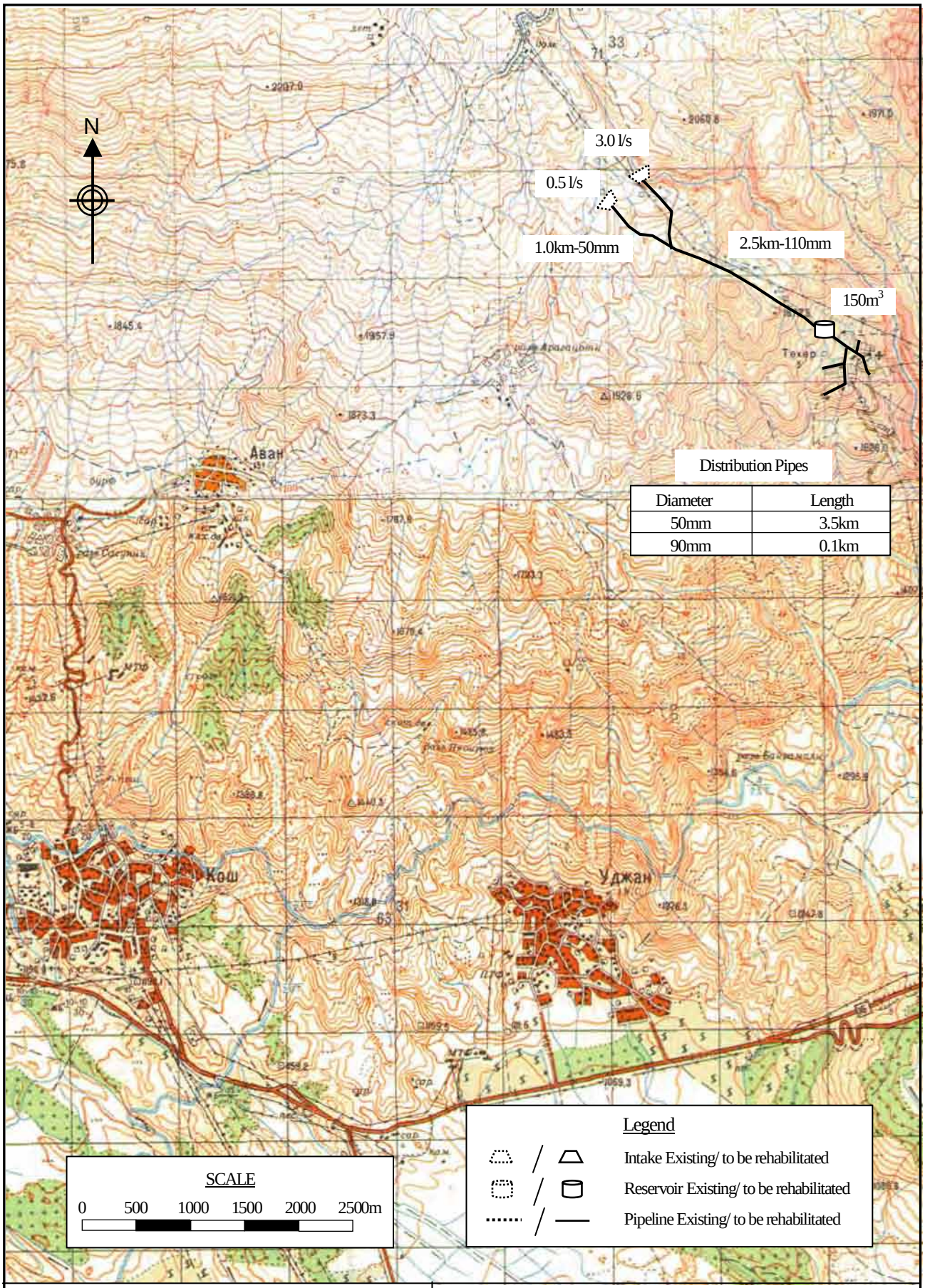
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
59	Tegher	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.59
Name : **Tegher**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	248	persons	24.8	
	2 Factory	-	nos	0.0	
	3 School (pupils)	-	pupils	0.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	111	household	9.7	
	Sub-total			34.5	
	Unaccouted for water (20%)			6.9	
1	Average Daily Water Demand			41.4	m3/day
2	Maximum Daily Water Demand			49.7	m3/day
3	Maximum Hourly Water Demand			10.8	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	2	3.5	lit/sec		302.4	m3/day
`	Total					302.4	m3/day
	2 Required reservoir volume					129	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
No	Item	Quantity	Unit
1	Intake		
	1m3		nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter	1,000	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	2,500	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	150m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	3,500	m
	75mm diameter		m
	90mm diameter	100	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	101	nos
6	Water meter installation	111	nos
7	Public tap	2	nos
8	Chlorination	1	nos
9	Pumps	-	nos



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 59	Tegher	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **59**
Name : **Tegher**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					
2	Transmission Pipe					
		50mm	1,000	m	5,520	5,520,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	2,500	m	9,680	24,200,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					29,720,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3	1	nos	18,804,500	18,804,500
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					18,804,500
4	Distribution Pipe					
		50mm	3,500	m	5,520	19,320,000
		75mm		m	7,160	
		90mm	100	m	8,040	804,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					20,124,000
5	House Connection		101	nos	74,000	7,474,000
6	Water Meter Installation		111	nos	80,000	8,880,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,440	m	3,600	5,184,000
	Total				AMD	90,866,500
					Equivalent to USD	297,416
					Equivalent to JPY	31,377,375
					AMD	USD
	Investment Cost per household		111	HH	818,617	2,679
	Investment Cost per person		248	persons	366,397	1,199

ARAGATSOTN MARZ
Talin District
No 59 Tegher

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		12.6																																							
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		70.32	0.00	0.00	0.20	0.40	0.45	0.47	0.79	0.82	0.85	0.87	1.31	1.35	1.40	1.44	1.49	1.54	1.59	1.65	1.70	1.76	1.81	1.87	1.94	2.00	2.06	2.13	2.20	2.28	2.35	2.43	2.51	2.59	2.68	2.77	2.86	2.95	3.05	3.15	3.25	3.36
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				76																																				
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		3.34			0.02	0.04	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	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
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		24.09			0.14	0.30	0.35	0.36	0.38	0.39	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	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.87	0.90	0.93	0.96	1.00	1.03	1.06	1.10
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					0.14	0.3	0.35	0.36	0.38	0.39	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	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.87	0.90	0.93	0.96	1.00	1.03	1.06	1.10
5. Pump replacement		0.00																0.00															0.00									
Sub-total		45.13	0.00	0.00	0.40	0.59	0.66	0.67	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	1.13	1.18	1.21	1.25	1.31	1.34	1.38	1.44	1.48	1.53	1.59	1.63	1.68	1.74	1.79	1.86	1.92	1.98	2.05
C Gross Income (A-B)		25.19	0.00	0.00	-0.20	-0.19	-0.21	-0.20	0.09	0.10	0.10	0.10	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.65	0.67	0.69	0.71	0.74	0.76	0.79	0.81	0.82	0.86	0.90	0.91	0.95	0.98	1.00	1.05	1.09	1.12	1.16	1.19	1.23	1.27	1.31
D Depreciation cost		86.45						2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47
E Interest paid		27.75	0.02	0.04	0.52	1.02	1.16	1.18	1.18	1.18	1.18	1.18	1.18	1.14	1.11	1.07	1.04	1.00	0.97	0.93	0.90	0.86	0.82	0.78	0.75	0.71	0.67	0.63	0.59	0.55	0.51	0.47	0.43	0.39	0.35	0.31	0.26	0.22	0.18	0.13	0.09	0.05
F Net Income		-89.01	-0.02	-0.04	-0.72	-1.21	-1.37	-3.85	-3.56	-3.55	-3.55	-3.55	-3.14	-3.08	-3.03	-2.98	-2.93	-2.87	-2.82	-2.75	-2.70	-2.64	-2.58	-2.51	-2.46	-2.39	-2.33	-2.28	-2.20	-2.12	-2.07	-1.99	-1.92	-1.86	-1.77	-1.69	-1.61	-1.53	-1.46	-1.37	-1.29	-1.21
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		-89.01	-0.02	-0.04	-0.72	-1.21	-1.37	-3.85	-3.56	-3.55	-3.55	-3.55	-3.14	-3.08	-3.03	-2.98	-2.93	-2.87	-2.82	-2.75	-2.70	-2.64	-2.58	-2.51	-2.46	-2.39	-2.33	-2.28	-2.20	-2.12	-2.07	-1.99	-1.92	-1.86	-1.77	-1.69	-1.61	-1.53	-1.46	-1.37	-1.29	-1.21
OM Cost Recovery Ratio (A/B)		156%	0%	0%	50%	67%	68%	70%	113%	114%	113%	113%	164%	165%	165%	164%	164%	164%	164%	165%	165%	164%	165%	165%	164%	165%	165%	163%	164%	165%	163%	164%	164%	163%	164%	165%	164%	165%	164%	164%	164%	164%

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	-89.01	-0.02	-0.04	-0.72	-1.21	-1.37	-3.85	-3.56	-3.55	-3.55	-3.55	-3.14	-3.08	-3.03	-2.98	-2.93	-2.87	-2.82	-2.75	-2.70	-2.64	-2.58	-2.51	-2.46	-2.39	-2.33	-2.28	-2.20	-2.12	-2.07	-1.99	-1.92	-1.86	-1.77	-1.69	-1.61	-1.53	-1.46	-1.37	-1.29	-1.21
2. Depreciation cost	86.45	0.00	0.00	0.00	0.00	0.00	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47
3. Interest Paid	27.75	0.02	0.04	0.52	1.02	1.16	1.18	1.18	1.18	1.18	1.18	1.18	1.14	1.11	1.07	1.04	1.00	0.97	0.93	0.90	0.86	0.82	0.78	0.75	0.71	0.67	0.63	0.59	0.55	0.51	0.47	0.43	0.39	0.35	0.31	0.26	0.22	0.18	0.13	0.09	0.05
Sub-total	25.19	0.00	0.00	-0.20	-0.19	-0.21	-0.20	0.09	0.10	0.10	0.10	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.65	0.67	0.69	0.71	0.74	0.76	0.79	0.81	0.82	0.86	0.90	0.91	0.95	0.98	1.00	1.05	1.09	1.12	1.16	1.19	1.23	1.27	1.31
B Finances																																									
1. Project Loan	117.50	2.36	1.67	48.49	49.91	14.43	0.36	0.28																																	
2. Local fund	40.11	0.79	0.56	16.42	17.12	5.01	0.12	0.09																																	
Sub-total	157.61	3.15	2.23	64.91	67.03	19.44	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.81	0.00	0.00	0.20	0.19	0.21	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	119.26	0.02	0.04	0.52	1.02	1.16	1.18	1.09	1.08	1.08	1.08	4.05	4.02	4.01	3.99	3.98	3.95	3.94	3.90	3.89	3.86	3.84	3.81	3.80	3.76	3.74	3.73	3.69	3.65	3.64	3.60	3.57	3.55	3.51	3.47	3.43	3.39	3.37	3.32	3.28	3.25
Sub-total	120.07	0.02	0.04	0.72	1.21	1.37	1.38	1.09	1.08	1.08	1.08	4.05	4.02	4.01	3.99	3.98	3.95	3.94	3.90	3.89	3.86	3.84	3.81	3.80	3.76	3.74	3.73	3.69	3.65	3.64	3.60	3.57	3.55	3.51	3.47	3.43	3.39	3.37	3.32	3.28	3.25
Total Cash Inflow	302.87	3.17	2.27	65.43	68.05	20.60	1.66	1.55	1.18	1.18	1.18	4.56	4.55	4.56	4.55	4.56	4.55	4.56	4.55	4.56	4.55	4.55	4.55	4.56	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.56	4.56	4.55	4.55	4.56	4.55	4.55	4.56
APPLICATION OF FUNDS																																								
D Project disbursement	157.61	3.15	2.23	64.91	67.03	19.44	0.48	0.37																																	
E Total debt services																																									
1. Loan repayment	117.51											3.38	3.41	3.45	3.48	3.52	3.55	3.59	3.62	3.66	3.69	3.73	3.77	3.81	3.84	3.88	3.92	3.96	4.00	4.04	4.08	4.12	4.16	4.21	4.25	4.29	4.33	4.38	4.42	4.46	4.51
2. Interest paid	27.75	0.02	0.04	0.52	1.02	1.16	1.18	1.18	1.18	1.18	1.18	1.18	1.14	1.11	1.07	1.04	1.00	0.97	0.93	0.90	0.86	0.82	0.78	0.75	0.71	0.67	0.63	0.59	0.55	0.51	0.47	0.43	0.39	0.35	0.31	0.26	0.22	0.18	0.13	0.09	0.05
Sub-total	145.26	0.02	0.04	0.52	1.02	1.16	1.18	1.18	1.18	1.18	1.18	4.56	4.55	4.56	4.55	4.56	4.55	4.56	4.55	4.56	4.55	4.55	4.55	4.56	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.56	4.56	4.55	4.55	4.56	4.55	4.55	4.56
Total Cash Outflow	302.87	3.17	2.27	65.43	68.05	20.60	1.66	1.55	1.18	1.18	1.18	4.56	4.55	4.56	4.55	4.56	4.55	4.56	4.55	4.56	4.55	4.55	4.55	4.56	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.56	4.56	4.55	4.55	4.56	4.55	4.55	4.56
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)	17%	0%	0%	0%	0%	0%	0%	8%	8%	8%	8%	11%	12%	12%	12%	13%	13%	14%	14%	15%	15%	16%	16%	17%	17%	18%	18%	19%	20%	20%	21%	22%	22%	23%	24%	25%	25%	26%	27%	28%	29%
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%

ARAGATSOTN MARZ
Talin District
No 59 Tegher

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	70.32	36.9%
	Subsidy	120.07	63.1%
	Total	190.39	100.0%
2	**Expenditure**		
	OM cost	45.13	23.7%
	Loan repayment	117.51	61.7%
	Interest paid	27.75	14.6%
	Surplus cash	0.00	0.0%
	Total	190.39	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	105.43	2.30	1.64	44.29	44.19	12.42	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	1.86			0.02	0.04	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
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	12.31			0.14	0.29	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pump replacement																	0.00															0.00								
Sub-total	23.29			0.40	0.57	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Total Outflow	128.72	2.30	1.64	44.69	44.76	13.04	0.95	0.88	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
B BENEFIT																																							
1. Water Tariff	44.15	0.00	0.00	0.20	0.40	0.45	0.47	0.79	0.82	0.85	0.87	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
2. Subsidy	92.71	0.00	0.00	0.20	0.19	0.21	0.20	0.00	0.00	0.00	0.00	2.87	2.88	2.90	2.92	2.94	2.95	2.97	2.97	2.99	3.00	3.02	3.03	3.05	3.05	3.07	3.10	3.10	3.10	3.13	3.13	3.14	3.16	3.16	3.16	3.17	3.17	3.19	3.19	3.19	3.20
Total Inflow	136.86	0.00	0.00	0.40	0.59	0.66	0.67	0.79	0.82	0.85	0.87	4.18	4.19	4.21	4.23	4.25	4.26	4.28	4.28	4.30	4.31	4.33	4.34	4.36	4.36	4.38	4.41	4.41	4.41	4.44	4.44	4.45	4.47	4.47	4.47	4.48	4.48	4.50	4.50	4.50	4.51
NET BENEFIT	8.13	-2.30	-1.64	-44.3	-44.2	-12.4	-0.28	-0.09	0.20	0.23	0.25	3.56	3.57	3.59	3.61	3.63	3.64	3.66	3.66	3.68	3.69	3.71	3.72	3.74	3.74	3.76	3.79	3.79	3.79	3.82	3.82	3.83	3.85	3.85	3.85	3.86	3.86	3.88	3.88	3.88	3.89

FIRR = **0.34%**

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	-35.23	-2.53	-1.80	-48.7	-48.6	-13.6	-0.31	-0.12	0.20	0.23	0.25	3.56	3.57	3.59	3.61	3.63	3.64	3.66	3.66	3.68	3.69	3.71	3.72	3.74	3.74	3.76	3.79	3.79	3.79	3.82	3.82	3.83	3.85	3.85	3.85	3.86	3.86	3.88	3.88	3.88	3.89
	2	Capital cost 20% up	-45.14	-2.76	-1.97	-53.1	-53.0	-14.9	-0.35	-0.14	0.20	0.23	0.25	3.56	3.57	3.59	3.61	3.63	3.64	3.66	3.66	3.68	3.69	3.71	3.72	3.74	3.74	3.76	3.79	3.79	3.79	3.82	3.82	3.83	3.85	3.85	3.85	3.86	3.86	3.88	3.88	3.88	3.89
2	1	OM cost 10% up	-26.96	-2.30	-1.64	-44.3	-44.2	-12.4	-0.34	-0.15	0.14	0.17	0.19	3.50	3.51	3.53	3.55	3.57	3.58	3.60	3.60	3.62	3.63	3.65	3.66	3.68	3.68	3.70	3.73	3.73	3.73	3.76	3.76	3.77	3.79	3.79	3.79	3.80	3.80	3.82	3.82	3.82	3.83
	2	OM cost 20% up	-28.58	-2.30	-1.64	-44.4	-44.3	-12.5	-0.40	-0.21	0.08	0.11	0.13	3.44	3.45	3.47	3.49	3.51	3.52	3.54	3.54	3.56	3.57	3.59	3.60	3.62	3.62	3.64	3.67	3.67	3.67	3.70	3.70	3.71	3.73	3.73	3.73	3.74	3.74	3.76	3.76	3.76	3.77
3	1	Revenue 10% down	-34.33	-2.30	-1.64	-44.3	-44.2	-12.4	-0.35	-0.17	0.12	0.15	0.16	3.14	3.15	3.17	3.19	3.21	3.21	3.23	3.23	3.25	3.26	3.28	3.29	3.30	3.30	3.32	3.35	3.35	3.35	3.38	3.38	3.39	3.40	3.40	3.40	3.41	3.41	3.43	3.43	3.43	3.44
	2	Revenue 20% down	-43.32	-2.30	-1.64	-44.4	-44.3	-12.5	-0.41	-0.25	0.04	0.06	0.08	2.72	2.73	2.75	2.76	2.78	2.79	2.80	2.80	2.82	2.83	2.84	2.85	2.87	2.87	2.88	2.91	2.91	2.91	2.93	2.93	2.94	2.96	2.96	2.96	2.96	2.96	2.98	2.98	2.98	2.99

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.10%	-45.74	-2.19%
	2	Capital cost 20% up	-0.49%	-17.01	-5.88%
2	1	OM cost 10% up	0.24%	3.95	25.32%
	2	OM cost 20% up	0.15%	13.19	7.58%
3	1	Revenue 10% down	-0.24%	-23.97	-4.17%
	2	Revenue 20% down	-0.89%	-13.82	-7.23%

No.60 Orgov

Information on Existing Water Sources (Aragatsotn)

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

No.60 Community Orgov
District Ashtarak
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	22	20.5	44	14	41.8	1,710	10.0	25.0	4.7
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	From this Orgov springs also other neigbouring communities (Byuzakan) are fed, 5l/sec is supplied to Orgov.
Alternative sources if any	No alternative water sources are available

No.60 Community Orgov
District Ashtarak
Marz Aragatsotn
Sampling date 03/Sep/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.2				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	9.8					
c	TDS	Mg/L	23				1000	1000
1	Al:Aluminum	Mg/L	n.d				0.10	0.50
2	B:Boron	Mg/L	n.d				0.70	0.50
3	Cl:Chloride	Mg/L	4				250	350
4	Cr:Chrome	Mg/L	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.17				1.50	
7	Hardness	Mg/L	55				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	<0.02				0.070	0.250
11	Ni:Nickel	Mg/L	n.d				0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9				50.0	45.0
13	SO4:Sulfate	Mg/L	2.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d				3.0	5.0
15	As:Arsenic	Mg/L	n.d				0.0	0.1
16	Ba:Barium	Mg/L	<0.01				0.70	0.10
17	Be:Berillium	Mg/L	n.d				NA	0.00020
18	Cd:Cadmium	Mg/L	0.0002				0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d				0.00100	0.00050
21	Se:Selenium	Mg/L	n.d				0.010	0.010
22	Sr:Strontium	Mg/L	<0.7				NA	7.0
23	CN:Cyanide	Mg/L	n.d				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml	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.60 Community Orgov
District Ashtarak
Marz Aragatsotn

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	2		26-100	4.4-7.5	Not Identified
2	3		17-30	2.3	Not Identified
3	4		10-12	0.7-0.9	Not Identified
4	5		4-7	0.7-0.9	Not Identified
5	6		6-7	0.4	Not Identified
6	8	15	2-3	0.3-0.4	Not Identified
7	8	16	3	0.4	Not Identified

No. **60** **Marz** Aragatsotn **Community** Orgov

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°22'20.5″	44°14'41,8″	1,710	1950	Concrete	4.7	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,000	200	Steel	13.0	1970	Little	No
2	1,200	150	Steel	4.7	1970	Little	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°21'05.1″	44°14'53,5″	1,660	reinforced concrete	Rectangular	6x6x3,8	100	Yes

5. CHLORINATION

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	5,000	150	cast iron	1970	Huge	Yes
2	5,000	80	Steel	1970	Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
2	1970		Yes	100	Yes

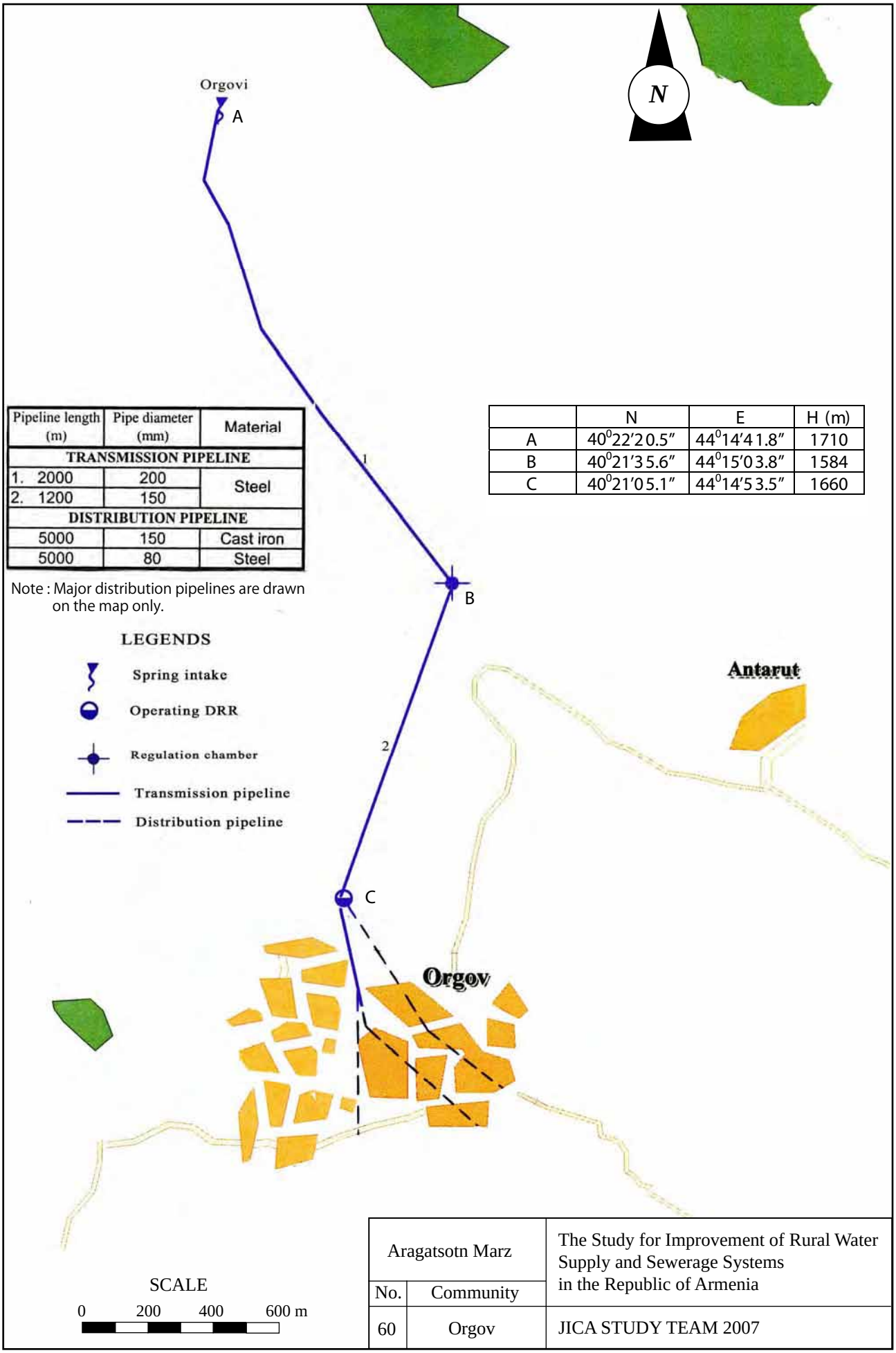
9. DRAINAGE SYSTEM

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

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.60 Orgov**
District	**Ashtarak**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	560
A2	Actual population in 2007	560
A3	Number of households	220
A4.1	Elderly people	55
A4.2	Population in labor force (age from 16 to 62)	370
A4.3	Children	120
A5.1	Pensioners	60
A5.2	Unemployed	0
A5.3	Receiving benefits	6
A6	Average monthly income of household (AMD)	10,000
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	100
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,471
	Annual Budget of the community 2005, in thousand AMD	1,731
	Annual Budget of the community 2006, in thousand AMD	3,758
	Annual Budget of the community 2007, in thousand AMD	3,332
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, vegetables
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	1233
D3	Date of expiry of water use permit	10years
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	almost sufficient
D7	Number of house connection to drinking water system	220
D8	How many house connection household set the water meter	0
D9	Number of public taps	0
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	very pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	according to the supplied
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	according to the supplied
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?	spring
D20	Are you satisfied with irrigation water supply volume?	is not sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	nobody
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	1 deteriorated
E5	Quantity and present condition of the water supply facilities:	1 deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	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
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	volunteers from 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)	0
	Others(AMD)	0
	Total (AMD)	0
E16	Do the residents participate in the O&M works?	earthwork, welding
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	yes
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	yes
F1.7	Archaeological historical or cultural valuable areas	yes
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 2000	200	Steel
2. 1200	150	
DISTRIBUTION PIPELINE		
5000	150	Cast iron
5000	80	Steel

Note : Major distribution pipelines are drawn on the map only.

	N	E	H (m)
A	$40^0$22′20.5″	$44^0$14′41.8″	1710
B	$40^0$21′35.6″	$44^0$15′03.8″	1584
C	$40^0$21′05.1″	$44^0$14′53.5″	1660

LEGENDS

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

SCALE

0 200 400 600 m

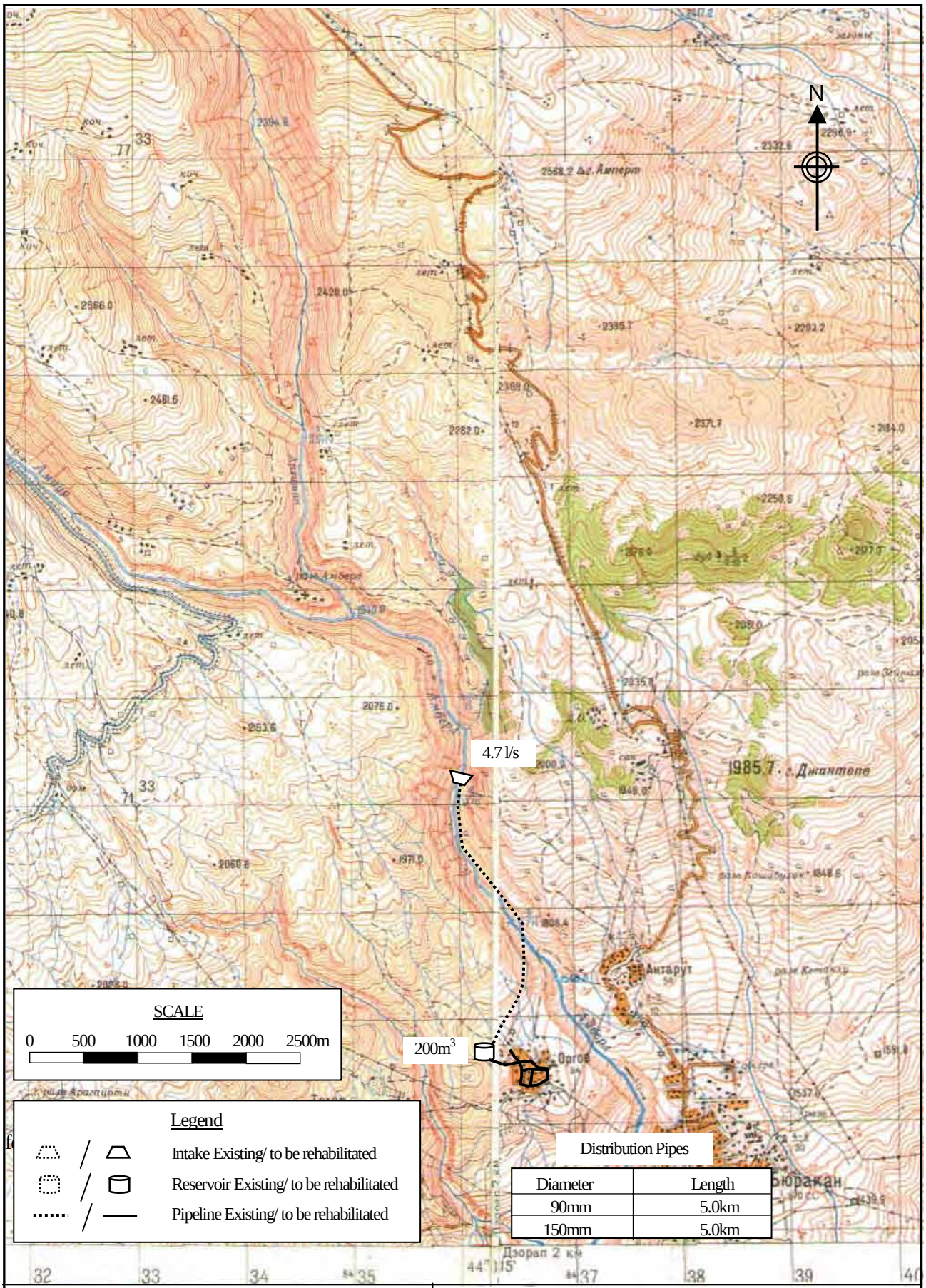
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
60	Orgov	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.60
Name : **Orgov**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	560	persons	56.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	100	pupils	1.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	220	household	19.1	
	Sub-total			76.1	
	Unaccouted for water (20%)			15.2	
1	Average Daily Water Demand			91.3	m3/day
2	Maximum Daily Water Demand			109.6	m3/day
3	Maximum Hourly Water Demand			14.8	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	4.7	lit/sec		406.1	m3/day
`	Total					406.1	m3/day
	2 Required reservoir volume					178	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		
	200m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	5,000	m
	110mm diameter		m
	150mm diameter	5,000	m
	200mm diameter		m
	250mm diameter		m
	5 House connection	-	nos
	6 Water meter installation	220	nos
	7 Public tap	3	nos
	8 Chlorination	1	nos
	9 Pumps	-	nos



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 60	Orgov	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **60**
Name : **Orgov**

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		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		m	7,160	
		90mm	5,000	m	8,040	40,200,000
		110mm		m	9,680	
		150mm	5,000	m	13,140	65,700,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					105,900,000
5	House Connection			nos	74,000	
6	Water Meter Installation		220	nos	80,000	17,600,000
7	Public Tap		3	nos	90,000	270,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	4,000	m	3,600	14,400,000
	Total				AMD	161,562,300
					Equivalent to USD	528,811
					Equivalent to JPY	55,789,548
					AMD	USD
	Investment Cost per household		220	HH	734,374	2,404
	Investment Cost per person		560	persons	288,504	944

ARAGATSOTN MARZ
Talin District
No 60 Orgov

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		27.8																																							
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		155.15	0.00	0.00	0.44	0.88	1.00	1.03	1.75	1.81	1.87	1.93	2.89	2.99	3.09	3.19	3.29	3.40	3.51	3.63	3.75	3.87	4.00	4.13	4.27	4.41	4.55	4.71	4.86	5.02	5.19	5.36	5.53	5.72	5.91	6.10	6.30	6.51	6.72	6.95	7.18	7.41
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				167																																				
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		7.30			0.04	0.09	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	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33
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		33.63			0.20	0.42	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	0.83	0.85	0.88	0.91	0.94	0.97	1.00	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	1.34	1.39	1.43	1.48	1.53
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					0.2	0.42	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	0.83	0.85	0.88	0.91	0.94	0.97	1.00	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	1.34	1.39	1.43	1.48	1.53
5. Pump replacement		0.00																0.00															0.00										
Sub-total		58.63	0.00	0.00	0.48	0.76	0.86	0.88	0.90	0.94	0.97	1.01	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	1.34	1.39	1.44	1.48	1.53	1.58	1.63	1.69	1.74	1.81	1.86	1.93	1.99	2.06	2.13	2.19	2.26	2.33	2.41	2.49	2.57	2.66
C Gross Income (A-B)		96.52	0.00	0.00	-0.04	0.12	0.14	0.15	0.85	0.87	0.90	0.92	1.85	1.92	1.98	2.05	2.11	2.18	2.25	2.33	2.41	2.48	2.56	2.65	2.74	2.83	2.92	3.02	3.12	3.21	3.33	3.43	3.54	3.66	3.78	3.91	4.04	4.18	4.31	4.46	4.61	4.75
D Depreciation cost		153.65						4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39
E Interest paid		47.44	0.02	0.04	0.88	1.76	2.00	2.01	2.01	2.01	2.01	2.01	2.01	1.95	1.90	1.84	1.78	1.72	1.66	1.59	1.53	1.47	1.41	1.34	1.28	1.21	1.15	1.08	1.01	0.95	0.88	0.81	0.74	0.67	0.60	0.52	0.45	0.38	0.30	0.23	0.15	0.08
F Net Income		-104.57	-0.02	-0.04	-0.92	-1.64	-1.86	-6.25	-5.55	-5.53	-5.50	-5.48	-4.55	-4.42	-4.31	-4.18	-4.06	-3.93	-3.80	-3.65	-3.51	-3.38	-3.24	-3.08	-2.93	-2.77	-2.62	-2.45	-2.28	-2.13	-1.94	-1.77	-1.59	-1.40	-1.21	-1.00	-0.80	-0.59	-0.38	-0.16	0.07	0.28
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		-104.57	-0.02	-0.04	-0.92	-1.64	-1.86	-6.25	-5.55	-5.53	-5.50	-5.48	-4.55	-4.42	-4.31	-4.18	-4.06	-3.93	-3.80	-3.65	-3.51	-3.38	-3.24	-3.08	-2.93	-2.77	-2.62	-2.45	-2.28	-2.13	-1.94	-1.77	-1.59	-1.40	-1.21	-1.00	-0.80	-0.59	-0.38	-0.16	0.07	0.28
OM Cost Recovery Ratio (A/B)		265%	0%	0%	91%	116%	116%	117%	194%	193%	193%	191%	278%	279%	278%	280%	279%	279%	279%	279%	280%	278%	278%	279%	279%	279%	279%	279%	279%	277%	279%	278%	278%	278%	277%	279%	279%	279%	279%	279%	279%	279%

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	-104.57	-0.02	-0.04	-0.92	-1.64	-1.86	-6.25	-5.55	-5.53	-5.50	-5.48	-4.55	-4.42	-4.31	-4.18	-4.06	-3.93	-3.80	-3.65	-3.51	-3.38	-3.24	-3.08	-2.93	-2.77	-2.62	-2.45	-2.28	-2.13	-1.94	-1.77	-1.59	-1.40	-1.21	-1.00	-0.80	-0.59	-0.38	-0.16	0.07	0.28
2. Depreciation cost	153.65	0.00	0.00	0.00	0.00	0.00	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39
3. Interest Paid	47.44	0.02	0.04	0.88	1.76	2.00	2.01	2.01	2.01	2.01	2.01	2.01	1.95	1.90	1.84	1.78	1.72	1.66	1.59	1.53	1.47	1.41	1.34	1.28	1.21	1.15	1.08	1.01	0.95	0.88	0.81	0.74	0.67	0.60	0.52	0.45	0.38	0.30	0.23	0.15	0.08
Sub-total	96.52	0.00	0.00	-0.04	0.12	0.14	0.15	0.85	0.87	0.90	0.92	1.85	1.92	1.98	2.05	2.11	2.18	2.25	2.33	2.41	2.48	2.56	2.65	2.74	2.83	2.92	3.02	3.12	3.21	3.33	3.43	3.54	3.66	3.78	3.91	4.04	4.18	4.31	4.46	4.61	4.75
B Finances																																									
1. Project Loan	201.19	2.36	1.67	84.50	87.11	24.91	0.36	0.28																																	
2. Local fund	68.72	0.79	0.56	28.61	29.90	8.65	0.12	0.09																																	
Sub-total	269.91	3.15	2.23	113.11	117.01	33.56	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.04	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	152.07	0.02	0.04	0.88	1.64	1.86	1.86	1.16	1.14	1.11	1.09	5.94	5.87	5.82	5.75	5.69	5.62	5.55	5.46	5.38	5.32	5.24	5.14	5.06	4.96	4.88	4.77	4.67	4.59	4.47	4.37	4.26	4.14	4.02	3.88	3.75	3.62	3.48	3.34	3.18	3.05
Sub-total	152.11	0.02	0.04	0.92	1.64	1.86	1.86	1.16	1.14	1.11	1.09	5.94	5.87	5.82	5.75	5.69	5.62	5.55	5.46	5.38	5.32	5.24	5.14	5.06	4.96	4.88	4.77	4.67	4.59	4.47	4.37	4.26	4.14	4.02	3.88	3.75	3.62	3.48	3.34	3.18	3.05
Total Cash Inflow	518.54	3.17	2.27	113.99	118.77	35.56	2.49	2.38	2.01	2.01	2.01	7.79	7.79	7.80	7.80	7.80	7.80	7.80	7.79	7.79	7.80	7.80	7.79	7.80	7.79	7.80	7.79	7.79	7.80	7.80	7.80	7.80	7.80	7.80	7.79	7.79	7.80	7.79	7.80	7.79	7.80
APPLICATION OF FUNDS																																								
D Project disbursement	269.91	3.15	2.23	113.11	117.01	33.56	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	201.19											5.78	5.84	5.90	5.96	6.02	6.08	6.14	6.20	6.26	6.33	6.39	6.45	6.52	6.58	6.65	6.71	6.78	6.85	6.92	6.99	7.06	7.13	7.20	7.27	7.34	7.42	7.49	7.57	7.64	7.72
2. Interest paid	47.44	0.02	0.04	0.88	1.76	2.00	2.01	2.01	2.01	2.01	2.01	2.01	1.95	1.90	1.84	1.78	1.72	1.66	1.59	1.53	1.47	1.41	1.34	1.28	1.21	1.15	1.08	1.01	0.95	0.88	0.81	0.74	0.67	0.60	0.52	0.45	0.38	0.30	0.23	0.15	0.08
Sub-total	248.63	0.02	0.04	0.88	1.76	2.00	2.01	2.01	2.01	2.01	2.01	7.79	7.79	7.80	7.80	7.80	7.80	7.80	7.79	7.79	7.80	7.80	7.79	7.80	7.79	7.80	7.79	7.79	7.80	7.80	7.80	7.80	7.80	7.80	7.79	7.79	7.80	7.79	7.80	7.79	7.80
Total Cash Outflow	518.54	3.17	2.27	113.99	118.77	35.56	2.49	2.38	2.01	2.01	2.01	7.79	7.79	7.80	7.80	7.80	7.80	7.80	7.79	7.79	7.80	7.80	7.79	7.80	7.79	7.80	7.79	7.79	7.80	7.80	7.80	7.80	7.80	7.80	7.79	7.79	7.80	7.79	7.80	7.79	7.80
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%	7%	7%	7%	42%	43%	45%	46%	24%	25%	25%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	36%	37%	39%	40%	41%	43%	44%	45%	47%	48%	50%	52%	54%	55%	57%	59%	61%
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%

ARAGATSOTN MARZ
Talin District
No 60 Orgov

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	155.15	50.5%
	Subsidy	152.11	49.5%
	Total	307.26	100.0%
2	**Expenditure**		
	OM cost	58.63	19.1%
	Loan repayment	201.19	65.5%
	Interest paid	47.44	15.4%
	Surplus cash	0.00	0.0%
	Total	307.26	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	180.13	2.30	1.64	77.12	77.07	21.41	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	3.73			0.04	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
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	17.16			0.20	0.40	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Pump replacement																	0.00															0.00								
Sub-total	30.02			0.48	0.73	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Total Outflow	210.15	2.30	1.64	77.60	77.80	22.21	1.13	1.06	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
B BENEFIT																																							
1. Water Tariff	97.41	0.00	0.00	0.44	0.88	1.00	1.03	1.75	1.81	1.87	1.93	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89
2. Subsidy	108.62	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.93	3.92	3.92	3.91	3.91	3.90	3.89	3.87	3.85	3.85	3.83	3.80	3.78	3.75	3.73	3.69	3.66	3.64	3.59	3.56	3.52	3.47	3.42	3.36	3.30	3.24	3.18	3.11	3.03	2.97
Total Inflow	206.03	0.00	0.00	0.48	0.88	1.00	1.03	1.75	1.81	1.87	1.93	6.82	6.81	6.81	6.80	6.80	6.79	6.78	6.76	6.74	6.74	6.72	6.69	6.67	6.64	6.62	6.58	6.55	6.53	6.48	6.45	6.41	6.36	6.31	6.25	6.19	6.13	6.07	6.00	5.92	5.86
NET BENEFIT	-4.11	-2.30	-1.64	-77.1	-76.9	-21.2	-0.10	0.69	1.01	1.07	1.13	6.02	6.01	6.01	6.00	6.00	5.99	5.98	5.96	5.94	5.94	5.92	5.89	5.87	5.84	5.82	5.78	5.75	5.73	5.68	5.65	5.61	5.56	5.51	5.45	5.39	5.33	5.27	5.20	5.12	5.06

FIRR = -0.11%

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	-69.83	-2.53	-1.80	-84.8	-84.6	-23.4	-0.13	0.66	1.01	1.07	1.13	6.02	6.01	6.01	6.00	6.00	5.99	5.98	5.96	5.94	5.94	5.92	5.89	5.87	5.84	5.82	5.78	5.75	5.73	5.68	5.65	5.61	5.56	5.51	5.45	5.39	5.33	5.27	5.20	5.12	5.06
	2	Capital cost 20% up	-86.75	-2.76	-1.97	-92.5	-92.3	-25.5	-0.17	0.64	1.01	1.07	1.13	6.02	6.01	6.01	6.00	6.00	5.99	5.98	5.96	5.94	5.94	5.92	5.89	5.87	5.84	5.82	5.78	5.75	5.73	5.68	5.65	5.61	5.56	5.51	5.45	5.39	5.33	5.27	5.20	5.12	5.06
2	1	OM cost 10% up	-55.02	-2.30	-1.64	-77.2	-77.0	-21.3	-0.18	0.61	0.93	0.99	1.05	5.94	5.93	5.93	5.92	5.92	5.91	5.90	5.88	5.86	5.86	5.84	5.81	5.79	5.76	5.74	5.70	5.67	5.65	5.60	5.57	5.53	5.48	5.43	5.37	5.31	5.25	5.19	5.12	5.04	4.98
	2	OM cost 20% up	-57.11	-2.30	-1.64	-77.2	-77.1	-21.4	-0.26	0.53	0.85	0.91	0.97	5.86	5.85	5.85	5.84	5.84	5.83	5.82	5.80	5.78	5.78	5.76	5.73	5.71	5.68	5.66	5.62	5.59	5.57	5.52	5.49	5.45	5.40	5.35	5.29	5.23	5.17	5.11	5.04	4.96	4.90
3	1	Revenue 10% down	-66.64	-2.30	-1.64	-77.2	-77.0	-21.3	-0.20	0.52	0.83	0.88	0.94	5.34	5.33	5.33	5.32	5.32	5.31	5.30	5.28	5.27	5.27	5.25	5.22	5.20	5.18	5.16	5.12	5.10	5.08	5.03	5.01	4.97	4.92	4.88	4.83	4.77	4.72	4.66	4.60	4.53	4.47
	2	Revenue 20% down	-80.35	-2.30	-1.64	-77.2	-77.1	-21.4	-0.31	0.34	0.65	0.70	0.74	4.66	4.65	4.65	4.64	4.64	4.63	4.62	4.61	4.59	4.59	4.58	4.55	4.54	4.51	4.50	4.46	4.44	4.42	4.38	4.36	4.33	4.29	4.25	4.20	4.15	4.10	4.06	4.00	3.94	3.89

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.56%	-8.03	-12.46%
	2	Capital cost 20% up	-0.96%	-8.85	-11.30%
2	1	OM cost 10% up	-0.19%	-4.24	-23.57%
	2	OM cost 20% up	-0.27%	-5.97	-16.75%
3	1	Revenue 10% down	-0.69%	-8.41	-11.89%
	2	Revenue 20% down	-1.33%	-9.17	-10.90%

No.61 Ortachya

Information on Existing Water Sources (Aragatsotn)

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

No.61 Community Ortachya
District Aragats
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	42	19.3	44	22	48.7	2,307	5.0	8.0	6.0
2	spring	40	42	4.9	44	21	35.5	2,294	0.1	0.8	0.5
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Not acceptable
Notes	5 Communities also take form the spring with 6l/sec discharge. 2l/sec water amount enters Ortachya. The springs are in open condition, spring intake is deteriorated. Community feels poor water quality.
Alternative sources if any	No alternative water sources are available

No.61 Community Ortachya
District Aragats
Marz Aragatsotn
Sampling date 06/Aug/2007

	Parameters analysed	Units	No.1 at community	No.2 Spring			Guidelines	
							WHO	Armenia
a	pH		8.4	7.6			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	18.9	12.1				
c	TDS	Mg/L	142	96			1000	1000
1	Al:Aluminum	Mg/L	0.01	<0.01			0.10	0.50
2	B:Boron	Mg/L	n.d	n.d			0.70	0.50
3	Cl:Chloride	Mg/L	3	3			250	350
4	Cr:Chrome	Mg/L	0.01	<0.01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.21	0.12			1.50	
7	Hardness	Mg/L	305	215			500	700
8	Fe:Iron	Mg/L	n.d	n.d			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d			0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	n.d			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	1.3			50.0	45.0
13	SO4:Sulfate	Mg/L	5.2	4.0			250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d			3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d			0.0	0.1
16	Ba:Barium	Mg/L	<0.01	<0.01			0.70	0.10
17	Be:Berillium	Mg/L	0.00005	<0.00005			NA	0.00020
18	Cd:Cadmium	Mg/L	0.0002	n.d			0.0030	0.0010
19	Pb:Lead	Mg/L	0.001	0.002			0.010	0.030
20	Hg:Mercury	Mg/L	n.d	n.d			0.00100	0.00050
21	Se:Selenium	Mg/L	n.d	n.d			0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	<0.7			NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.61 Community Ortachya
District Aragats
Marz Aragatsotn

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	2		4-23	Not Identified	Not Identified
2	3		3-20	Not Identified	Not Identified
3	4		3-65	0.6-3.0	Not Identified
4	6		3-20	Not Identified	Not Identified
5	7		3-65	0.6-3.0	Not Identified
6	8		5-77	0.6-3.0	Not Identified

No. 61 **Marz** Aragatsotn **Community** Ortachya

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°42'19.3″	44°22'48.7″	2,307	1986	reinforced concrete	6.0	Yes
2	Spring	40°42'04.9″	44°21'35.5″	2,294	1828	reinforced concrete	0.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,100	150	Steel	3.0	1986	Huge	Yes
2	400	100	cast iron	0.4	1959	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°41'56.7″	44°21'26.4″	2,235	reinforced concrete	Rectangular	6x6x3.5	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	1,150	25	Steel	1986	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)
4	1986		No	0	Yes

9. DRAINAGE SYSTEM

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

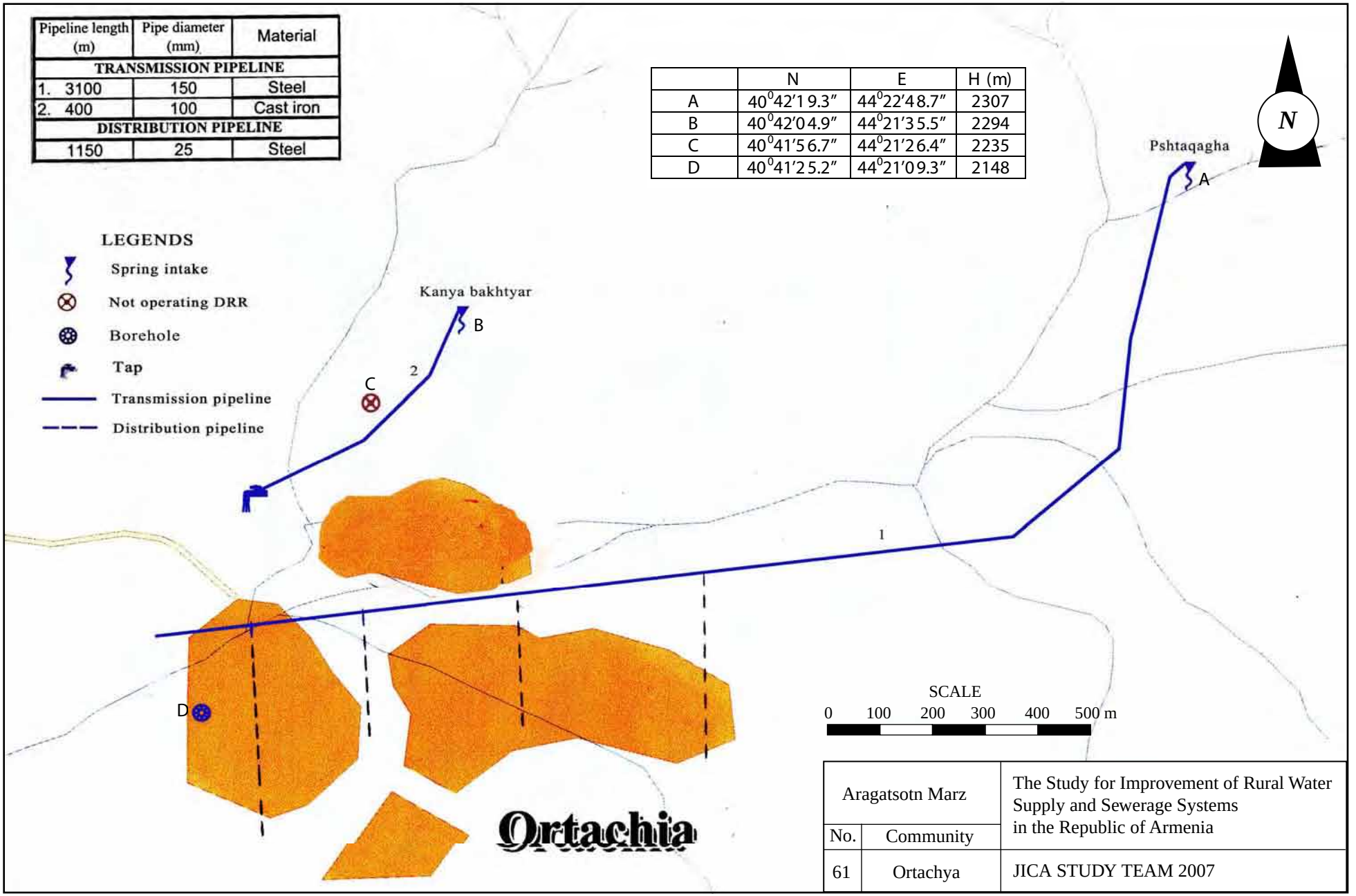
Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.61 Ortachya**
District	**Aragats**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	275
A2	Actual population in 2007	254
A3	Number of households	48
A4.1	Elderly people	20
A4.2	Population in labor force (age from 16 to 62)	16
A4.3	Children	63
A5.1	Pensioners	26
A5.2	Unemployed	0
A5.3	Receiving benefits	9
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	36
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,600
	Annual Budget of the community 2005, in thousand AMD	1,600
	Annual Budget of the community 2006, in thousand AMD	1,600
	Annual Budget of the community 2007, in thousand AMD	1,600
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	is not planned
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	sufficient
D7	Number of house connection to drinking water system	40
D8	How many house connection household set the water meter	0
D9	Number of public taps	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?	mainly 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	800
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?	sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	nobody
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	1 deteriorated
E5	Quantity and present condition of the water supply facilities:	1 deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	partially repaired
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?	(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?	in no way
E13	Who is in charge of the repair work in the community?	absent
E14	How you prepare O&M costs?	no collection
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?	no
E17	What kind of OM method is preferable to you?	difficult to answer
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	yes
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	yes
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	yes

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 3100	150	Steel
2. 400	100	Cast iron
DISTRIBUTION PIPELINE		
1150	25	Steel

	N	E	H (m)
A	40°42′19.3″	44°22′48.7″	2307
B	40°42′04.9″	44°21′35.5″	2294
C	40°41′56.7″	44°21′26.4″	2235
D	40°41′25.2″	44°21′09.3″	2148



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

Marz : **Aragatsotn** No.61
Name : **Ortachya**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	254	persons	25.4	
	2 Factory	-	nos	0.0	
	3 School (pupils)	36	pupils	0.4	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	48	household	4.2	
	Sub-total			30.0	
	Unaccouted for water (20%)			6.0	
1	Average Daily Water Demand			36.0	m3/day
2	Maximum Daily Water Demand			43.2	m3/day
3	Maximum Hourly Water Demand			9.4	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
1	Water source type					
a	Spring	2	6.5	lit/sec	561.6	m3/day
`	Total				561.6	m3/day
2	Required reservoir volume				112	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3	2	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter	400	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	1,500	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	150m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	1,200	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter	1,600	m
	200mm diameter		m
	250mm diameter		m
5	House connection	8	nos
6	Water meter installation	48	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	Aragatsotn	
No. 61	Ortachya	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **61**
Name : **Ortachya**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	2	nos	367,700	735,400
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					735,400
2	Transmission Pipe					
		50mm	400	m	5,520	2,208,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	1,500	m	9,680	14,520,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					16,728,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3	1	nos	18,804,500	18,804,500
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					18,804,500
4	Distribution Pipe					
		50mm	1,200	m	5,520	6,624,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	1,600	m	13,140	21,024,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					27,648,000
5	House Connection		8	nos	74,000	592,000
6	Water Meter Installation		48	nos	80,000	3,840,000
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	1,120	m	3,600	4,032,000
	Total				AMD	72,969,900
					Equivalent to USD	238,838
					Equivalent to JPY	25,197,448
					AMD	USD
	Investment Cost per household		48	HH	1,520,206	4,976
	Investment Cost per person		254	persons	287,283	940

ARAGATSOTN MARZ
Aparan District
No 61 Ortachya

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		11.0																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		61.13	0.00	0.00	0.16	0.32	0.39	0.41	0.69	0.71	0.74	0.76	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	1.85	1.92	1.98	2.04	2.11	2.18	2.25	2.33	2.41	2.48	2.57	2.65	2.74	2.83	2.92
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				66																																				
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		2.89			0.02	0.03	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	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	0.10	0.11	0.11	0.12	0.12	0.12	0.13	0.13
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		11.69			0.07	0.14	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	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53
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					0.07	0.14	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	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53
5. Pump replacement		0.00																0.00															0.00									
Sub-total		32.28	0.00	0.00	0.33	0.42	0.47	0.48	0.50	0.52	0.53	0.55	0.57	0.58	0.60	0.63	0.65	0.67	0.69	0.71	0.74	0.77	0.79	0.81	0.85	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.10	1.13	1.16	1.21	1.24	1.29	1.32	1.37	1.41	1.46
C Gross Income (A-B)		28.85	0.00	0.00	-0.17	-0.10	-0.08	-0.07	0.19	0.19	0.21	0.21	0.57	0.60	0.62	0.63	0.65	0.67	0.69	0.72	0.74	0.76	0.79	0.82	0.83	0.87	0.90	0.92	0.96	0.99	1.02	1.05	1.08	1.12	1.17	1.20	1.24	1.28	1.33	1.37	1.42	1.46
D Depreciation cost		69.30						1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
E Interest paid		22.76	0.02	0.04	0.40	0.79	0.96	0.97	0.97	0.97	0.97	0.97	0.97	0.94	0.91	0.88	0.85	0.82	0.80	0.77	0.74	0.71	0.68	0.64	0.61	0.58	0.55	0.52	0.49	0.45	0.42	0.39	0.35	0.32	0.29	0.25	0.22	0.18	0.15	0.11	0.07	0.04
F Net Income		-63.21	-0.02	-0.04	-0.57	-0.89	-1.04	-3.02	-2.76	-2.76	-2.74	-2.74	-2.38	-2.32	-2.27	-2.23	-2.18	-2.13	-2.09	-2.03	-1.98	-1.93	-1.87	-1.80	-1.76	-1.69	-1.63	-1.58	-1.51	-1.44	-1.38	-1.32	-1.25	-1.18	-1.10	-1.03	-0.96	-0.88	-0.80	-0.72	-0.63	-0.56
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		-63.21	-0.02	-0.04	-0.57	-0.89	-1.04	-3.02	-2.76	-2.76	-2.74	-2.74	-2.38	-2.32	-2.27	-2.23	-2.18	-2.13	-2.09	-2.03	-1.98	-1.93	-1.87	-1.80	-1.76	-1.69	-1.63	-1.58	-1.51	-1.44	-1.38	-1.32	-1.25	-1.18	-1.10	-1.03	-0.96	-0.88	-0.80	-0.72	-0.63	-0.56
OM Cost Recovery Ratio (A/B)		189%	0%	0%	49%	76%	83%	85%	138%	137%	140%	138%	200%	203%	203%	200%	200%	200%	200%	201%	200%	199%	200%	201%	198%	200%	200%	199%	200%	200%	200%	199%	198%	199%	201%	199%	200%	199%	201%	200%	201%	200%

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	-63.21	-0.02	-0.04	-0.57	-0.89	-1.04	-3.02	-2.76	-2.76	-2.74	-2.74	-2.38	-2.32	-2.27	-2.23	-2.18	-2.13	-2.09	-2.03	-1.98	-1.93	-1.87	-1.80	-1.76	-1.69	-1.63	-1.58	-1.51	-1.44	-1.38	-1.32	-1.25	-1.18	-1.10	-1.03	-0.96	-0.88	-0.80	-0.72	-0.63	-0.56
2. Depreciation cost	69.30	0.00	0.00	0.00	0.00	0.00	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
3. Interest Paid	22.76	0.02	0.04	0.40	0.79	0.96	0.97	0.97	0.97	0.97	0.97	0.97	0.94	0.91	0.88	0.85	0.82	0.80	0.77	0.74	0.71	0.68	0.64	0.61	0.58	0.55	0.52	0.49	0.45	0.42	0.39	0.35	0.32	0.29	0.25	0.22	0.18	0.15	0.11	0.07	0.04
Sub-total	28.85	0.00	0.00	-0.17	-0.10	-0.08	-0.07	0.19	0.19	0.21	0.21	0.57	0.60	0.62	0.63	0.65	0.67	0.69	0.72	0.74	0.76	0.79	0.82	0.83	0.87	0.90	0.92	0.96	0.99	1.02	1.05	1.08	1.12	1.17	1.20	1.24	1.28	1.33	1.37	1.42	1.46
B Finances																																								
1. Project Loan	96.58	2.36	1.67	36.86	37.87	17.18	0.36	0.28																																	
2. Local fund	33.00	0.79	0.56	12.47	12.99	5.98	0.12	0.09																																	
Sub-total	129.58	3.15	2.23	49.33	50.86	23.16	0.48	0.37																																	
C Subsidy from Government																																								
1. Subsidy for O&M cost	0.42	0.00	0.00	0.17	0.10	0.08	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	90.10	0.02	0.04	0.40	0.79	0.96	0.97	0.78	0.78	0.76	0.76	3.18	3.14	3.12	3.11	3.09	3.07	3.06	3.03	3.01	2.99	2.96	2.92	2.91	2.87	2.84	2.82	2.79	2.75	2.72	2.69	2.66	2.62	2.58	2.54	2.51	2.46	2.42	2.37	2.32	2.29
Sub-total	90.52	0.02	0.04	0.57	0.89	1.04	1.04	0.78	0.78	0.76	0.76	3.18	3.14	3.12	3.11	3.09	3.07	3.06	3.03	3.01	2.99	2.96	2.92	2.91	2.87	2.84	2.82	2.79	2.75	2.72	2.69	2.66	2.62	2.58	2.54	2.51	2.46	2.42	2.37	2.32	2.29
Total Cash Inflow	248.95	3.17	2.27	49.73	51.65	24.12	1.45	1.34	0.97	0.97	0.97	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.75	3.75	3.75	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.74	3.75	3.74	3.75	3.74	3.74	3.75
APPLICATION OF FUNDS																																								
D Project disbursement	129.58	3.15	2.23	49.33	50.86	23.16	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	96.61											2.78	2.80	2.83	2.86	2.89	2.92	2.95	2.98	3.01	3.04	3.07	3.10	3.13	3.16	3.19	3.22	3.26	3.29	3.32	3.35	3.39	3.42	3.46	3.49	3.53	3.56	3.60	3.63	3.67	3.71
2. Interest paid	22.76	0.02	0.04	0.40	0.79	0.96	0.97	0.97	0.97	0.97	0.97	0.97	0.94	0.91	0.88	0.85	0.82	0.80	0.77	0.74	0.71	0.68	0.64	0.61	0.58	0.55	0.52	0.49	0.45	0.42	0.39	0.35	0.32	0.29	0.25	0.22	0.18	0.15	0.11	0.07	0.04
Sub-total	119.37	0.02	0.04	0.40	0.79	0.96	0.97	0.97	0.97	0.97	0.97	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.75	3.75	3.75	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.74	3.75	3.74	3.75	3.74	3.74	3.75
Total Cash Outflow	248.95	3.17	2.27	49.73	51.65	24.12	1.45	1.34	0.97	0.97	0.97	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.75	3.75	3.75	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.74	3.74	3.74	3.74	3.74	3.75	3.74	3.75	3.74	3.75	3.74	3.74	3.75
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)	24%	0%	0%	0%	0%	0%	0%	20%	20%	22%	22%	15%	16%	17%	17%	17%	18%	18%	19%	20%	20%	21%	22%	22%	23%	24%	25%	26%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	37%	38%	39%
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%

ARAGATSOTN MARZ
Aparan District
No 61 Ortachya

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	61.13	40.3%
	Subsidy	90.52	59.7%
	Total	151.65	100.0%
2	**Expenditure**		
	OM cost	32.28	21.3%
	Loan repayment	96.61	63.7%
	Interest paid	22.76	15.0%
	Surplus cash	0.00	0.0%
	Total	151.65	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	86.54	2.30	1.64	33.68	33.55	14.78	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	1.49			0.02	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
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	5.96			0.07	0.13	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Pump replacement																	0.00															0.00								
Sub-total	16.57			0.33	0.40	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	103.11	2.30	1.64	34.01	33.95	15.22	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
B BENEFIT																																							
1. Water Tariff	38.38	0.00	0.00	0.16	0.32	0.39	0.41	0.69	0.71	0.74	0.76	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
2. Subsidy	68.56	0.00	0.00	0.17	0.10	0.08	0.07	0.00	0.00	0.00	0.00	2.21	2.20	2.21	2.23	2.24	2.25	2.26	2.26	2.27	2.28	2.28	2.28	2.30	2.29	2.29	2.30	2.30	2.30	2.30	2.30	2.31	2.30	2.29	2.29	2.29	2.28	2.27	2.26	2.25	2.25
Total Inflow	106.94	0.00	0.00	0.33	0.42	0.47	0.48	0.69	0.71	0.74	0.76	3.35	3.34	3.35	3.37	3.38	3.39	3.40	3.40	3.41	3.42	3.42	3.42	3.44	3.43	3.43	3.44	3.44	3.44	3.44	3.44	3.45	3.44	3.43	3.43	3.43	3.42	3.41	3.40	3.39	3.39
NET BENEFIT	3.83	-2.30	-1.64	-33.7	-33.5	-14.8	-0.29	-0.01	0.27	0.30	0.32	2.91	2.90	2.91	2.93	2.94	2.95	2.96	2.96	2.97	2.98	2.98	2.98	3.00	2.99	2.99	3.00	3.00	3.00	3.00	3.00	3.01	3.00	2.99	2.99	2.99	2.98	2.97	2.96	2.95	2.95
FIRR =	**0.20%**																																							

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	-30.38	-2.53	-1.80	-37.0	-36.9	-16.2	-0.32	-0.04	0.27	0.30	0.32	2.91	2.90	2.91	2.93	2.94	2.95	2.96	2.96	2.97	2.98	2.98	2.98	3.00	2.99	2.99	3.00	3.00	3.00	3.00	3.00	3.01	3.00	2.99	2.99	2.99	2.98	2.97	2.96	2.95	2.95
	2	Capital cost 20% up	-38.50	-2.76	-1.97	-40.4	-40.2	-17.7	-0.36	-0.06	0.27	0.30	0.32	2.91	2.90	2.91	2.93	2.94	2.95	2.96	2.96	2.97	2.98	2.98	2.98	3.00	2.99	2.99	3.00	3.00	3.00	3.00	3.00	3.01	3.00	2.99	2.99	2.99	2.98	2.97	2.96	2.95	2.95
2	1	OM cost 10% up	-23.42	-2.30	-1.64	-33.7	-33.6	-14.8	-0.33	-0.05	0.23	0.26	0.28	2.87	2.86	2.87	2.89	2.90	2.91	2.92	2.92	2.93	2.94	2.94	2.94	2.96	2.95	2.95	2.96	2.96	2.96	2.96	2.96	2.97	2.96	2.95	2.95	2.95	2.94	2.93	2.92	2.91	2.91
	2	OM cost 20% up	-24.58	-2.30	-1.64	-33.7	-33.6	-14.8	-0.38	-0.10	0.18	0.21	0.23	2.82	2.81	2.82	2.84	2.85	2.86	2.87	2.87	2.88	2.89	2.89	2.89	2.91	2.90	2.90	2.91	2.91	2.91	2.91	2.91	2.92	2.91	2.90	2.90	2.90	2.89	2.88	2.87	2.86	2.86
3	1	Revenue 10% down	-29.31	-2.30	-1.64	-33.7	-33.6	-14.8	-0.34	-0.08	0.20	0.23	0.24	2.58	2.57	2.58	2.59	2.60	2.61	2.62	2.62	2.63	2.64	2.64	2.64	2.66	2.65	2.65	2.66	2.66	2.66	2.66	2.66	2.67	2.66	2.65	2.65	2.65	2.64	2.63	2.62	2.61	2.61
	2	Revenue 20% down	-36.37	-2.30	-1.64	-33.7	-33.6	-14.8	-0.39	-0.15	0.13	0.15	0.17	2.24	2.23	2.24	2.26	2.26	2.27	2.28	2.28	2.29	2.30	2.30	2.30	2.31	2.30	2.30	2.31	2.31	2.31	2.31	2.31	2.32	2.31	2.30	2.30	2.30	2.30	2.29	2.28	2.27	2.27

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.24%	-18.42	-5.43%
	2	Capital cost 20% up	-0.63%	-13.18	-7.59%
2	1	OM cost 10% up	0.11%	7.54	13.25%
	2	OM cost 20% up	0.03%	63.34	1.58%
3	1	Revenue 10% down	-0.38%	-15.33	-6.52%
	2	Revenue 20% down	-1.02%	-11.98	-8.35%