No.29 Irind

Information on Existing Water Sources (Aragatsotn)

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

No.29 Community Irind
District Talin
Marz Aragatsotn

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	5 springs	40	24	18.1	44	0	0.5	2,106	5.0	12.0	12.0
2	Muriqneri spring	40	24	11.4	43	59	17.9	2,056	15.0	18.0	18.0
3	Khachiki spring	40	24	6.5	44	0	20.5	2,108	2.0	11.0	3.0
4	Zavai spring	40	25	20.5	44	1	32.3	2,346	1.0	3.0	3.0
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 Muroqneri spring also No.11 Arteni community is fed (10 L/sec).
Alternative sources if any	The community has other prospective sources

No.29 Community Irind
District Talin
Marz Aragatsotn
Sampling date 29/Aug/2007

	Parameters analysed	Units	No.1Muriqneri aghbyur	No.2 Hing aghbyur			Guidelines	
							WHO	Armenia
a	pH		7.5	7.2			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	8.3	10				
c	TDS	Mg/L	31	33			1000	1000
1	Al:Aluminum	Mg/L	0.01	0.02			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	0.21	0.15			1.50	
7	Hardness	Mg/L	75	70			500	700
8	Fe:Iron	Mg/L	n.d	n.d			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d			0.40	0.10
10	Mo:Molibdenum	Mg/L	0.020	0.030			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	0.9			50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	3.0			250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d			3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d			0.0	0.1
16	Ba:Barium	Mg/L	<0.01	<0.01			0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d			NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d			0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001			0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002			0.00100	0.00050
21	Se:Selenium	Mg/L	0.001	0.004			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		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.29 Community Irind
District Talin
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	1		167	15.0	Not Identified
2	2		166	15.0	Not Identified
3	3		164	15.0	Not Identified
4	4		164	15.0	Not Identified
5	5		170	15.0	Not Identified
6	6		167	15.0	Not Identified
7	7		158	15.0	Not Identified
8	8		169	15.0	Not Identified

No. 29 **Marz** Aragatsotn **Community** Irind

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°24'18,1″	44°00'00,5″	2,106	1968	Concrete	12.0	No
2	Spring	40°24'11,4″	43°59'17,9″	2,056	2004	Concrete	18.0	No
3	Spring	40°24'06,5″	44°00'20,5″	2,108	1968	Concrete	3.0	Yes
4	Spring	40°25'20,5″	44°01'32,3″	2,346	1998	Concrete	3.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,600	100	Steel	1.2	1987	Medium	Yes
2	350	100	AsbestosCement	1.8	1968	Medium	Yes
	350	250	Steel		2005	Medium	Yes
3	1,950	250	Steel	10.2	2005	Little	Yes
	350	150	AsbestosCement		1968	Little	Yes
4	1,850	100	Steel	7.6	2006	Little	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°23'47,6″	43°58'54,7″	1,982	Steel	Circle	d=1,8m, h=2m	5	No

5. CHLORINATION

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	7,200	100	Steel	1952	Little	Yes
2	1,000	50	Steel	1990	Little	Yes
3	2,800	80	Steel	1971	Little	Yes
4	1,400	100	AsbestosCement	1955	Little	Yes
5	150	50	Ductile Iron	1950	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)
10	1965	2005	Yes	70	Yes

9. DRAINAGE SYSTEM

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

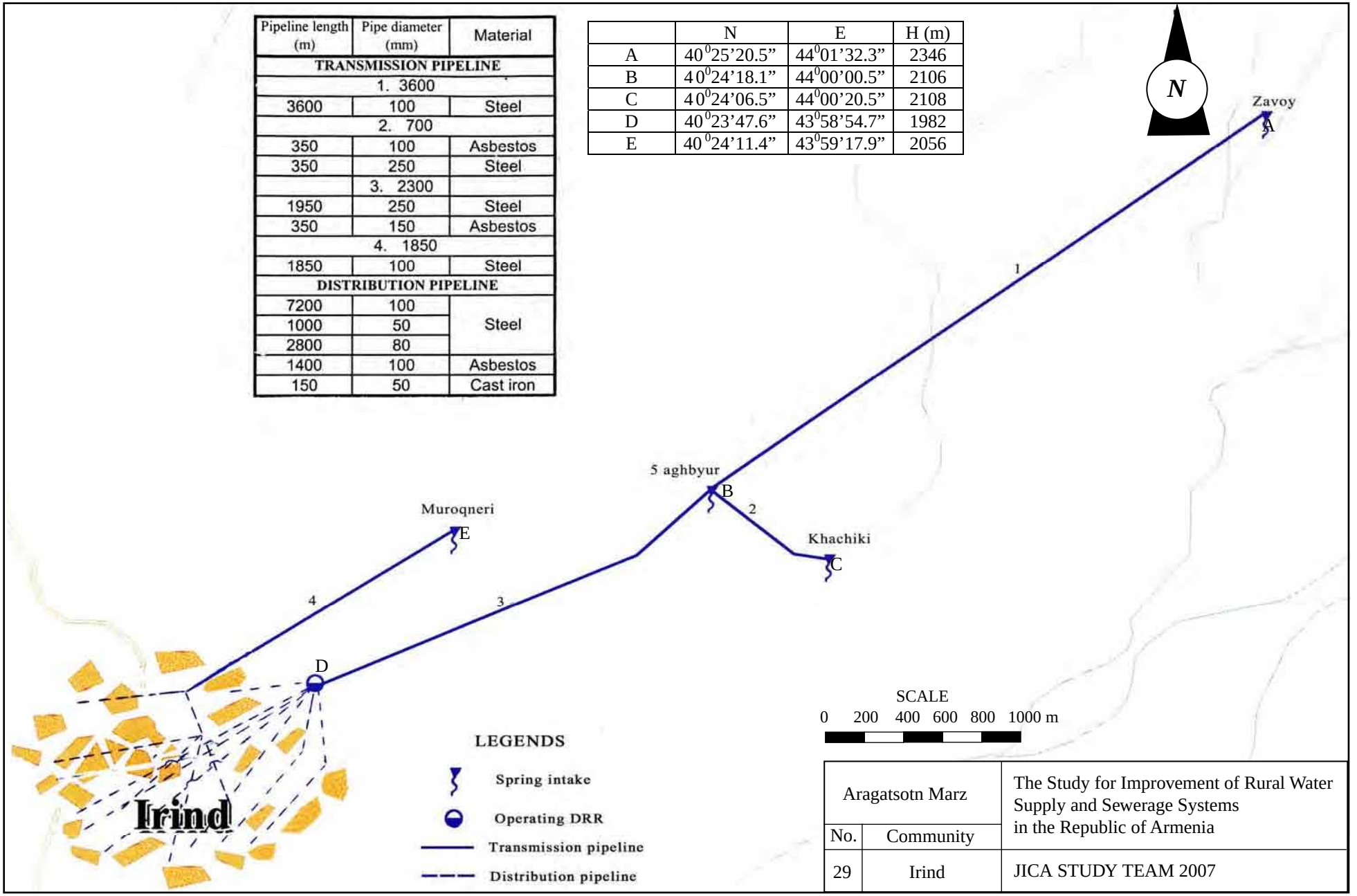
Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.29 Irind**
District	**Talin**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	950
A2	Actual population in 2007	976
A3	Number of households	189
A4.1	Elderly people	160
A4.2	Population in labor force (age from 16 to 62)	397
A4.3	Children	220
A5.1	Pensioners	151
A5.2	Unemployed	0
A5.3	Receiving benefits	48
A6	Average monthly income of household (AMD)	18,000
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	180
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,150
	Annual Budget of the community 2005, in thousand AMD	1,100
	Annual Budget of the community 2006, in thousand AMD	1,300
	Annual Budget of the community 2007, in thousand AMD	1,400
	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	11,500
	Amount spent in drinking water sector 2006, in thousand AMD	14
	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, wool, eggs
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	180
D8	How many house connection household set the water meter	0
D9	Number of public taps	5
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs, 10%-do not have HH connection
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)	200
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	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?	from reservoir
D20	Are you satisfied with irrigation water supply volume?	is not sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Safaryan Degham
E2	Position	administration deputy head
E3	Telephone	(093)833411
E4	Quantity and present condition of the water supply facilities: spring/ intake	2 rehabilitated
E5	Quantity and present condition of the water supply facilities:	2 rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1 rehabilitated·
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	5 rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administration deputy head
E14	How you prepare O&M costs?	from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	600,000
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	800,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 3600		
3600	100	Steel
2. 700		
350	100	Asbestos
350	250	Steel
3. 2300		
1950	250	Steel
350	150	Asbestos
4. 1850		
1850	100	Steel
DISTRIBUTION PIPELINE		
7200	100	Steel
1000	50	
2800	80	
1400	100	Asbestos
150	50	Cast iron

	N	E	H (m)
A	$40^0$25’20.5”	$44^0$01’32.3”	2346
B	$40^0$24’18.1”	$44^0$00’00.5”	2106
C	$40^0$24’06.5”	$44^0$00’20.5”	2108
D	$40^0$23’47.6”	$43^0$58’54.7”	1982
E	$40^0$24’11.4”	$43^0$59’17.9”	2056



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

Marz : **Aragatsotn** No.29
Name : **Irind**

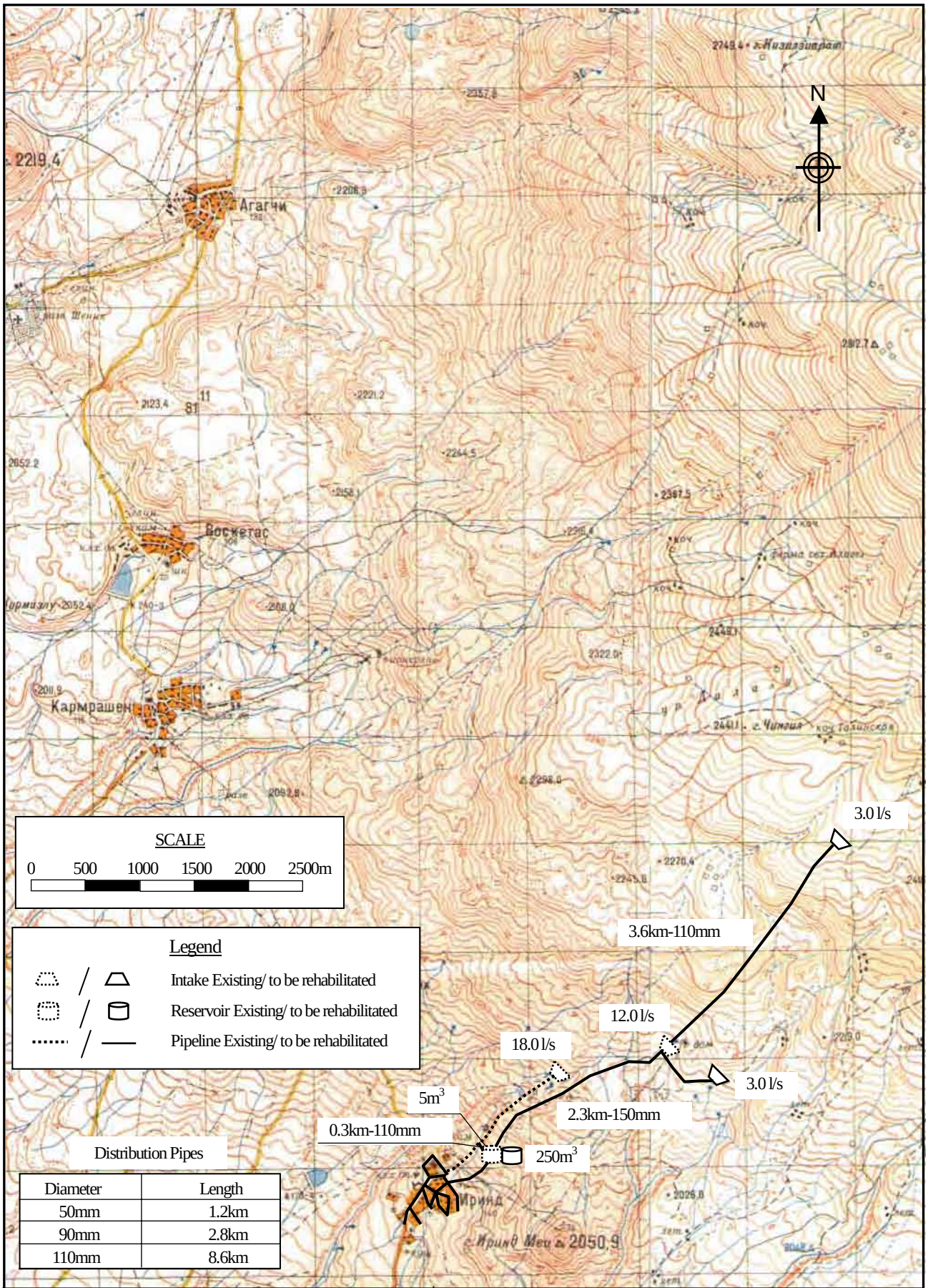
No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	976	persons	97.6	
	2 Factory	-	nos	0.0	
	3 School (pupils)	180	pupils	1.8	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	189	household	16.4	
	Sub-total			115.8	
	Unaccouted for water (20%)			23.2	
1	Average Daily Water Demand			139.0	m3/day
2	Maximum Daily Water Demand			166.8	m3/day
3	Maximum Hourly Water Demand			19.9	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
	1 Water source type					
	a Spring	4	36.0	lit/sec	3,110.4	m3/day
`	Total				3,110.4	m3/day
	2 Required reservoir volume				238	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3	2	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	3,900	m
	150mm diameter	2,300	m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	250m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	1,200	m
	75mm diameter		m
	90mm diameter	2,800	m
	110mm diameter	8,600	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	9	nos
6	Water meter installation	189	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. 29	Irind	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **29**
Name : **Irind**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	2	nos	367,700	735,400
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					735,400
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	3,900	m	9,680	37,752,000
		150mm	2,300	m	13,140	30,222,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					67,974,000
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	1,200	m	5,520	6,624,000
		75mm		m	7,160	
		90mm	2,800	m	8,040	22,512,000
		110mm	8,600	m	9,680	83,248,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					112,384,000
5	House Connection		9	nos	74,000	666,000
6	Water Meter Installation		189	nos	80,000	15,120,000
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	5,040	m	3,600	18,144,000
	Total				AMD	241,656,200
					Equivalent to USD	790,967
					Equivalent to JPY	83,447,005
					AMD	USD
	Investment Cost per household		189	HH	1,278,604	4,185
	Investment Cost per person		976	persons	247,599	810

ARAGATSOTN MARZ
Talin District
No 29 Irind

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		42.3																																							
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		236.06	0.00	0.00	0.67	1.34	1.52	1.57	2.66	2.75	2.84	2.94	4.40	4.54	4.69	4.85	5.01	5.17	5.35	5.52	5.70	5.89	6.09	6.29	6.50	6.71	6.93	7.16	7.40	7.64	7.89	8.15	8.42	8.70	8.99	9.28	9.59	9.91	10.23	10.57	10.92	11.28
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				254																																				
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		11.13			0.07	0.14	0.16	0.17	0.17	0.18	0.19	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.45	0.46	0.47	0.49	0.51
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		54.07			0.32	0.67	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.09	1.13	1.17	1.20	1.24	1.29	1.33	1.37	1.42	1.46	1.51	1.56	1.61	1.67	1.72	1.78	1.84	1.90	1.96	2.02	2.09	2.16	2.23	2.31	2.38	2.46
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					0.32	0.67	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.09	1.13	1.17	1.20	1.24	1.29	1.33	1.37	1.42	1.46	1.51	1.56	1.61	1.67	1.72	1.78	1.84	1.90	1.96	2.02	2.09	2.16	2.23	2.31	2.38	2.46
5. Pump replacement		0.00																0.00															0.00									
Sub-total		82.90	0.00	0.00	0.63	1.06	1.21	1.25	1.28	1.33	1.38	1.42	1.47	1.51	1.56	1.62	1.67	1.73	1.79	1.84	1.90	1.97	2.03	2.09	2.17	2.23	2.31	2.39	2.46	2.55	2.63	2.73	2.82	2.91	3.00	3.10	3.20	3.31	3.41	3.53	3.64	3.77
C Gross Income (A-B)		153.16	0.00	0.00	0.04	0.28	0.31	0.32	1.38	1.42	1.46	1.52	2.93	3.03	3.13	3.23	3.34	3.44	3.56	3.68	3.80	3.92	4.06	4.20	4.33	4.48	4.62	4.77	4.94	5.09	5.26	5.42	5.60	5.79	5.99	6.18	6.39	6.60	6.82	7.04	7.28	7.51
D Depreciation cost		229.60						6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56
E Interest paid		69.76	0.02	0.04	1.29	2.58	2.95	2.96	2.96	2.96	2.96	2.96	2.96	2.87	2.79	2.70	2.61	2.53	2.44	2.35	2.25	2.16	2.07	1.98	1.88	1.78	1.69	1.59	1.49	1.39	1.29	1.19	1.09	0.98	0.88	0.77	0.66	0.56	0.45	0.34	0.23	0.11
F Net Income		-146.20	-0.02	-0.04	-1.25	-2.30	-2.64	-9.20	-8.14	-8.10	-8.06	-8.00	-6.59	-6.40	-6.22	-6.03	-5.83	-5.65	-5.44	-5.23	-5.01	-4.80	-4.57	-4.34	-4.11	-3.86	-3.63	-3.38	-3.11	-2.86	-2.59	-2.33	-2.05	-1.75	-1.45	-1.15	-0.83	-0.52	-0.19	0.14	0.49	0.84
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		-146.20	-0.02	-0.04	-1.25	-2.30	-2.64	-9.20	-8.14	-8.10	-8.06	-8.00	-6.59	-6.40	-6.22	-6.03	-5.83	-5.65	-5.44	-5.23	-5.01	-4.80	-4.57	-4.34	-4.11	-3.86	-3.63	-3.38	-3.11	-2.86	-2.59	-2.33	-2.05	-1.75	-1.45	-1.15	-0.83	-0.52	-0.19	0.14	0.49	0.84
OM Cost Recovery Ratio (A/B)		285%	0%	0%	107%	126%	126%	126%	208%	207%	206%	207%	299%	301%	301%	299%	300%	299%	299%	300%	300%	299%	300%	301%	300%	301%	300%	300%	301%	300%	300%	299%	299%	299%	300%	299%	300%	299%	300%	299%	300%	299%

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	-146.20	-0.02	-0.04	-1.25	-2.30	-2.64	-9.20	-8.14	-8.10	-8.06	-8.00	-6.59	-6.40	-6.22	-6.03	-5.83	-5.65	-5.44	-5.23	-5.01	-4.80	-4.57	-4.34	-4.11	-3.86	-3.63	-3.38	-3.11	-2.86	-2.59	-2.33	-2.05	-1.75	-1.45	-1.15	-0.83	-0.52	-0.19	0.14	0.49	0.84
2. Depreciation cost	229.60	0.00	0.00	0.00	0.00	0.00	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56
3. Interest Paid	69.76	0.02	0.04	1.29	2.58	2.95	2.96	2.96	2.96	2.96	2.96	2.96	2.87	2.79	2.70	2.61	2.53	2.44	2.35	2.25	2.16	2.07	1.98	1.88	1.78	1.69	1.59	1.49	1.39	1.29	1.19	1.09	0.98	0.88	0.77	0.66	0.56	0.45	0.34	0.23	0.11
Sub-total	153.16	0.00	0.00	0.04	0.28	0.31	0.32	1.38	1.42	1.46	1.52	2.93	3.03	3.13	3.23	3.34	3.44	3.56	3.68	3.80	3.92	4.06	4.20	4.33	4.48	4.62	4.77	4.94	5.09	5.26	5.42	5.60	5.79	5.99	6.18	6.39	6.60	6.82	7.04	7.28	7.51
B Finances																																									
1. Project Loan	295.99	2.36	1.67	125.27	129.26	36.79	0.36	0.28																																	
2. Local fund	101.18	0.79	0.56	42.44	44.39	12.79	0.12	0.09																																	
Sub-total	397.17	3.15	2.23	167.71	173.65	49.58	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	212.57	0.02	0.04	1.25	2.30	2.64	2.64	1.58	1.54	1.50	1.44	8.54	8.43	8.34	8.24	8.12	8.03	7.91	7.79	7.66	7.55	7.41	7.27	7.14	6.98	6.85	6.70	6.53	6.38	6.21	6.05	5.87	5.68	5.48	5.29	5.07	4.87	4.65	4.43	4.19	3.96
Sub-total	212.57	0.02	0.04	1.25	2.30	2.64	2.64	1.58	1.54	1.50	1.44	8.54	8.43	8.34	8.24	8.12	8.03	7.91	7.79	7.66	7.55	7.41	7.27	7.14	6.98	6.85	6.70	6.53	6.38	6.21	6.05	5.87	5.68	5.48	5.29	5.07	4.87	4.65	4.43	4.19	3.96
Total Cash Inflow	762.90	3.17	2.27	169.00	176.23	52.53	3.44	3.33	2.96	2.96	2.96	11.47	11.46	11.47	11.47	11.46	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.47
APPLICATION OF FUNDS																																								
D Project disbursement	397.17	3.15	2.23	167.71	173.65	49.58	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	295.97											8.51	8.59	8.68	8.77	8.85	8.94	9.03	9.12	9.21	9.31	9.40	9.49	9.59	9.68	9.78	9.88	9.98	10.08	10.18	10.28	10.38	10.49	10.59	10.70	10.80	10.91	11.02	11.13	11.24	11.36
2. Interest paid	69.76	0.02	0.04	1.29	2.58	2.95	2.96	2.96	2.96	2.96	2.96	2.96	2.87	2.79	2.70	2.61	2.53	2.44	2.35	2.25	2.16	2.07	1.98	1.88	1.78	1.69	1.59	1.49	1.39	1.29	1.19	1.09	0.98	0.88	0.77	0.66	0.56	0.45	0.34	0.23	0.11
Sub-total	365.73	0.02	0.04	1.29	2.58	2.95	2.96	2.96	2.96	2.96	2.96	11.47	11.46	11.47	11.47	11.46	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.47
Total Cash Outflow	762.90	3.17	2.27	169.00	176.23	52.53	3.44	3.33	2.96	2.96	2.96	11.47	11.46	11.47	11.47	11.46	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.47	11.46	11.47	11.47	11.47	11.47	11.47
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)	42%	0%	0%	3%	11%	11%	11%	47%	48%	49%	51%	26%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	37%	38%	39%	40%	42%	43%	44%	46%	47%	49%	50%	52%	54%	56%	58%	59%	61%	63%	65%
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 29 Irind

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

Item	Millon AMD	Rate
1 Revenue		
Water fee revenue	236.06	52.6%
Subsidy	212.57	47.4%
Total	448.63	100.0%
2 Expenditure		
OM cost	82.90	18.5%
Loan repayment	295.97	66.0%
Interest paid	69.76	15.5%
Surplus cash	0.00	0.0%
Total	448.63	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	264.74	2.30	1.64	114.30	114.32	31.59	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	5.97			0.07	0.14	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	0.16
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	27.61			0.32	0.65	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Pump replacement																	0.00															0.00									
Sub-total	42.70			0.63	1.03	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	1.14	1.14	1.14	1.14	1.14	1.14
Total Outflow	307.44	2.30	1.64	114.93	115.35	32.73	1.47	1.40	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	1.14	1.14	1.14
B BENEFIT																																								
1. Water Tariff	148.29	0.00	0.00	0.67	1.34	1.52	1.57	2.66	2.75	2.84	2.94	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
2. Subsidy	149.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.58	5.56	5.55	5.54	5.51	5.50	5.47	5.44	5.41	5.39	5.34	5.29	5.26	5.20	5.16	5.11	5.04	4.99	4.92	4.86	4.78	4.70	4.60	4.52	4.41	4.31	4.20	4.09	3.96	3.85
Total Inflow	297.83	0.00	0.00	0.67	1.34	1.52	1.57	2.66	2.75	2.84	2.94	9.98	9.96	9.95	9.94	9.91	9.90	9.87	9.84	9.81	9.79	9.74	9.69	9.66	9.60	9.56	9.51	9.44	9.39	9.32	9.26	9.18	9.10	9.00	8.92	8.81	8.71	8.60	8.49	8.36	8.25
NET BENEFIT	-9.61	-2.30	-1.64	-114.3	-114.0	-31.2	0.10	1.26	1.61	1.70	1.80	8.84	8.82	8.81	8.80	8.77	8.76	8.73	8.70	8.67	8.65	8.60	8.55	8.52	8.46	8.42	8.37	8.30	8.25	8.18	8.12	8.04	7.96	7.86	7.78	7.67	7.57	7.46	7.35	7.22	7.11
FIRR =	**-0.18%**																																							

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	-104.42	-2.53	-1.80	-125.7	-125.4	-34.4	0.07	1.23	1.61	1.70	1.80	8.84	8.82	8.81	8.80	8.77	8.76	8.73	8.70	8.67	8.65	8.60	8.55	8.52	8.46	8.42	8.37	8.30	8.25	8.18	8.12	8.04	7.96	7.86	7.78	7.67	7.57	7.46	7.35	7.22	7.11
	2	Capital cost 20% up	-129.27	-2.76	-1.97	-137.1	-136.9	-37.5	0.03	1.21	1.61	1.70	1.80	8.84	8.82	8.81	8.80	8.77	8.76	8.73	8.70	8.67	8.65	8.60	8.55	8.52	8.46	8.42	8.37	8.30	8.25	8.18	8.12	8.04	7.96	7.86	7.78	7.67	7.57	7.46	7.35	7.22	7.11
2	1	OM cost 10% up	-82.55	-2.30	-1.64	-114.3	-114.1	-31.3	-0.01	1.15	1.50	1.59	1.69	8.73	8.71	8.70	8.69	8.66	8.65	8.62	8.59	8.56	8.54	8.49	8.44	8.41	8.35	8.31	8.26	8.19	8.14	8.07	8.01	7.93	7.85	7.75	7.67	7.56	7.46	7.35	7.24	7.11	7.00
	2	OM cost 20% up	-85.53	-2.30	-1.64	-114.4	-114.2	-31.4	-0.13	1.03	1.38	1.47	1.57	8.61	8.59	8.58	8.57	8.54	8.53	8.50	8.47	8.44	8.42	8.37	8.32	8.29	8.23	8.19	8.14	8.07	8.02	7.95	7.89	7.81	7.73	7.63	7.55	7.44	7.34	7.23	7.12	6.99	6.88
3	1	Revenue 10% down	-99.44	-2.30	-1.64	-114.3	-114.1	-31.4	-0.06	0.99	1.34	1.42	1.51	7.84	7.82	7.82	7.81	7.78	7.77	7.74	7.72	7.69	7.67	7.63	7.58	7.55	7.50	7.46	7.42	7.36	7.31	7.25	7.19	7.12	7.05	6.96	6.89	6.79	6.70	6.60	6.50	6.38	6.29
	2	Revenue 20% down	-119.31	-2.30	-1.64	-114.4	-114.3	-31.5	-0.21	0.73	1.06	1.13	1.21	6.84	6.83	6.82	6.81	6.79	6.78	6.76	6.73	6.71	6.69	6.65	6.61	6.59	6.54	6.51	6.47	6.41	6.37	6.32	6.27	6.20	6.14	6.06	6.00	5.91	5.83	5.74	5.65	5.55	5.46

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.63%	-7.18	-13.94%
	2	Capital cost 20% up	-1.03%	-8.28	-12.08%
2	1	OM cost 10% up	-0.26%	-3.11	-32.19%
	2	OM cost 20% up	-0.34%	-4.75	-21.05%
3	1	Revenue 10% down	-0.76%	-7.67	-13.04%
	2	Revenue 20% down	-1.40%	-8.74	-11.45%

No.30 Lernapar

Information on Existing Water Sources (Aragatsotn)

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

No.30 Community Lernapar
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	Jori ground spring	40	44	53	44	9	17.3	2168	0.2	0.4	0.4
2	Astghoyi Dzoz ground spring	40	45	2.8	44	9	50.3	2231	0.2	0.5	0.5
3	Kavochang ground spring	40	44	50.4	44	9	43.4	2170	0.1	0.2	0.2
4	Sari ground spring	40	45	4.5	44	10	3.7	2,275	0.5	1.5	1.5
5	Ikliki ground spring	40	44	36.8	44	10	31.2	2,202	0.5	1.0	1.0
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 springs are in open and deteriorated condition. The community has not house-connections, residents use public taps. An estimated 50% leakage occurs in water pipelines.
Alternative sources if any	At 3km distance from the Community there is a 30l/sec capacity spring, which was used by the community in the past, however it is not used presently.

No.30 Community Lernapar
District Aragats
Marz Aragatsotn
Sampling date 20/Jul/2007

	Parameters analysed	Units	No.1 Dzori aghbyur	No.2 Astghoyi dzor	No.3 Sari aghbyur	No.4 Papsi qarap	No.5 Ikliki aghbyur	Guidelines	
								WHO	Armenia
a	pH		6.4	7.5	6.7	7.6	7.1	6.5-8	6.0 - 9.0
b	Temperature	Deg.C	12.4	10.4	12.9	12.7	10.4		
c	TDS	Mg/L	104	117	128	124	175	1000	1000
1	Al:Aluminum	Mg/L	n.d	n.d	n.d	n.d	n.d	0.10	0.50
2	B:Boron	Mg/L	n.d	n.d	n.d	n.d	n.d	0.70	0.50
3	Cl:Chloride	Mg/L	4	4	6	4	7	250	350
4	Cr:Chrome	Mg/L	n.d	n.d	0.01	<0.01	<0.01	0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d	n.d	n.d	n.d	2	1
6	F:Fluoride	Mg/L	0.17	0.18	0.19	0.17	0.17	1.50	
7	Hardness	Mg/L	220	245	280	260	395	500	700
8	Fe:Iron	Mg/L	n.d	n.d	n.d	n.d	n.d	0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d	n.d	n.d	n.d	0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	n.d	n.d	n.d	n.d	0.070	0.250
11	Ni:Nickel	Mg/L	0.018	0.008	0.008	n.d	0.011	0.020	0.100
12	Nitrate(NO3+)	Mg/L	3.1	2.2	4.0	1.8	1.8	50.0	45.0
13	SO4:Sulfate	Mg/L	12.0	6.0	8.0	13.0	3.0	250.0	500.0
14	Zn:Zink	Mg/L	n.d	n.d	n.d	n.d	n.d	3.0	5.0
15	As:Arsenic	Mg/L	n.d	n.d	n.d	n.d	n.d	0.0	0.1
16	Ba:Barium	Mg/L	n.d	n.d	<0.01	0.02	<0.01	0.70	0.10
17	Be:Berillium	Mg/L	n.d	n.d	n.d	n.d	n.d	NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d	n.d	n.d	n.d	0.0030	0.0010
19	Pb:Lead	Mg/L	0.001	0.001	0.001	0.001	<0.001	0.010	0.030
20	Hg:Mercury	Mg/L	n.d	n.d	n.d	n.d	n.d	0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	<0.7	<0.7	<0.7	<0.7	NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d	n.d	n.d	n.d	0.070	0.035
24	Coli form bacteria	bacteria per 100 ml						-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml						0	0
26	Total bacteria	bacteria per 1 ml						-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.30 Community Antarut
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	3		4-25	Not Identified	Not Identified
2	4		5-20	0.4-1.2	Not Identified
3	6		5-67	Not Identified	Not Identified
4	7		4-23	Not Identified	Not Identified
5	8		5-20	Not Identified	Not Identified

No. **30** **Marz** Aragatsotn **Community** Lernapar

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°44'53.0″	44°09'17.3″	2,168	1935	ground	0.4	Yes
2	Spring	40°45'02.8″	44°09'50.3″	2,231	1947	ground	0.5	Yes
3	Spring	40°44'50.4″	44°09'43.4″	2,170	1947	ground	0.2	Yes
4	Spring	40°45'04.5″	44°10'03.7″	2,275	1975	ground	1.5	Yes
5	Spring	40°44'36.8″	44°10'31.2″	2,202	1890	ground	1.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	600	50	Steel	0.2	1950	Huge	Yes
2	1,500	100	Steel	0.2	1953	Huge	Yes
3	1,500	50	Steel	0.14	1953	Medium	Yes
4	800	50	Steel	0.7	1975	Huge	Yes
5	2,500	100	Steel	0.7	1980	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°44'46.7″	44°09'47.2″	2,181	reinforced concrete	Rectangular	15x6x3	250	Yes

5. CHLORINATION

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,500	100	cast iron	1953	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)
8	1953	1980	No	0	Yes

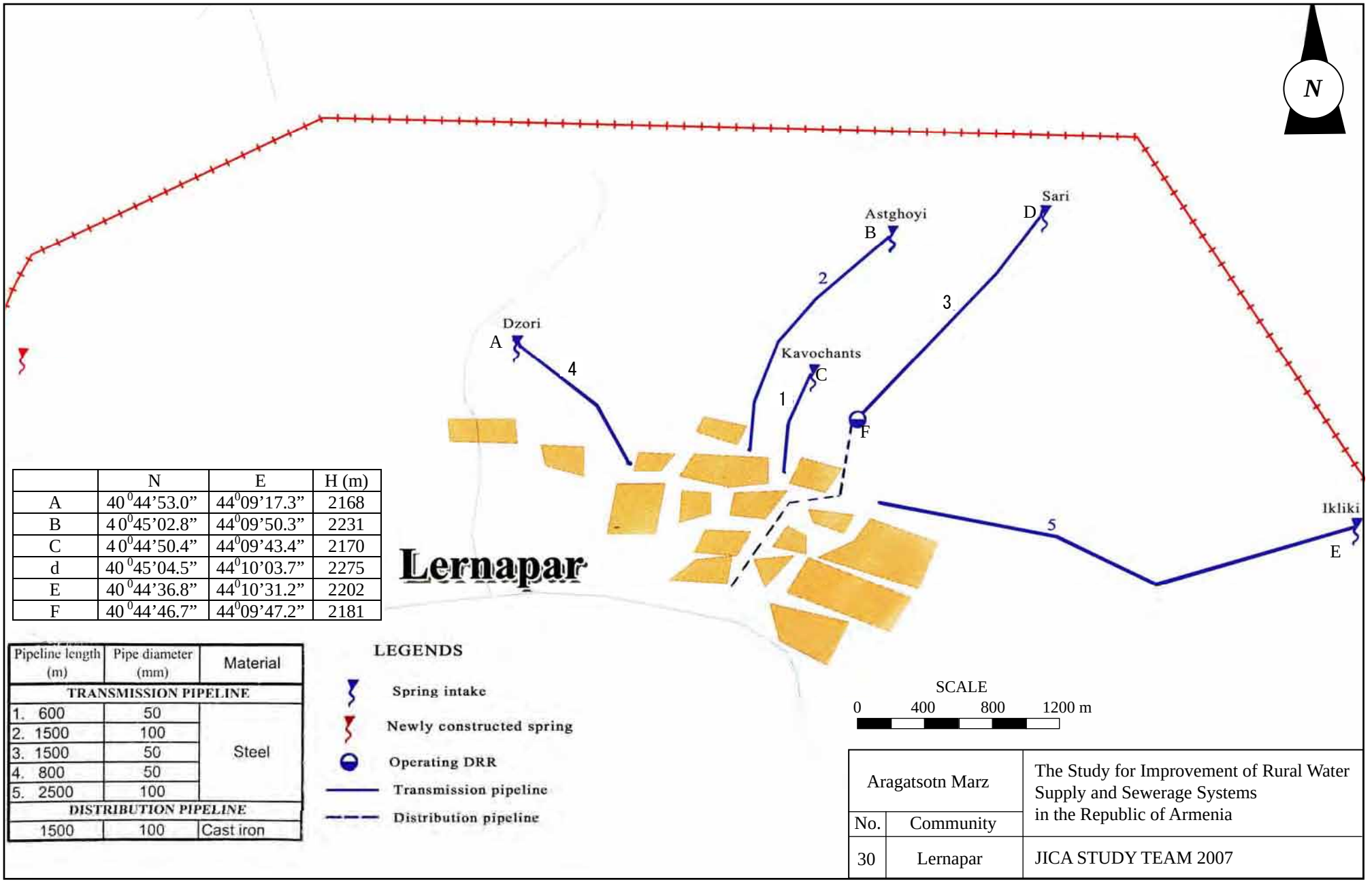
9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
Yes	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.30 Lernapar**
District	**Aragats**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	565
A2	Actual population in 2007	632
A3	Number of households	142
A4.1	Elderly people	65
A4.2	Population in labor force (age from 16 to 62)	430
A4.3	Children	137
A5.1	Pensioners	69
A5.2	Unemployed	278
A5.3	Receiving benefits	26
A6	Average monthly income of household (AMD)	15,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	136
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	3,900
	Annual Budget of the community 2005, in thousand AMD	4,840
	Annual Budget of the community 2006, in thousand AMD	4,145
	Annual Budget of the community 2007, in thousand AMD	4,240
	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	is not planned³í
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	25
D8	How many house connection household set the water meter	0
D9	Number of public taps	5
D10.1	How is the regime of water supply in your community in the dry season?	regularly. 3 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly. 3 hrs
D11	What time of day water is given?	9-12;
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	mainly convenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	200
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	200
D16	Drinking water monthly water fee per household	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	3 deteriorated
E5	Quantity and present condition of the water supply facilities:	5 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	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administration head
E14	How you prepare O&M costs?	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?	manpower
E17	What kind of OM method is preferable to you?	resident participation
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	yes
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



	N	E	H (m)
A	40 ^{0}44'53.0"	44^{0}09'17.3"	2168
B	4 0^{0}45'02.8"	44^{0}09'50.3"	2231
C	4 0^{0}44'50.4"	44^{0}09'43.4"	2170
d	40 ^{0}45'04.5"	44^{0}10'03.7"	2275
E	40 ^{0}44'36.8"	44^{0}10'31.2"	2202
F	40 ^{0}44'46.7"	44^{0}09'47.2"	2181

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 600	50	Steel
2. 1500	100	
3. 1500	50	
4. 800	50	
5. 2500	100	
DISTRIBUTION PIPELINE		
1500	100	Cast iron

LEGENDS

- Spring intake
- Newly constructed spring
- Operating DRR
- Transmission pipeline
- Distribution pipeline

SCALE

0 400 800 1200 m

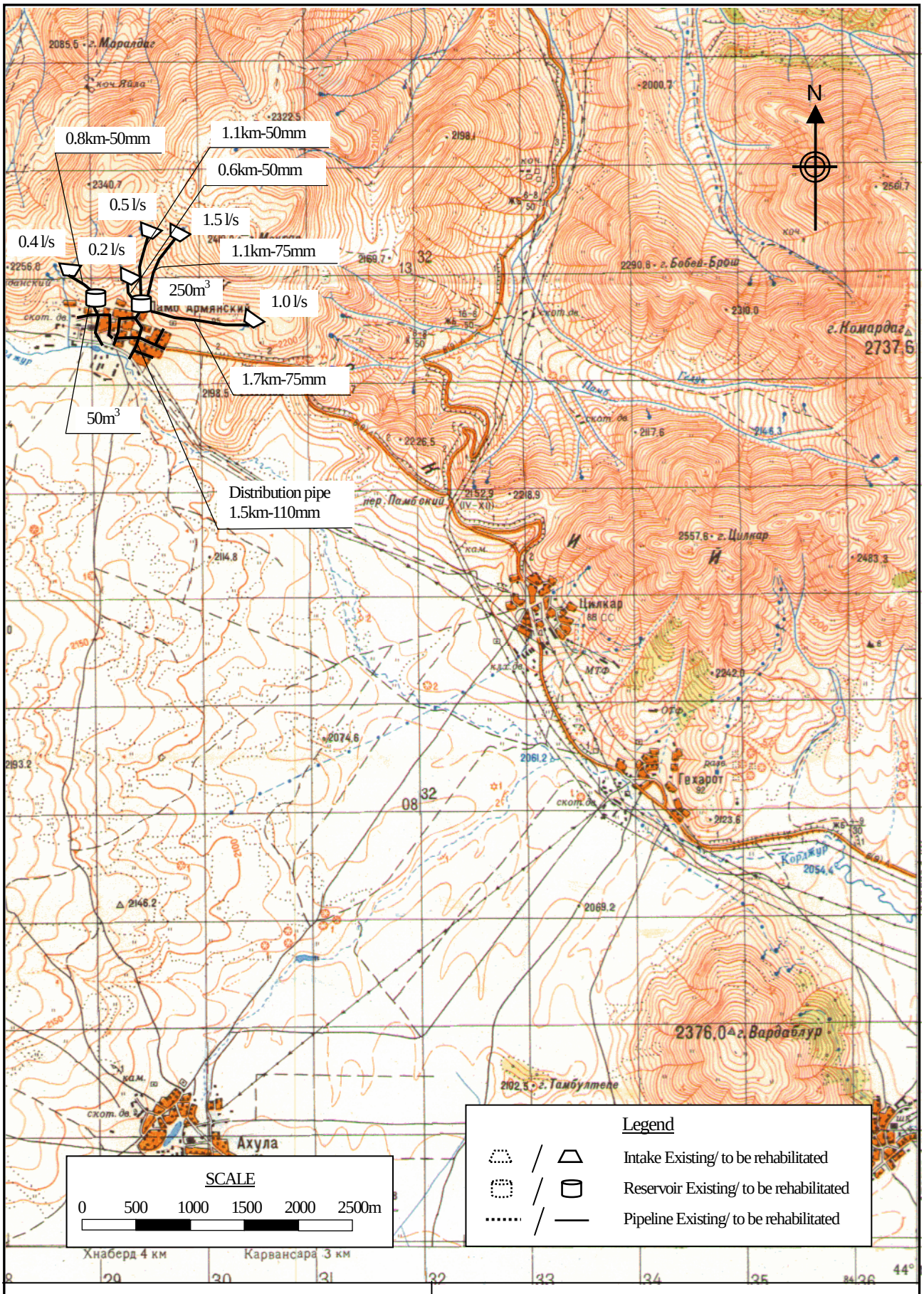
Aragatsotn Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
30	Lernapar	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.30
Name : **Lernapar**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	632	persons	63.2	
	2 Factory	-	nos	0.0	
	3 School (pupils)	136	pupils	1.4	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	142	household	12.4	
	Sub-total			77.0	
	Unaccouted for water (20%)			15.4	
1	Average Daily Water Demand			92.4	m3/day
2	Maximum Daily Water Demand			110.9	m3/day
3	Maximum Hourly Water Demand			15.0	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	5	3.6	lit/sec		311.0	m3/day
`	Total					311.0	m3/day
	2 Required reservoir volume					180	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
No	Item	Quantity	Unit
1	Intake		
	1m3	5	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter	2,500	m
	75mm diameter	2,800	m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	50m3 capacity	1	nos
	250m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	1,500	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	117	nos
6	Water meter installation	142	nos
7	Public tap	2	nos
8	Chlorination	2	nos
9	Pumps	-	nos



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 30	Lernapar	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **30**
Name : **Lernapar**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	5	nos	367,700	1,838,500
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,838,500
2	Transmission Pipe					
		50mm	2,500	m	5,520	13,800,000
		75mm	2,800	m	7,160	20,048,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					33,848,000
3	Reservoir					
		50m3	1	nos	8,363,900	8,363,900
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3	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					34,316,700
4	Distribution Pipe					
		50mm		m	5,520	
		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					14,520,000
5	House Connection		117	nos	74,000	8,658,000
6	Water Meter Installation		142	nos	80,000	11,360,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	600	m	3,600	2,160,000
	Total				AMD	107,881,200
					Equivalent to USD	353,107
					Equivalent to JPY	37,252,771
					AMD	USD
	Investment Cost per household		142	HH	759,727	2,487
	Investment Cost per person		632	persons	170,698	559

ARAGATSOTN MARZ
Aparan District
No 30 Lernapar

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		28.1																																							
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		156.87	0.00	0.00	0.41	0.83	1.01	1.05	1.77	1.83	1.89	1.95	2.93	3.02	3.12	3.22	3.33	3.44	3.55	3.67	3.79	3.92	4.05	4.18	4.32	4.46	4.61	4.76	4.92	5.08	5.25	5.42	5.60	5.78	5.98	6.17	6.38	6.59	6.80	7.03	7.26	7.50
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				169																																				
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		7.42			0.04	0.08	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34
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		21.14			0.12	0.25	0.31	0.32	0.33	0.34	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	0.56	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
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					0.12	0.25	0.31	0.32	0.33	0.34	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	0.56	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
5. Pump replacement		0.00																0.00															0.00										
Sub-total		46.26	0.00	0.00	0.40	0.58	0.68	0.69	0.72	0.74	0.76	0.79	0.82	0.85	0.87	0.90	0.93	0.96	1.00	1.02	1.06	1.10	1.13	1.17	1.21	1.24	1.29	1.33	1.37	1.42	1.47	1.52	1.57	1.62	1.68	1.73	1.79	1.85	1.90	1.97	2.03	2.10
C Gross Income (A-B)		110.61	0.00	0.00	0.01	0.25	0.33	0.36	1.05	1.09	1.13	1.16	2.11	2.17	2.25	2.32	2.40	2.48	2.55	2.65	2.73	2.82	2.92	3.01	3.11	3.22	3.32	3.43	3.55	3.66	3.78	3.90	4.03	4.16	4.30	4.44	4.59	4.74	4.90	5.06	5.23	5.40
D Depreciation cost		102.55						2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93
E Interest paid		32.46	0.02	0.04	0.57	1.12	1.37	1.38	1.38	1.38	1.38	1.38	1.38	1.34	1.30	1.26	1.22	1.18	1.14	1.09	1.05	1.01	0.97	0.92	0.88	0.83	0.79	0.74	0.70	0.65	0.60	0.55	0.51	0.46	0.41	0.36	0.31	0.26	0.21	0.16	0.11	0.05
F Net Income		-24.40	-0.02	-0.04	-0.56	-0.87	-1.04	-3.95	-3.26	-3.22	-3.18	-3.15	-2.20	-2.10	-1.98	-1.87	-1.75	-1.63	-1.52	-1.37	-1.25	-1.12	-0.98	-0.84	-0.70	-0.54	-0.40	-0.24	-0.08	0.08	0.25	0.42	0.59	0.77	0.96	1.15	1.35	1.55	1.76	1.97	2.19	2.42
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		-24.40	-0.02	-0.04	-0.56	-0.87	-1.04	-3.95	-3.26	-3.22	-3.18	-3.15	-2.20	-2.10	-1.98	-1.87	-1.75	-1.63	-1.52	-1.37	-1.25	-1.12	-0.98	-0.84	-0.70	-0.54	-0.40	-0.24	-0.08	0.08	0.25	0.42	0.59	0.77	0.96	1.15	1.35	1.55	1.76	1.97	2.19	2.42
OM Cost Recovery Ratio (A/B)		339%	0%	0%	102%	143%	149%	152%	246%	247%	249%	247%	357%	355%	359%	358%	358%	358%	355%	360%	358%	356%	358%	357%	357%	360%	357%	358%	359%	358%	357%	357%	357%	357%	356%	357%	356%	356%	358%	357%	358%	357%

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	-24.40	-0.02	-0.04	-0.56	-0.87	-1.04	-3.95	-3.26	-3.22	-3.18	-3.15	-2.20	-2.10	-1.98	-1.87	-1.75	-1.63	-1.52	-1.37	-1.25	-1.12	-0.98	-0.84	-0.70	-0.54	-0.40	-0.24	-0.08	0.08	0.25	0.42	0.59	0.77	0.96	1.15	1.35	1.55	1.76	1.97	2.19	2.42
2. Depreciation cost	102.55	0.00	0.00	0.00	0.00	0.00	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93
3. Interest Paid	32.46	0.02	0.04	0.57	1.12	1.37	1.38	1.38	1.38	1.38	1.38	1.38	1.34	1.30	1.26	1.22	1.18	1.14	1.09	1.05	1.01	0.97	0.92	0.88	0.83	0.79	0.74	0.70	0.65	0.60	0.55	0.51	0.46	0.41	0.36	0.31	0.26	0.21	0.16	0.11	0.05
Sub-total	110.61	0.00	0.00	0.01	0.25	0.33	0.36	1.05	1.09	1.13	1.16	2.11	2.17	2.25	2.32	2.40	2.48	2.55	2.65	2.73	2.82	2.92	3.01	3.11	3.22	3.32	3.43	3.55	3.66	3.78	3.90	4.03	4.16	4.30	4.44	4.59	4.74	4.90	5.06	5.23	5.40
B Finances																																									
1. Project Loan	138.03	2.36	1.67	53.42	54.99	24.95	0.36	0.28																																	
2. Local fund	47.18	0.79	0.56	18.09	18.87	8.66	0.12	0.09																																	
Sub-total	185.21	3.15	2.23	71.51	73.86	33.61	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	59.94	0.02	0.04	0.56	0.87	1.04	1.02	0.33	0.29	0.25	0.22	3.24	3.18	3.10	3.03	2.95	2.87	2.80	2.69	2.62	2.53	2.43	2.34	2.24	2.13	2.03	1.92	1.80	1.69	1.57	1.44	1.32	1.19	1.05	0.91	0.76	0.61	0.45	0.29	0.12	0.00
Sub-total	59.94	0.02	0.04	0.56	0.87	1.04	1.02	0.33	0.29	0.25	0.22	3.24	3.18	3.10	3.03	2.95	2.87	2.80	2.69	2.62	2.53	2.43	2.34	2.24	2.13	2.03	1.92	1.80	1.69	1.57	1.44	1.32	1.19	1.05	0.91	0.76	0.61	0.45	0.29	0.12	0.00
Total Cash Inflow	355.76	3.17	2.27	72.08	74.98	34.98	1.86	1.75	1.38	1.38	1.38	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.34	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.34	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.40
APPLICATION OF FUNDS																																								
D Project disbursement	185.21	3.15	2.23	71.51	73.86	33.61	0.48	0.37																																	
E Total debt services																																									
1. Loan repayment	138.04											3.97	4.01	4.05	4.09	4.13	4.17	4.21	4.25	4.30	4.34	4.38	4.43	4.47	4.52	4.56	4.61	4.65	4.70	4.75	4.79	4.84	4.89	4.94	4.99	5.04	5.09	5.14	5.19	5.24	5.30
2. Interest paid	32.46	0.02	0.04	0.57	1.12	1.37	1.38	1.38	1.38	1.38	1.38	1.38	1.34	1.30	1.26	1.22	1.18	1.14	1.09	1.05	1.01	0.97	0.92	0.88	0.83	0.79	0.74	0.70	0.65	0.60	0.55	0.51	0.46	0.41	0.36	0.31	0.26	0.21	0.16	0.11	0.05
Sub-total	170.50	0.02	0.04	0.57	1.12	1.37	1.38	1.38	1.38	1.38	1.38	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.34	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.34	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35
Total Cash Outflow	355.71	3.17	2.27	72.08	74.98	34.98	1.86	1.75	1.38	1.38	1.38	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.34	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.34	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35
F Net Surplus Cash (A+C2)-E	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Project Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	65%	0%	0%	2%	22%	24%	26%	76%	79%	82%	84%	39%	41%	42%	43%	45%	46%	48%	50%	51%	53%	55%	56%	58%	60%	62%	64%	66%	68%	71%	73%	75%	78%	80%	83%	86%	89%	92%	95%	98%	101%
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%	101%

ARAGATSOTN MARZ
Aparan District
No 30 Lernapar

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	156.87	72.4%
	Subsidy	59.94	27.6%
	Total	216.81	100.0%
2	**Expenditure**		
	OM cost	46.26	21.3%
	Loan repayment	138.04	63.7%
	Interest paid	32.46	15.0%
	Surplus cash	0.05	0.0%
	Total	216.81	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	123.43	2.30	1.64	48.78	48.68	21.44	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	10.80			0.12	0.24	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Pump replacement																	0.00															0.00								
Sub-total	23.65			0.40	0.57	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	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
Total Outflow	147.08	2.30	1.64	49.18	49.25	22.07	0.96	0.89	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	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
B BENEFIT																																							
1. Water Tariff	98.64	0.00	0.00	0.41	0.83	1.01	1.05	1.77	1.83	1.89	1.95	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93
2. Subsidy	32.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	1.84	1.80	1.77	1.73	1.69	1.66	1.60	1.57	1.52	1.46	1.42	1.36	1.30	1.24	1.18	1.10	1.04	0.97	0.89	0.81	0.73	0.64	0.55	0.45	0.35	0.24	0.13	0.01	0.00
Total Inflow	131.55	0.00	0.00	0.41	0.83	1.01	1.05	1.77	1.83	1.89	1.95	4.79	4.77	4.73	4.70	4.66	4.62	4.59	4.53	4.50	4.45	4.39	4.35	4.29	4.23	4.17	4.11	4.03	3.97	3.90	3.82	3.74	3.66	3.57	3.48	3.38	3.28	3.17	3.06	2.94	2.93
NET BENEFIT	-15.53	-2.30	-1.64	-48.8	-48.4	-21.1	0.09	0.88	1.20	1.26	1.32	4.16	4.14	4.10	4.07	4.03	3.99	3.96	3.90	3.87	3.82	3.76	3.72	3.66	3.60	3.54	3.48	3.40	3.34	3.27	3.19	3.11	3.03	2.94	2.85	2.75	2.65	2.54	2.43	2.31	2.30

FIRR = -0.68%

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	-54.25	-2.53	-1.80	-53.6	-53.3	-23.2	0.06	0.85	1.20	1.26	1.32	4.16	4.14	4.10	4.07	4.03	3.99	3.96	3.90	3.87	3.82	3.76	3.72	3.66	3.60	3.54	3.48	3.40	3.34	3.27	3.19	3.11	3.03	2.94	2.85	2.75	2.65	2.54	2.43	2.31	2.30
	2	Capital cost 20% up	-65.83	-2.76	-1.97	-58.5	-58.2	-25.3	0.02	0.83	1.20	1.26	1.32	4.16	4.14	4.10	4.07	4.03	3.99	3.96	3.90	3.87	3.82	3.76	3.72	3.66	3.60	3.54	3.48	3.40	3.34	3.27	3.19	3.11	3.03	2.94	2.85	2.75	2.65	2.54	2.43	2.31	2.30
2	1	OM cost 10% up	-44.33	-2.30	-1.64	-48.8	-48.5	-21.1	0.03	0.82	1.14	1.20	1.26	4.10	4.08	4.04	4.01	3.97	3.93	3.90	3.84	3.81	3.76	3.70	3.66	3.60	3.54	3.48	3.42	3.34	3.28	3.21	3.13	3.05	2.97	2.88	2.79	2.69	2.59	2.48	2.37	2.25	2.24
	2	OM cost 20% up	-45.98	-2.30	-1.64	-48.9	-48.5	-21.2	-0.04	0.75	1.07	1.13	1.19	4.03	4.01	3.97	3.94	3.90	3.86	3.83	3.77	3.74	3.69	3.63	3.59	3.53	3.47	3.41	3.35	3.27	3.21	3.14	3.06	2.98	2.90	2.81	2.72	2.62	2.52	2.41	2.30	2.18	2.17
3	1	Revenue 10% down	-51.63	-2.30	-1.64	-48.8	-48.5	-21.2	-0.01	0.70	1.02	1.07	1.13	3.68	3.66	3.63	3.60	3.56	3.53	3.50	3.45	3.42	3.38	3.32	3.29	3.23	3.18	3.12	3.07	3.00	2.94	2.88	2.81	2.74	2.66	2.58	2.50	2.41	2.32	2.22	2.12	2.02	2.01
	2	Revenue 20% down	-60.59	-2.30	-1.64	-48.9	-48.6	-21.3	-0.12	0.53	0.83	0.88	0.93	3.20	3.19	3.15	3.13	3.10	3.07	3.04	2.99	2.97	2.93	2.88	2.85	2.80	2.75	2.71	2.66	2.59	2.55	2.49	2.43	2.36	2.30	2.23	2.15	2.07	1.99	1.91	1.82	1.72	1.71

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-1.15%	-4.08	-24.52%
	2	Capital cost 20% up	-1.57%	-5.66	-17.67%
2	1	OM cost 10% up	-0.79%	-1.38	-72.54%
	2	OM cost 20% up	-0.90%	-2.44	-41.05%
3	1	Revenue 10% down	-1.31%	-4.83	-20.72%
	2	Revenue 20% down	-2.02%	-6.63	-15.08%

No.31 Lernarot

Information on Existing Water Sources (Aragatsotn)

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

No.31 Community Lernarot
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	Zeniki spring	40	27	57.8	44	8	1.8	3,142	3.0	10.0	4.0
2	Ananun spring	40	26	44.5	44	7	52.0	2,999	0.8	3.0	3.0
3	Spring	40	24	5.5	44	7	47.3	1,950	0.3	2.0	0.5
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	Zenik spring's discharge is 4l/sec. Because of wrong design and construction of the water main, not all of water is taken.
Alternative sources if any	No alternative water sources are available

No.31 Community Lernarot
District Ashtarak
Marz Aragatsotn
Sampling date 30/Aug/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
a	pH		8.1	7.9			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10.2	13.5				
c	TDS	Mg/L	13	34			1000	1000
1	Al:Aluminum	Mg/L	0.03	0.02			0.10	0.50
2	B:Boron	Mg/L	n.d	n.d			0.70	0.50
3	Cl:Chloride	Mg/L	4	4			250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	n.d			2	1
6	F:Fluoride	Mg/L	0.02	0.12			1.50	
7	Hardness	Mg/L	35	65			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	0.020			0.070	0.250
11	Ni:Nickel	Mg/L	0.006	0.006			0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	0.9			50.0	45.0
13	SO4:Sulfate	Mg/L	2.0	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	n.d	n.d			NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	n.d			0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001			0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002			0.00100	0.00050
21	Se:Selenium	Mg/L	n.d	n.d			0.010	0.010
22	Sr:Strontium	Mg/L	n.d	n.d			NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.31 Community Lernarot
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		8-24	0.9	Not Identified
2	3		72-100	7.0	Not Identified
3	4		12-14	0.9	Not Identified
4	5		12	0.9	Not Identified
5	6		6-8	0.4-0.7	Not Identified
6	7		8-10	0.7-0.9	Not Identified
7	8		16-18	0.6-0.7	Not Identified

No. 31 **Marz** Aragatsotn **Community** Lernarot

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°26'44,5″	44°07'52.0″	2,999	2000	reinforced concrete	3.0	Yes
2	Spring	40°27'57,8″	44°08'01,8″	3,142	2000	reinforced concrete	4.0	Yes
3	Spring	40°24'05,5″	44°07'47,3″	1,950	1975	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	2,500	100	Steel	1.8	2000	Little	Yes
	800	200	Steel				
2	9,000	150	Steel	3.4	2000	Little	Yes
	6,000	200	Steel				
3	2,000	80	Steel	0.5	1975	Medium	Yes
	7,000	100	Steel				

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°21'10,0″	44°06'32,1″	1,810	reinforced concrete	Circle	h=3,5m,d=5r	60	Yes
2	40°21'13,6″	44°06'32.2″	1,830	reinforced concrete	Rectangular	6x14x3,5	250	No

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,800	50	Steel	-	Medium	Yes
2	1,000	100	Steel		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)
7		2002	Yes	100	Yes

9. DRAINAGE SYSTEM

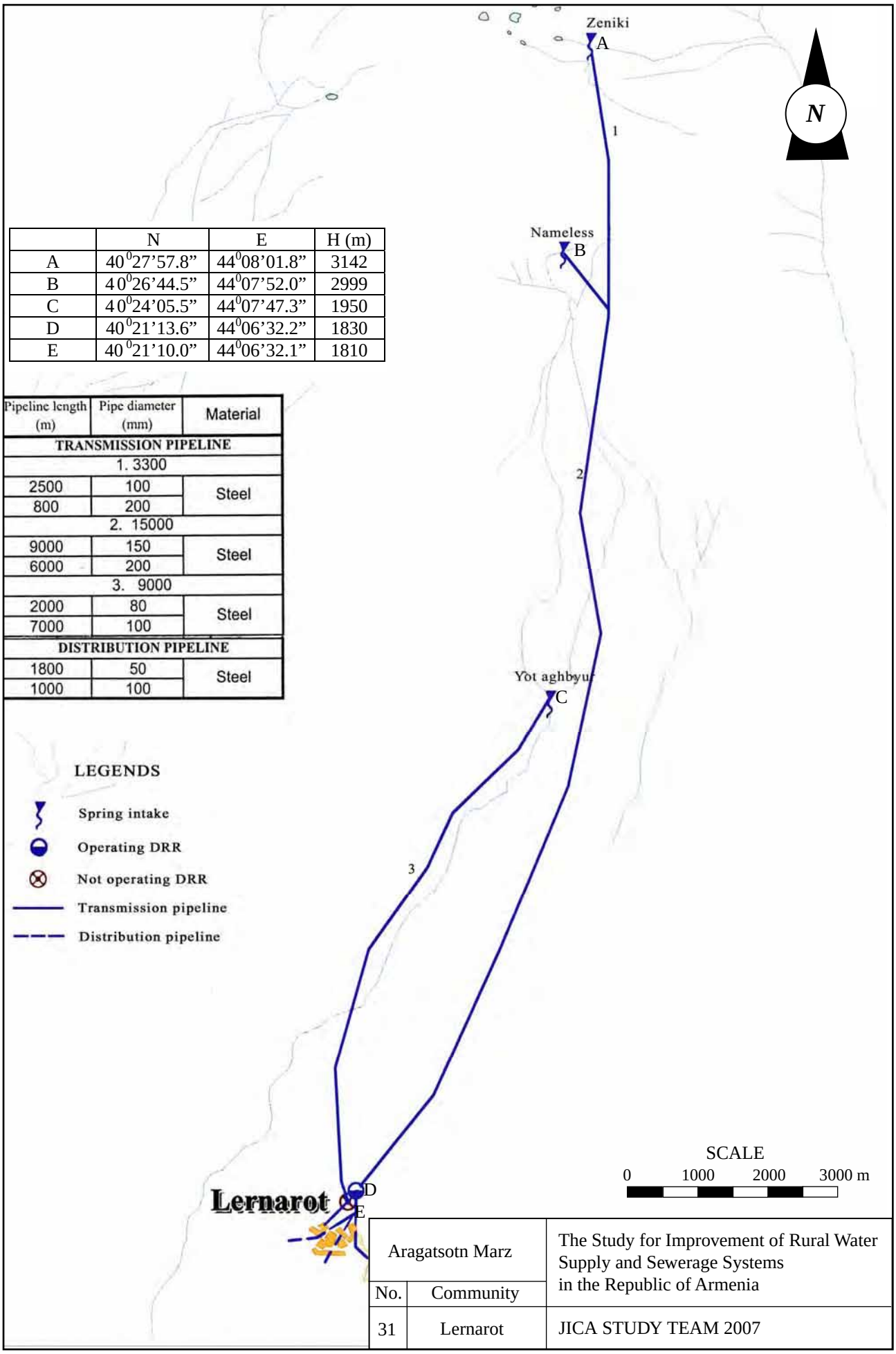
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Aragatsotn**
Number and Name of Community	**No.31 Lernarot**
District	**Ashtarak**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	347
A2	Actual population in 2007	420
A3	Number of households	117
A4.1	Elderly people	90
A4.2	Population in labor force (age from 16 to 62)	233
A4.3	Children	100
A5.1	Pensioners	110
A5.2	Unemployed	0
A5.3	Receiving benefits	23
A6	Average monthly income of household (AMD)	25,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	72
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	3,000
	Annual Budget of the community 2005, in thousand AMD	3,240
	Annual Budget of the community 2006, in thousand AMD	3,455
	Annual Budget of the community 2007, in thousand AMD	2,000
	Annual Budget of the community 2008, in thousand AMD	is not planned.
B2	Amount spent in drinking water sector 2004, in thousand AMD	30
	Amount spent in drinking water sector 2005, in thousand AMD	25
	Amount spent in drinking water sector 2006, in thousand AMD	50
	Amount spent in drinking water sector 2007, in thousand AMD	30
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	yes
D2	Water use permit number	0743
D3	Date of expiry of water use permit	14.06.05-14.06.08
D4	Planned date of obtaining water use permit	
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	117
D8	How many house connection household set the water meter	0
D9	Number of public taps	7
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?	3 hrs n winter
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?	not convenient at all
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)	1,000
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
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	Hovsepyan Andok
E2	Position	administration head
E3	Telephone	(093)195953
E4	Quantity and present condition of the water supply facilities: spring/ intake	7- partially repaired
E5	Quantity and present condition of the water supply facilities:	1 partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-partially repaired, 1is not used
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?	residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	absent
E14	How you prepare O&M costs?	collection from residents in case of emergency
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	30,000
	Others(AMD)	0
	Total (AMD)	30,000
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.	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

Aragatsotn
No.31 Lernarot



	N	E	H (m)
A	40^{0}27'57.8"	44^{0}08'01.8"	3142
B	40^{0}26'44.5"	44^{0}07'52.0"	2999
C	40^{0}24'05.5"	44^{0}07'47.3"	1950
D	40^{0}21'13.6"	44^{0}06'32.2"	1830
E	40^{0}21'10.0"	44^{0}06'32.1"	1810

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 3300		
2500	100	Steel
800	200	
2. 15000		
9000	150	Steel
6000	200	
3. 9000		
2000	80	Steel
7000	100	
DISTRIBUTION PIPELINE		
1800	50	Steel
1000	100	

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

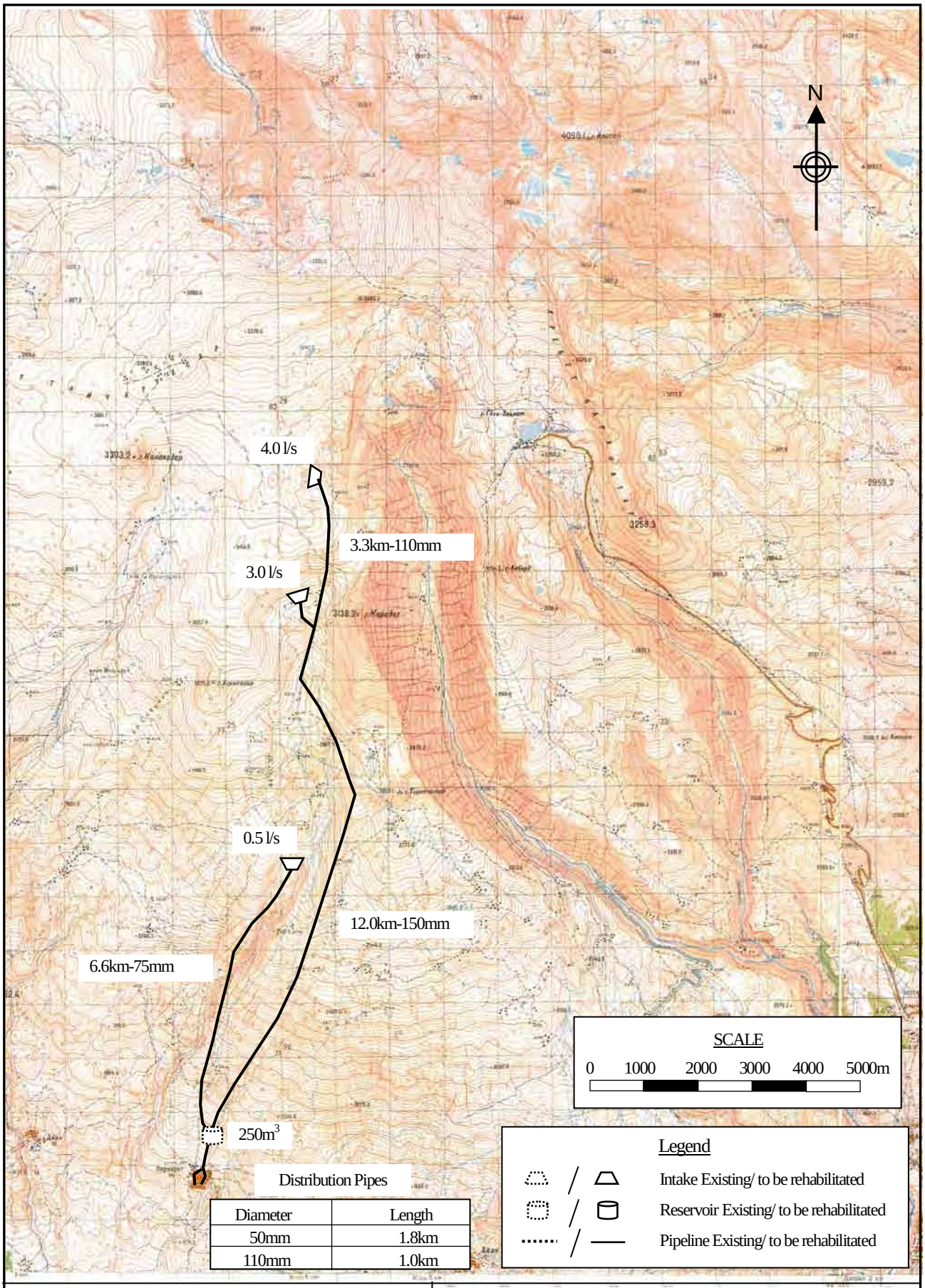
Marz : **Aragatsotn** No.31
Name : **Lernarot**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	420	persons	42.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	72	pupils	0.7	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	117	household	10.2	
	Sub-total			52.9	
	Unaccouted for water (20%)			10.6	
1	Average Daily Water Demand			63.5	m3/day
2	Maximum Daily Water Demand			76.2	m3/day
3	Maximum Hourly Water Demand			14.4	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	3	7.5	lit/sec		648.0	m3/day
`	Total					648.0	m3/day
	2 Required reservoir volume					173	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3	3	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter	6,600	m
	90mm diameter		m
	110mm diameter	3,300	m
	150mm diameter	12,000	m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
4	Distribution pipe		
	50mm diameter	1,800	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	1,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	-	nos
6	Water meter installation	117	nos
7	Public tap	2	nos
8	Chlorination	1	nos
9	Pumps	-	nos



Distribution Pipes

Diameter	Length
50mm	1.8km
110mm	1.0km

Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Aragatsotn	
No. 31	Lernarot	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **31**
Name : **Lernarot**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,103,100
2	Transmission Pipe					
		50mm		m	5,520	
		75mm	6,600	m	7,160	47,256,000
		90mm		m	8,040	
		110mm	3,300	m	9,680	31,944,000
		150mm	12,000	m	13,140	157,680,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					236,880,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					
4	Distribution Pipe					
		50mm	1,800	m	5,520	9,936,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	1,000	m	9,680	9,680,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					19,616,000
5	House Connection			nos	74,000	
6	Water Meter Installation		117	nos	80,000	9,360,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,120	m	3,600	4,032,000
	Total				AMD	271,671,100
					Equivalent to USD	889,209
					Equivalent to JPY	93,811,538
					AMD	USD
	Investment Cost per household		117	HH	2,321,975	7,600
	Investment Cost per person		420	persons	646,836	2,117

ARAGATSOTN MARZ
Talin District
No 31 Lernarot

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		19.3																																							
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		107.87	0.00	0.00	0.31	0.61	0.70	0.72	1.22	1.26	1.30	1.34	2.01	2.08	2.14	2.22	2.29	2.36	2.44	2.52	2.61	2.69	2.78	2.87	2.97	3.07	3.17	3.27	3.38	3.49	3.61	3.72	3.85	3.97	4.11	4.24	4.38	4.53	4.67	4.83	4.99	5.15
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				116																																					
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		5.07			0.03	0.06	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	0.17	0.18	0.18	0.19	0.20	0.20	0.21	0.22	0.22	0.23
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		76.74			0.46	0.95	1.12	1.16	1.20	1.24	1.28	1.32	1.36	1.41	1.45	1.50	1.55	1.60	1.65	1.71	1.77	1.82	1.88	1.95	2.01	2.08	2.14	2.22	2.29	2.36	2.44	2.52	2.61	2.69	2.78	2.87	2.97	3.07	3.17	3.27	3.38	3.49
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					0.46	0.95	1.12	1.16	1.20	1.24	1.28	1.32	1.36	1.41	1.45	1.50	1.55	1.60	1.65	1.71	1.77	1.82	1.88	1.95	2.01	2.08	2.14	2.22	2.29	2.36	2.44	2.52	2.61	2.69	2.78	2.87	2.97	3.07	3.17	3.27	3.38	3.49
5. Pump replacement		0.00																0.00															0.00										
Sub-total		99.51	0.00	0.00	0.73	1.26	1.45	1.50	1.55	1.60	1.65	1.71	1.76	1.82	1.88	1.94	2.00	2.08	2.14	2.21	2.29	2.36	2.43	2.52	2.60	2.69	2.77	2.88	2.96	3.06	3.16	3.27	3.38	3.49	3.60	3.72	3.85	3.97	4.10	4.24	4.37	4.52
C Gross Income (A-B)		8.36	0.00	0.00	-0.42	-0.65	-0.75	-0.78	-0.33	-0.34	-0.35	-0.37	0.25	0.26	0.26	0.28	0.29	0.28	0.30	0.31	0.32	0.33	0.35	0.35	0.37	0.38	0.40	0.39	0.42	0.43	0.45	0.45	0.47	0.48	0.51	0.52	0.53	0.56	0.57	0.59	0.62	0.63
D Depreciation cost		257.95						7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37
E Interest paid		78.16	0.02	0.04	1.44	2.90	3.30	3.32	3.32	3.32	3.32	3.32	3.32	3.22	3.12	3.03	2.93	2.83	2.73	2.63	2.53	2.42	2.32	2.21	2.11	2.00	1.89	1.78	1.67	1.56	1.45	1.33	1.22	1.10	0.98	0.86	0.74	0.62	0.50	0.38	0.25	0.13
F Net Income		-327.75	-0.02	-0.04	-1.86	-3.55	-4.05	-11.47	-11.02	-11.03	-11.04	-11.06	-10.44	-10.33	-10.23	-10.12	-10.01	-9.92	-9.80	-9.69	-9.58	-9.46	-9.34	-9.23	-9.11	-8.99	-8.86	-8.76	-8.62	-8.50	-8.37	-8.25	-8.12	-7.99	-7.84	-7.71	-7.58	-7.43	-7.30	-7.16	-7.00	-6.87
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		-327.75	-0.02	-0.04	-1.86	-3.55	-4.05	-11.47	-11.02	-11.03	-11.04	-11.06	-10.44	-10.33	-10.23	-10.12	-10.01	-9.92	-9.80	-9.69	-9.58	-9.46	-9.34	-9.23	-9.11	-8.99	-8.86	-8.76	-8.62	-8.50	-8.37	-8.25	-8.12	-7.99	-7.84	-7.71	-7.58	-7.43	-7.30	-7.16	-7.00	-6.87
OM Cost Recovery Ratio (A/B)		108%	0%	0%	42%	48%	48%	48%	79%	79%	79%	78%	114%	114%	114%	114%	115%	113%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%

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	-327.75	-0.02	-0.04	-1.86	-3.55	-4.05	-11.47	-11.02	-11.03	-11.04	-11.06	-10.44	-10.33	-10.23	-10.12	-10.01	-9.92	-9.80	-9.69	-9.58	-9.46	-9.34	-9.23	-9.11	-8.99	-8.86	-8.76	-8.62	-8.50	-8.37	-8.25	-8.12	-7.99	-7.84	-7.71	-7.58	-7.43	-7.30	-7.16	-7.00	-6.87
2. Depreciation cost	257.95	0.00	0.00	0.00	0.00	0.00	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37
3. Interest Paid	78.16	0.02	0.04	1.44	2.90	3.30	3.32	3.32	3.32	3.32	3.32	3.32	3.22	3.12	3.03	2.93	2.83	2.73	2.63	2.53	2.42	2.32	2.21	2.11	2.00	1.89	1.78	1.67	1.56	1.45	1.33	1.22	1.10	0.98	0.86	0.74	0.62	0.50	0.38	0.25	0.13
Sub-total	8.36	0.00	0.00	-0.42	-0.65	-0.75	-0.78	-0.33	-0.34	-0.35	-0.37	0.25	0.26	0.26	0.28	0.29	0.28	0.30	0.31	0.32	0.33	0.35	0.35	0.37	0.38	0.40	0.39	0.42	0.43	0.45	0.45	0.47	0.48	0.51	0.52	0.53	0.56	0.57	0.59	0.62	0.63
B Finances																																									
1. Project Loan	331.50	2.36	1.67	140.55	145.05	41.23	0.36	0.28																																	
2. Local fund	113.30	0.79	0.56	47.60	49.80	14.34	0.12	0.09																																	
Sub-total	444.80	3.15	2.23	188.15	194.85	55.57	0.48	0.37																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	3.99	0.00	0.00	0.42	0.65	0.75	0.78	0.33	0.34	0.35	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	397.31	0.02	0.04	1.44	2.90	3.30	3.32	3.32	3.32	3.32	3.32	12.60	12.59	12.58	12.57	12.56	12.57	12.55	12.54	12.53	12.51	12.50	12.49	12.48	12.47	12.44	12.45	12.42	12.42	12.40	12.39	12.38	12.36	12.33	12.32	12.31	12.28	12.27	12.26	12.22	12.22
Sub-total	401.30	0.02	0.04	1.86	3.55	4.05	4.10	3.65	3.66	3.67	3.69	12.60	12.59	12.58	12.57	12.56	12.57	12.55	12.54	12.53	12.51	12.50	12.49	12.48	12.47	12.44	12.45	12.42	12.42	12.40	12.39	12.38	12.36	12.33	12.32	12.31	12.28	12.27	12.26	12.22	12.22
Total Cash Inflow	854.46	3.17	2.27	189.59	197.75	58.87	3.80	3.69	3.32	3.32	3.32	12.85	12.85	12.84	12.85	12.85	12.85	12.85	12.85	12.85	12.84	12.85	12.84	12.85	12.85	12.84	12.84	12.84	12.85	12.85	12.84	12.85	12.84	12.84	12.84	12.84	12.84	12.84	12.84	12.85	12.85
APPLICATION OF FUNDS																																								
D Project disbursement	444.80	3.15	2.23	188.15	194.85	55.57	0.48	0.37																																	
E Total debt services																																								
1. Loan repayment	331.50											9.53	9.63	9.72	9.82	9.92	10.02	10.12	10.22	10.32	10.42	10.53	10.63	10.74	10.85	10.95	11.06	11.17	11.29	11.40	11.51	11.63	11.74	11.86	11.98	12.10	12.22	12.34	12.47	12.59	12.72
2. Interest paid	78.16	0.02	0.04	1.44	2.90	3.30	3.32	3.32	3.32	3.32	3.32	3.32	3.22	3.12	3.03	2.93	2.83	2.73	2.63	2.53	2.42	2.32	2.21	2.11	2.00	1.89	1.78	1.67	1.56	1.45	1.33	1.22	1.10	0.98	0.86	0.74	0.62	0.50	0.38	0.25	0.13
Sub-total	409.66	0.02	0.04	1.44	2.90	3.30	3.32	3.32	3.32	3.32	3.32	12.85	12.85	12.84	12.85	12.85	12.85	12.85	12.85	12.85	12.84	12.85	12.84	12.85	12.85	12.84	12.84	12.84	12.85	12.85	12.84	12.85	12.84	12.84	12.84	12.84	12.84	12.84	12.84	12.85	12.85
Total Cash Outflow	854.46	3.17	2.27	189.59	197.75	58.87	3.80	3.69	3.32	3.32	3.32	12.85	12.85	12.84	12.85	12.85	12.85	12.85	12.85	12.85	12.84	12.85	12.84	12.85	12.85	12.84	12.84	12.84	12.85	12.85	12.84	12.85	12.84	12.84	12.84	12.84	12.84	12.84	12.84	12.85	12.85
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)	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%	4%	5%	5%	5%
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 31 Lernarot

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	107.87	21.2%
	Subsidy	401.30	78.8%
	Total	509.17	100.0%
2	**Expenditure**		
	OM cost	99.51	19.5%
	Loan repayment	331.50	65.1%
	Interest paid	78.16	15.4%
	Surplus cash	0.00	0.0%
	Total	509.17	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	296.43	2.30	1.64	128.23	128.27	35.40	0.33	0.26																																	
2. Operation and Maintenance Cost																																									
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	2.61			0.03	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
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	39.18			0.46	0.92	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Pump replacement																	0.00															0.00									
Sub-total	50.91			0.73	1.22	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Total Outflow	347.34	2.30	1.64	128.96	129.49	36.76	1.69	1.62	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
B BENEFIT																																								
1. Water Tariff	67.76	0.00	0.00	0.31	0.61	0.70	0.72	1.22	1.26	1.30	1.34	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
2. Subsidy	323.14	0.00	0.00	0.42	0.65	0.75	0.78	0.33	0.34	0.35	0.37	9.28	9.37	9.46	9.54	9.63	9.74	9.82	9.91	10.00	10.09	10.18	10.28	10.37	10.47	10.55	10.67	10.75	10.86	10.95	11.06	11.16	11.26	11.35	11.46	11.57	11.66	11.77	11.88	11.97	12.09
Total Inflow	390.90	0.00	0.00	0.73	1.26	1.45	1.50	1.55	1.60	1.65	1.71	11.29	11.38	11.47	11.55	11.64	11.75	11.83	11.92	12.01	12.10	12.19	12.29	12.38	12.48	12.56	12.68	12.76	12.87	12.96	13.07	13.17	13.27	13.36	13.47	13.58	13.67	13.78	13.89	13.98	14.10
NET BENEFIT	43.56	-2.30	-1.64	-128.2	-128.2	-35.3	-0.19	-0.07	0.24	0.29	0.35	9.93	10.02	10.11	10.19	10.28	10.39	10.47	10.56	10.65	10.74	10.83	10.93	11.02	11.12	11.20	11.32	11.40	11.51	11.60	11.71	11.81	11.91	12.00	12.11	12.22	12.31	12.42	12.53	12.62	12.74

FIRR = **0.62%**

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	-87.28	-2.53	-1.80	-141.1	-141.1	-38.9	-0.22	-0.10	0.24	0.29	0.35	9.93	10.02	10.11	10.19	10.28	10.39	10.47	10.56	10.65	10.74	10.83	10.93	11.02	11.12	11.20	11.32	11.40	11.51	11.60	11.71	11.81	11.91	12.00	12.11	12.22	12.31	12.42	12.53	12.62	12.74
	2	Capital cost 20% up	-115.10	-2.76	-1.97	-153.9	-153.9	-42.4	-0.26	-0.12	0.24	0.29	0.35	9.93	10.02	10.11	10.19	10.28	10.39	10.47	10.56	10.65	10.74	10.83	10.93	11.02	11.12	11.20	11.32	11.40	11.51	11.60	11.71	11.81	11.91	12.00	12.11	12.22	12.31	12.42	12.53	12.62	12.74
2	1	OM cost 10% up	-63.01	-2.30	-1.64	-128.3	-128.4	-35.4	-0.33	-0.21	0.10	0.15	0.21	9.79	9.88	9.97	10.05	10.14	10.25	10.33	10.42	10.51	10.60	10.69	10.79	10.88	10.98	11.06	11.18	11.26	11.37	11.46	11.57	11.67	11.77	11.86	11.97	12.08	12.17	12.28	12.39	12.48	12.60
	2	OM cost 20% up	-66.56	-2.30	-1.64	-128.4	-128.5	-35.6	-0.46	-0.34	-0.03	0.02	0.08	9.66	9.75	9.84	9.92	10.01	10.12	10.20	10.29	10.38	10.47	10.56	10.66	10.75	10.85	10.93	11.05	11.13	11.24	11.33	11.44	11.54	11.64	11.73	11.84	11.95	12.04	12.15	12.26	12.35	12.47
3	1	Revenue 10% down	-84.88	-2.30	-1.64	-128.3	-128.4	-35.5	-0.34	-0.23	0.08	0.12	0.18	8.80	8.88	8.96	9.04	9.12	9.22	9.29	9.37	9.45	9.53	9.61	9.70	9.78	9.87	9.94	10.05	10.12	10.22	10.30	10.40	10.49	10.58	10.66	10.76	10.86	10.94	11.04	11.14	11.22	11.33
	2	Revenue 20% down	-110.31	-2.30	-1.64	-128.4	-128.5	-35.6	-0.49	-0.38	-0.08	-0.04	0.01	7.67	7.74	7.82	7.88	7.95	8.04	8.10	8.18	8.25	8.32	8.39	8.47	8.54	8.62	8.69	8.78	8.85	8.94	9.01	9.10	9.18	9.26	9.33	9.42	9.50	9.58	9.66	9.75	9.82	9.92

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.19%	23.12	4.33%
	2	Capital cost 20% up	-0.20%	-40.86	-2.45%
2	1	OM cost 10% up	0.55%	1.29	77.61%
	2	OM cost 20% up	0.48%	2.97	33.67%
3	1	Revenue 10% down	0.07%	83.07	1.20%
	2	Revenue 20% down	-0.54%	-21.40	-4.67%

No.32 Lusaqyugh

Information on Existing Water Sources (Aragatsotn)

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

No.32 Community Lusagyugh
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	Bozkyandaz-1 spring	40	37	18.2	44	24	21.7	2,416	0.8	3.0	1.0
2	Bozkyandaz-2 spring	40	37	19.6	44	24	40.7	2,343	0.3	1.0	0.5
3	Mukgchi spring	40	37	3.8	44	24	21.8	2,235	1.0	2.0	1.0
4	Gzgzan spring	40	37	22.9	44	22	51.3	2,240	1.5	3.0	2.0
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	Transmission pipelines are deteriorated. Community feels poor water quality.
Alternative sources if any	No alternative water sources are available

No.32 Community Lusagyugh
District Aparan
Marz Aragatsotn
Sampling date 11/Aug/2007

	Parameters analysed	Units	No.1 Boz kyan. Dali aghbyur	No.2 grgran aghbyur			Guidelines	
							WHO	Armenia
a	pH		7.9	7.8			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	6	9.4				
c	TDS	Mg/L	19	53			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	0.09	0.05			1.50	
7	Hardness	Mg/L	40	110			500	700
8	Fe:Iron	Mg/L	n.d	0.02			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	n.d			0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	n.d			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	n.d			0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8	1.3			50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	5.0			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	0.0027	0.0027			0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001			0.010	0.030
20	Hg:Mercury	Mg/L	n.d	n.d			0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001			0.010	0.010
22	Sr:Strontium	Mg/L	n.d	n.d			NA	7.0
23	CN:Cyanide	Mg/L	n.d	n.d			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.32 Community Lusagyugh
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			2.3/1; 2.1/1	Not Identified
2	3			0.9	Not Identified
3	4			2.3/1; 2.1/2	Not Identified
4	5			4.3/1; 9/2	Not Identified
5	6			9/2	Identified in 2 sample
6	7			0.0	Not Identified

No. 32 **Marz** Aragatsotn **Community** Lusagyugh

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water main	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°37'18.2″	44°24'41.7″	2,416	1964	reinforced concrete	1.0	Yes
2	Spring	40°37'19.6″	44°24'40.7″	2,343	1964	reinforced concrete	0.5	Yes
3	Spring	40°37'03.8″	44°24'21.8″	2,235	1982	reinforced concrete	1.0	No
4	Spring	40°37'22.9″	44°22'51.3″	2,240	1964	reinforced concrete	2.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	400	100	Steel	0.0	1964	Huge	Yes
	530	50	Steel		1964	Huge	Yes
2	1,700	80	Steel	0.8	1964	Medium	Yes
	150	65	Steel		1964	Medium	Yes
3	1,200	100	Steel	1.4	1964	Medium	Yes
	1,300	100	cast iron		1982	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°36'39.5″	44°23'30.4″	2,079	reinforced concrete	Rectangular	6x12x4	250	No
2	40°36'39.5″	44°23'30.4″	2,079	reinforced concrete	Circle	d=8m, h=4m	200	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	600	100	cast iron	2006	Little	No
2	1,600	100	Steel	2006	Little	No
3	1,050	80	Steel	2006	Little	No
4	1,150	50	Steel	2006	Little	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)
4		2006	Yes	90	No

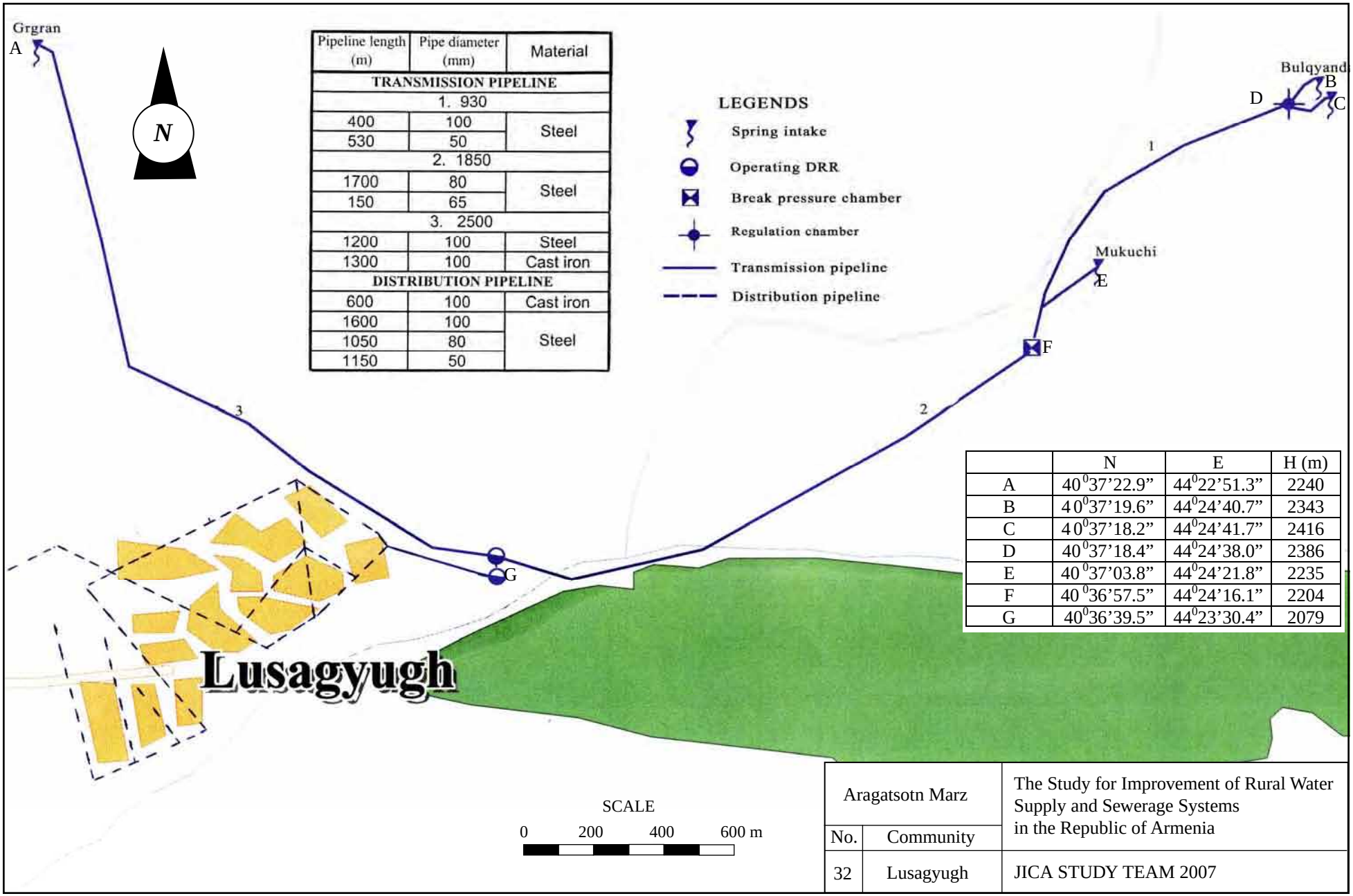
9. DRAINAGE SYSTEM

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.32 Lusagyugh**
District	**Aparan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	886
A2	Actual population in 2007	890
A3	Number of households	247
A4.1	Elderly people	110
A4.2	Population in labor force (age from 16 to 62)	580
A4.3	Children	200
A5.1	Pensioners	130
A5.2	Unemployed	0
A5.3	Receiving benefits	25
A6	Average monthly income of household (AMD)	35,000 - 40,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	128
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	920
	Annual Budget of the community 2005, in thousand AMD	1,850
	Annual Budget of the community 2006, in thousand AMD	2,118
	Annual Budget of the community 2007, in thousand AMD	1,012
	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	470 (50-budget, 420-soc. Invest. fund)
	Amount spent in drinking water sector 2007, in thousand AMD	300
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned.
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	247
D8	How many house connection household set the water meter	0
D9	Number of public taps	2
D10.1	How is the regime of water supply in your community in the dry season?	regularly 3-4 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly 3-4 hrs
D11	What time of day water is given?	8-12,
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	mainly convenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	1,000
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	from the mountains by pipelines
D20	Are you satisfied with irrigation water supply volume?	almost sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Grigoryan Khosrov
E2	Position	water distributor
E3	Telephone	(0252) 24074
E4	Quantity and present condition of the water supply facilities: spring/ intake	2- deteriorated
E5	Quantity and present condition of the water supply facilities:	deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1- rehabilitated .1-is not used
E7	Quantity and present condition of the water supply facilities: net/distribution pipes	rehabilitated·
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	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)	420,000
	Repair cost(AMD)	150,000
	Others(AMD)	0
	Total (AMD)	570,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1. 930		
400	100	Steel
530	50	
2. 1850		
1700	80	Steel
150	65	
3. 2500		
1200	100	Steel
1300	100	Cast iron
DISTRIBUTION PIPELINE		
600	100	Cast iron
1600	100	Steel
1050	80	
1150	50	

	N	E	H (m)
A	$40^0$37’22.9”	$44^0$22’51.3”	2240
B	$40^0$37’19.6”	$44^0$24’40.7”	2343
C	$40^0$37’18.2”	$44^0$24’41.7”	2416
D	$40^0$37’18.4”	$44^0$24’38.0”	2386
E	$40^0$37’03.8”	$44^0$24’21.8”	2235
F	$40^0$36’57.5”	$44^0$24’16.1”	2204
G	$40^0$36’39.5”	$44^0$23’30.4”	2079

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	
32	Lusagyugh	JICA STUDY TEAM 2007

Marz : **Aragatsotn** No.32
Name : **Lusagyugh**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	890	persons	89.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	128	pupils	1.3	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	247	household	21.5	
	Sub-total			111.8	
	Unaccouted for water (20%)			22.4	
1	Average Daily Water Demand			134.2	m3/day
2	Maximum Daily Water Demand			161.0	m3/day
3	Maximum Hourly Water Demand			19.2	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	4	4.5	lit/sec		388.8	m3/day
`	Total					388.8	m3/day
	2 Required reservoir volume					230	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**			
	No Item	Quantity	Unit	
	1 Intake			
	1m3	3	nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
	2 Transmission pipe			
	50mm diameter		m	
	75mm diameter	1,300	m	
	90mm diameter	4,400	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		nos	
	6 Water meter installation	247	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. 32	Lusagyugh	JICA STUDY TEAM

Marz : **Aragatsotn**
No. : **32**
Name : **Lusagyugh**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,103,100
2	Transmission Pipe					
		50mm		m	5,520	
		75mm	1,300	m	7,160	9,308,000
		90mm	4,400	m	8,040	35,376,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					44,684,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		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			nos	74,000	
6	Water Meter Installation		247	nos	80,000	19,760,000
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		m	3,600	
	Total				AMD	66,317,100
					Equivalent to USD	217,063
					Equivalent to JPY	22,900,151
					AMD	USD
	Investment Cost per household		247	HH	268,490	879
	Investment Cost per person		890	persons	74,514	244

ARAGATSOTN MARZ
Aparan District
No 32 Lusagyugh

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		40.8																																							
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		227.79	0.00	0.00	0.60	1.20	1.47	1.52	2.57	2.66	2.74	2.83	4.25	4.39	4.53	4.68	4.84	5.00	5.16	5.33	5.51	5.69	5.88	6.07	6.27	6.48	6.69	6.91	7.14	7.38	7.62	7.87	8.13	8.40	8.68	8.96	9.26	9.56	9.88	10.21	10.54	10.89
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				245																																				
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		10.71			0.06	0.12	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	0.20	0.21	0.22	0.22	0.23	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49
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		24.81			0.14	0.29	0.36	0.37	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	0.69	0.72	0.74	0.77	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.03	1.06	1.09	1.13
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	0.29	0.36	0.37	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	0.69	0.72	0.74	0.77	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.03	1.06	1.09	1.13
5. Pump replacement		0.00																0.00															0.00									
Sub-total		53.22	0.00	0.00	0.44	0.66	0.78	0.79	0.83	0.85	0.88	0.91	0.94	0.98	1.00	1.04	1.07	1.11	1.15	1.18	1.22	1.27	1.30	1.34	1.39	1.43	1.48	1.54	1.58	1.64	1.69	1.75	1.80	1.87	1.93	1.99	2.06	2.12	2.19	2.27	2.33	2.42
C Gross Income (A-B)		174.57	0.00	0.00	0.16	0.54	0.69	0.73	1.74	1.81	1.86	1.92	3.31	3.41	3.53	3.64	3.77	3.89	4.01	4.15	4.29	4.42	4.58	4.73	4.88	5.05	5.21	5.37	5.56	5.74	5.93	6.12	6.33	6.53	6.75	6.97	7.20	7.44	7.69	7.94	8.21	8.47
D Depreciation cost		63.00						1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
E Interest paid		20.90	0.02	0.04	0.37	0.72	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.86	0.84	0.81	0.78	0.76	0.73	0.70	0.68	0.65	0.62	0.59	0.56	0.53	0.51	0.48	0.45	0.42	0.39	0.36	0.33	0.29	0.26	0.23	0.20	0.17	0.13	0.10	0.07	0.03
F Net Income		90.67	-0.02	-0.04	-0.21	-0.18	-0.19	-1.96	-0.95	-0.88	-0.83	-0.77	0.62	0.75	0.89	1.03	1.19	1.33	1.48	1.65	1.81	1.97	2.16	2.34	2.52	2.72	2.90	3.09	3.31	3.52	3.74	3.96	4.20	4.44	4.69	4.94	5.20	5.47	5.76	6.04	6.34	6.64
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		90.67	-0.02	-0.04	-0.21	-0.18	-0.19	-1.96	-0.95	-0.88	-0.83	-0.77	0.62	0.75	0.89	1.03	1.19	1.33	1.48	1.65	1.81	1.97	2.16	2.34	2.52	2.72	2.90	3.09	3.31	3.52	3.74	3.96	4.20	4.44	4.69	4.94	5.20	5.47	5.76	6.04	6.34	6.64
OM Cost Recovery Ratio (A/B)		428%	0%	0%	136%	181%	188%	192%	310%	313%	311%	311%	452%	448%	453%	450%	452%	450%	449%	452%	452%	448%	452%	453%	451%	453%	452%	449%	452%	450%	451%	450%	452%	449%	450%	450%	450%	451%	451%	450%	452%	450%

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	90.67	-0.02	-0.04	-0.21	-0.18	-0.19	-1.96	-0.95	-0.88	-0.83	-0.77	0.62	0.75	0.89	1.03	1.19	1.33	1.48	1.65	1.81	1.97	2.16	2.34	2.52	2.72	2.90	3.09	3.31	3.52	3.74	3.96	4.20	4.44	4.69	4.94	5.20	5.47	5.76	6.04	6.34	6.64
2. Depreciation cost	63.00	0.00	0.00	0.00	0.00	0.00	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
3. Interest Paid	20.90	0.02	0.04	0.37	0.72	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.86	0.84	0.81	0.78	0.76	0.73	0.70	0.68	0.65	0.62	0.59	0.56	0.53	0.51	0.48	0.45	0.42	0.39	0.36	0.33	0.29	0.26	0.23	0.20	0.17	0.13	0.10	0.07	0.03
Sub-total	174.57	0.00	0.00	0.16	0.54	0.69	0.73	1.74	1.81	1.86	1.92	3.31	3.41	3.53	3.64	3.77	3.89	4.01	4.15	4.29	4.42	4.58	4.73	4.88	5.05	5.21	5.37	5.56	5.74	5.93	6.12	6.33	6.53	6.75	6.97	7.20	7.44	7.69	7.94	8.21	8.47
B Finances																																									
1. Project Loan	88.69	2.36	1.67	33.70	34.61	15.71	0.36	0.28																																	
2. Local fund	30.29	0.79	0.56	11.41	11.86	5.46	0.12	0.09																																	
Sub-total	118.98	3.15	2.23	45.11	46.47	21.17	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	0.96	0.02	0.04	0.21	0.18	0.19	0.16	0.00	0.00	0.00	0.00	0.13	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
Sub-total	0.96	0.02	0.04	0.21	0.18	0.19	0.16	0.00	0.00	0.00	0.00	0.13	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
Total Cash Inflow	294.51	3.17	2.27	45.48	47.19	22.05	1.37	2.11	1.81	1.86	1.92	3.44	3.44	3.53	3.64	3.77	3.89	4.01	4.15	4.29	4.42	4.58	4.73	4.88	5.05	5.21	5.37	5.56	5.74	5.93	6.12	6.33	6.53	6.75	6.97	7.20	7.44	7.69	7.94	8.21	8.47
APPLICATION OF FUNDS																																									
D Project disbursement	118.98	3.15	2.23	45.11	46.47	21.17	0.48	0.37																																	
E Total debt services																																									
1. Loan repayment	88.69											2.55	2.58	2.60	2.63	2.65	2.68	2.71	2.73	2.76	2.79	2.82	2.84	2.87	2.90	2.93	2.96	2.99	3.02	3.05	3.08	3.11	3.14	3.17	3.21	3.24	3.27	3.30	3.34	3.37	3.40
2. Interest paid	20.90	0.02	0.04	0.37	0.72	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.86	0.84	0.81	0.78	0.76	0.73	0.70	0.68	0.65	0.62	0.59	0.56	0.53	0.51	0.48	0.45	0.42	0.39	0.36	0.33	0.29	0.26	0.23	0.20	0.17	0.13	0.10	0.07	0.03
Sub-total	109.59	0.02	0.04	0.37	0.72	0.88	0.89	0.89	0.89	0.89	0.89	3.44	3.44	3.44	3.44	3.43	3.44	3.44	3.43	3.44	3.44	3.44	3.43	3.43	3.43	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.43	3.43	3.44	3.44	3.44	3.43	3.44	3.44	3.43
Total Cash Outflow	228.57	3.17	2.27	45.48	47.19	22.05	1.37	1.26	0.89	0.89	0.89	3.44	3.44	3.44	3.44	3.43	3.44	3.44	3.43	3.44	3.44	3.44	3.43	3.43	3.43	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.43	3.43	3.44	3.44	3.44	3.43	3.44	3.44	3.43
F Net Surplus Cash (A+C2)-E	65.94	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.92	0.97	1.03	0.00	0.00	0.09	0.20	0.34	0.45	0.57	0.72	0.85	0.98	1.14	1.30	1.45	1.62	1.77	1.93	2.12	2.30	2.49	2.68	2.89	3.10	3.32	3.53	3.76	4.00	4.26	4.50	4.77	5.04
Project Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	159%	0%	0%	43%	75%	78%	82%	196%	203%	209%	216%	96%	99%	103%	106%	110%	113%	117%	121%	125%	128%	133%	138%	142%	147%	151%	156%	162%	167%	172%	178%	184%	190%	197%	203%	209%	216%	224%	231%	239%	247%
Cost recovery by water fee + subsidy ((A+C2)/E)	160%	100%	100%	100%	100%	100%	100%	196%	203%	209%	216%	100%	100%	103%	106%	110%	113%	117%	121%	125%	128%	133%	138%	142%	147%	151%	156%	162%	167%	172%	178%	184%	190%	197%	203%	209%	216%	224%	231%	239%	247%

ARAGATSOTN MARZ
Aparan District
No 32 Lusagyugh

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	227.79	99.6%
	Subsidy	0.96	0.4%
	Total	228.75	100.0%
2	**Expenditure**		
	OM cost	53.22	23.3%
	Loan repayment	88.69	38.8%
	Interest paid	20.90	9.1%
	Surplus cash	65.94	28.8%
	Total	228.75	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	79.52	2.30	1.64	30.80	30.67	13.52	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	5.58			0.06	0.12	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
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	12.66			0.14	0.28	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Pump replacement																	0.00															0.00										
Sub-total	27.36			0.44	0.64	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Total Outflow	106.88	2.30	1.64	31.24	31.31	14.25	1.06	0.99	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
B BENEFIT																																								
1. Water Tariff	143.09	0.00	0.00	0.60	1.20	1.47	1.52	2.57	2.66	2.74	2.83	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2. Subsidy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	143.09	0.00	0.00	0.60	1.20	1.47	1.52	2.57	2.66	2.74	2.83	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
NET BENEFIT	36.21	-2.30	-1.64	-30.6	-30.1	-12.8	0.46	1.58	1.93	2.01	2.10	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52

FIRR = **1.96%**

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	-4.61	-2.53	-1.80	-33.7	-33.2	-14.1	0.43	1.55	1.93	2.01	2.10	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52
	2	Capital cost 20% up	-12.07	-2.76	-1.97	-36.8	-36.2	-15.5	0.39	1.53	1.93	2.01	2.10	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52
2	1	OM cost 10% up	0.94	-2.30	-1.64	-30.7	-30.2	-12.9	0.39	1.51	1.86	1.94	2.03	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45
	2	OM cost 20% up	-0.96	-2.30	-1.64	-30.7	-30.2	-12.9	0.31	1.43	1.78	1.86	1.95	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37
3	1	Revenue 10% down	-6.80	-2.30	-1.64	-30.7	-30.2	-12.9	0.31	1.32	1.66	1.74	1.82	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
	2	Revenue 20% down	-16.46	-2.30	-1.64	-30.8	-30.3	-13.1	0.16	1.07	1.40	1.46	1.53	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	1.44%	3.60	27.75%
	2	Capital cost 20% up	0.98%	10.00	10.00%
2	1	OM cost 10% up	1.82%	0.76	132.35%
	2	OM cost 20% up	1.68%	1.64	60.82%
3	1	Revenue 10% down	1.24%	5.79	17.26%
	2	Revenue 20% down	0.45%	33.24	3.01%