No.7 Itsakar

Information on Existing Water Sources (Tavush)

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

No.7 Community Itsaqar
District Idjevan
Marz Tavush

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Berd water main pipeline	40	50	57.4	45	19	16.0	1,605	5.0	5.0	3.0
2											
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

Latitude, Longitude, Atitude: *Measured at site*

Yield (Min, Max): *Interviewed to the Community*

Yield (at site): *Measured / estimated at site in summer of 2007*

Users Acceptnce for water quality	Acceptable
Notes	
Alternative sources if any	No alternative source will be required if the network is to be improved and service is to be regulated.

No.7 Community Itsaqar
District Idjevan
Marz Tavush
Sampling date 1/Sep/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		8.6				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	16.1					
c	TDS	Mg/L	32				1000	1000
1	Al:Aluminum	Mg/L	n.d.				0.10	0.50
2	B:Boron	Mg/L	n.d.				0.70	0.50
3	Cl:Chloride	Mg/L	4				250	350
4	Cr:Chrome	Mg/L	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d.				2	1
6	F:Fluoride	Mg/L	0.02				1.50	
7	Hardness	Mg/L	70				500	700
8	Fe:Iron	Mg/L	n.d.				0.30	0.30
9	Mn:Manganese	Mg/L	n.d.				0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d.				0.070	0.250
11	Ni:Nickel	Mg/L	n.d.				0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9				50.0	45.0
13	SO4:Sulfate	Mg/L	3.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d.				3.0	5.0
15	As:Arsenic	Mg/L	n.d.				0.0	0.1
16	Ba:Barium	Mg/L	<0.01				0.70	0.10
17	Be:Berillium	Mg/L	n.d.				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d.				0.0030	0.0010
19	Pb:Lead	Mg/L	0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d.				0.00100	0.00050
21	Se:Selenium	Mg/L	0.003				0.010	0.010
22	Sr:Strontium	Mg/L	n.d.				NA	7.0
23	CN:Cyanide	Mg/L	n.d.				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.7 Community Itsaqar
District Tavush
Marz Tavush

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	7	08	11	9.0	Not Identified
2	7	19	17	2.1	Identified
3	8	27	11	9.3	Not Identified
4			7	7.5	Not Identified
5			17	2.3	Identified
6			36	2.1	Identified
7			15	9.0	Identified
8			24	2.3	Identified

No. 7 **Marz** Tavush **Community** Itsakar

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Existing pipeline	40°50′57.4″	45°19′16.0″	1,605	1965	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	2,200	75	Polyethylene	3.0	2003		No
	700	80	Steel		1991	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°52′15.3″	45°19′04.6″	1,515	Concrete	Rectangular	5x12x3	150	Yes

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,000	50	Steel	1991	Huge	Yes
2	500	40	Steel		Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

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

9. DRAINAGE SYSTEM

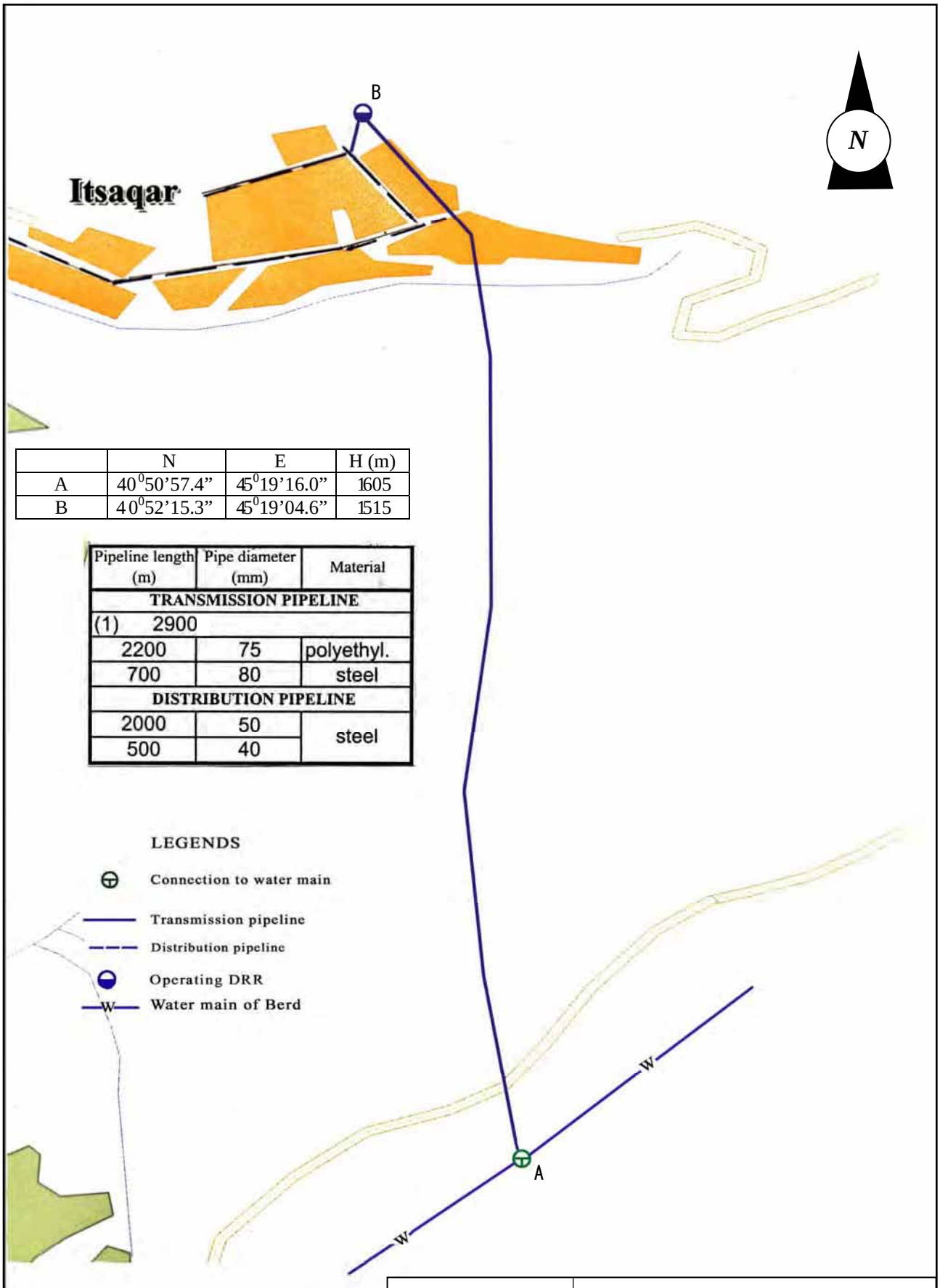
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Tavush**
Number and Name of Community	**No.7 Itsakar**
District	**Tavush**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	387
A2	Actual population in 2007	402
A3	Number of households	121
A4.1	Elderly people	149
A4.2	Population in labor force (age from 16 to 62)	147
A4.3	Children	104
A5.1	Pensioners	82
A5.2	Unemployed	21
A5.3	Receiving benefits	31
A6	Average monthly income of household (AMD)	10,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	61
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,100
	Annual Budget of the community 2005, in thousand AMD	1,210
	Annual Budget of the community 2006, in thousand AMD	1,140
	Annual Budget of the community 2007, in thousand AMD	1,168
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	68
	Amount spent in drinking water sector 2005, in thousand AMD	72
	Amount spent in drinking water sector 2006, in thousand AMD	48
	Amount spent in drinking water sector 2007, in thousand AMD	54
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	cereals, dairy, meat, agricultural products
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	8
D8	How many house connection household set the water meter	0
D9	Number of public taps	0
D10.1	How is the regime of water supply in your community in the dry season?	irregularly, once in 2days 8hrs
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?	13^{00}-21^{00}
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)	difficult to answer
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	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 1- Flate rate, 2- Having water tariff	-
D19	Where do you acquire the irrigation water?	absent
D20	Are you satisfied with irrigation water supply volume?	absent
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Ardinyan Armen
E2	Position	water distributor
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-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
E7	Quantity and present condition of the water supply facilities: net/distribution	absent
E8	Quantity and present condition of the water supply facilities: public tap	absent
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	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 head
E14	How you prepare O&M costs?	donation from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	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, reduce 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

Tavush
No.7 Itsakar



	N	E	H (m)
A	$40^0$50'57.4"	$45^0$19'16.0"	1605
B	$40^0$52'15.3"	$45^0$19'04.6"	1515

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 2900		
2200	75	polyethyl.
700	80	steel
DISTRIBUTION PIPELINE		
2000	50	steel
500	40	

LEGENDS

- Connection to water main
- Transmission pipeline
- Distribution pipeline
- Operating DRR
- W — Water main of Berd

SCALE

0 1 2 3 4 5 km

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

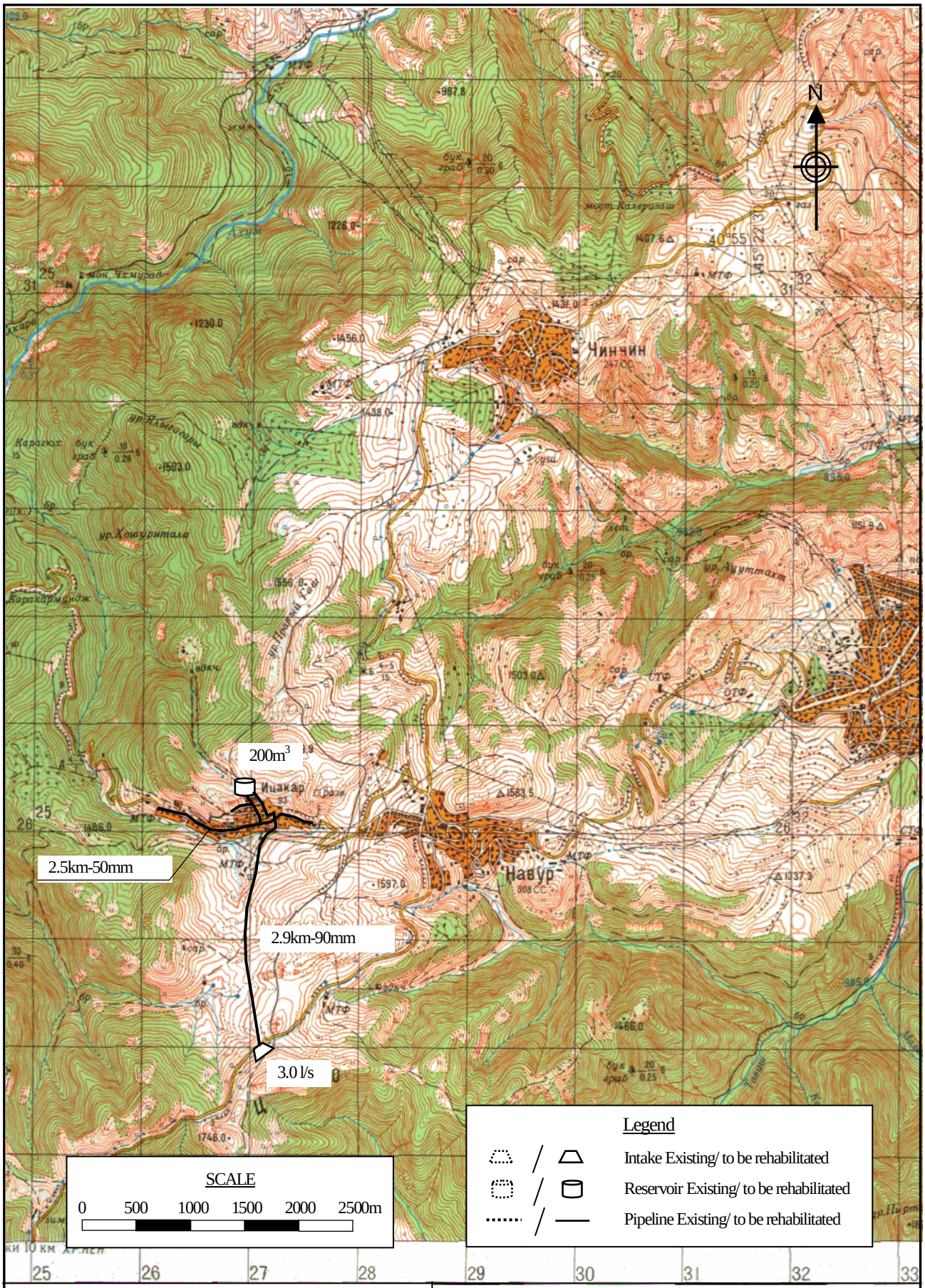
Marz : **Tavush** No.7
Name : **Itsakar**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	402	persons	40.2	
	2 Factory	-	nos	0.0	
	3 School (pupils)	61	pupils	0.6	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	121	household	10.5	
	Sub-total			51.3	
	Unaccouted for water (20%)			10.3	
1	Average Daily Water Demand			61.6	m3/day
2	Maximum Daily Water Demand			73.9	m3/day
3	Maximum Hourly Water Demand			14.0	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	3.0	lit/sec		259.2	m3/day
`	Total					259.2	m3/day
	2 Required reservoir volume					168	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3	1	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	2,900	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	200m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	2,500	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	113	nos
6	Water meter installation	121	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	Tavush	
No. 07	Itsakar	JICA STUDY TEAM

Marz : **Tavush**
No. : **7**
Name : **Itsakar**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	1	nos	367,700	367,700
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					367,700
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	2,900	m	8,040	23,316,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					23,316,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	1	nos	22,524,600	22,524,600
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					22,524,600
4	Distribution Pipe					
		50mm	2,500	m	5,520	13,800,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					13,800,000
5	House Connection		113	nos	74,000	8,362,000
6	Water Meter Installation		121	nos	80,000	9,680,000
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	1,000	m	3,600	3,600,000
	Total				AMD	82,330,300
					Equivalent to USD	269,476
					Equivalent to JPY	28,429,715
					AMD	USD
	Investment Cost per household		121	HH	680,416	2,227
	Investment Cost per person		402	persons	204,802	670

TAVUSH MARZ
Ijevan District
No 7 Itsakar

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		18.7																																							
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		104.17	0.00	0.00	0.00	0.47	0.67	0.70	1.18	1.22	1.26	1.30	1.95	2.01	2.08	2.15	2.22	2.29	2.37	2.45	2.53	2.61	2.70	2.79	2.88	2.97	3.07	3.17	3.28	3.38	3.50	3.61	3.73	3.85	3.98	4.11	4.25	4.39	4.53	4.68	4.84	5.00
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				113																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		4.91			0.00	0.05	0.07	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.19	0.19	0.20	0.20	0.21	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		13.94			0.00	0.14	0.20	0.21	0.22	0.22	0.23	0.24	0.25	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.41	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0	0.14	0.20	0.21	0.22	0.22	0.23	0.24	0.25	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.41	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63
5. Pump replacement		0.00																0.00															0.00									
Sub-total		36.55	0.00	0.00	0.24	0.44	0.53	0.54	0.57	0.58	0.60	0.63	0.65	0.66	0.68	0.71	0.73	0.76	0.79	0.81	0.83	0.87	0.89	0.92	0.95	0.98	1.02	1.05	1.08	1.12	1.16	1.20	1.24	1.28	1.32	1.37	1.41	1.45	1.49	1.55	1.60	1.66
C Gross Income (A-B)		67.81	0.00	0.00	-0.24	0.03	0.14	0.16	0.61	0.64	0.66	0.67	1.30	1.35	1.40	1.44	1.49	1.53	1.58	1.64	1.70	1.74	1.81	1.87	1.93	1.99	2.05	2.12	2.20	2.26	2.34	2.41	2.49	2.57	2.66	2.74	2.84	2.94	3.04	3.13	3.24	3.34
D Depreciation cost		78.05						2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
E Interest paid		26.62	0.04	0.07	0.10	0.82	1.14	1.15	1.15	1.15	1.15	1.15	1.15	1.12	1.09	1.05	1.02	0.98	0.95	0.91	0.88	0.84	0.81	0.77	0.73	0.69	0.66	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
F Net Income		-36.86	-0.04	-0.07	-0.34	-0.79	-1.00	-3.22	-2.77	-2.74	-2.72	-2.71	-2.08	-2.00	-1.92	-1.84	-1.76	-1.68	-1.60	-1.50	-1.41	-1.33	-1.23	-1.13	-1.03	-0.93	-0.84	-0.73	-0.61	-0.51	-0.39	-0.28	-0.16	-0.04	0.09	0.21	0.35	0.49	0.64	0.77	0.92	1.07
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		-36.86	-0.04	-0.07	-0.34	-0.79	-1.00	-3.22	-2.77	-2.74	-2.72	-2.71	-2.08	-2.00	-1.92	-1.84	-1.76	-1.68	-1.60	-1.50	-1.41	-1.33	-1.23	-1.13	-1.03	-0.93	-0.84	-0.73	-0.61	-0.51	-0.39	-0.28	-0.16	-0.04	0.09	0.21	0.35	0.49	0.64	0.77	0.92	1.07
OM Cost Recovery Ratio (A/B)		285%	0%	0%	0%	107%	126%	130%	207%	210%	210%	206%	300%	305%	306%	303%	304%	301%	300%	302%	305%	300%	303%	303%	303%	303%	301%	302%	304%	302%	302%	301%	301%	301%	302%	300%	301%	303%	304%	302%	303%	301%

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	-36.86	-0.04	-0.07	-0.34	-0.79	-1.00	-3.22	-2.77	-2.74	-2.72	-2.71	-2.08	-2.00	-1.92	-1.84	-1.76	-1.68	-1.60	-1.50	-1.41	-1.33	-1.23	-1.13	-1.03	-0.93	-0.84	-0.73	-0.61	-0.51	-0.39	-0.28	-0.16	-0.04	0.09	0.21	0.35	0.49	0.64	0.77	0.92	1.07
2. Depreciation cost	78.05	0.00	0.00	0.00	0.00	0.00	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
3. Interest Paid	26.62	0.04	0.07	0.10	0.82	1.14	1.15	1.15	1.15	1.15	1.15	1.15	1.12	1.09	1.05	1.02	0.98	0.95	0.91	0.88	0.84	0.81	0.77	0.73	0.69	0.66	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
Sub-total	67.81	0.00	0.00	-0.24	0.03	0.14	0.16	0.61	0.64	0.66	0.67	1.30	1.35	1.40	1.44	1.49	1.53	1.58	1.64	1.70	1.74	1.81	1.87	1.93	1.99	2.05	2.12	2.20	2.26	2.34	2.41	2.49	2.57	2.66	2.74	2.84	2.94	3.04	3.13	3.24	3.34
B Finances																																									
1. Project Loan	115.23	3.91	2.79	3.72	72.12	31.66	0.58	0.45																																	
2. Local fund	38.68	1.29	0.91	1.25	24.27	10.83	0.07	0.06																																	
Sub-total	153.91	5.20	3.70	4.97	96.39	42.49	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.24	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	73.79	0.04	0.07	0.10	0.79	1.00	0.99	0.54	0.51	0.49	0.48	3.16	3.12	3.07	3.02	2.98	2.93	2.89	2.82	2.77	2.72	2.66	2.60	2.53	2.47	2.42	2.35	2.26	2.20	2.12	2.05	1.97	1.89	1.80	1.72	1.63	1.53	1.42	1.33	1.23	1.12
Sub-total	74.03	0.04	0.07	0.34	0.79	1.00	0.99	0.54	0.51	0.49	0.48	3.16	3.12	3.07	3.02	2.98	2.93	2.89	2.82	2.77	2.72	2.66	2.60	2.53	2.47	2.42	2.35	2.26	2.20	2.12	2.05	1.97	1.89	1.80	1.72	1.63	1.53	1.42	1.33	1.23	1.12
Total Cash Inflow	295.75	5.24	3.77	5.07	97.21	43.63	1.80	1.66	1.15	1.15	1.15	4.46	4.47	4.47	4.46	4.47	4.46	4.47	4.46	4.47	4.46	4.47	4.47	4.46	4.46	4.47	4.47	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.47	4.47	4.46	4.46	4.47	4.46
APPLICATION OF FUNDS																																								
D Project disbursement	153.91	5.20	3.70	4.97	96.39	42.49	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	115.22											3.31	3.35	3.38	3.41	3.45	3.48	3.52	3.55	3.59	3.62	3.66	3.70	3.73	3.77	3.81	3.85	3.88	3.92	3.96	4.00	4.04	4.08	4.12	4.16	4.21	4.25	4.29	4.33	4.38	4.42
2. Interest paid	26.62	0.04	0.07	0.10	0.82	1.14	1.15	1.15	1.15	1.15	1.15	1.15	1.12	1.09	1.05	1.02	0.98	0.95	0.91	0.88	0.84	0.81	0.77	0.73	0.69	0.66	0.62	0.58	0.54	0.50	0.46	0.42	0.38	0.34	0.30	0.26	0.22	0.17	0.13	0.09	0.04
Sub-total	141.84	0.04	0.07	0.10	0.82	1.14	1.15	1.15	1.15	1.15	1.15	4.46	4.47	4.47	4.46	4.47	4.46	4.47	4.46	4.47	4.46	4.47	4.47	4.46	4.46	4.47	4.47	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.47	4.47	4.46	4.46	4.47	4.46
Total Cash Outflow	295.75	5.24	3.77	5.07	97.21	43.63	1.80	1.66	1.15	1.15	1.15	4.46	4.47	4.47	4.46	4.47	4.46	4.47	4.46	4.47	4.46	4.47	4.47	4.46	4.46	4.47	4.47	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.47	4.47	4.46	4.46	4.47	4.46
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)	48%	0%	0%	0%	4%	12%	14%	53%	56%	57%	58%	29%	30%	31%	32%	33%	34%	35%	37%	38%	39%	40%	42%	43%	45%	46%	47%	49%	51%	52%	54%	56%	58%	60%	61%	64%	66%	68%	70%	72%	75%
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%

TAVUSH MARZ
Ijevan District
No 7 Itsakar

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	104.17	58.5%
	Subsidy	74.03	41.5%
	Total	178.20	100.0%
2	**Expenditure**		
	OM cost	36.36	20.4%
	Loan repayment	115.22	64.7%
	Interest paid	26.62	14.9%
	Surplus cash	0.00	0.0%
	Total	178.20	100.0%

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

Description	Total	Year																																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																								
1. Investment Cost	102.01	3.82	2.73	3.51	63.84	27.16	0.53	0.42																																
2. Operation and Maintenance Cost																																								
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	2.57			0.00	0.05	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	6.97			0.00	0.13	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Pump replacement																	0.00															0.00									
Sub-total	18.66			0.24	0.42	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Total Outflow	120.67	3.82	2.73	3.75	64.26	27.66	1.03	0.92	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
B BENEFIT																																								
1. Water Tariff	65.30	0.00	0.00	0.00	0.47	0.67	0.70	1.18	1.22	1.26	1.30	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
2. Subsidy	50.32	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.01	2.00	1.98	1.97	1.96	1.95	1.94	1.91	1.89	1.88	1.85	1.83	1.80	1.78	1.76	1.73	1.68	1.66	1.62	1.59	1.55	1.51	1.46	1.42	1.37	1.31	1.25	1.20	1.14	1.08
Total Inflow	115.62	0.00	0.00	0.24	0.47	0.67	0.70	1.18	1.22	1.26	1.30	3.96	3.95	3.93	3.92	3.91	3.90	3.89	3.86	3.84	3.83	3.80	3.78	3.75	3.73	3.71	3.68	3.63	3.61	3.57	3.54	3.50	3.46	3.41	3.37	3.32	3.26	3.20	3.15	3.09	3.03
NET BENEFIT	-5.05	-3.82	-2.73	-3.5	-63.8	-27.0	-0.33	0.26	0.72	0.76	0.80	3.46	3.45	3.43	3.42	3.41	3.40	3.39	3.36	3.34	3.33	3.30	3.28	3.25	3.23	3.21	3.18	3.13	3.11	3.07	3.04	3.00	2.96	2.91	2.87	2.82	2.76	2.70	2.65	2.59	2.53

FIRR = -0.25%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-40.03	-4.20	-3.00	-3.9	-70.2	-29.7	-0.38	0.22	0.72	0.76	0.80	3.46	3.45	3.43	3.42	3.41	3.40	3.39	3.36	3.34	3.33	3.30	3.28	3.25	3.23	3.21	3.18	3.13	3.11	3.07	3.04	3.00	2.96	2.91	2.87	2.82	2.76	2.70	2.65	2.59	2.53
	2	Capital cost 20% up	-49.53	-4.58	-3.28	-4.2	-76.6	-32.4	-0.44	0.18	0.72	0.76	0.80	3.46	3.45	3.43	3.42	3.41	3.40	3.39	3.36	3.34	3.33	3.30	3.28	3.25	3.23	3.21	3.18	3.13	3.11	3.07	3.04	3.00	2.96	2.91	2.87	2.82	2.76	2.70	2.65	2.59	2.53
2	1	OM cost 10% up	-31.83	-3.82	-2.73	-3.5	-63.8	-27.0	-0.38	0.21	0.67	0.71	0.75	3.41	3.40	3.38	3.37	3.36	3.35	3.34	3.31	3.29	3.28	3.25	3.23	3.20	3.18	3.16	3.13	3.08	3.06	3.02	2.99	2.95	2.91	2.86	2.82	2.77	2.71	2.65	2.60	2.54	2.48
	2	OM cost 20% up	-33.13	-3.82	-2.73	-3.6	-63.9	-27.1	-0.43	0.16	0.62	0.66	0.70	3.36	3.35	3.33	3.32	3.31	3.30	3.29	3.26	3.24	3.23	3.20	3.18	3.15	3.13	3.11	3.08	3.03	3.01	2.97	2.94	2.90	2.86	2.81	2.77	2.72	2.66	2.60	2.55	2.49	2.43
3	1	Revenue 10% down	-38.28	-3.82	-2.73	-3.5	-63.8	-27.1	-0.40	0.14	0.60	0.63	0.67	3.06	3.06	3.04	3.03	3.02	3.01	3.00	2.97	2.96	2.95	2.92	2.90	2.88	2.86	2.84	2.81	2.77	2.75	2.71	2.69	2.65	2.61	2.57	2.53	2.49	2.43	2.38	2.34	2.28	2.23
	2	Revenue 20% down	-46.03	-3.82	-2.73	-3.6	-63.9	-27.1	-0.47	0.02	0.48	0.51	0.54	2.67	2.66	2.64	2.64	2.63	2.62	2.61	2.59	2.57	2.56	2.54	2.52	2.50	2.48	2.47	2.44	2.40	2.39	2.36	2.33	2.30	2.27	2.23	2.20	2.16	2.11	2.06	2.02	1.97	1.92

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.71%	-6.48	-15.42%
	2	Capital cost 20% up	-1.13%	-7.77	-12.86%
2	1	OM cost 10% up	-0.35%	-2.73	-36.57%
	2	OM cost 20% up	-0.44%	-4.31	-23.22%
3	1	Revenue 10% down	-0.86%	-7.09	-14.10%
	2	Revenue 20% down	-1.54%	-8.37	-11.95%

No.8 Lusahovit

Information on Existing Water Sources (Tavush)

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

No.8 Community Lusahovit
District Idjevan
Marz Tavush

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	spring intake	-	-	-	-	-	-	-	4.0	8.0	3.0
2	spring intake	-	-	-	-	-	-	-			2.0
3	spring intake	-	-	-	-	-	-	-	2.0	2.0	2.0
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	8l/sec water amount enters into the community.
Alternative sources if any	If a reservoir is built in the community, alternative sources will not be needed.

No.8 Community Lusahovit
District Idjevan
Marz Tavush
Sampling date 10/Sep/2007

	Parameters analysed	Units	No.1 Erkataza+ par.taza	No.2 Tsllan			Guidelines	
							WHO	Armenia
a	pH		8.3	7.7			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	11.6	12.7				
c	TDS	Mg/L	264	309			1000	1000
1	Al:Aluminum	Mg/L	<0.008	n.d.			0.10	0.50
2	B:Boron	Mg/L	n.d.	n.d.			0.70	0.50
3	Cl:Chloride	Mg/L	5	10			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	0.07	0.16			1.50	
7	Hardness	Mg/L	570	575			500	700
8	Fe:Iron	Mg/L	n.d.	n.d.			0.30	0.30
9	Mn:Manganese	Mg/L	n.d.	n.d.			0.40	0.10
10	Mo:Molibdenum	Mg/L	<0.02	<0.02			0.070	0.250
11	Ni:Nickel	Mg/L	0.006	0.006			0.020	0.100
12	Nitrate(NO3+)	Mg/L	0.9	1.3			50.0	45.0
13	SO4:Sulfate	Mg/L	8.0	30.0			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	0.001			0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	<0.7			NA	7.0
23	CN:Cyanide	Mg/L	n.d.	n.d.			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.8 Community Lusahovit
District Ijevan
Marz Tavush

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	.2	48	9.0	Not Identified
2	5	12	48	4.3	Not Identified
3	8	22	45	4.3	Not Identified
4	8	22	45	9.0	Not Identified

No. 8 **Marz** Tavush **Community** Lusahovit

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	_	_	-	1967	Concrete	3.0	Yes
2	Spring	_	_	-	1980	Concrete	2.0	Yes
3	Spring	_	_	-	1985	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	3,000	100	Steel	3.0	1967	Medium	Yes
2	2,000	100	Steel	2.0	1980	Medium	Yes
3	1,500	75	Steel	2.0	1985		No

4. RESERVOIR

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

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,000	50	Steel	1967	Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

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

9. DRAINAGE SYSTEM

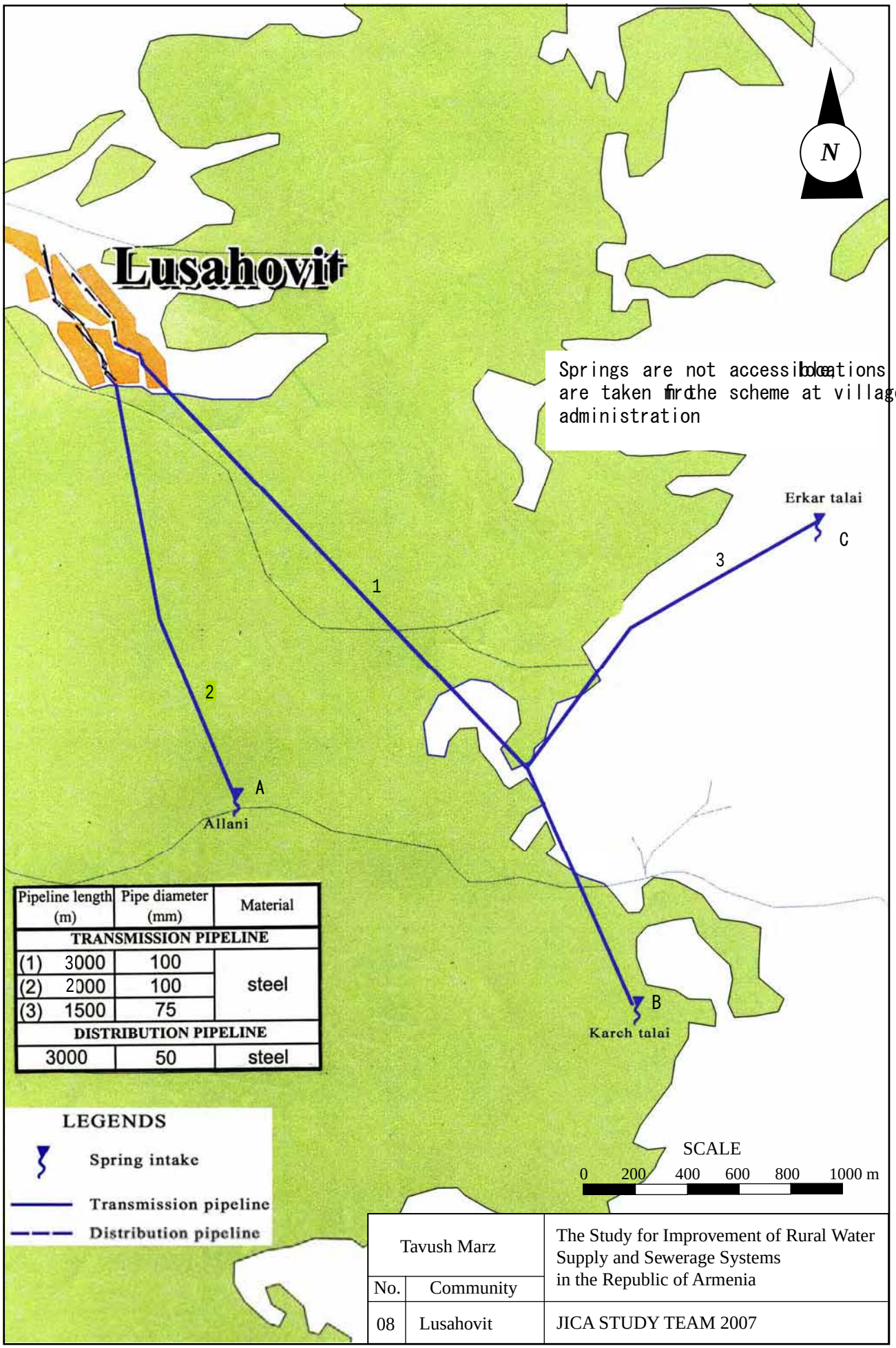
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Tavush**
Number and Name of Community	**No.8 Lusahovit**
District	**Idejevan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	415
A2	Actual population in 2007	407
A3	Number of households	125
A4.1	Elderly people	25
A4.2	Population in labor force (age from 16 to 62)	287
A4.3	Children	90
A5.1	Pensioners	45
A5.2	Unemployed	10
A5.3	Receiving benefits	16
A6	Average monthly income of household (AMD)	50,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	47
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	450
	Annual Budget of the community 2005, in thousand AMD	370
	Annual Budget of the community 2006, in thousand AMD	300
	Annual Budget of the community 2007, in thousand AMD	200
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	200
	Amount spent in drinking water sector 2005, in thousand AMD	250
	Amount spent in drinking water sector 2006, in thousand AMD	300
	Amount spent in drinking water sector 2007, in thousand AMD	250
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	cereals, dairy, potatoes
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1-Yes, 2-No	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	almost sufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	100
D8	How many house connection household set the water meter	0
D9	Number of public taps	0
D10.1	How is the regime of water supply in your community in the dry season?	irregularly - 24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	mainly pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	100
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 1- Flate rate, 2- Having water tariff	-
D19	Where do you acquire the irrigation water?	spring
D20	Are you satisfied with irrigation water supply volume?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	absent
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	5-deteriorated
E5	Quantity and present condition of the water supply facilities:	1-partially repaired
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	absent
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves, hired specialist
E13	Who is in charge of the repair work in the community?	administration head
E14	How you prepare O&M costs?	donation from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	300,000
	Others(AMD)	0
	Total (AMD)	300,000
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

Tavush
No.8 Lusahovit



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 3000	100	steel
(2) 2000	100	
(3) 1500	75	
DISTRIBUTION PIPELINE		
3000	50	steel

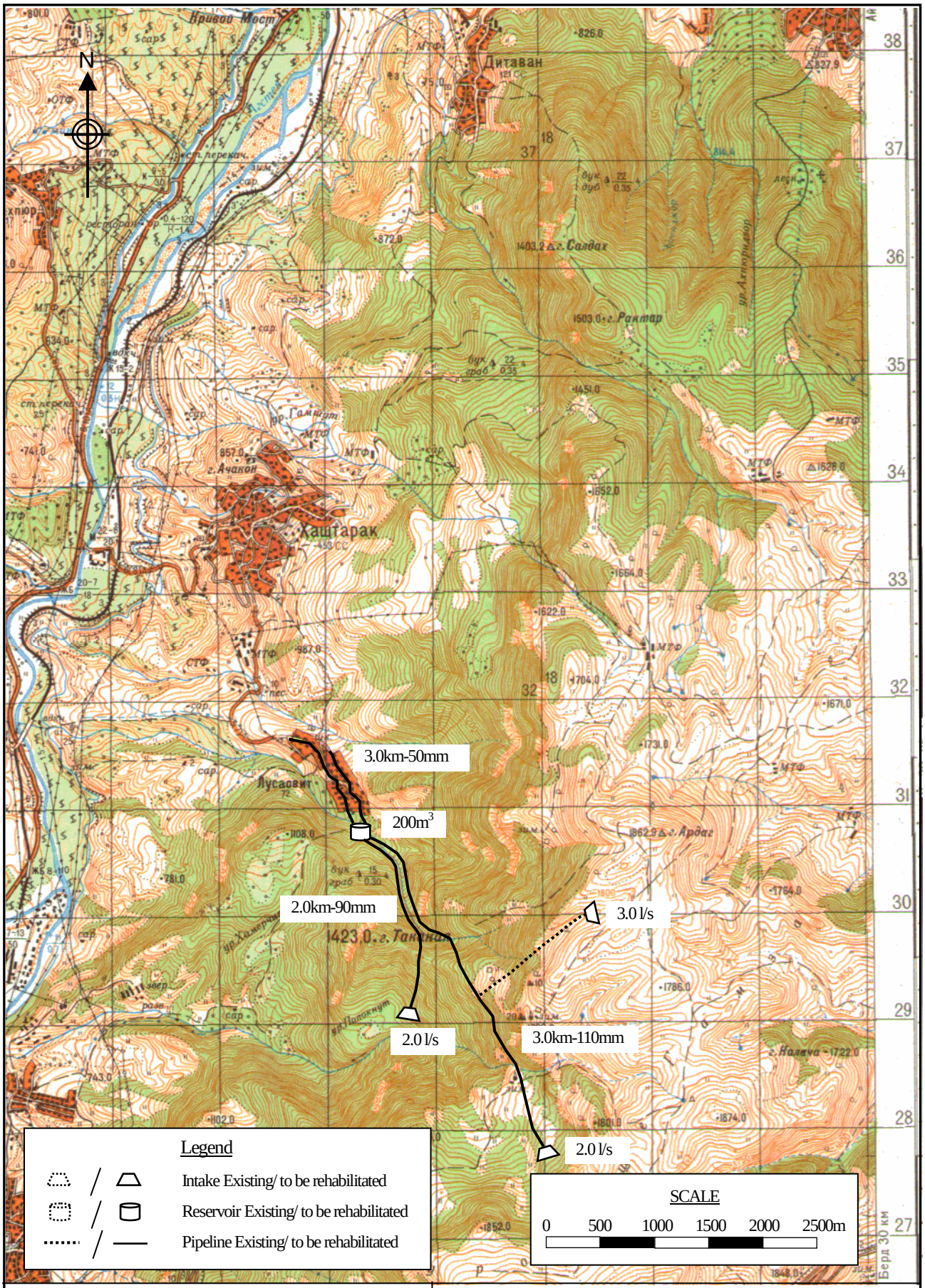
Tavush Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
08	Lusahovit	JICA STUDY TEAM 2007

Marz : **Tavush** No.8
Name : **Lusahovit**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	407	persons	40.7	
	2 Factory	-	nos	0.0	
	3 School (pupils)	47	pupils	0.5	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	125	household	10.9	
	Sub-total			52.1	
	Unaccouted for water (20%)			10.4	
1	Average Daily Water Demand			62.5	m3/day
2	Maximum Daily Water Demand			75.0	m3/day
3	Maximum Hourly Water Demand			14.2	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	3	7.0	lit/sec		604.8	m3/day
`	Total					604.8	m3/day
	2 Required reservoir volume					171	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**			
	No Item	Quantity	Unit	
	1 Intake			
	1m3	3	nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
	2 Transmission pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter	2,000	m	
	110mm diameter	3,000	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
	3 Reservoir			
	200m3 capacity	1	nos	
	4 Distribution pipe			
	50mm diameter	3,000	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
	5 House connection	25	nos	
	6 Water meter installation	125	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	Tavush	
No. 08	Lusahovit	JICA STUDY TEAM

Marz : **Tavush**
No. : **8**
Name : **Lusahovit**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,103,100
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	2,000	m	8,040	16,080,000
		110mm	3,000	m	9,680	29,040,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					45,120,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3	1	nos	22,524,600	22,524,600
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					22,524,600
4	Distribution Pipe					
		50mm	3,000	m	5,520	16,560,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					16,560,000
5	House Connection		25	nos	74,000	1,850,000
6	Water Meter Installation		125	nos	80,000	10,000,000
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	1,200	m	3,600	4,320,000
	Total				AMD	102,157,700
					Equivalent to USD	334,373
					Equivalent to JPY	35,276,373
					AMD	USD
	Investment Cost per household		125	HH	817,262	2,675
	Investment Cost per person		407	persons	251,002	822

TAVUSH MARZ
Ijevan District
No 8 Lusahovit

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		19.0																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		105.77	0.00	0.00	0.00	0.48	0.68	0.71	1.20	1.24	1.28	1.32	1.98	2.04	2.11	2.18	2.25	2.33	2.40	2.48	2.57	2.65	2.74	2.83	2.92	3.02	3.12	3.22	3.33	3.44	3.55	3.67	3.79	3.91	4.04	4.18	4.31	4.46	4.60	4.76	4.91	5.07
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				115																																				
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		5.02			0.00	0.05	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	0.21	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		24.22			0.00	0.24	0.35	0.36	0.38	0.39	0.40	0.41	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.87	0.90	0.93	0.96	1.00	1.03	1.06	1.10
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0	0.24	0.35	0.36	0.38	0.39	0.40	0.41	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.87	0.90	0.93	0.96	1.00	1.03	1.06	1.10
5. Pump replacement		0.00																0.00															0.00									
Sub-total		46.94	0.00	0.00	0.24	0.54	0.68	0.70	0.73	0.75	0.77	0.80	0.83	0.85	0.89	0.91	0.94	0.98	1.01	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	1.36	1.39	1.44	1.49	1.54	1.59	1.65	1.69	1.75	1.81	1.86	1.93	1.99	2.05	2.13
C Gross Income (A-B)		59.16	0.00	0.00	-0.24	-0.06	0.00	0.01	0.47	0.49	0.51	0.52	1.15	1.19	1.22	1.27	1.31	1.35	1.39	1.44	1.50	1.54	1.60	1.65	1.70	1.76	1.82	1.86	1.94	2.00	2.06	2.13	2.20	2.26	2.35	2.43	2.50	2.60	2.67	2.77	2.86	2.94
D Depreciation cost		96.95						2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77
E Interest paid		32.33	0.04	0.07	0.10	0.99	1.39	1.40	1.40	1.40	1.40	1.40	1.40	1.36	1.32	1.28	1.24	1.20	1.15	1.11	1.07	1.02	0.98	0.93	0.89	0.84	0.80	0.75	0.71	0.66	0.61	0.56	0.51	0.46	0.42	0.37	0.31	0.26	0.21	0.16	0.11	0.05
F Net Income		-70.12	-0.04	-0.07	-0.34	-1.05	-1.39	-4.16	-3.70	-3.68	-3.66	-3.65	-3.02	-2.94	-2.87	-2.78	-2.70	-2.62	-2.53	-2.44	-2.34	-2.25	-2.15	-2.05	-1.96	-1.85	-1.75	-1.66	-1.54	-1.43	-1.32	-1.20	-1.08	-0.97	-0.84	-0.71	-0.58	-0.43	-0.31	-0.16	-0.02	0.12
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		-70.12	-0.04	-0.07	-0.34	-1.05	-1.39	-4.16	-3.70	-3.68	-3.66	-3.65	-3.02	-2.94	-2.87	-2.78	-2.70	-2.62	-2.53	-2.44	-2.34	-2.25	-2.15	-2.05	-1.96	-1.85	-1.75	-1.66	-1.54	-1.43	-1.32	-1.20	-1.08	-0.97	-0.84	-0.71	-0.58	-0.43	-0.31	-0.16	-0.02	0.12
OM Cost Recovery Ratio (A/B)		225%	0%	0%	0%	89%	100%	101%	164%	165%	166%	165%	239%	240%	237%	240%	239%	238%	238%	238%	240%	239%	240%	240%	239%	240%	240%	237%	240%	239%	238%	238%	238%	237%	239%	239%	238%	240%	238%	239%	240%	238%

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	-70.12	-0.04	-0.07	-0.34	-1.05	-1.39	-4.16	-3.70	-3.68	-3.66	-3.65	-3.02	-2.94	-2.87	-2.78	-2.70	-2.62	-2.53	-2.44	-2.34	-2.25	-2.15	-2.05	-1.96	-1.85	-1.75	-1.66	-1.54	-1.43	-1.32	-1.20	-1.08	-0.97	-0.84	-0.71	-0.58	-0.43	-0.31	-0.16	-0.02	0.12
2. Depreciation cost	96.95	0.00	0.00	0.00	0.00	0.00	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77
3. Interest Paid	32.33	0.04	0.07	0.10	0.99	1.39	1.40	1.40	1.40	1.40	1.40	1.40	1.36	1.32	1.28	1.24	1.20	1.15	1.11	1.07	1.02	0.98	0.93	0.89	0.84	0.80	0.75	0.71	0.66	0.61	0.56	0.51	0.46	0.42	0.37	0.31	0.26	0.21	0.16	0.11	0.05
Sub-total	59.16	0.00	0.00	-0.24	-0.06	0.00	0.01	0.47	0.49	0.51	0.52	1.15	1.19	1.22	1.27	1.31	1.35	1.39	1.44	1.50	1.54	1.60	1.65	1.70	1.76	1.82	1.86	1.94	2.00	2.06	2.13	2.20	2.26	2.35	2.43	2.50	2.60	2.67	2.77	2.86	2.94
B Finances																																									
1. Project Loan	140.04	3.91	2.79	3.72	88.93	39.66	0.58	0.45																																	
2. Local fund	48.49	1.29	0.91	1.25	31.14	13.77	0.07	0.06																																	
Sub-total	188.53	5.20	3.70	4.97	120.07	53.43	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.30	0.00	0.00	0.24	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	112.91	0.04	0.07	0.10	0.99	1.39	1.39	0.93	0.91	0.89	0.88	4.28	4.24	4.21	4.16	4.12	4.08	4.03	3.99	3.93	3.88	3.83	3.77	3.73	3.66	3.61	3.56	3.49	3.43	3.37	3.29	3.22	3.16	3.08	3.00	2.92	2.82	2.75	2.66	2.57	2.48
Sub-total	113.21	0.04	0.07	0.34	1.05	1.39	1.39	0.93	0.91	0.89	0.88	4.28	4.24	4.21	4.16	4.12	4.08	4.03	3.99	3.93	3.88	3.83	3.77	3.73	3.66	3.61	3.56	3.49	3.43	3.37	3.29	3.22	3.16	3.08	3.00	2.92	2.82	2.75	2.66	2.57	2.48
Total Cash Inflow	360.90	5.24	3.77	5.07	121.06	54.82	2.05	1.91	1.40	1.40	1.40	5.43	5.43	5.43	5.43	5.43	5.43	5.42	5.43	5.43	5.42	5.43	5.42	5.43	5.42	5.43	5.42	5.43	5.43	5.43	5.42	5.42	5.42	5.43	5.43	5.42	5.42	5.42	5.43	5.43	5.42
APPLICATION OF FUNDS																																								
D Project disbursement	188.53	5.20	3.70	4.97	120.07	53.43	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	140.04											4.03	4.07	4.11	4.15	4.19	4.23	4.27	4.32	4.36	4.40	4.45	4.49	4.54	4.58	4.63	4.67	4.72	4.77	4.82	4.86	4.91	4.96	5.01	5.06	5.11	5.16	5.21	5.27	5.32	5.37
2. Interest paid	32.33	0.04	0.07	0.10	0.99	1.39	1.40	1.40	1.40	1.40	1.40	1.40	1.36	1.32	1.28	1.24	1.20	1.15	1.11	1.07	1.02	0.98	0.93	0.89	0.84	0.80	0.75	0.71	0.66	0.61	0.56	0.51	0.46	0.42	0.37	0.31	0.26	0.21	0.16	0.11	0.05
Sub-total	172.37	0.04	0.07	0.10	0.99	1.39	1.40	1.40	1.40	1.40	1.40	5.43	5.43	5.43	5.43	5.43	5.43	5.42	5.43	5.43	5.42	5.43	5.42	5.43	5.42	5.43	5.42	5.43	5.43	5.43	5.42	5.42	5.42	5.43	5.43	5.42	5.42	5.42	5.43	5.43	5.42
Total Cash Outflow	360.90	5.24	3.77	5.07	121.06	54.82	2.05	1.91	1.40	1.40	1.40	5.43	5.43	5.43	5.43	5.43	5.43	5.42	5.43	5.43	5.42	5.43	5.42	5.43	5.42	5.43	5.42	5.43	5.43	5.43	5.42	5.42	5.42	5.43	5.43	5.42	5.42	5.42	5.43	5.43	5.42
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)	34%	0%	0%	0%	0%	0%	1%	34%	35%	36%	37%	21%	22%	22%	23%	24%	25%	26%	27%	28%	28%	29%	30%	31%	32%	34%	34%	36%	37%	38%	39%	41%	42%	43%	45%	46%	48%	49%	51%	53%	54%
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%

TAVUSH MARZ
Ijevan District
No 8 Lusahovit

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	105.77	48.3%
	Subsidy	113.21	51.7%
	Total	218.98	100.0%
2	**Expenditure**		
	OM cost	46.61	21.3%
	Loan repayment	140.04	64.0%
	Interest paid	32.33	14.8%
	Surplus cash	0.00	0.0%
	Total	218.98	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	123.84	3.82	2.73	3.51	78.72	34.11	0.53	0.42																																
2. Operation and Maintenance Cost																																								
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	2.57			0.00	0.05	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
Mantenance cost	12.11			0.00	0.23	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pump replacement																	0.00															0.00								
Sub-total	23.80			0.24	0.52	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Total Outflow	147.64	3.82	2.73	3.75	79.24	34.75	1.17	1.06	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
B BENEFIT																																							
1. Water Tariff	66.31	0.00	0.00	0.00	0.48	0.68	0.71	1.20	1.24	1.28	1.32	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
2. Subsidy	82.88	0.00	0.00	0.24	0.06	0.00	0.00	0.00	0.00	0.00	0.00	2.88	2.88	2.89	2.88	2.88	2.88	2.88	2.88	2.86	2.86	2.85	2.84	2.84	2.82	2.81	2.81	2.78	2.77	2.76	2.73	2.71	2.70	2.66	2.63	2.61	2.56	2.54	2.50	2.46	2.43
Total Inflow	149.19	0.00	0.00	0.24	0.54	0.68	0.71	1.20	1.24	1.28	1.32	4.86	4.86	4.87	4.86	4.86	4.86	4.86	4.86	4.84	4.84	4.83	4.82	4.82	4.80	4.79	4.79	4.76	4.75	4.74	4.71	4.69	4.68	4.64	4.61	4.59	4.54	4.52	4.48	4.44	4.41
NET BENEFIT	1.55	-3.82	-2.73	-3.5	-78.7	-34.1	-0.46	0.14	0.60	0.64	0.68	4.22	4.22	4.23	4.22	4.22	4.22	4.22	4.22	4.20	4.20	4.19	4.18	4.18	4.16	4.15	4.15	4.12	4.11	4.10	4.07	4.05	4.04	4.00	3.97	3.95	3.90	3.88	3.84	3.80	3.77

FIRR = **0.06%**

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-44.42	-4.20	-3.00	-3.9	-86.6	-37.5	-0.51	0.10	0.60	0.64	0.68	4.22	4.22	4.23	4.22	4.22	4.22	4.22	4.22	4.22	4.20	4.20	4.19	4.18	4.18	4.16	4.15	4.15	4.12	4.11	4.10	4.07	4.05	4.04	4.00	3.97	3.95	3.90	3.88	3.84	3.80	3.77
	2	Capital cost 20% up	-55.95	-4.58	-3.28	-4.2	-94.4	-40.9	-0.57	0.06	0.60	0.64	0.68	4.22	4.22	4.23	4.22	4.22	4.22	4.22	4.22	4.22	4.20	4.20	4.19	4.18	4.18	4.16	4.15	4.15	4.12	4.11	4.10	4.07	4.05	4.04	4.00	3.97	3.95	3.90	3.88	3.84	3.80	3.77
2	1	OM cost 10% up	-34.55	-3.82	-2.73	-3.5	-78.8	-34.1	-0.52	0.08	0.54	0.58	0.62	4.16	4.16	4.17	4.16	4.16	4.16	4.16	4.16	4.14	4.14	4.13	4.12	4.12	4.10	4.09	4.09	4.06	4.05	4.04	4.01	3.99	3.98	3.94	3.91	3.89	3.84	3.82	3.78	3.74	3.71
	2	OM cost 20% up	-36.20	-3.82	-2.73	-3.6	-78.8	-34.2	-0.59	0.01	0.47	0.51	0.55	4.09	4.09	4.10	4.09	4.09	4.09	4.09	4.09	4.07	4.07	4.06	4.05	4.05	4.03	4.02	4.02	3.99	3.98	3.97	3.94	3.92	3.91	3.87	3.84	3.82	3.77	3.75	3.71	3.67	3.64
3	1	Revenue 10% down	-42.79	-3.82	-2.73	-3.5	-78.8	-34.1	-0.53	0.02	0.48	0.51	0.55	3.73	3.73	3.74	3.73	3.73	3.73	3.73	3.73	3.72	3.72	3.71	3.70	3.70	3.68	3.67	3.67	3.64	3.64	3.63	3.60	3.58	3.57	3.54	3.51	3.49	3.45	3.43	3.39	3.36	3.33
	2	Revenue 20% down	-52.68	-3.82	-2.73	-3.6	-78.8	-34.2	-0.60	-0.10	0.35	0.38	0.42	3.25	3.25	3.26	3.25	3.25	3.25	3.25	3.25	3.23	3.23	3.22	3.22	3.22	3.20	3.19	3.19	3.17	3.16	3.15	3.13	3.11	3.10	3.07	3.05	3.03	2.99	2.98	2.94	2.91	2.89

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.40%	-11.51	-8.68%
	2	Capital cost 20% up	-0.80%	-10.75	-9.31%
2	1	OM cost 10% up	-0.03%	-28.52	-3.51%
	2	OM cost 20% up	-0.13%	-14.77	-6.77%
3	1	Revenue 10% down	-0.54%	-11.11	-9.00%
	2	Revenue 20% down	-1.21%	-10.50	-9.53%

No.9 Lusadzor

Information on Existing Water Sources (Tavush)

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

No.9 Community Lusadzor
District Idjevan
Marz Tavush

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	spring intake	40	56	3.1	45	8	25.9	743	16.0	16.0	6.2
2	spring intake	40	56	5.2	45	8	37.6	734			10.0
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Acceptable
Notes	The upper districts of the Community has no water at all. It is necessary to build a pumping station on the pipelines of Lorataki and Jani springs and pump water to 2x100m3 reservoir.
Alternative sources if any	

No.9 Community Lusadzor
District Idjevan
Marz Tavush
Sampling date 08/Sep/2007

	Parameters analysed	Units	No.1 Khachi aghbyur				Guidelines	
							WHO	Armenia
a	pH		7.6				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	21.1					
c	TDS	Mg/L	344				1000	1000
1	Al:Aluminum	Mg/L	<0.008				0.10	0.50
2	B:Boron	Mg/L	n.d.				0.70	0.50
3	Cl:Chloride	Mg/L	9				250	350
4	Cr:Chrome	Mg/L	n.d.				0.05	0.05
5	Cu:Copper	Mg/L	n.d.				2	1
6	F:Fluoride	Mg/L	0.18				1.50	
7	Hardness	Mg/L	715				500	700
8	Fe:Iron	Mg/L	n.d.				0.30	0.30
9	Mn:Manganese	Mg/L	n.d.				0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d.				0.070	0.250
11	Ni:Nickel	Mg/L	<0.006				0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8				50.0	45.0
13	SO4:Sulfate	Mg/L	32.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d.				3.0	5.0
15	As:Arsenic	Mg/L	n.d.				0.0	0.1
16	Ba:Barium	Mg/L	<0.01				0.70	0.10
17	Be:Berillium	Mg/L	0.00005				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d.				0.0030	0.0010
19	Pb:Lead	Mg/L	0.006				0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002				0.00100	0.00050
21	Se:Selenium	Mg/L	0.001				0.010	0.010
22	Sr:Strontium	Mg/L	<0.7				NA	7.0
23	CN:Cyanide	Mg/L	n.d.				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.9 Community Lusadzor
District Ijevan
Marz Tavush

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	0	02	30	2.0	Not Identified
2	4	4	35	4.3	Not Identified
3	6	26	18	0.9	Not Identified
4	6	26	15	0.0	Not Identified

No. 9 **Marz** Tavush **Community** Lusadzor

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°56′03.1″	45°08′25.9″	743	1950	Concrete	6.2	Yes
2	Spring	40°56′03.1″	45°08′25.9″	743	1978	Concrete		Yes
3	Spring	40°56′05.2″	45°08′37.6″	734	1970	Concrete	10.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,000	50 - 100	Steel	2.0	1950	Huge	Yes
2	700	100	Steel	10.0	1970	Huge	Yes
3	400	100	Steel	2.2	1950	Huge	Yes
4	400	100	Steel	2.0	1978	Medium	Yes
	600	70	Steel			Medium	Yes

4. RESERVOIR

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

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	700	100	Steel	1950	Huge	Yes
2	100	75	Steel		Huge	Yes
3	600	100	Steel		Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
2	1950		No	0	Yes

9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
No	Yes	

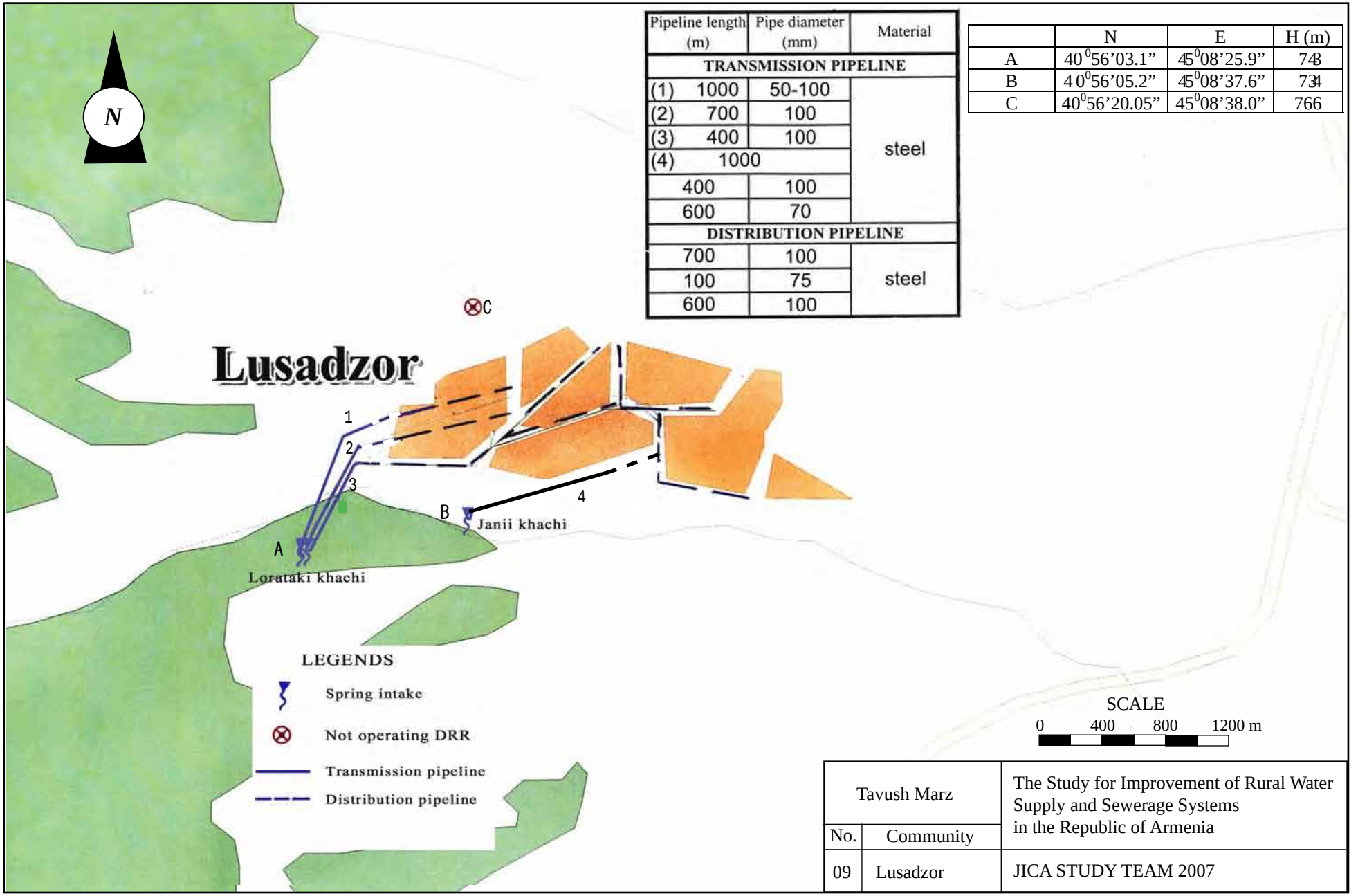
Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Tavush**
Number and Name of Community	**No.9 Lusadzor**
District	**Idejevan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	580
A2	Actual population in 2007	694
A3	Number of households	150
A4.1	Elderly people	88
A4.2	Population in labor force (age from 16 to 62)	393
A4.3	Children	213
A5.1	Pensioners	99
A5.2	Unemployed	35
A5.3	Receiving benefits	40
A6	Average monthly income of household (AMD)	30,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	87
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	2,948
	Annual Budget of the community 2005, in thousand AMD	2,939
	Annual Budget of the community 2006, in thousand AMD	2,612
	Annual Budget of the community 2007, in thousand AMD	1,640
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	60
	Amount spent in drinking water sector 2005, in thousand AMD	50
	Amount spent in drinking water sector 2006, in thousand AMD	60
	Amount spent in drinking water sector 2007, in thousand AMD	40
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	cereals, dairy, meat, agricultural products
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	ongoing
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	0
D8	How many house connection household set the water meter	0
D9	Number of public taps	2
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	mainly displeased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	500

No.	Question	Answer
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	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 1- Flate rate, 2- Having water tariff	-
D19	Where do you acquire the irrigation water?	spring
D20	Are you satisfied with irrigation water supply volume?	insufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	absent
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-deteriorated
E5	Quantity and present condition of the water supply facilities:	1-deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community 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?	donation from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	50,000
	Others(AMD)	0
	Total (AMD)	50,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	resident participation, reduce 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

Tavush
No.9 Lusadzor



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 1000	50-100	steel
(2) 700	100	
(3) 400	100	
(4) 1000		
400	100	
600	70	
DISTRIBUTION PIPELINE		
700	100	steel
100	75	
600	100	

	N	E	H (m)
A	40 ^{0}56’03.1”	45^{0}08’25.9”	743
B	40^{0}56’05.2”	45^{0}08’37.6”	734
C	40^{0}56’20.05”	45^{0}08’38.0”	766

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09	Lusadzor	JICA STUDY TEAM 2007