No.24 Tsovaqyugh

Information on Existing Water Sources (Gegharkunik)

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

No.24 Community Tsovagyugh
District Sevan
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	38	8.5	44	50	10.1	2,185	5.0	7.0	7.0
2	Spring	40	37	31.6	44	50	17.3	2,184			
3	Spring	40	38	45.6	44	57	27.2	2,812	2.0	3.0	3.0
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	Leakage in internal network - up to 75%
Alternative sources if any	There are some free springs in this "Aytsemnassar" springs' area.

No.24 Community Tsovagyugh
District Sevan
Marz Gegharkunik
Sampling date 16/Jul/2007

	Parameters analysed	Units	No.1 Dilijan side	No.2			Guidelines	
							WHO	Armenia
a	pH		7.27	7.5			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	13	10.7				
c	TDS	Mg/L	27	59			1000	1000
1	Al:Aluminum	Mg/L	n.d	nd			0.10	0.50
2	B:Boron	Mg/L	n.d	nd			0.70	0.50
3	Cl:Chloride	Mg/L	4	7			250	350
4	Cr:Chrome	Mg/L	<0.01	<0,01			0.05	0.05
5	Cu:Copper	Mg/L	n.d	nd			2	1
6	F:Fluoride	Mg/L	0.22	0.20			1.50	
7	Hardness	Mg/L	170	230			500	700
8	Fe:Iron	Mg/L	n.d	nd			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	nd			0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	nd			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	nd			0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	5.8			50.0	45.0
13	SO4:Sulfate	Mg/L	5.0	3.5			250.0	500.0
14	Zn:Zink	Mg/L	n.d	nd			3.0	5.0
15	As:Arsenic	Mg/L	n.d	nd			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	n.d	nd			0.0030	0.0010
19	Pb:Lead	Mg/L	0.012	0.001			0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002			0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001			0.010	0.010
22	Sr:Strontium	Mg/L	n.d	<0.7			NA	7.0
23	CN:Cyanide	Mg/L	n.d	nd			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml		<3			-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml		nd			0	0
26	Total bacteria	bacteria per 1 ml		25			-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.24 Community Tsovagyugh
District Sevan
Marz Gegharkunik

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	01	21	45	-	Not identified
2	02	20	45	-	Not identified
3	03	09	-	0.9-15	Not identified
4	04	02	-	2.1-4.3	Not identified
5	05	07	45	-	Not identified
6	06	12	45	-	Not identified
7	06	13	200	4.3	Not identified
8	07	03	-	2.1-4.3	Not identified
9	08	13	200	2.1-4.3	Not identified

No. 24 **Marz** Gegharkunik **Community** Tsovagyugh

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°38′08.5″	44°50′10.1″	2,185	1993	Concrete	7.0	Yes
2	Spring	40°37′31.6″	44°50′17.3″	2,184	1994	Concrete		Yes
3	Spring	40°38′45.6″	44°57′27.2″	2,212	1970	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	22,000	150	Polyethylene	7.0	1994	Little	Yes
2	2,000	150	Steel	3.0	1970	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°38′07.5″	44°57′05.2″	2,055	Reinforced concrete	Rectangular	12x12x4	500	Yes
2	40°38′15.9″	44°57′33.4″	2,064	Reinforced concrete	Circle	R=6m	500	Yes

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	5,000	100	Steel	1994	Huge	Yes
2	2,000	50	Steel	1970	Huge	Yes

7. PUMP STATION

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

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
5	1970		Yes	60	No

9. DRAINAGE SYSTEM

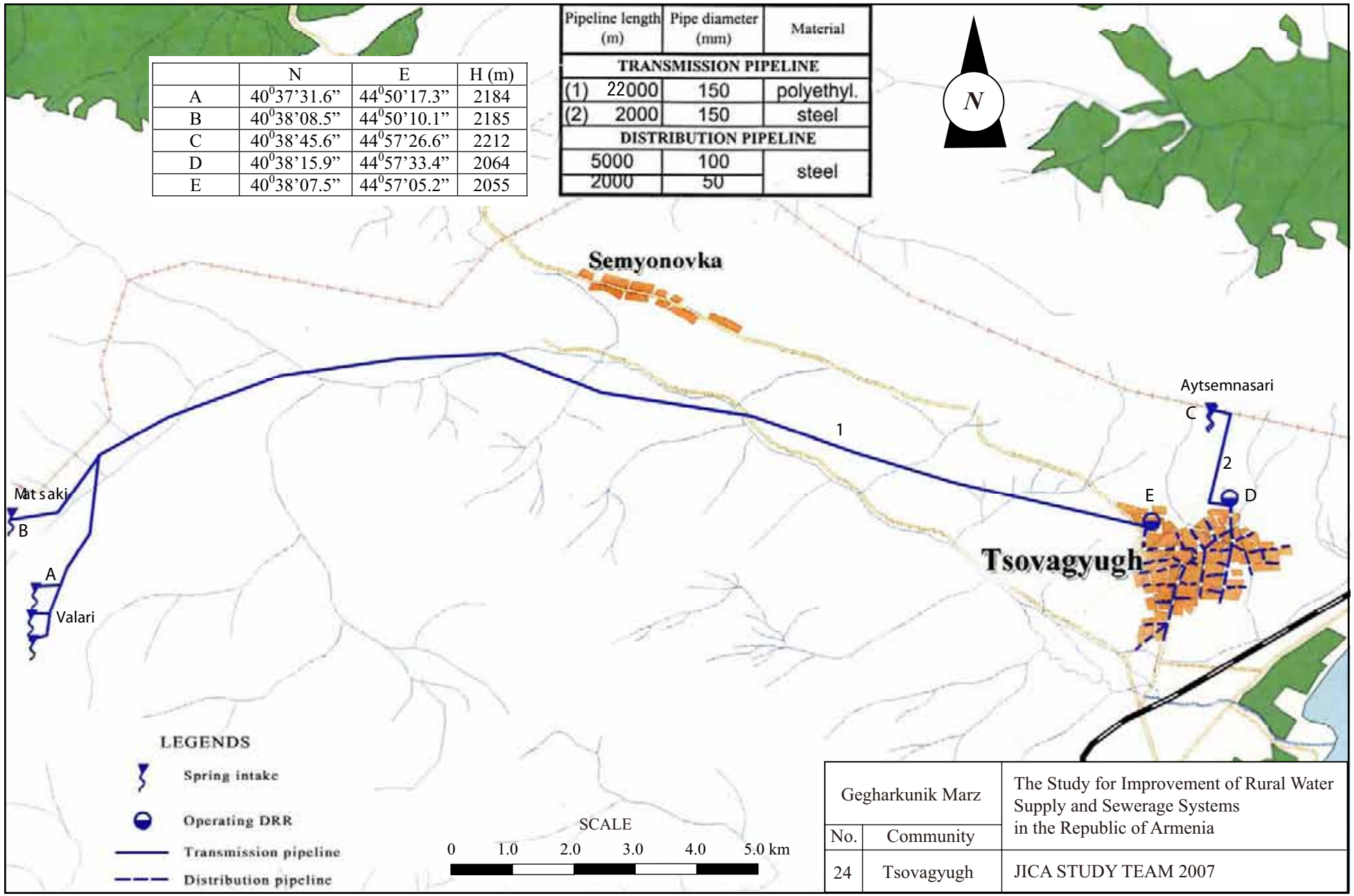
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.24 Tsovagyugh**
District	**Sevan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	4,001
A2	Actual population in 2007	4,159
A3	Number of households	1,200
A4.1	Elderly people	430
A4.2	Population in labor force (age from 16 to 62)	2,465
A4.3	Children	1,304
A5.1	Pensioners	640
A5.2	Unemployed	800
A5.3	Receiving benefits	178
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	740
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	10,000
	Annual Budget of the community 2005, in thousand AMD	4,200
	Annual Budget of the community 2006, in thousand AMD	6,100
	Annual Budget of the community 2007, in thousand AMD	24,822
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	450
	Amount spent in drinking water sector 2005, in thousand AMD	450
	Amount spent in drinking water sector 2006, in thousand AMD	680
	Amount spent in drinking water sector 2007, in thousand AMD	350
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	hay, cereals, dairy, meat, carpet weaving
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	unknown
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	500
D8	How many house connection household set the water meter	0
D9	Number of public taps	4
D10.1	How is the regime of water supply in your community in the dry season?	regularly - 10-12hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly - 20-22hrs
D11	What time of day water is given?	09^{00}-21^{00}, 09^{00}-07^{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?	5 hrs
D14.2	Estimate quantity of domestic water use of each household (litter per day)	700
D15.1	How long the taps are open to provide the each household for filling	8 hrs
D15.2	Estimate quantity of water for filling containers of each household (litter per	1,500
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	absent
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Babakhanyan Sargis
E2	Position	
E3	Telephone	(0261)95683
E4	Quantity and present condition of the water supply facilities: spring/ intake	10-good
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1-rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2-partially rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves, inviting a 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)	720 000
	Repair cost(AMD)	2,500,000
	Others(AMD)	0
	Total (AMD)	3,220,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	residents participation, water fee reduction
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

Gegharkunik
No.24 Tsovagyugh



	N	E	H (m)
A	40°37'31.6"	44°50'17.3"	2184
B	40°38'08.5"	44°50'10.1"	2185
C	40°38'45.6"	44°57'26.6"	2212
D	40°38'15.9"	44°57'33.4"	2064
E	40°38'07.5"	44°57'05.2"	2055

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 22000	150	polyethyl.
(2) 2000	150	steel
DISTRIBUTION PIPELINE		
5000	100	steel
2000	50	

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

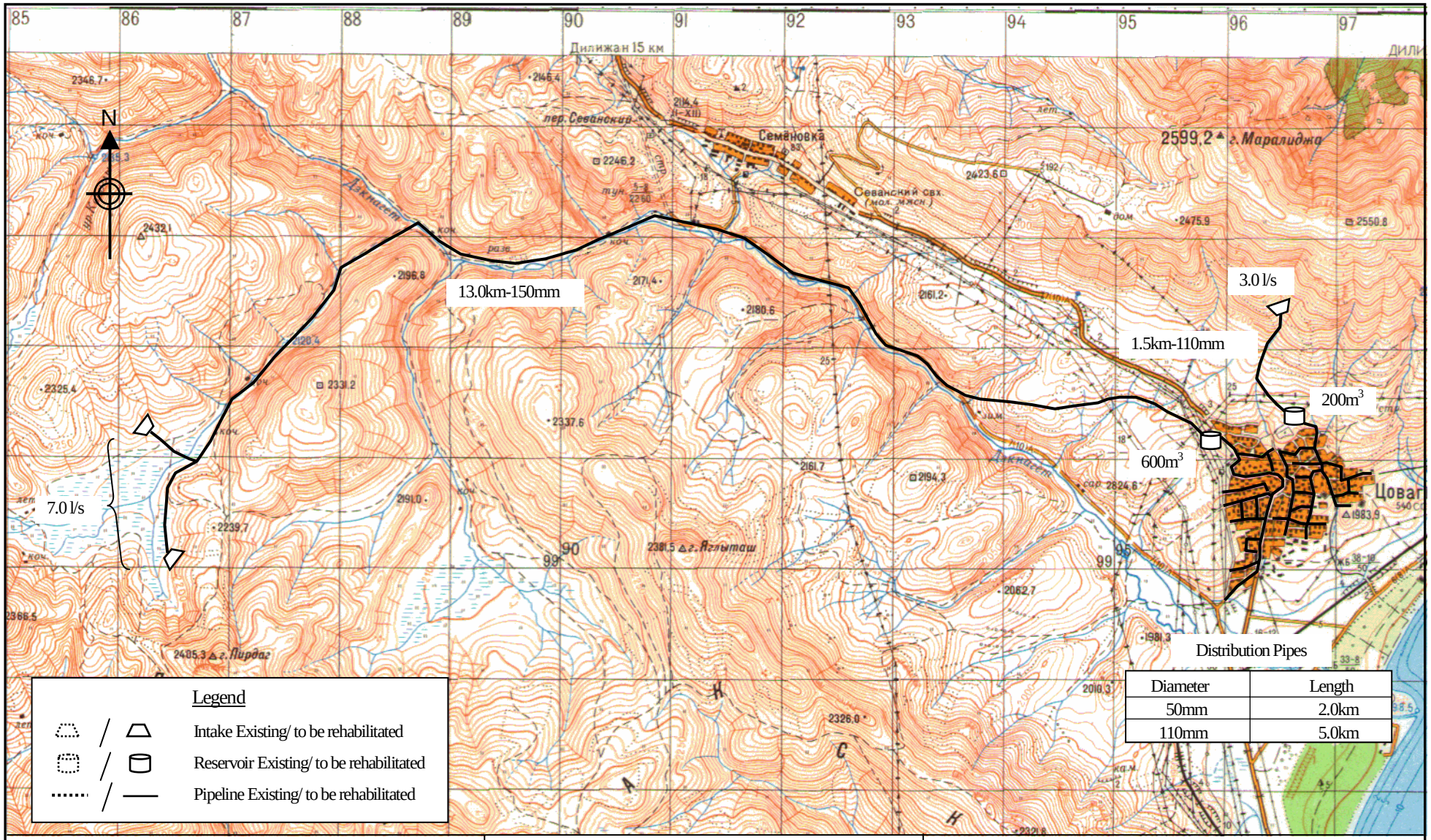
Marz : **Gegharkunik** No.24
Name : **Tsovagyugh**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	4,159	persons	415.9	
	2 Factory	1	nos	50.0	
	3 School (pupils)	740	pupils	7.4	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	1,200	household	104.4	
	Sub-total			577.7	
	Unaccouted for water (20%)			115.5	
1	Average Daily Water Demand		443.7	693.2	m3/day
2	Maximum Daily Water Demand			831.9	m3/day
3	Maximum Hourly Water Demand			67.6	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	2	7.0	lit/sec		604.8	m3/day
	B Spring	1	3.0	lit/sec		259.2	m3/day
`	Total					864.0	m3/day
	2 Required reservoir volume					811	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
	1 Intake		
	1m3	3	nos
	2m3		nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	1,500	m
	150mm diameter	13,000	m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	200m3 capacity	1	nos
	600m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter	2,000	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	5,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	5 House connection	700	nos
	6 Water meter installation	1,200	nos
	7 Public tap	12	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	Gegharkunik	
No. 24	Tsovagyugh	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **24**
Name : **Tsovagyugh**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,103,100
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	1,500	m	9,680	14,520,000
		150mm	13,000	m	13,140	170,820,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					185,340,000
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	
		600m3	1	nos	55,489,200	55,489,200
	Sub-total					78,013,800
4	Distribution Pipe					
		50mm	2,000	m	5,520	11,040,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	5,000	m	9,680	48,400,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					59,440,000
5	House Connection		700	nos	74,000	51,800,000
6	Water Meter Installation		1,200	nos	80,000	96,000,000
7	Public Tap		12	nos	90,000	1,080,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	2,800	m	3,600	10,080,000
	Total				AMD	483,856,900
					Equivalent to USD	1,583,716
					Equivalent to JPY	167,082,034
					AMD	USD
	Investment Cost per household		1,200	HH	403,214	1,320
	Investment Cost per person		4,159	persons	116,340	381

GEGHARKUNIK MARZ
Sevan District
No 24 Tsovagyugh

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		210.9																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		1182.84	0.00	0.00	7.59	7.59	7.59	7.84	13.28	13.72	14.18	14.64	21.95	22.67	23.42	24.19	24.99	25.82	26.67	27.55	28.46	29.40	30.37	31.37	32.40	33.47	34.58	35.72	36.90	38.11	39.37	40.67	42.01	43.40	44.83	46.31	47.84	49.42	51.05	52.73	54.47	56.27
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				3																																				
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		53.07			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	1.13	1.17	1.21	1.25	1.29	1.33	1.38	1.42	1.47	1.52	1.57	1.62	1.67	1.73	1.79	1.85	1.91	1.97	2.03	2.10	2.17	2.24	2.32	2.39
2. Chlorine																																									
Pouring volume	kg/yr				1,266																																				
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		56.04			0.76	0.78	0.81	0.84	0.86	0.89	0.92	0.95	0.98	1.02	1.05	1.09	1.12	1.16	1.20	1.24	1.28	1.32	1.36	1.41	1.45	1.50	1.55	1.60	1.66	1.71	1.77	1.83	1.89	1.95	2.01	2.08	2.15	2.22	2.29	2.37	2.44	2.53
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		80.41			1.09	1.13	1.16	1.20	1.24	1.28	1.32	1.37	1.41	1.46	1.51	1.56	1.61	1.66	1.72	1.77	1.83	1.89	1.96	2.02	2.09	2.16	2.23	2.30	2.38	2.45	2.54	2.62	2.71	2.79	2.89	2.98	3.08	3.18	3.29	3.40	3.51	3.62
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					1.09	1.13	1.16	1.20	1.24	1.28	1.32	1.37	1.41	1.46	1.51	1.56	1.61	1.66	1.72	1.77	1.83	1.89	1.96	2.02	2.09	2.16	2.23	2.30	2.38	2.45	2.54	2.62	2.71	2.79	2.89	2.98	3.08	3.18	3.29	3.40	3.51	3.62
5. Pump replacement		0.00																0.00															0.00									
Sub-total		189.52	0.00	0.00	2.57	2.65	2.74	2.83	2.92	3.02	3.11	3.22	3.32	3.44	3.56	3.68	3.79	3.92	4.05	4.18	4.32	4.46	4.61	4.76	4.92	5.08	5.25	5.42	5.61	5.78	5.98	6.18	6.39	6.59	6.81	7.03	7.26	7.50	7.75	8.01	8.27	8.54
C Gross Income (A-B)		993.32	0.00	0.00	5.02	4.94	4.85	5.01	10.36	10.70	11.07	11.42	18.63	19.23	19.86	20.51	21.20	21.90	22.62	23.37	24.14	24.94	25.76	26.61	27.48	28.39	29.33	30.30	31.29	32.33	33.39	34.49	35.62	36.81	38.02	39.28	40.58	41.92	43.30	44.72	46.20	47.73
D Depreciation cost		459.55						13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13
E Interest paid		139.73	0.04	0.07	5.70	5.74	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.60	5.43	5.26	5.09	4.92	4.74	4.57	4.39	4.21	4.03	3.85	3.66	3.48	3.29	3.10	2.90	2.71	2.51	2.32	2.12	1.91	1.71	1.50	1.29	1.08	0.87	0.66	0.44	0.22
F Net Income		394.04	-0.04	-0.07	-0.68	-0.80	-0.91	-13.88	-8.53	-8.19	-7.82	-7.47	-0.26	0.50	1.30	2.12	2.98	3.85	4.75	5.67	6.62	7.60	8.60	9.63	10.69	11.78	12.91	14.07	15.26	16.49	17.75	19.04	20.37	21.77	23.18	24.65	26.16	27.71	29.30	30.93	32.63	34.38
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		394.04	-0.04	-0.07	-0.68	-0.80	-0.91	-13.88	-8.53	-8.19	-7.82	-7.47	-0.26	0.50	1.30	2.12	2.98	3.85	4.75	5.67	6.62	7.60	8.60	9.63	10.69	11.78	12.91	14.07	15.26	16.49	17.75	19.04	20.37	21.77	23.18	24.65	26.16	27.71	29.30	30.93	32.63	34.38
OM Cost Recovery Ratio (A/B)		624%	0%	0%	295%	286%	277%	277%	455%	454%	456%	455%	661%	659%	658%	657%	659%	659%	659%	659%	659%	659%	659%	659%	659%	659%	659%	659%	658%	659%	658%	658%	657%	659%	658%	659%	659%	659%	659%	659%	659%	659%

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	394.04	-0.04	-0.07	-0.68	-0.80	-0.91	-13.88	-8.53	-8.19	-7.82	-7.47	-0.26	0.50	1.30	2.12	2.98	3.85	4.75	5.67	6.62	7.60	8.60	9.63	10.69	11.78	12.91	14.07	15.26	16.49	17.75	19.04	20.37	21.77	23.18	24.65	26.16	27.71	29.30	30.93	32.63	34.38
2. Depreciation cost	459.55	0.00	0.00	0.00	0.00	0.00	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13
3. Interest Paid	139.73	0.04	0.07	5.70	5.74	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.60	5.43	5.26	5.09	4.92	4.74	4.57	4.39	4.21	4.03	3.85	3.66	3.48	3.29	3.10	2.90	2.71	2.51	2.32	2.12	1.91	1.71	1.50	1.29	1.08	0.87	0.66	0.44	0.22
Sub-total	993.32	0.00	0.00	5.02	4.94	4.85	5.01	10.36	10.70	11.07	11.42	18.63	19.23	19.86	20.51	21.20	21.90	22.62	23.37	24.14	24.94	25.76	26.61	27.48	28.39	29.33	30.30	31.29	32.33	33.39	34.49	35.62	36.81	38.02	39.28	40.58	41.92	43.30	44.72	46.20	47.73
B Finances																																									
1. Project Loan	576.41	3.91	2.79	563.59	3.48	1.61	0.58	0.45																																	
2. Local fund	194.75	1.29	0.91	190.96	1.16	0.30	0.07	0.06																																	
Sub-total	771.16	5.20	3.70	754.55	4.64	1.91	0.65	0.51																																	
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	15.92	0.04	0.07	0.68	0.80	0.91	0.75	0.00	0.00	0.00	0.00	3.70	3.11	2.47	1.82	1.13	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	15.92	0.04	0.07	0.68	0.80	0.91	0.75	0.00	0.00	0.00	0.00	3.70	3.11	2.47	1.82	1.13	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	1780.40	5.24	3.77	760.25	10.38	7.67	6.41	10.87	10.70	11.07	11.42	22.33	22.34	22.33	22.33	22.33	22.34	22.62	23.37	24.14	24.94	25.76	26.61	27.48	28.39	29.33	30.30	31.29	32.33	33.39	34.49	35.62	36.81	38.02	39.28	40.58	41.92	43.30	44.72	46.20	47.73
APPLICATION OF FUNDS																																									
D Project disbursement	771.16	5.20	3.70	754.55	4.64	1.91	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	576.41											16.57	16.74	16.90	17.07	17.24	17.42	17.59	17.77	17.94	18.12	18.30	18.49	18.67	18.86	19.05	19.24	19.43	19.63	19.82	20.02	20.22	20.42	20.63	20.83	21.04	21.25	21.46	21.68	21.90	22.11
2. Interest paid	139.73	0.04	0.07	5.70	5.74	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.60	5.43	5.26	5.09	4.92	4.74	4.57	4.39	4.21	4.03	3.85	3.66	3.48	3.29	3.10	2.90	2.71	2.51	2.32	2.12	1.91	1.71	1.50	1.29	1.08	0.87	0.66	0.44	0.22
Sub-total	716.14	0.04	0.07	5.70	5.74	5.76	5.76	5.76	5.76	5.76	5.76	22.33	22.34	22.33	22.33	22.33	22.34	22.33	22.34	22.33	22.33	22.33	22.34	22.33	22.34	22.34	22.34	22.33	22.34	22.33	22.34	22.34	22.33	22.34	22.33	22.33	22.33	22.33	22.34	22.34	22.33
Total Cash Outflow	1487.30	5.24	3.77	760.25	10.38	7.67	6.41	6.27	5.76	5.76	5.76	22.33	22.34	22.33	22.33	22.33	22.34	22.33	22.34	22.33	22.33	22.33	22.34	22.33	22.34	22.34	22.34	22.33	22.34	22.33	22.34	22.34	22.33	22.34	22.33	22.33	22.33	22.33	22.34	22.34	22.33
F Net Surplus Cash (A+C2)-E	293.10	0.00	0.00	0.00	0.00	0.00	0.00	4.60	4.94	5.31	5.66	0.00	0.00	0.00	0.00	0.00	0.00	0.29	1.03	1.81	2.61	3.43	4.27	5.15	6.05	6.99	7.96	8.96	9.99	11.06	12.15	13.28	14.48	15.68	16.95	18.25	19.59	20.97	22.38	23.86	25.40
Investment Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	139%	0%	0%	88%	86%	84%	87%	180%	186%	192%	198%	83%	86%	89%	92%	95%	98%	101%	105%	108%	112%	115%	119%	123%	127%	131%	136%	140%	145%	150%	154%	159%	165%	170%	176%	182%	188%	194%	200%	207%	214%
Cost recovery by water fee + subsidy ((A+C2)/E)	141%	100%	100%	100%	100%	100%	100%	180%	186%	192%	198%	100%	100%	100%	100%	100%	100%	101%	105%	108%	112%	115%	119%	123%	127%	131%	136%	140%	145%	150%	154%	159%	165%	170%	176%	182%	188%	194%	200%	207%	214%

GEGHARKUNIK MARZ
Sevan District
No 24 Tsovagyugh

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	1,182.84	98.7%
	Subsidy	15.92	1.3%
	Total	1,198.76	100.0%
2	**Expenditure**		
	OM cost	189.52	15.8%
	Loan repayment	576.41	48.1%
	Interest paid	139.73	11.7%
	Surplus cash	293.10	24.5%
	Total	1,198.76	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	526.20	3.82	2.73	514.03	3.21	1.46	0.53	0.42																																	
2. Operation and Maintenance Cost																																									
Salary	27.36			0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Chlorine	29.62			0.76	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
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	41.42			1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Pump replacement	0.00																0.00															0.00									
Sub-total	98.40			2.57	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
Total Outflow	624.60	3.82	2.73	516.60	5.80	4.05	3.12	3.01	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
B BENEFIT																																								
1. Water Tariff	744.93	0.00	0.00	7.59	7.59	7.59	7.84	13.28	13.72	14.18	14.64	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95
2. Subsidy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	744.93	0.00	0.00	7.59	7.59	7.59	7.84	13.28	13.72	14.18	14.64	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95	21.95
NET BENEFIT	120.33	-3.82	-2.73	-509.0	1.8	3.5	4.72	10.27	11.13	11.59	12.05	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36

FIRR = 1.03%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-114.16	-4.20	-3.00	-560.4	1.5	3.4	4.67	10.23	11.13	11.59	12.05	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36
	2	Capital cost 20% up	-164.11	-4.58	-3.28	-611.8	1.1	3.2	4.61	10.19	11.13	11.59	12.05	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36	19.36
2	1	OM cost 10% up	-71.10	-3.82	-2.73	-509.3	1.5	3.3	4.46	10.01	10.87	11.33	11.79	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10
	2	OM cost 20% up	-78.00	-3.82	-2.73	-509.5	1.3	3.0	4.20	9.75	10.61	11.07	11.53	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84	18.84
3	1	Revenue 10% down	-114.64	-3.82	-2.73	-509.8	1.0	2.8	3.94	8.94	9.76	10.17	10.59	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17
	2	Revenue 20% down	-165.07	-3.82	-2.73	-510.5	0.3	2.0	3.15	7.61	8.39	8.75	9.12	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97	14.97

No.		Description	FIRR		Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.54%		8.88	11.26%
	2	Capital cost 20% up	0.11%		79.53	1.26%
2	1	OM cost 10% up	0.95%		0.85	117.82%
	2	OM cost 20% up	0.87%		1.86	53.68%
3	1	Revenue 10% down	0.41%		15.15	6.60%
	2	Revenue 20% down	-0.27%		-48.33	-2.07%

No.25 Tsovak

Information on Existing Water Sources (Gegharkunik)

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

No.25 Community Tsovak
District Vardenis
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	8	54.8	45	36	33.9	2,050	20.0	20.0	8.0
2	Spring	-	-	-	-	-	-	-	-	-	5.0
3	Spring	-	-	-	-	-	-	-	-	-	7.0
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	Intake points consist of 3 springs. 150l/sec water is supplied for irrigation
Alternative sources if any	

No.25 Community Tsovak
District Vardenis
Marz Gegharkunik
Sampling date 21/Aug/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.5				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	7.9					
c	TDS	Mg/L	52				1000	1000
1	Al:Aluminum	Mg/L	n.d				0.10	0.50
2	B:Boron	Mg/L	n.d				0.70	0.50
3	Cl:Chloride	Mg/L	6				250	350
4	Cr:Chrome	Mg/L	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.83				1.50	
7	Hardness	Mg/L	90				500	700
8	Fe:Iron	Mg/L	0.02				0.30	0.30
9	Mn:Manganese	Mg/L	n.d				0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d				0.070	0.250
11	Ni:Nickel	Mg/L	n.d				0.020	0.100
12	Nitrate(NO3+)	Mg/L	2.7				50.0	45.0
13	SO4:Sulfate	Mg/L	12.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d				3.0	5.0
15	As:Arsenic	Mg/L	n.d				0.0	0.1
16	Ba:Barium	Mg/L	0.01				0.70	0.10
17	Be:Berillium	Mg/L	<0.00005				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d				0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001				0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002				0.00100	0.00050
21	Se:Selenium	Mg/L	n.d				0.010	0.010
22	Sr:Strontium	Mg/L	<0.7				NA	7.0
23	CN:Cyanide	Mg/L	n.d				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	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.25 Community Tsovak
District Vardenis
Marz Gegharkunik

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	01	11	20	0.3	Not identified
2	02	01	24	0.3	Not identified
3	03	02	20	0.3	Not identified
4	05	14	24	0.3	Not identified
5	06	12	24	0.3	Not identified
6	07	17	24	0.3	Not identified
7	08	13	20	0.3	Not identified

No. 25 **Marz** Gegharkunik **Community** Tsovak

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
2	Transmission pipeline	Possible	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	Spring	40°08′54.8″	45°36′33.9″	2,050	2006	Concrete	20.0	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	6,000	200	Steel	8.0	2006	Medium	Yes
2	3,000	200	Steel	5.0	1950	Huge	Yes
	3,000	150	Steel			Huge	Yes
3	6,000	200	Steel	7.0	1960	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°10′41.7″	45°38′20.6″	1994	Concrete	Rectangular	12x15x4	600	No

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	4,000	150	Steel	1994	Huge	Yes
2	3,000	100	Steel		Huge	Yes
3	1,500	75	Steel		Huge	Yes
4	700	50	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)
15			Yes	33	Yes

9. DRAINAGE SYSTEM

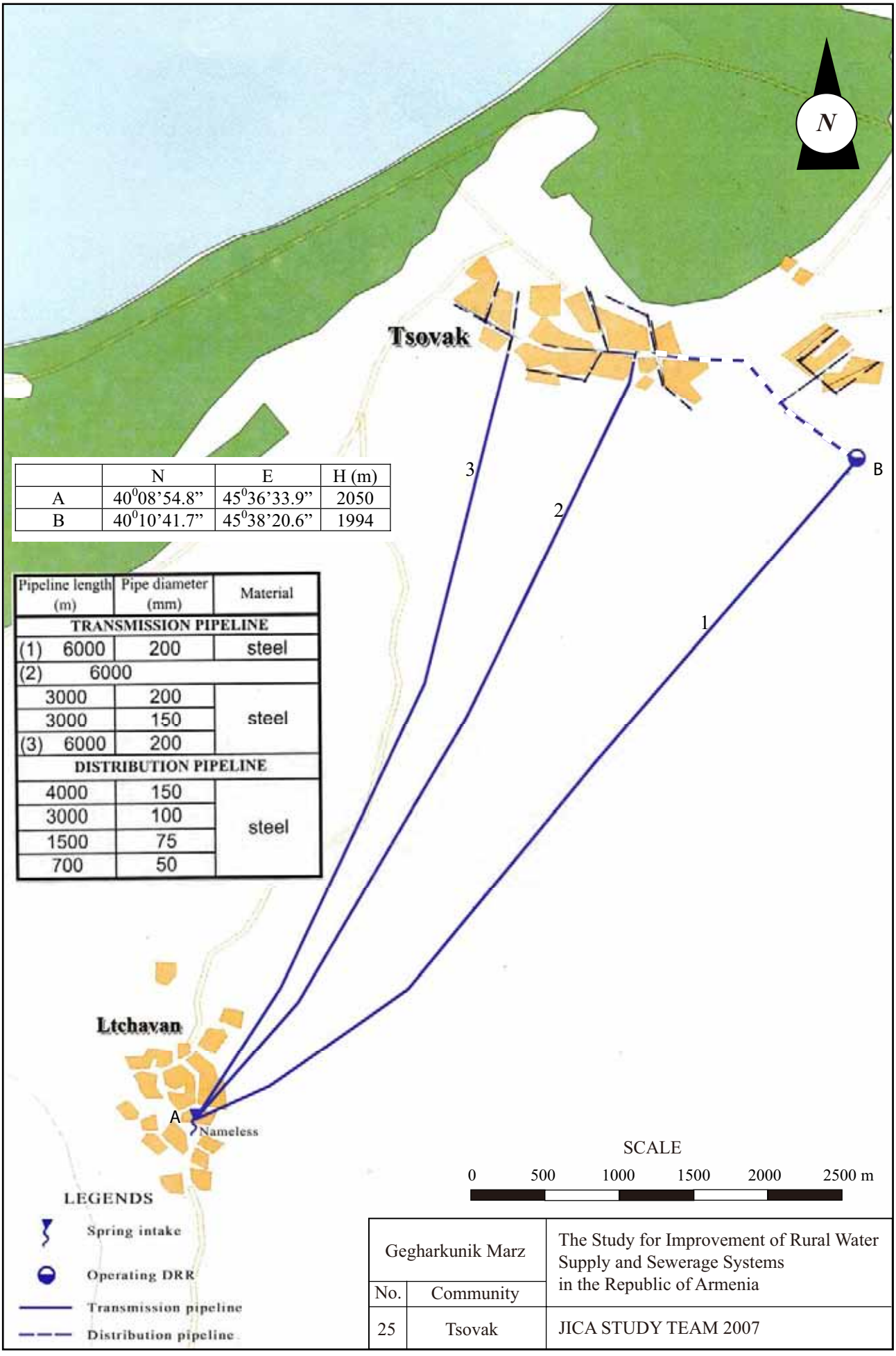
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.25 Tsovak**
District	**Vardenis**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	2,315
A2	Actual population in 2007	2,472
A3	Number of households	720
A4.1	Elderly people	360
A4.2	Population in labor force (age from 16 to 62)	1,347
A4.3	Children	765
A5.1	Pensioners	400
A5.2	Unemployed	0
A5.3	Receiving benefits	147
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	500
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,800
	Annual Budget of the community 2005, in thousand AMD	2,100
	Annual Budget of the community 2006, in thousand AMD	2,300
	Annual Budget of the community 2007, in thousand AMD	950
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	250
	Amount spent in drinking water sector 2005, in thousand AMD	850
	Amount spent in drinking water sector 2006, in thousand AMD	280
	Amount spent in drinking water sector 2007, in thousand AMD	240
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes, cereals, 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	350
D8	How many house connection household set the water meter	0
D9	Number of public taps	20
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?	-
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300
D15.1	How long the taps are open to provide the each household for filling	1 hour
D15.2	Estimate quantity of water for filling containers of each household (litter per	-
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 Maqenis river
D20	Are you satisfied with irrigation water supply volume?	almost sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Kirakosyan Vaghinak
E2	Position	water distributor
E3	Telephone	with the help of administ. head
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-deteriorated, 1-partially rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	2-deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2-partially rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community 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?	hired specialist 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)	240,000
	Repair cost(AMD)	280,000
	Others(AMD)	0
	Total (AMD)	520,000
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

Gegharkunik
No.25Tsovak



	N	E	H (m)
A	$40^0$08'54.8"	$45^0$36'33.9"	2050
B	$40^0$10'41.7"	$45^0$38'20.6"	1994

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 6000	200	steel
(2) 6000		
3000	200	steel
3000	150	
(3) 6000	200	
DISTRIBUTION PIPELINE		
4000	150	steel
3000	100	
1500	75	
700	50	

Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
25	Tsovak	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.25
Name : **Tsovak**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	2,472	persons	247.2	
	2 Factory	-	nos	0.0	
	3 School (pupils)	500	pupils	5.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	720	household	62.6	
	Sub-total			314.8	
	Unaccouted for water (20%)			63.0	
1	Average Daily Water Demand			377.8	m3/day
2	Maximum Daily Water Demand			453.3	m3/day
3	Maximum Hourly Water Demand			44.2	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
	1 Water source type					
	a Spring	3	20.0	lit/sec	1728.0	m3/day
`	Total				1,728.0	m3/day
	2 Required reservoir volume				530	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3		nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter	4,500	m
	250mm diameter		m
3	Reservoir		
4	Distribution pipe		
	50mm diameter	700	m
	75mm diameter	1,500	m
	90mm diameter		m
	110mm diameter	3,000	m
	150mm diameter	4,000	m
	200mm diameter		m
	250mm diameter		m
5	House connection	370	nos
6	Water meter installation	720	nos
7	Public tap	8	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	Gegharkunik	
No. 25	Tsovak	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **25**
Name : **Tsovak**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm	4,500	m	19,440	87,480,000
		250mm		m	27,040	
	Sub-total					87,480,000
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	700	m	5,520	3,864,000
		75mm	1,500	m	7,160	10,740,000
		90mm		m	8,040	
		110mm	3,000	m	9,680	29,040,000
		150mm	4,000	m	13,140	52,560,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					96,204,000
5	House Connection		370	nos	74,000	27,380,000
6	Water Meter Installation		720	nos	80,000	57,600,000
7	Public Tap		8	nos	90,000	720,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	3,680	m	3,600	13,248,000
	Total				AMD	283,132,000
					Equivalent to USD	926,722
					Equivalent to JPY	97,769,135
					AMD	USD
	Investment Cost per household		720	HH	393,239	1,287
	Investment Cost per person		2,472	persons	114,536	375

GEGHARKUNIK MARZ
Marutuni District
No 25 Tsovak

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		114.9																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		641.37	0.00	0.00	1.70	3.39	4.14	4.27	7.24	7.48	7.72	7.98	11.96	12.35	12.76	13.18	13.62	14.07	14.53	15.01	15.51	16.02	16.55	17.09	17.66	18.24	18.84	19.46	20.11	20.77	21.45	22.16	22.89	23.65	24.43	25.24	26.07	26.93	27.82	28.74	29.68	30.66
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				2																																				
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		35.40			0.48	0.50	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.64	0.66	0.69	0.71	0.73	0.76	0.78	0.81	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.05	1.08	1.12	1.15	1.19	1.23	1.27	1.31	1.36	1.40	1.45	1.50	1.54	1.60
2. Chlorine																																									
Pouring volume	kg/yr				690																																				
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		30.20			0.17	0.35	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	0.99	1.03	1.06	1.10	1.13	1.17	1.21	1.25	1.29	1.33	1.38
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		69.33			0.39	0.80	1.01	1.05	1.08	1.12	1.15	1.19	1.23	1.27	1.31	1.36	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.76	1.82	1.88	1.94	2.00	2.07	2.14	2.21	2.28	2.36	2.44	2.52	2.60	2.68	2.77	2.87	2.96	3.06	3.16
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					0.39	0.8	1.01	1.05	1.08	1.12	1.15	1.19	1.23	1.27	1.31	1.36	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.76	1.82	1.88	1.94	2.00	2.07	2.14	2.21	2.28	2.36	2.44	2.52	2.60	2.68	2.77	2.87	2.96	3.06	3.16
5. Pump replacement		0.00																0.00															0.00										
Sub-total		134.93	0.00	0.00	1.04	1.65	1.96	2.04	2.10	2.17	2.23	2.31	2.39	2.46	2.54	2.64	2.72	2.81	2.91	3.00	3.11	3.20	3.30	3.42	3.53	3.65	3.77	3.88	4.02	4.15	4.29	4.42	4.58	4.73	4.89	5.04	5.21	5.38	5.57	5.75	5.93	6.14
C Gross Income (A-B)		506.44	0.00	0.00	0.66	1.74	2.18	2.23	5.14	5.31	5.49	5.67	9.57	9.89	10.22	10.54	10.90	11.26	11.62	12.01	12.40	12.82	13.25	13.67	14.13	14.59	15.07	15.58	16.09	16.62	17.16	17.74	18.31	18.92	19.54	20.20	20.86	21.55	22.25	22.99	23.75	24.52
D Depreciation cost		269.15						7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69
E Interest paid		82.96	0.04	0.07	1.45	2.87	3.52	3.53	3.53	3.53	3.53	3.53	3.53	3.43	3.33	3.22	3.12	3.01	2.91	2.80	2.69	2.58	2.47	2.36	2.24	2.13	2.01	1.90	1.78	1.66	1.54	1.42	1.30	1.17	1.05	0.92	0.79	0.66	0.53	0.40	0.27	0.14
F Net Income		154.33	-0.04	-0.07	-0.79	-1.13	-1.34	-8.99	-6.08	-5.91	-5.73	-5.55	-1.65	-1.23	-0.80	-0.37	0.09	0.56	1.02	1.52	2.02	2.55	3.09	3.62	4.20	4.77	5.37	5.99	6.62	7.27	7.93	8.63	9.32	10.06	10.80	11.59	12.38	13.20	14.03	14.90	15.79	16.69
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		154.33	-0.04	-0.07	-0.79	-1.13	-1.34	-8.99	-6.08	-5.91	-5.73	-5.55	-1.65	-1.23	-0.80	-0.37	0.09	0.56	1.02	1.52	2.02	2.55	3.09	3.62	4.20	4.77	5.37	5.99	6.62	7.27	7.93	8.63	9.32	10.06	10.80	11.59	12.38	13.20	14.03	14.90	15.79	16.69
OM Cost Recovery Ratio (A/B)		475%	0%	0%	164%	205%	211%	209%	345%	345%	346%	345%	500%	502%	502%	499%	501%	501%	499%	500%	499%	501%	502%	500%	500%	500%	500%	502%	500%	500%	500%	501%	500%	500%	500%	501%	500%	501%	499%	500%	501%	499%

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	154.33	-0.04	-0.07	-0.79	-1.13	-1.34	-8.99	-6.08	-5.91	-5.73	-5.55	-1.65	-1.23	-0.80	-0.37	0.09	0.56	1.02	1.52	2.02	2.55	3.09	3.62	4.20	4.77	5.37	5.99	6.62	7.27	7.93	8.63	9.32	10.06	10.80	11.59	12.38	13.20	14.03	14.90	15.79	16.69
2. Depreciation cost	269.15	0.00	0.00	0.00	0.00	0.00	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69
3. Interest Paid	82.96	0.04	0.07	1.45	2.87	3.52	3.53	3.53	3.53	3.53	3.53	3.53	3.43	3.33	3.22	3.12	3.01	2.91	2.80	2.69	2.58	2.47	2.36	2.24	2.13	2.01	1.90	1.78	1.66	1.54	1.42	1.30	1.17	1.05	0.92	0.79	0.66	0.53	0.40	0.27	0.14
Sub-total	506.44	0.00	0.00	0.66	1.74	2.18	2.23	5.14	5.31	5.49	5.67	9.57	9.89	10.22	10.54	10.90	11.26	11.62	12.01	12.40	12.82	13.25	13.67	14.13	14.59	15.07	15.58	16.09	16.62	17.16	17.74	18.31	18.92	19.54	20.20	20.86	21.55	22.25	22.99	23.75	24.52
B Finances																																									
1. Project Loan	353.00	3.91	2.79	138.04	142.69	64.54	0.58	0.45																																	
2. Local fund	120.03	1.29	0.91	46.76	49.24	21.70	0.07	0.06																																	
Sub-total	473.03	5.20	3.70	184.80	191.93	86.24	0.65	0.51																																	
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	30.68	0.04	0.07	0.79	1.13	1.34	1.30	0.00	0.00	0.00	0.00	4.11	3.79	3.46	3.14	2.78	2.42	2.06	1.67	1.28	0.86	0.43	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	30.68	0.04	0.07	0.79	1.13	1.34	1.30	0.00	0.00	0.00	0.00	4.11	3.79	3.46	3.14	2.78	2.42	2.06	1.67	1.28	0.86	0.43	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	1010.15	5.24	3.77	186.25	194.80	89.76	4.18	5.65	5.31	5.49	5.67	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	14.13	14.59	15.07	15.58	16.09	16.62	17.16	17.74	18.31	18.92	19.54	20.20	20.86	21.55	22.25	22.99	23.75	24.52
APPLICATION OF FUNDS																																									
D Project disbursement	473.03	5.20	3.70	184.80	191.93	86.24	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	353.03											10.15	10.25	10.35	10.46	10.56	10.67	10.77	10.88	10.99	11.10	11.21	11.32	11.44	11.55	11.67	11.78	11.90	12.02	12.14	12.26	12.38	12.51	12.63	12.76	12.89	13.01	13.15	13.28	13.41	13.54
2. Interest paid	82.96	0.04	0.07	1.45	2.87	3.52	3.53	3.53	3.53	3.53	3.53	3.53	3.43	3.33	3.22	3.12	3.01	2.91	2.80	2.69	2.58	2.47	2.36	2.24	2.13	2.01	1.90	1.78	1.66	1.54	1.42	1.30	1.17	1.05	0.92	0.79	0.66	0.53	0.40	0.27	0.14
Sub-total	435.99	0.04	0.07	1.45	2.87	3.52	3.53	3.53	3.53	3.53	3.53	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.67	13.68	13.68	13.68
Total Cash Outflow	909.02	5.24	3.77	186.25	194.80	89.76	4.18	4.04	3.53	3.53	3.53	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.68	13.67	13.68	13.68	13.68
F Net Surplus Cash (A+C2)-E	101.13	0.00	0.00	0.00	0.00	0.00	0.00	1.61	1.78	1.96	2.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.91	1.39	1.90	2.41	2.94	3.48	4.06	4.63	5.24	5.86	6.52	7.18	7.88	8.57	9.31	10.07	10.84
Investment Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	116%	0%	0%	46%	61%	62%	63%	146%	150%	156%	161%	70%	72%	75%	77%	80%	82%	85%	88%	91%	94%	97%	100%	103%	107%	110%	114%	118%	121%	125%	130%	134%	138%	143%	148%	152%	158%	163%	168%	174%	179%
Cost recovery by water fee + subsidy ((A+C2)/E)	123%	100%	100%	100%	100%	100%	100%	146%	150%	156%	161%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	103%	107%	110%	114%	118%	121%	125%	130%	134%	138%	143%	148%	152%	158%	163%	168%	174%	179%

GEGHARKUNIK MARZ
Marutuni District
No 25 Tsovak

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	641.37	95.4%
	Subsidy	30.68	4.6%
	Total	672.05	100.0%
2	**Expenditure**		
	OM cost	134.93	20.1%
	Loan repayment	353.03	52.5%
	Interest paid	82.96	12.3%
	Surplus cash	101.13	15.0%
	Total	672.05	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	315.20	3.82	2.73	125.99	126.29	55.42	0.53	0.42																																	
2. Operation and Maintenance Cost																																									
Salary	18.24			0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Chlorine	16.00			0.17	0.35	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
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	35.37			0.39	0.78	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pump replacement	0.00																0.00															0.00									
Sub-total	69.61			1.04	1.61	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
Total Outflow	384.81	3.82	2.73	127.03	127.90	57.28	2.39	2.28	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
B BENEFIT																																								
1. Water Tariff	402.72	0.00	0.00	1.70	3.39	4.14	4.27	7.24	7.48	7.72	7.98	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96
2. Subsidy	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.36	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	403.79	0.00	0.00	1.70	3.39	4.14	4.27	7.24	7.48	7.72	7.98	12.54	12.32	12.09	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96	11.96
NET BENEFIT	18.98	-3.82	-2.73	-125.3	-124.5	-53.1	1.88	4.96	5.62	5.86	6.12	10.68	10.46	10.23	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10

FIRR = 0.29%

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	-100.91	-4.20	-3.00	-137.9	-137.1	-58.7	1.83	4.92	5.62	5.86	6.12	10.68	10.46	10.23	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10
	2	Capital cost 20% up	-130.45	-4.58	-3.28	-150.5	-149.8	-64.2	1.77	4.88	5.62	5.86	6.12	10.68	10.46	10.23	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10
2	1	OM cost 10% up	-76.21	-3.82	-2.73	-125.4	-124.7	-53.3	1.69	4.77	5.43	5.67	5.93	10.49	10.27	10.04	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91	9.91
	2	OM cost 20% up	-81.07	-3.82	-2.73	-125.5	-124.8	-53.5	1.51	4.59	5.25	5.49	5.75	10.31	10.09	9.86	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73
3	1	Revenue 10% down	-98.63	-3.82	-2.73	-125.5	-124.8	-53.6	1.45	4.24	4.87	5.09	5.32	9.43	9.23	9.02	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90
	2	Revenue 20% down	-125.89	-3.82	-2.73	-125.7	-125.2	-54.0	1.03	3.51	4.12	4.32	4.52	8.17	8.00	7.81	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.18%	-26.09	-3.83%
	2	Capital cost 20% up	-0.61%	-14.84	-6.74%
2	1	OM cost 10% up	0.19%	5.71	17.53%
	2	OM cost 20% up	0.08%	27.10	3.69%
3	1	Revenue 10% down	-0.35%	-18.49	-5.41%
	2	Revenue 20% down	-1.05%	-12.80	-7.81%

No.26 Tsovinar

Information on Existing Water Sources (Gegharkunik)

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

No.26 Community Tsovinar
District Martuni
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	2	6.3	45	31	19.3	2,799	10.0	25.0	25.0
2	Spring	40	2	26.0	45	30	9.0	2,760	8.0	20.0	20.0
3	Spring	40	1	57.8	45	29	26.8	2,740	-	-	-
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	Reservoir have heavy leakages Leakage in the internal network - 60%
Alternative sources if any	

No.26 Community Tsovinar
District Martuni
Marz Gegharkunik
Sampling date 11/Aug/2007

	Parameters analysed	Units	No.1	No.2			Guidelines	
							WHO	Armenia
a	pH		7.8	7.6			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	7.5	9.7				
c	TDS	Mg/L	19	14			1000	1000
1	Al:Aluminum	Mg/L	n.d	0.01			0.10	0.50
2	B:Boron	Mg/L	n.d	nd			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	nd			2	1
6	F:Fluoride	Mg/L	0.60	0.54			1.50	
7	Hardness	Mg/L	35	40			500	700
8	Fe:Iron	Mg/L	0.02	nd			0.30	0.30
9	Mn:Manganese	Mg/L	n.d	nd			0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	nd			0.070	0.250
11	Ni:Nickel	Mg/L	n.d	nd			0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8	1.8			50.0	45.0
13	SO4:Sulfate	Mg/L	2.0	2.0			250.0	500.0
14	Zn:Zink	Mg/L	n.d	nd			3.0	5.0
15	As:Arsenic	Mg/L	n.d	nd			0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.01			0.70	0.10
17	Be:Berillium	Mg/L	0.00008	0.00009			NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	nd			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	nd			0.010	0.010
22	Sr:Strontium	Mg/L	n.d	nd			NA	7.0
23	CN:Cyanide	Mg/L	n.d	nd			0.070	0.035
24	Coli form bacteria	bacteria per 100 ml	nd				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	nd				0	0
26	Total bacteria	bacteria per 1 ml	nd				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.26 Community Tsovinar
District Martuni
Marz Gegharkunik

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	01	30	2-5 2-5	-	Not identified
2	02	20	3-8 3-8	-	Not identified
3	03	28	3-5 3-5	-	Not identified
4	04	10	3-36 3-45	0.4-0.9	Not identified
5	05	14	18-43 21-71	0.9-2.3	Not identified
6	06	13	1-5 1-5	-	Not identified
7	07	27	3-5 3-5	-	Not identified
8	08	16	4-8 4-8	-	Not identified

No. 26 **Marz** Gegharkunik **Community** Tsovinar

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Difficult	Difficult	
	Intake	Difficult	Difficult	
2	Transmission pipeline	Difficult	Difficult	Difficult to find the pipeline route
3	Reservoir	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°02′06.3″	45°31′19.3″	2,799	1967	Concrete	25.0	Yes
2	Spring	40°02′26.0″	45°30′09.0″	2,760	1986	Concrete	20.0	No
3	Spring	40°01′57.8″	45°29′26.8″	2,740	-	-	-	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	22,000	200	Cast iron	25.0	1967	Little	Yes
2	19,000	150	Polyethylene	20.0	1986	Little	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°08′54.8″	45°28′22.9″	2,050	Concrete	Circle	D=12, H=5	500	Yes
2							500	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	200	Steel	1967	Huge	Yes
2	4,000	150	Steel		Huge	Yes
3	2,000	100	Steel		Huge	Yes
4	3,000	50	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)
40	1960	1970	Yes	50	Yes

9. DRAINAGE SYSTEM

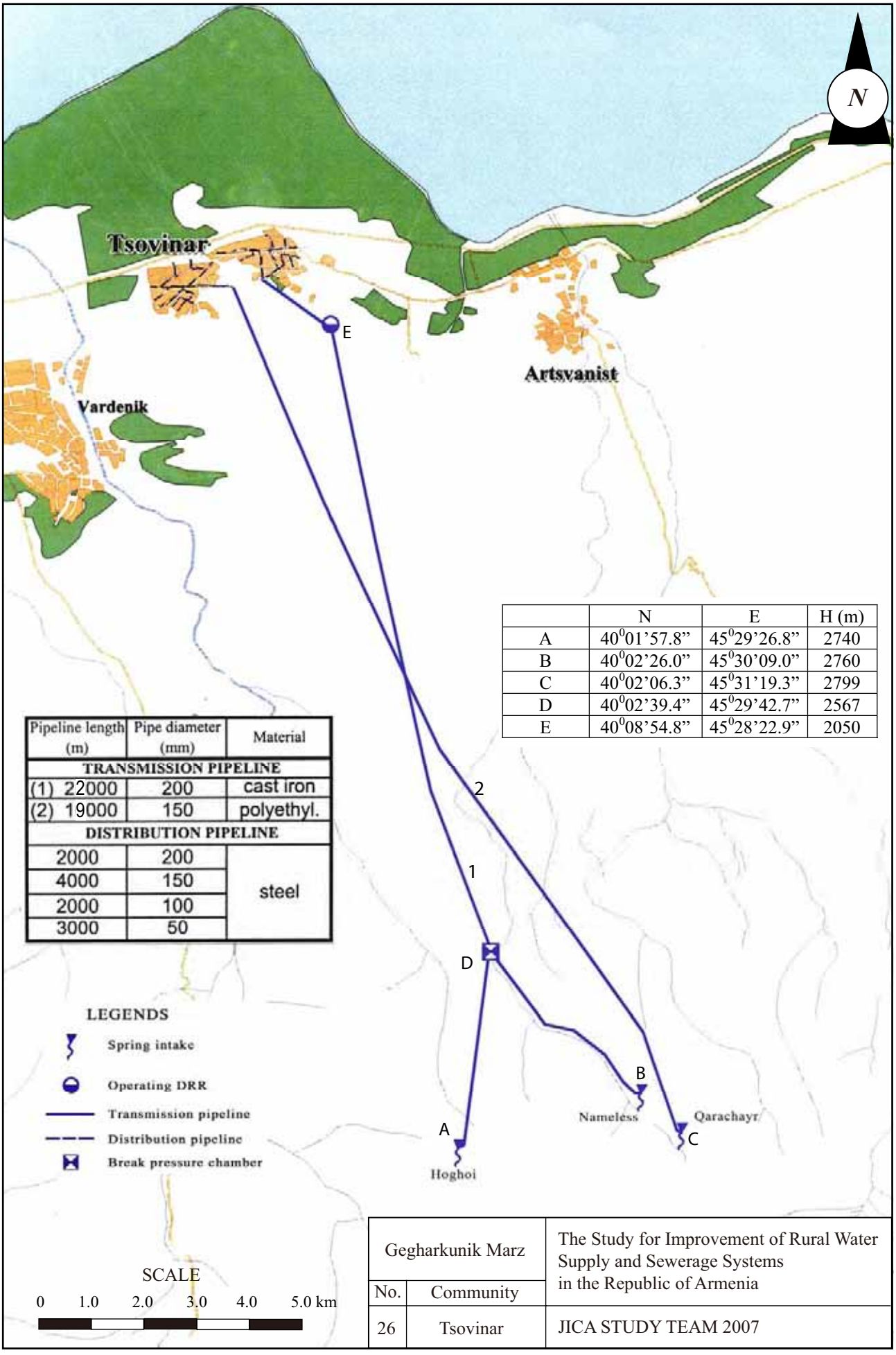
Existence	Rehabilitation	Remarks
Yes	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.26 Tsovinar**
District	**Martini**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	5,000
A2	Actual population in 2007	5,180
A3	Number of households	1,728
A4.1	Elderly people	1,200
A4.2	Population in labor force (age from 16 to 62)	2,750
A4.3	Children	1,066
A5.1	Pensioners	715
A5.2	Unemployed	2
A5.3	Receiving benefits	350
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	2
A10	Number of pupils	835
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	0
	Annual Budget of the community 2005, in thousand AMD	0
	Annual Budget of the community 2006, in thousand AMD	3,500
	Annual Budget of the community 2007, in thousand AMD	1,500
	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	2,000
	Amount spent in drinking water sector 2007, in thousand AMD	2,000
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes,cabbage, cereals, 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	-
D5	Present condition of the water supply volume of Domestic use	almost sufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	1210
D8	How many house connection household set the water meter	0
D9	Number of public taps	15-20
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?	-
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	500
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
D16	Drinking water monthly water fee per household	1000 drams/ month
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1Flate rate, 2 Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	river Arpa
D20	Are you satisfied with irrigation water supply volume?	sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Mkhoyan Mkhitar
E2	Position	water specialist
E3	Telephone	with the help of administ. head
E4	Quantity and present condition of the water supply facilities: spring/ intake	10-partially rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	2-rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1rehabilitated .
E7	Quantity and present condition of the water supply facilities: net/distribution	rehabilitated
E8	Quantity and present condition of the water supply facilities: public tap	partially 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
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	administratiuon head
E14	How you prepare O&M costs?	administration budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	480,000
	Repair cost(AMD)	2,000,000
	Others(AMD)	0
	Total (AMD)	2,480,000
E16	Do the residents participate in the O&M works?	no
E17	What kind of OM method is preferable to you?	difficult to answer
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Gegharkunik
No.26 Tsovinar



	N	E	H (m)
A	$40^0$01'57.8"	$45^0$29'26.8"	2740
B	$40^0$02'26.0"	$45^0$30'09.0"	2760
C	$40^0$02'06.3"	$45^0$31'19.3"	2799
D	$40^0$02'39.4"	$45^0$29'42.7"	2567
E	$40^0$08'54.8"	$45^0$28'22.9"	2050

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 22000	200	cast iron
(2) 19000	150	polyethyl.
DISTRIBUTION PIPELINE		
2000	200	steel
4000	150	
2000	100	
3000	50	

LEGENDS

- Spring intake
- Operating DRR
- Transmission pipeline
- Distribution pipeline
- Break pressure chamber

SCALE

0 1.0 2.0 3.0 4.0 5.0 km

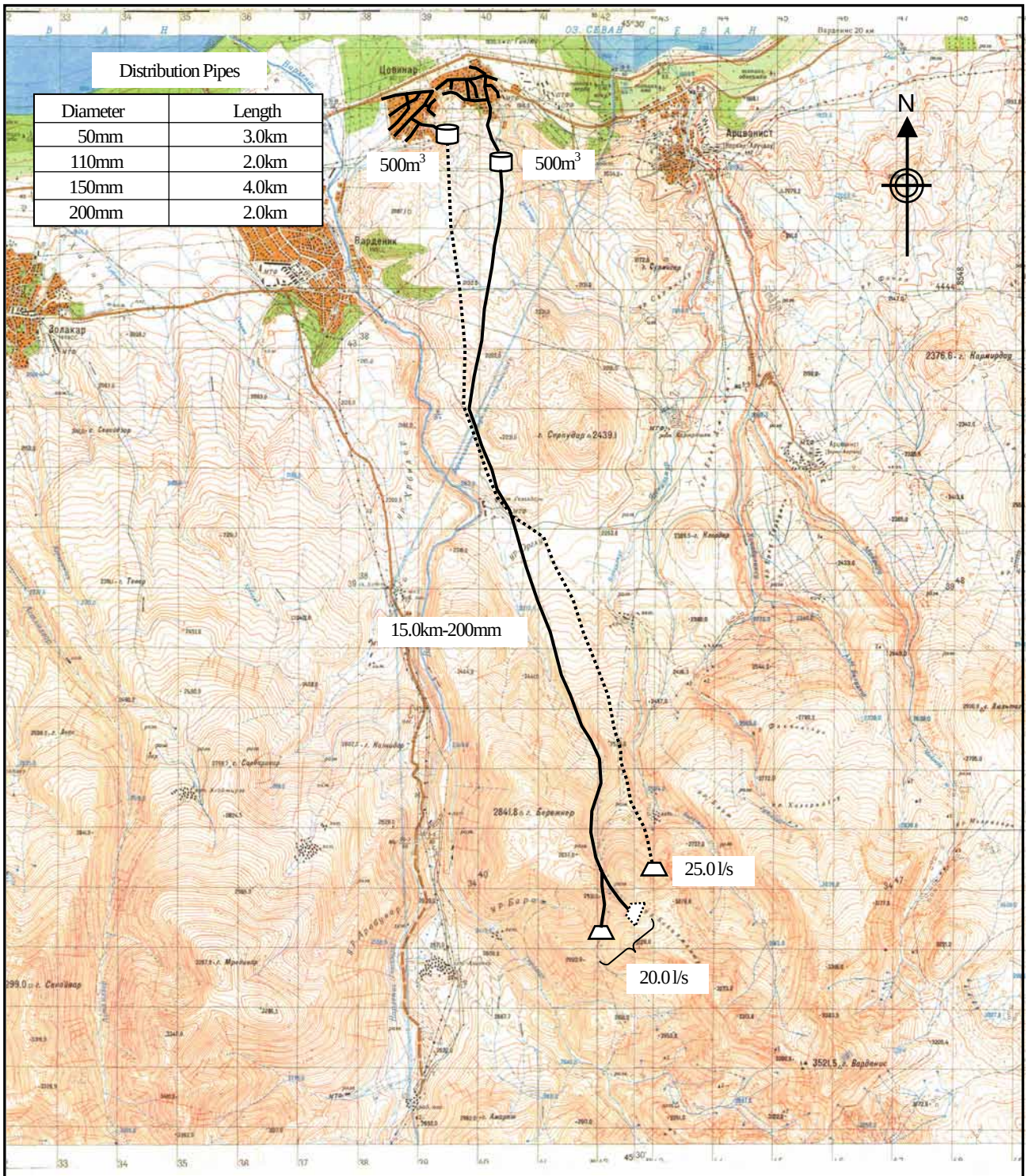
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
26	Tsovinar	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.26
Name : **Tsovinar**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	5,180	persons	518.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	835	pupils	8.4	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	1,728	household	150.3	
	Sub-total			676.7	
	Unaccouted for water (20%)			135.3	
1	Average Daily Water Demand			812.0	m3/day
2	Maximum Daily Water Demand			974.4	m3/day
3	Maximum Hourly Water Demand			79.2	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	3	45.0	lit/sec		3,888.0	m3/day
`	Total					3,888.0	m3/day
	2 Required reservoir volume					950	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
No	Item	Quantity	Unit
1	Intake		
	1m3		nos
	2m3	2	nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter	15,000	m
	250mm diameter		m
3	Reservoir		
	500m3 capacity	2	nos
4	Distribution pipe		
	50mm diameter	3,000	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	2,000	m
	150mm diameter	4,000	m
	200mm diameter	2,000	m
	250mm diameter		m
5	House connection	518	nos
6	Water meter installation	1,728	nos
7	Public tap	18	nos
8	Chlorination	2	nos
9	Pumps	-	nos



SCALE

0 1000 2000 3000 4000 5000m

Legend

Intake Existing/ to be rehabilitated

Reservoir Existing/ to be rehabilitated

Pipeline Existing/ to be rehabilitated

Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 26	Tsovinar	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **26**
Name : **Tsovinar**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3	2	nos	545,000	1,090,000
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,090,000
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm	15,000	m	19,440	291,600,000
		250mm		m	27,040	
	Sub-total					291,600,000
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	2	nos	42,520,900	85,041,800
	Sub-total					85,041,800
4	Distribution Pipe					
		50mm	3,000	m	5,520	16,560,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	2,000	m	9,680	19,360,000
		150mm	4,000	m	13,140	52,560,000
		200mm	2,000	m	19,440	38,880,000
		250mm		m	27,040	
	Sub-total					127,360,000
5	House Connection		518	nos	74,000	38,332,000
6	Water Meter Installation		1,728	nos	80,000	138,240,000
7	Public Tap		18	nos	90,000	1,620,000
8	Chlorilation Equipment		2	nos	500,000	1,000,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	4,400	m	3,600	15,840,000
	Total				AMD	700,123,800
					Equivalent to USD	2,291,581
					Equivalent to JPY	241,761,786
					AMD	USD
	Investment Cost per household		1,728	HH	405,164	1,326
	Investment Cost per person		5,180	persons	135,159	442

GEGHARKUNIK MARZ
Marutuni District
No 26 Tsovinar

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		247.0																																							
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		1378.73	0.00	0.00	3.65	7.29	8.89	9.19	15.56	16.07	16.61	17.15	25.71	26.56	27.43	28.34	29.27	30.24	31.24	32.27	33.33	34.43	35.57	36.74	37.96	39.21	40.50	41.84	43.22	44.65	46.12	47.64	49.21	50.84	52.52	54.25	56.04	57.89	59.80	61.77	63.81	65.92
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				4																																				
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		70.79			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	2.03	2.09	2.16	2.23	2.31	2.38	2.46	2.54	2.63	2.71	2.80	2.90	2.99	3.09	3.19
2. Chlorine																																									
Pouring volume	kg/yr				1,482																																				
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		64.91			0.36	0.75	0.95	0.98	1.01	1.05	1.08	1.12	1.15	1.19	1.23	1.27	1.31	1.36	1.40	1.45	1.50	1.54	1.59	1.65	1.70	1.76	1.82	1.88	1.94	2.00	2.07	2.14	2.21	2.28	2.35	2.43	2.51	2.60	2.68	2.77	2.86	2.96
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		132.83			0.75	1.54	1.94	2.01	2.07	2.14	2.21	2.28	2.36	2.44	2.52	2.60	2.69	2.78	2.87	2.96	3.06	3.16	3.26	3.37	3.48	3.60	3.72	3.84	3.97	4.10	4.23	4.37	4.52	4.67	4.82	4.98	5.14	5.31	5.49	5.67	5.86	6.05
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					0.75	1.54	1.94	2.01	2.07	2.14	2.21	2.28	2.36	2.44	2.52	2.60	2.69	2.78	2.87	2.96	3.06	3.16	3.26	3.37	3.48	3.60	3.72	3.84	3.97	4.10	4.23	4.37	4.52	4.67	4.82	4.98	5.14	5.31	5.49	5.67	5.86	6.05
5. Pump replacement		0.00																0.00															0.00									
Sub-total		268.53	0.00	0.00	2.07	3.28	3.91	4.05	4.17	4.32	4.46	4.60	4.75	4.92	5.08	5.24	5.42	5.60	5.78	5.97	6.17	6.37	6.57	6.80	7.02	7.26	7.50	7.75	8.00	8.26	8.53	8.82	9.11	9.41	9.71	10.04	10.36	10.71	11.07	11.43	11.81	12.20
C Gross Income (A-B)		1110.20	0.00	0.00	1.58	4.01	4.98	5.14	11.39	11.75	12.15	12.55	20.96	21.64	22.35	23.10	23.85	24.64	25.46	26.30	27.16	28.06	29.00	29.94	30.94	31.95	33.00	34.09	35.22	36.39	37.59	38.82	40.10	41.43	42.81	44.21	45.68	47.18	48.73	50.34	52.00	53.72
D Depreciation cost		665.00						19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
E Interest paid		198.75	0.04	0.07	3.43	6.89	8.46	8.46	8.46	8.46	8.46	8.46	8.47	8.22	7.98	7.73	7.48	7.23	6.97	6.71	6.45	6.19	5.92	5.65	5.38	5.11	4.83	4.55	4.27	3.98	3.69	3.40	3.11	2.81	2.51	2.21	1.90	1.59	1.28	0.97	0.65	0.32
F Net Income		246.45	-0.04	-0.07	-1.85	-2.88	-3.48	-22.32	-16.07	-15.71	-15.31	-14.91	-6.51	-5.58	-4.63	-3.63	-2.63	-1.59	-0.51	0.59	1.71	2.87	4.08	5.29	6.56	7.84	9.17	10.54	11.95	13.41	14.90	16.42	17.99	19.62	21.30	23.00	24.78	26.59	28.45	30.37	32.35	34.40
G Tax and duties		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Net Income after deduction of TAX		246.45	-0.04	-0.07	-1.85	-2.88	-3.48	-22.32	-16.07	-15.71	-15.31	-14.91	-6.51	-5.58	-4.63	-3.63	-2.63	-1.59	-0.51	0.59	1.71	2.87	4.08	5.29	6.56	7.84	9.17	10.54	11.95	13.41	14.90	16.42	17.99	19.62	21.30	23.00	24.78	26.59	28.45	30.37	32.35	34.40
OM Cost Recovery Ratio (A/B)		513%	0%	0%	176%	222%	227%	227%	373%	372%	372%	373%	541%	540%	540%	541%	540%	540%	540%	541%	540%	541%	541%	540%	541%	540%	540%	540%	540%	541%	541%	540%	540%	540%	541%	540%	541%	541%	540%	540%	540%	540%

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	246.45	-0.04	-0.07	-1.85	-2.88	-3.48	-22.32	-16.07	-15.71	-15.31	-14.91	-6.51	-5.58	-4.63	-3.63	-2.63	-1.59	-0.51	0.59	1.71	2.87	4.08	5.29	6.56	7.84	9.17	10.54	11.95	13.41	14.90	16.42	17.99	19.62	21.30	23.00	24.78	26.59	28.45	30.37	32.35	34.40
2. Depreciation cost	665.00	0.00	0.00	0.00	0.00	0.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
3. Interest Paid	198.75	0.04	0.07	3.43	6.89	8.46	8.46	8.46	8.46	8.46	8.46	8.47	8.22	7.98	7.73	7.48	7.23	6.97	6.71	6.45	6.19	5.92	5.65	5.38	5.11	4.83	4.55	4.27	3.98	3.69	3.40	3.11	2.81	2.51	2.21	1.90	1.59	1.28	0.97	0.65	0.32
Sub-total	1110.20	0.00	0.00	1.58	4.01	4.98	5.14	11.39	11.75	12.15	12.55	20.96	21.64	22.35	23.10	23.85	24.64	25.46	26.30	27.16	28.06	29.00	29.94	30.94	31.95	33.00	34.09	35.22	36.39	37.59	38.82	40.10	41.43	42.81	44.21	45.68	47.18	48.73	50.34	52.00	53.72
B Finances																																									
1. Project Loan	846.84	3.91	2.79	335.87	346.43	156.81	0.58	0.45																																	
2. Local fund	289.71	1.29	0.91	113.79	119.04	54.55	0.07	0.06																																	
Sub-total	1136.55	5.20	3.70	449.66	465.47	211.36	0.65	0.51																																	
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	105.68	0.04	0.07	1.85	2.88	3.48	3.32	0.00	0.00	0.00	0.00	11.86	11.17	10.46	9.71	8.96	8.18	7.35	6.51	5.65	4.76	3.81	2.87	1.87	0.87	0.00	0.00	0.00	0.00	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	105.68	0.04	0.07	1.85	2.88	3.48	3.32	0.00	0.00	0.00	0.00	11.86	11.17	10.46	9.71	8.96	8.18	7.35	6.51	5.65	4.76	3.81	2.87	1.87	0.87	0.00	0.00	0.00	0.00	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	2352.43	5.24	3.77	453.09	472.36	219.82	9.11	11.90	11.75	12.15	12.55	32.82	32.81	32.81	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.81	32.81	32.81	32.82	33.00	34.09	35.22	36.39	37.59	38.82	40.10	41.43	42.81	44.21	45.68	47.18	48.73	50.34	52.00	53.72
APPLICATION OF FUNDS																																									
D Project disbursement	1136.55	5.20	3.70	449.66	465.47	211.36	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	846.83											24.35	24.59	24.83	25.08	25.33	25.59	25.84	26.10	26.36	26.63	26.89	27.16	27.43	27.71	27.98	28.26	28.55	28.83	29.12	29.41	29.71	30.00	30.30	30.61	30.91	31.22	31.53	31.85	32.17	32.49
2. Interest paid	198.75	0.04	0.07	3.43	6.89	8.46	8.46	8.46	8.46	8.46	8.46	8.47	8.22	7.98	7.73	7.48	7.23	6.97	6.71	6.45	6.19	5.92	5.65	5.38	5.11	4.83	4.55	4.27	3.98	3.69	3.40	3.11	2.81	2.51	2.21	1.90	1.59	1.28	0.97	0.65	0.32
Sub-total	1045.58	0.04	0.07	3.43	6.89	8.46	8.46	8.46	8.46	8.46	8.46	32.82	32.81	32.81	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.82	32.81
Total Cash Outflow	2182.13	5.24	3.77	453.09	472.36	219.82	9.11	8.97	8.46	8.46	8.46	32.82	32.81	32.81	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.81	32.81	32.82	32.81	32.81	32.81	32.82	32.82	32.81
F Net Surplus Cash (A+C2)-E	170.30	0.00	0.00	0.00	0.00	0.00	0.00	2.93	3.29	3.69	4.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	1.28	2.40	3.58	4.78	6.01	7.28	8.62	10.00	11.39	12.87	14.37	15.92	17.52	19.18	20.91
Investment Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	106%	0%	0%	46%	58%	59%	61%	135%	139%	144%	148%	64%	66%	68%	70%	73%	75%	78%	80%	83%	85%	88%	91%	94%	97%	101%	104%	107%	111%	115%	118%	122%	126%	130%	135%	139%	144%	149%	153%	158%	164%
Cost recovery by water fee + subsidy ((A+C2)/E)	116%	100%	100%	100%	100%	100%	100%	135%	139%	144%	148%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	104%	107%	111%	115%	118%	122%	126%	130%	135%	139%	144%	149%	153%	158%	164%

GEGHARKUNIK MARZ
Marutuni District
No 26 Tsovinar

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	1,378.73	92.9%
	Subsidy	105.68	7.1%
	Total	1,484.41	100.0%
2	**Expenditure**		
	OM cost	268.53	18.1%
	Loan repayment	846.83	57.0%
	Interest paid	198.75	13.4%
	Surplus cash	170.30	11.5%
	Total	1,484.41	100.0%

B. FIRR CALCULATION

Unit: million AMD

Year 1–20:

Description	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A COST																					
1. Investment Cost	754.62	3.82	2.73	306.38	306.26	134.48	0.53	0.42													
2. Operation and Maintenance Cost																					
Salary	36.48			0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Chlorine	34.23			0.36	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
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
Mantenance cost	67.76			0.75	1.49	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
Pump replacement	0.00																0.00				
Sub-total	138.48			2.07	3.20	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
Total Outflow	893.10	3.82	2.73	308.45	309.46	138.18	4.23	4.12	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
B BENEFIT																					
1. Water Tariff	865.71	0.00	0.00	3.65	7.29	8.89	9.19	15.56	16.07	16.61	17.15	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71
2. Subsidy	13.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.39	2.95	2.48	1.98	1.48	0.95	0.38	0.00	0.00	0.00
Total Inflow	879.32	0.00	0.00	3.65	7.29	8.89	9.19	15.56	16.07	16.61	17.15	29.10	28.66	28.19	27.69	27.19	26.66	26.09	25.71	25.71	25.71
NET BENEFIT	-13.78	-3.82	-2.73	-304.8	-302.2	-129.3	4.96	11.44	12.37	12.91	13.45	25.40	24.96	24.49	23.99	23.49	22.96	22.39	22.01	22.01	22.01

Year 21–40:

Description	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																				
2. Operation and Maintenance Cost																				
Salary	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Chlorine	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
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
Mantenance cost	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
Pump replacement											0.00									
Sub-total	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
Total Outflow	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
B BENEFIT																				
1. Water Tariff	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71
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
Total Inflow	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71	25.71
NET BENEFIT	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01

FIRR = -0.09%

C. SENSITIVITY ANALYSIS

Year 1–20:

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
1	1 Capital cost 10% up	-279.28	-4.20	-3.00	-335.4	-332.8	-142.7	4.91	11.40	12.37	12.91	13.45	25.40	24.96	24.49	23.99	23.49	22.96	22.39	22.01	22.01	22.01
	2 Capital cost 20% up	-349.99	-4.58	-3.28	-366.1	-363.4	-156.2	4.85	11.36	12.37	12.91	13.45	25.40	24.96	24.49	23.99	23.49	22.96	22.39	22.01	22.01	22.01
2	1 OM cost 10% up	-218.22	-3.82	-2.73	-305.0	-302.5	-129.7	4.59	11.07	12.00	12.54	13.08	25.03	24.59	24.12	23.62	23.12	22.59	22.02	21.64	21.64	21.64
	2 OM cost 20% up	-227.88	-3.82	-2.73	-305.2	-302.8	-130.0	4.22	10.70	11.63	12.17	12.71	24.66	24.22	23.75	23.25	22.75	22.22	21.65	21.27	21.27	21.27
3	1 Revenue 10% down	-268.08	-3.82	-2.73	-305.2	-302.9	-130.2	4.04	9.88	10.76	11.25	11.74	22.49	22.09	21.67	21.22	20.77	20.29	19.78	19.44	19.44	19.44
	2 Revenue 20% down	-327.59	-3.82	-2.73	-305.5	-303.6	-131.1	3.12	8.33	9.16	9.59	10.02	19.58	19.23	18.85	18.45	18.05	17.63	17.17	16.87	16.87	16.87

Year 21–40:

No.	Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1 Capital cost 10% up	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01
	2 Capital cost 20% up	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01	22.01
2	1 OM cost 10% up	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64	21.64
	2 OM cost 20% up	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27
3	1 Revenue 10% down	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44
	2 Revenue 20% down	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87	16.87

No.	Description	FIRR	Sensitivity indicator	Swiching value
1	1 Capital cost 10% up	-0.56%	-8.36	-11.96%
	2 Capital cost 20% up	-0.98%	-9.06	-11.04%
2	1 OM cost 10% up	-0.19%	-5.04	-19.85%
	2 OM cost 20% up	-0.28%	-6.71	-14.90%
3	1 Revenue 10% down	-0.71%	-8.70	-11.49%
	2 Revenue 20% down	-1.39%	-9.34	-10.71%

No.27 Kalavan

Information on Existing Water Sources (Gegharkunik)

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

No.27 Community Kalavan
District Krasnoselsk
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	36	55.1	45	7	0.5	1,470	0.5	1.0	1.0
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.27 Community Kalavan
District Krasnoselsk
Marz Gegharkunik
Sampling date 01/Aug/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		8.3				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	10.7					
c	TDS	Mg/L	91				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	n.d.				0.05	0.05
5	Cu:Copper	Mg/L	n.d.				2	1
6	F:Fluoride	Mg/L	0.23				1.50	
7	Hardness	Mg/L	175				500	700
8	Fe:Iron	Mg/L	0.04				0.30	0.30
9	Mn:Manganese	Mg/L	n.d.				0.40	0.10
10	Mo:Molibdenum	Mg/L	0.020				0.070	0.250
11	Ni:Nickel	Mg/L	n.d.				0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8				50.0	45.0
13	SO4:Sulfate	Mg/L	3.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d.				3.0	5.0
15	As:Arsenic	Mg/L	n.d.				0.0	0.1
16	Ba:Barium	Mg/L	<0.01				0.70	0.10
17	Be:Berillium	Mg/L	0.00006				NA	0.00020
18	Cd:Cadmium	Mg/L	0.0003				0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d.				0.00100	0.00050
21	Se:Selenium	Mg/L	n.d.				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.27 Community Kalavan
District Krasnoselsk
Marz Gegharkunik

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	01	12	35	-	Not identified
2	02	01	40	-	Not identified
3	03	13	40	-	Not identified
4	04	03	45	-	Not identified
5	06	05	35	-	Not identified
6	07	16	40	-	Not identified
7	08	08	30	-	Not identified
8	08	08	40	-	Not identified

No. 27 **Marz** Gegharkunik **Community** Kalavan

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
2	Transmission pipeline	Possible	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°36′55.1″	45°07′00.5″	1,470	1960	Concrete	1.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	5,000	50	Steel	1.0	1960	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
	No			

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	No					

7. PUMP STATION

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

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
1	1960		No	0	No

9. DRAINAGE SYSTEM

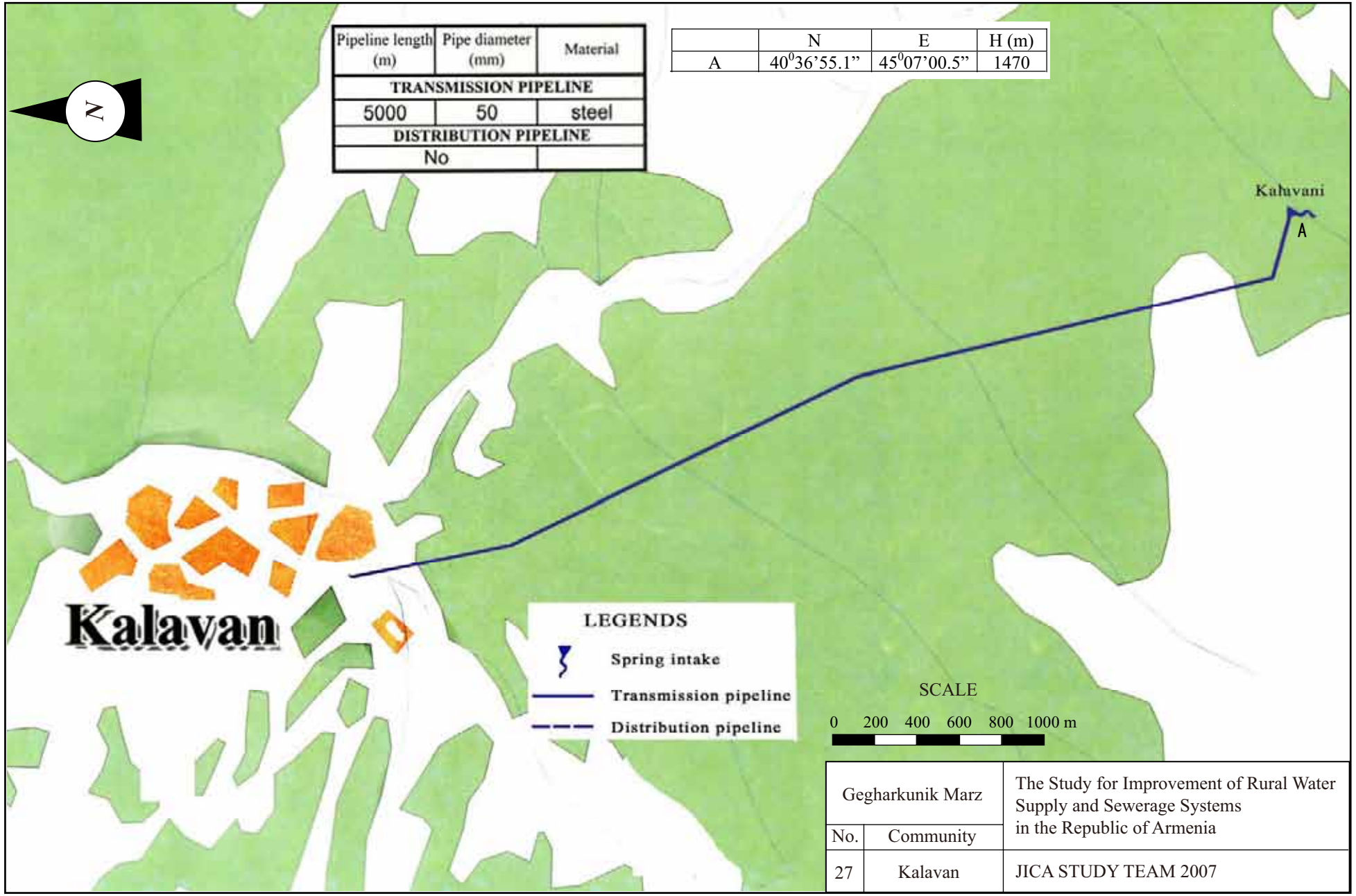
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.27 Kalavan**
District	**Kranoseisk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	155
A2	Actual population in 2007	165
A3	Number of households	60
A4.1	Elderly people	10
A4.2	Population in labor force (age from 16 to 62)	81
A4.3	Children	11
A5.1	Pensioners	11
A5.2	Unemployed	0
A5.3	Receiving benefits	10
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	25
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	370
	Annual Budget of the community 2005, in thousand AMD	174
	Annual Budget of the community 2006, in thousand AMD	120
	Annual Budget of the community 2007, in thousand AMD	260
	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:	cereals, 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	unknown
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	32
D8	How many house connection household set the water meter	0
D9	Number of public taps	6
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	-
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300
D15.1	How long the taps are open to provide the each household for filling	1 hour
D15.2	Estimate quantity of water for filling containers of each household (litter per	-
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 river
D20	Are you satisfied with irrigation water supply volume?	sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	nobody
E2	Position	
E3	Telephone	
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-partially rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1- partially rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	partially rehabilitated
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?	hired specialist from community
E14	How you prepare O&M costs?	not collect
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?	residents participation, water fee reduction
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

Gegharkunik
No.27 Kalavan



Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
27	Kalavan	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.27
Name : **Klavan**

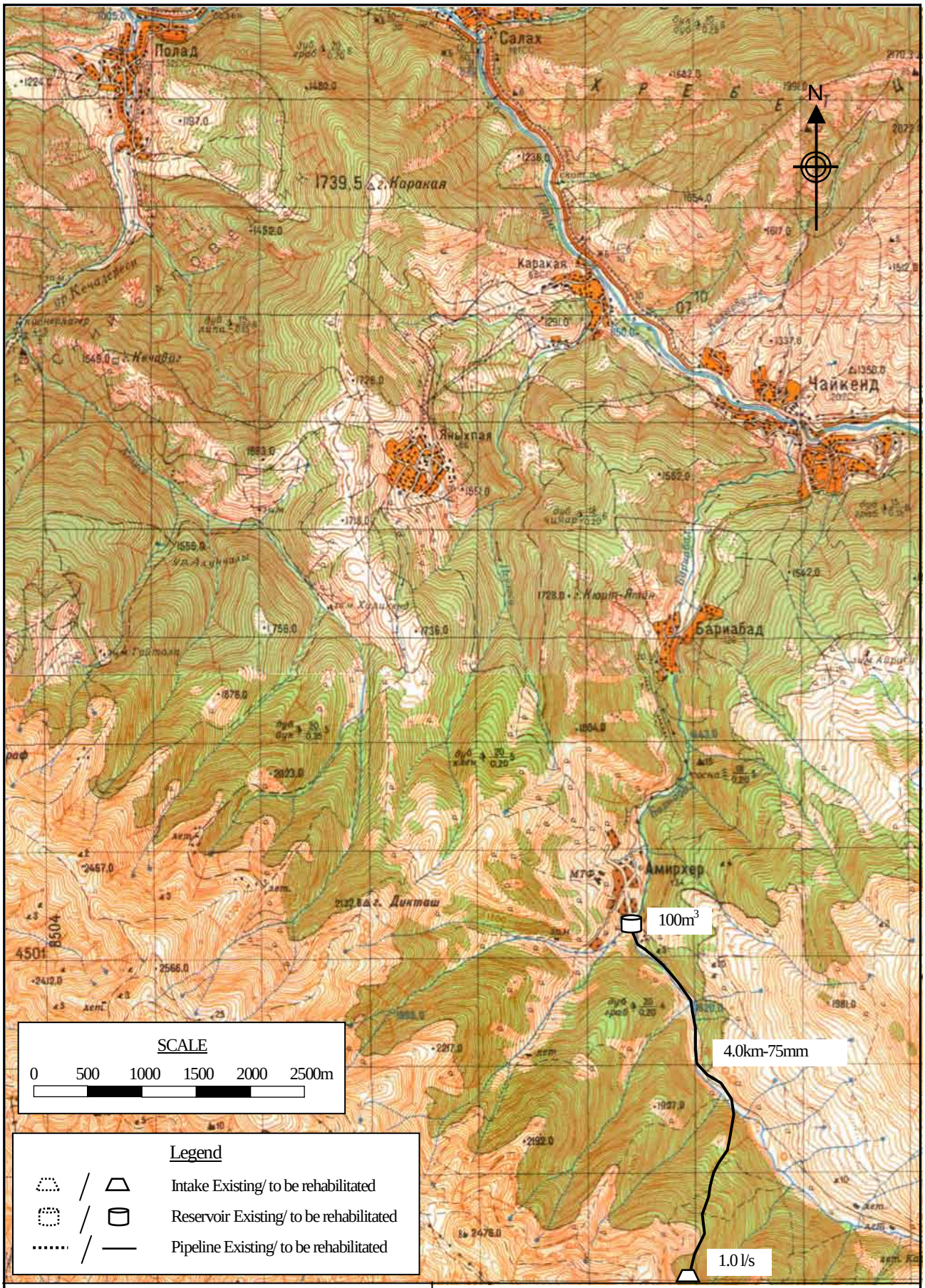
No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	165	persons	16.5	
	2 Factory	-	nos	0.0	
	3 School (pupils)	25	pupils	0.3	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	60	household	5.2	
	Sub-total			22.0	
	Unaccouted for water (20%)			4.4	
1	Average Daily Water Demand			26.4	m3/day
2	Maximum Daily Water Demand			31.7	m3/day
3	Maximum Hourly Water Demand			7.7	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
	1 Water source type					
	a Spring	1	1.0	lit/sec	86.4	m3/day
`	Total				86.4	m3/day
	2 Required reservoir volume				93	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	4,000	m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	100m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	5 House connection	28	nos
	6 Water meter installation	60	nos
	7 Public tap	1	nos
	8 Chlorination	1	nos
	9 Pumps	-	nos



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 27	Kalavan	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **27**
Name : **Kalavan**

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	4,000	m	7,160	28,640,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					28,640,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3	1	nos	12,968,300	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					12,968,300
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		28	nos	74,000	2,072,000
6	Water Meter Installation		60	nos	80,000	4,800,000
7	Public Tap		1	nos	90,000	90,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa		m	3,600	
	Total				AMD	49,438,000
					Equivalent to USD	161,816
					Equivalent to JPY	17,071,580
					AMD	USD
	Investment Cost per household		60	HH	823,967	2,697
	Investment Cost per person		165	persons	299,624	981

GEGHARKUNIK MARZ
Ijevan District
No 27 Kalavan

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		8.0																																							
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		44.65	0.00	0.00	0.00	0.20	0.29	0.30	0.51	0.52	0.54	0.56	0.84	0.86	0.89	0.92	0.95	0.98	1.02	1.05	1.08	1.12	1.16	1.19	1.23	1.27	1.32	1.36	1.41	1.45	1.50	1.55	1.60	1.65	1.71	1.76	1.82	1.88	1.94	2.01	2.07	2.14
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				49																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		2.12			0.00	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10
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		13.03			0.00	0.13	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51	0.53	0.54	0.56	0.58	0.60
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	0.13	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.51	0.53	0.54	0.56	0.58	0.60
5. Pump replacement		0.00																0.00															0.00									
Sub-total		32.85	0.00	0.00	0.24	0.40	0.48	0.49	0.50	0.52	0.55	0.57	0.58	0.60	0.62	0.64	0.66	0.68	0.71	0.73	0.75	0.78	0.80	0.82	0.86	0.89	0.92	0.95	0.97	1.02	1.05	1.08	1.12	1.16	1.20	1.23	1.27	1.32	1.35	1.40	1.44	1.50
C Gross Income (A-B)		11.80	0.00	0.00	-0.24	-0.20	-0.19	-0.19	0.01	0.00	-0.01	-0.01	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.37	0.38	0.40	0.41	0.44	0.43	0.45	0.47	0.48	0.49	0.51	0.53	0.55	0.56	0.59	0.61	0.63	0.64
D Depreciation cost		46.90						1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
E Interest paid		17.73	0.04	0.07	0.10	0.55	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.74	0.72	0.70	0.67	0.65	0.63	0.61	0.58	0.56	0.53	0.51	0.49	0.46	0.44	0.41	0.38	0.36	0.33	0.31	0.28	0.25	0.23	0.20	0.17	0.14	0.12	0.09	0.06	0.03
F Net Income		-52.83	-0.04	-0.07	-0.34	-0.75	-0.95	-2.29	-2.09	-2.10	-2.11	-2.11	-1.84	-1.82	-1.79	-1.76	-1.72	-1.69	-1.66	-1.63	-1.59	-1.56	-1.51	-1.48	-1.46	-1.42	-1.38	-1.34	-1.28	-1.27	-1.22	-1.18	-1.14	-1.10	-1.06	-1.01	-0.96	-0.92	-0.87	-0.82	-0.77	-0.73
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		-52.83	-0.04	-0.07	-0.34	-0.75	-0.95	-2.29	-2.09	-2.10	-2.11	-2.11	-1.84	-1.82	-1.79	-1.76	-1.72	-1.69	-1.66	-1.63	-1.59	-1.56	-1.51	-1.48	-1.46	-1.42	-1.38	-1.34	-1.28	-1.27	-1.22	-1.18	-1.14	-1.10	-1.06	-1.01	-0.96	-0.92	-0.87	-0.82	-0.77	-0.73
OM Cost Recovery Ratio (A/B)		136%	0%	0%	0%	50%	60%	61%	102%	100%	98%	98%	145%	143%	144%	144%	144%	144%	144%	144%	144%	144%	145%	145%	143%	143%	143%	143%	145%	142%	143%	144%	143%	142%	143%	143%	143%	142%	144%	144%	144%	143%

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	-52.83	-0.04	-0.07	-0.34	-0.75	-0.95	-2.29	-2.09	-2.10	-2.11	-2.11	-1.84	-1.82	-1.79	-1.76	-1.72	-1.69	-1.66	-1.63	-1.59	-1.56	-1.51	-1.48	-1.46	-1.42	-1.38	-1.34	-1.28	-1.27	-1.22	-1.18	-1.14	-1.10	-1.06	-1.01	-0.96	-0.92	-0.87	-0.82	-0.77	-0.73
2. Depreciation cost	46.90	0.00	0.00	0.00	0.00	0.00	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
3. Interest Paid	17.73	0.04	0.07	0.10	0.55	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.74	0.72	0.70	0.67	0.65	0.63	0.61	0.58	0.56	0.53	0.51	0.49	0.46	0.44	0.41	0.38	0.36	0.33	0.31	0.28	0.25	0.23	0.20	0.17	0.14	0.12	0.09	0.06	0.03
Sub-total	11.80	0.00	0.00	-0.24	-0.20	-0.19	-0.19	0.01	0.00	-0.01	-0.01	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.37	0.38	0.40	0.41	0.44	0.43	0.45	0.47	0.48	0.49	0.51	0.53	0.55	0.56	0.59	0.61	0.63	0.64
B Finances																																									
1. Project Loan	76.39	3.91	2.79	3.77	44.84	20.05	0.58	0.45																																	
2. Local fund	25.15	1.29	0.91	1.26	15.10	6.46	0.07	0.06																																	
Sub-total	101.54	5.20	3.70	5.03	59.94	26.51	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.84	0.00	0.00	0.24	0.20	0.19	0.19	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	81.49	0.04	0.07	0.10	0.55	0.76	0.76	0.75	0.76	0.76	0.76	2.70	2.70	2.69	2.68	2.67	2.66	2.65	2.64	2.63	2.62	2.60	2.59	2.60	2.58	2.56	2.55	2.52	2.53	2.51	2.49	2.48	2.47	2.45	2.43	2.41	2.40	2.37	2.35	2.33	2.32
Sub-total	82.33	0.04	0.07	0.34	0.75	0.95	0.95	0.75	0.76	0.77	0.77	2.70	2.70	2.69	2.68	2.67	2.66	2.65	2.64	2.63	2.62	2.60	2.59	2.60	2.58	2.56	2.55	2.52	2.53	2.51	2.49	2.48	2.47	2.45	2.43	2.41	2.40	2.37	2.35	2.33	2.32
Total Cash Inflow	195.67	5.24	3.77	5.13	60.49	27.27	1.41	1.27	0.76	0.76	0.76	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.97	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96
APPLICATION OF FUNDS																																								
D Project disbursement	101.54	5.20	3.70	5.03	59.94	26.51	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	76.40											2.20	2.22	2.24	2.26	2.29	2.31	2.33	2.35	2.38	2.40	2.43	2.45	2.48	2.50	2.52	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. Interest paid	17.73	0.04	0.07	0.10	0.55	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.74	0.72	0.70	0.67	0.65	0.63	0.61	0.58	0.56	0.53	0.51	0.49	0.46	0.44	0.41	0.38	0.36	0.33	0.31	0.28	0.25	0.23	0.20	0.17	0.14	0.12	0.09	0.06	0.03
Sub-total	94.13	0.04	0.07	0.10	0.55	0.76	0.76	0.76	0.76	0.76	0.76	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.97	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96
Total Cash Outflow	195.67	5.24	3.77	5.13	60.49	27.27	1.41	1.27	0.76	0.76	0.76	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.97	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96
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
Investment Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	13%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	9%	9%	9%	9%	10%	10%	10%	11%	11%	11%	12%	13%	12%	13%	14%	14%	15%	15%	15%	16%	16%	17%	17%	18%	19%	19%	20%	21%	21%	22%
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%

GEGHARKUNIK MARZ
Ijevan District
No 27 Kalavan

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	44.65	35.4%
	Subsidy	81.49	64.6%
	Total	126.14	100.0%
2	**Expenditure**		
	OM cost	32.85	26.0%
	Loan repayment	76.40	60.6%
	Interest paid	17.73	14.1%
	Surplus cash	0.00	0.0%
	Total	126.98	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	68.12	3.82	2.73	3.56	39.77	17.29	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	1.10			0.00	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
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	6.61			0.00	0.13	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Pump replacement	0.00																0.00															0.00								
Sub-total	16.83			0.24	0.39	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Total Outflow	84.95	3.82	2.73	3.80	40.16	17.74	0.98	0.87	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
B BENEFIT																																							
1. Water Tariff	28.12	0.00	0.00	0.00	0.20	0.29	0.30	0.51	0.52	0.54	0.56	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
2. Subsidy	64.61	0.00	0.00	0.24	0.20	0.19	0.19	0.00	0.00	0.01	0.01	1.94	1.96	1.97	1.98	2.00	2.01	2.02	2.03	2.05	2.06	2.07	2.08	2.11	2.12	2.12	2.14	2.14	2.17	2.18	2.18	2.20	2.22	2.22	2.23	2.24	2.26	2.25	2.26	2.27	2.29
Total Inflow	92.73	0.00	0.00	0.24	0.40	0.48	0.49	0.51	0.52	0.55	0.57	2.78	2.80	2.81	2.82	2.84	2.85	2.86	2.87	2.89	2.90	2.91	2.92	2.95	2.96	2.96	2.98	2.98	3.01	3.02	3.02	3.04	3.06	3.06	3.07	3.08	3.10	3.09	3.10	3.11	3.13
NET BENEFIT	7.78	-3.82	-2.73	-3.6	-39.8	-17.3	-0.49	-0.36	0.07	0.10	0.12	2.33	2.35	2.36	2.37	2.39	2.40	2.41	2.42	2.44	2.45	2.46	2.47	2.50	2.51	2.51	2.53	2.53	2.56	2.57	2.57	2.59	2.61	2.61	2.62	2.63	2.65	2.64	2.65	2.66	2.68

FIRR = 0.50%

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	-20.82	-4.20	-3.00	-3.9	-43.7	-19.0	-0.54	-0.40	0.07	0.10	0.12	2.33	2.35	2.36	2.37	2.39	2.40	2.41	2.42	2.44	2.45	2.46	2.47	2.50	2.51	2.51	2.53	2.53	2.56	2.57	2.57	2.59	2.61	2.61	2.62	2.63	2.65	2.64	2.65	2.66	2.68
	2	Capital cost 20% up	-27.18	-4.58	-3.28	-4.3	-47.7	-20.7	-0.60	-0.44	0.07	0.10	0.12	2.33	2.35	2.36	2.37	2.39	2.40	2.41	2.42	2.44	2.45	2.46	2.47	2.50	2.51	2.51	2.53	2.53	2.56	2.57	2.57	2.59	2.61	2.61	2.62	2.63	2.65	2.64	2.65	2.66	2.68
2	1	OM cost 10% up	-15.64	-3.82	-2.73	-3.6	-39.8	-17.3	-0.54	-0.41	0.03	0.05	0.07	2.29	2.31	2.32	2.33	2.35	2.36	2.37	2.38	2.40	2.41	2.42	2.43	2.46	2.47	2.47	2.49	2.49	2.52	2.53	2.53	2.55	2.57	2.57	2.58	2.59	2.61	2.60	2.61	2.62	2.64
	2	OM cost 20% up	-16.81	-3.82	-2.73	-3.6	-39.8	-17.4	-0.58	-0.45	-0.02	0.01	0.03	2.24	2.26	2.27	2.28	2.30	2.31	2.32	2.33	2.35	2.36	2.37	2.38	2.41	2.42	2.42	2.44	2.44	2.47	2.48	2.48	2.50	2.52	2.52	2.53	2.54	2.56	2.55	2.56	2.57	2.59
3	1	Revenue 10% down	-20.55	-3.82	-2.73	-3.6	-39.8	-17.3	-0.54	-0.41	0.02	0.04	0.06	2.05	2.07	2.08	2.09	2.11	2.12	2.12	2.13	2.15	2.16	2.17	2.18	2.21	2.21	2.21	2.23	2.23	2.26	2.27	2.27	2.29	2.30	2.30	2.31	2.32	2.34	2.33	2.34	2.35	2.37
	2	Revenue 20% down	-26.63	-3.82	-2.73	-3.6	-39.8	-17.4	-0.59	-0.46	-0.03	-0.01	0.01	1.77	1.79	1.80	1.81	1.82	1.83	1.84	1.85	1.86	1.87	1.88	1.89	1.91	1.92	1.92	1.93	1.93	1.96	1.97	1.97	1.98	2.00	2.00	2.01	2.01	2.03	2.02	2.03	2.04	2.05

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.06%	74.71	1.34%
	2	Capital cost 20% up	-0.34%	-24.88	-4.02%
2	1	OM cost 10% up	0.40%	2.70	37.08%
	2	OM cost 20% up	0.29%	7.45	13.43%
3	1	Revenue 10% down	-0.10%	-59.88	-1.67%
	2	Revenue 20% down	-0.77%	-16.54	-6.05%

No.28 Barepat

Information on Existing Water Sources (Gegharkunik)

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

No.28 Community Barepat
District Krasnoselsk
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	39	15.1	45	6	32.0	1,460	1.0	1.5	0.5
2	Spring	40	40	32.5	45	7	51.6	1,506			1.0
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	Leakage in internal network - 80%
Alternative sources if any	

No.28 Community Barepat
District Krasnoselsk
Marz Gegharkunik
Sampling date 31/Jul/2007

	Parameters analysed	Units	No.1 at reservoir	No.2			Guidelines	
							WHO	Armenia
a	pH		7.8	7.8			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	16.1	19.2				
c	TDS	Mg/L	341	338			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	7	11			250	350
4	Cr:Chrome	Mg/L	n.d.	n.d.			0.05	0.05
5	Cu:Copper	Mg/L	n.d.	n.d.			2	1
6	F:Fluoride	Mg/L	0.83	0.69			1.50	
7	Hardness	Mg/L	610	485			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	<0,002			0.070	0.250
11	Ni:Nickel	Mg/L	n.d.	0.007			0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	0.9			50.0	45.0
13	SO4:Sulfate	Mg/L	27.0	22.0			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.28 Community Barepat
District Krasnoselsk
Marz Gegharkunik

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	01	07	40	-	Not identified
2	01	07	40	-	Not identified
3	01	12	35	-	Not identified
4	02	09	30	-	Not identified
5	03	13	40	-	Not identified
6	04	20	40	-	Not identified
7	05	04	35	-	Not identified
8	06	27	40	-	Not identified
9	07	06	30	-	Not identified
10	08	08	35	-	Not identified

No. 28 **Marz** Gegharkunik **Community** Barepat

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°39′15.1″	45°06′32.0″	1,460	1960	Concrete	0.5	Yes
2	Spring	40°40′32.5″	45°07′51.6″	1,506	1970	Concrete	1.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,000	40	Steel	0.5	1960	Little	Yes
2	1,500	40	Steel	0.6	1970	Huge	Yes
	1,000	60	Polyethylene		1997	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°40′21.8″	45°07′13.4″	1,451	Steel	Circle	R=1.5, L=3	20	No
2	40°40′09.6″	45°06′42.0″	1,457	Steel	Circle	R=1.5, L=3	20	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	2,000	40	Steel	1960	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 public tabs					

9. DRAINAGE SYSTEM

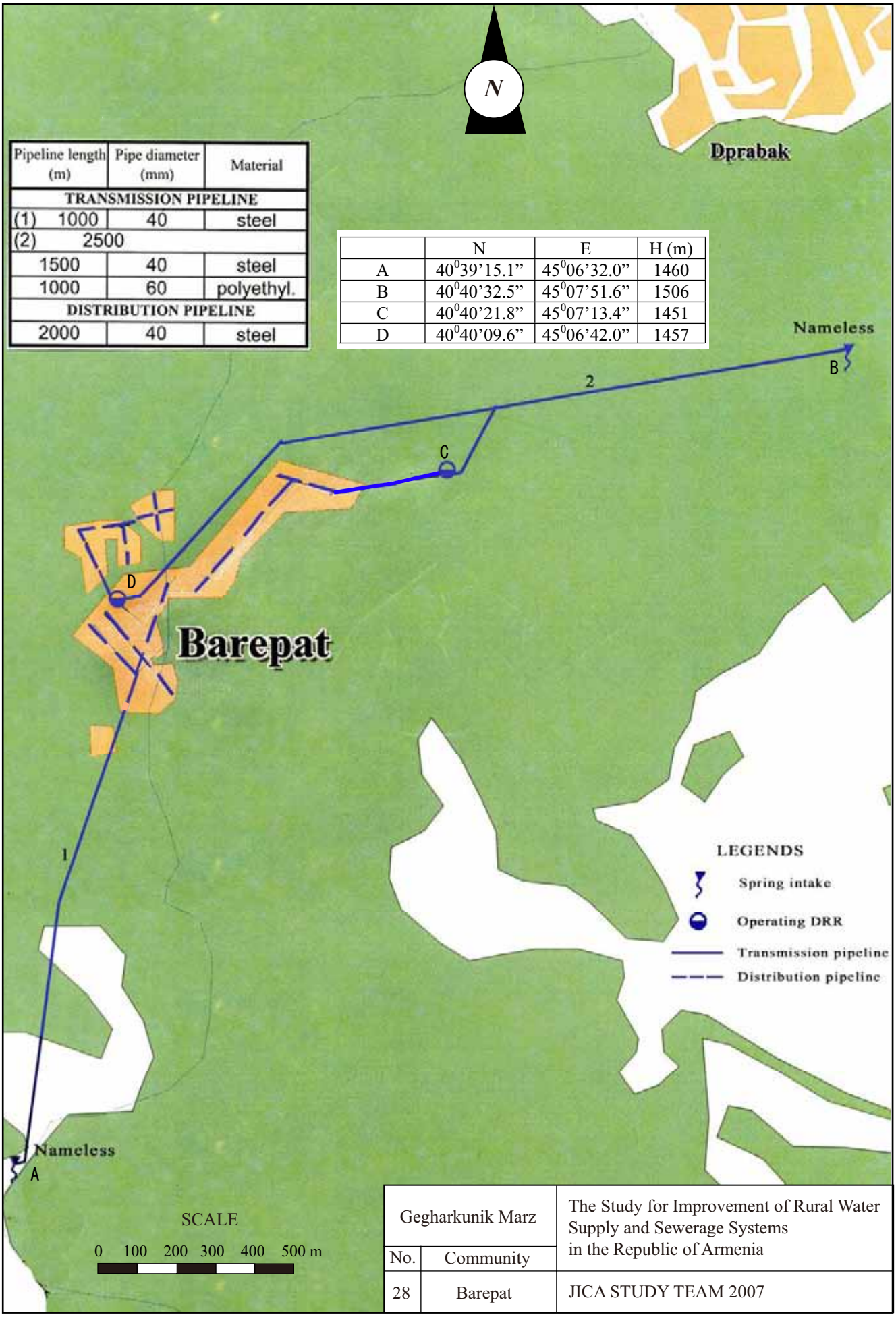
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.28 Barepat**
District	**Kranoseisk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	115
A2	Actual population in 2007	125
A3	Number of households	45
A4.1	Elderly people	30
A4.2	Population in labor force (age from 16 to 62)	64
A4.3	Children	31
A5.1	Pensioners	34
A5.2	Unemployed	0
A5.3	Receiving benefits	8
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	2
A10	Number of pupils	20
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	280
	Annual Budget of the community 2005, in thousand AMD	130
	Annual Budget of the community 2006, in thousand AMD	83
	Annual Budget of the community 2007, in thousand AMD	194
	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:	cereals, 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	unknown
D5	Present condition of the water supply volume of Domestic use	sufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
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	4
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	-
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300
D15.1	How long the taps are open to provide the each household for filling	1 hour
D15.2	Estimate quantity of water for filling containers of each household (litter per	-
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 river
D20	Are you satisfied with irrigation water supply volume?	sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	nobody
E2	Position	
E3	Telephone	
E4	Quantity and present condition of the water supply facilities: spring/ intake	3-partially rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	3- partially rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2- partially rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	partially 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?	hired specialist from community
E14	How you prepare O&M costs?	not collect
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?	residents participation, water fee reduction
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

Gegharkunik
No.28 Barepat



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 1000	40	steel
(2) 2500		
1500	40	steel
1000	60	polyethyl.
DISTRIBUTION PIPELINE		
2000	40	steel

	N	E	H (m)
A	$40^0$39’15.1”	$45^0$06’32.0”	1460
B	$40^0$40’32.5”	$45^0$07’51.6”	1506
C	$40^0$40’21.8”	$45^0$07’13.4”	1451
D	$40^0$40’09.6”	$45^0$06’42.0”	1457

Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
28	Barepat	JICA STUDY TEAM 2007

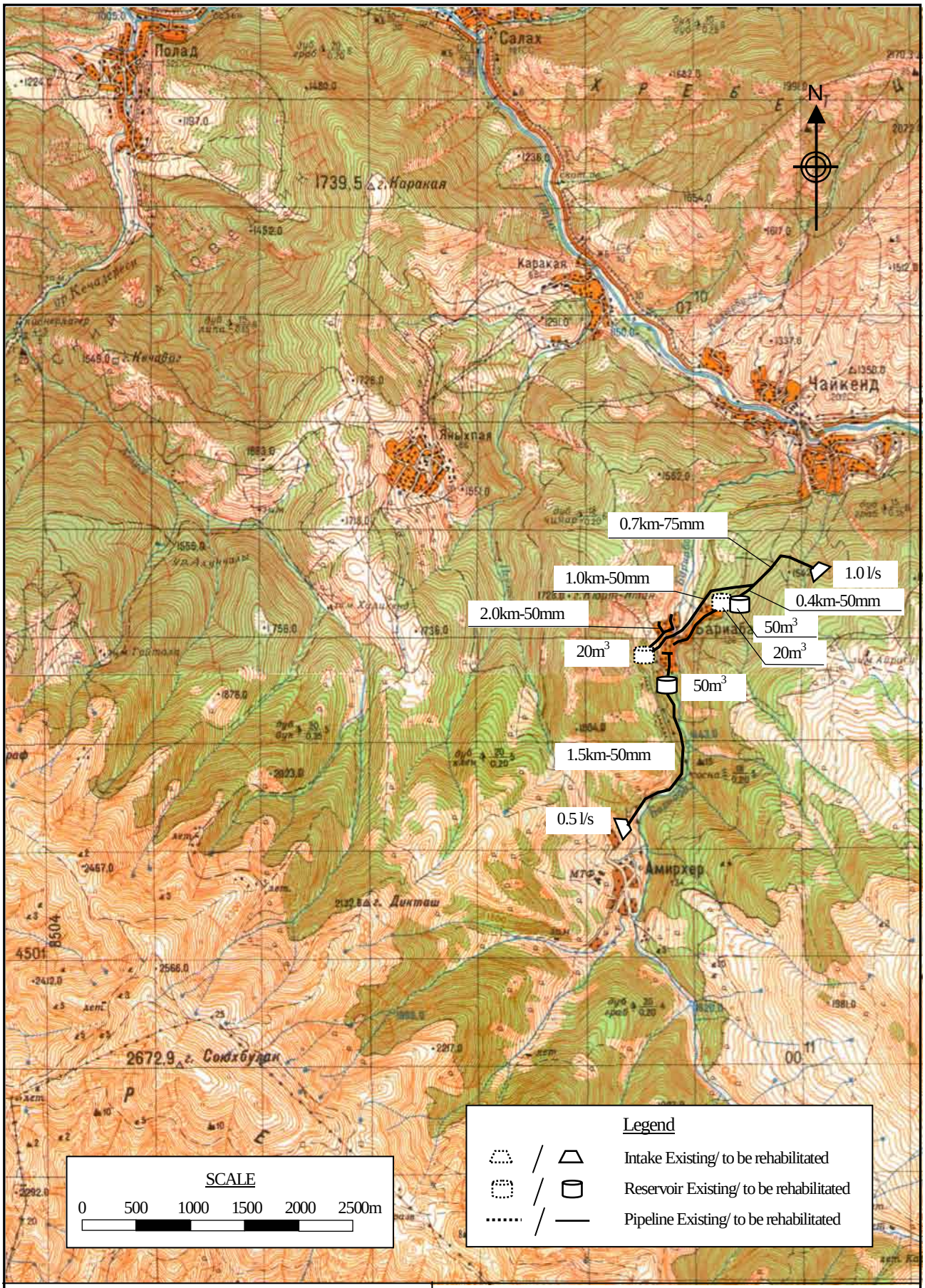
Marz : **Gegharkunik** No.28
Name : **Barepat**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	125	persons	12.5	
	2 Factory	-	nos	0.0	
	3 School (pupils)	20	pupils	0.2	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	45	household	3.9	
	Sub-total			16.6	
	Unaccouted for water (20%)			3.3	
1	Average Daily Water Demand			19.9	m3/day
2	Maximum Daily Water Demand			23.9	m3/day
3	Maximum Hourly Water Demand			5.8	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	1.0	lit/sec		86.4	m3/day
	b Spring	1	0.5	lit/sec		43.2	m3/day
`	Total					129.6	m3/day
	2 Required reservoir volume					70	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	2,900	m	
	75mm diameter	700	m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	50m3 capacity	2	nos	For route 1 and 2
4	Distribution pipe			
	50mm diameter	2,000	m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	48	nos	
6	Water meter installation	45	nos	
7	Public tap	2	nos	
8	Chlorination	3	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	Gegharkunik	
No. 28	Barepat	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **28**
Name : **Barepat**

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	2,900	m	5,520	16,008,000
		75mm	700	m	7,160	5,012,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					21,020,000
3	Reservoir					
		50m3	2	nos	8,363,900	16,727,800
		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					16,727,800
4	Distribution Pipe					
		50mm	2,000	m	5,520	11,040,000
		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					11,040,000
5	House Connection		48	nos	74,000	3,552,000
6	Water Meter Installation		105	nos	80,000	8,400,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		3	nos	500,000	1,500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	800	m	3,600	2,880,000
	Total				AMD	66,035,200
					Equivalent to USD	216,140
					Equivalent to JPY	22,802,807
					AMD	USD
	Investment Cost per household		105	HH	628,907	2,058
	Investment Cost per person		290	persons	227,708	745

GEGHARKUNIK MARZ
Ijevan District
No 28 Barepat

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		14.1																																							
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		78.40	0.00	0.00	0.00	0.36	0.51	0.52	0.89	0.92	0.95	0.98	1.47	1.51	1.56	1.62	1.67	1.72	1.78	1.84	1.90	1.96	2.03	2.10	2.17	2.24	2.31	2.39	2.47	2.55	2.63	2.72	2.81	2.90	3.00	3.09	3.20	3.30	3.41	3.52	3.64	3.76
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				85																																					
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		3.69			0.00	0.04	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17
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		13.75			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		35.14	0.00	0.00	0.24	0.43	0.51	0.53	0.55	0.56	0.58	0.60	0.63	0.64	0.66	0.68	0.71	0.74	0.76	0.78	0.81	0.84	0.86	0.88	0.92	0.95	0.98	1.02	1.04	1.08	1.12	1.16	1.20	1.24	1.28	1.32	1.36	1.40	1.44	1.50	1.54	1.60
C Gross Income (A-B)		43.26	0.00	0.00	-0.24	-0.07	0.00	-0.01	0.34	0.36	0.37	0.38	0.84	0.87	0.90	0.94	0.96	0.98	1.02	1.06	1.09	1.12	1.17	1.22	1.25	1.29	1.33	1.37	1.43	1.47	1.51	1.56	1.61	1.66	1.72	1.77	1.84	1.90	1.97	2.02	2.10	2.16
D Depreciation cost		62.65						1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
E Interest paid		22.32	0.04	0.07	0.10	0.69	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.94	0.91	0.88	0.85	0.82	0.79	0.76	0.74	0.71	0.67	0.64	0.61	0.58	0.55	0.52	0.49	0.45	0.42	0.39	0.35	0.32	0.29	0.25	0.22	0.18	0.15	0.11	0.07	0.04
F Net Income		-41.71	-0.04	-0.07	-0.34	-0.76	-0.96	-2.76	-2.41	-2.39	-2.38	-2.37	-1.91	-1.86	-1.80	-1.73	-1.68	-1.63	-1.56	-1.49	-1.44	-1.38	-1.29	-1.21	-1.15	-1.08	-1.01	-0.94	-0.85	-0.77	-0.70	-0.62	-0.53	-0.45	-0.36	-0.27	-0.17	-0.07	0.03	0.12	0.24	0.33
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		-41.71	-0.04	-0.07	-0.34	-0.76	-0.96	-2.76	-2.41	-2.39	-2.38	-2.37	-1.91	-1.86	-1.80	-1.73	-1.68	-1.63	-1.56	-1.49	-1.44	-1.38	-1.29	-1.21	-1.15	-1.08	-1.01	-0.94	-0.85	-0.77	-0.70	-0.62	-0.53	-0.45	-0.36	-0.27	-0.17	-0.07	0.03	0.12	0.24	0.33
OM Cost Recovery Ratio (A/B)		223%	0%	0%	0%	85%	100%	98%	162%	164%	164%	163%	233%	236%	236%	238%	235%	232%	234%	236%	235%	233%	236%	239%	236%	236%	236%	234%	238%	236%	235%	234%	234%	234%	234%	234%	235%	236%	237%	235%	236%	235%

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	-41.71	-0.04	-0.07	-0.34	-0.76	-0.96	-2.76	-2.41	-2.39	-2.38	-2.37	-1.91	-1.86	-1.80	-1.73	-1.68	-1.63	-1.56	-1.49	-1.44	-1.38	-1.29	-1.21	-1.15	-1.08	-1.01	-0.94	-0.85	-0.77	-0.70	-0.62	-0.53	-0.45	-0.36	-0.27	-0.17	-0.07	0.03	0.12	0.24	0.33
2. Depreciation cost	62.65	0.00	0.00	0.00	0.00	0.00	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
3. Interest Paid	22.32	0.04	0.07	0.10	0.69	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.94	0.91	0.88	0.85	0.82	0.79	0.76	0.74	0.71	0.67	0.64	0.61	0.58	0.55	0.52	0.49	0.45	0.42	0.39	0.35	0.32	0.29	0.25	0.22	0.18	0.15	0.11	0.07	0.04
Sub-total	43.26	0.00	0.00	-0.24	-0.07	0.00	-0.01	0.34	0.36	0.37	0.38	0.84	0.87	0.90	0.94	0.96	0.98	1.02	1.06	1.09	1.12	1.17	1.22	1.25	1.29	1.33	1.37	1.43	1.47	1.51	1.56	1.61	1.66	1.72	1.77	1.84	1.90	1.97	2.02	2.10	2.16
B Finances																																									
1. Project Loan	96.49	3.91	2.79	3.80	59.05	25.91	0.58	0.45																																	
2. Local fund	32.63	1.29	0.91	1.26	19.88	9.16	0.07	0.06																																	
Sub-total	129.12	5.20	3.70	5.06	78.93	35.07	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.32	0.00	0.00	0.24	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	75.22	0.04	0.07	0.10	0.69	0.96	0.96	0.62	0.60	0.59	0.58	2.89	2.87	2.84	2.80	2.78	2.76	2.71	2.67	2.65	2.62	2.56	2.51	2.49	2.45	2.41	2.37	2.31	2.27	2.23	2.18	2.12	2.08	2.02	1.97	1.90	1.84	1.77	1.72	1.64	1.58
Sub-total	75.54	0.04	0.07	0.34	0.76	0.96	0.97	0.62	0.60	0.59	0.58	2.89	2.87	2.84	2.80	2.78	2.76	2.71	2.67	2.65	2.62	2.56	2.51	2.49	2.45	2.41	2.37	2.31	2.27	2.23	2.18	2.12	2.08	2.02	1.97	1.90	1.84	1.77	1.72	1.64	1.58
Total Cash Inflow	247.92	5.24	3.77	5.16	79.62	36.03	1.61	1.47	0.96	0.96	0.96	3.73	3.74	3.74	3.74	3.74	3.74	3.73	3.73	3.74	3.74	3.73	3.73	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.73	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74
APPLICATION OF FUNDS																																								
D Project disbursement	129.12	5.20	3.70	5.06	78.93	35.07	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	96.48											2.77	2.80	2.83	2.86	2.89	2.92	2.94	2.97	3.00	3.03	3.06	3.09	3.13	3.16	3.19	3.22	3.25	3.29	3.32	3.35	3.38	3.42	3.45	3.49	3.52	3.56	3.59	3.63	3.67	3.70
2. Interest paid	22.32	0.04	0.07	0.10	0.69	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.94	0.91	0.88	0.85	0.82	0.79	0.76	0.74	0.71	0.67	0.64	0.61	0.58	0.55	0.52	0.49	0.45	0.42	0.39	0.35	0.32	0.29	0.25	0.22	0.18	0.15	0.11	0.07	0.04
Sub-total	118.80	0.04	0.07	0.10	0.69	0.96	0.96	0.96	0.96	0.96	0.96	3.73	3.74	3.74	3.74	3.74	3.74	3.73	3.73	3.74	3.74	3.73	3.73	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.73	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74
Total Cash Outflow	247.92	5.24	3.77	5.16	79.62	36.03	1.61	1.47	0.96	0.96	0.96	3.73	3.74	3.74	3.74	3.74	3.74	3.73	3.73	3.74	3.74	3.73	3.73	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.73	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74
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
Investment Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	36%	0%	0%	0%	0%	0%	0%	35%	38%	39%	40%	23%	23%	24%	25%	26%	26%	27%	28%	29%	30%	31%	33%	33%	34%	36%	37%	38%	39%	40%	42%	43%	44%	46%	47%	49%	51%	53%	54%	56%	58%
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%

GEGHARKUNIK MARZ
Ijevan District
No 28 Barepat

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	78.40	51.0%
	Subsidy	75.22	49.0%
	Total	153.62	100.0%
2	**Expenditure**		
	OM cost	35.14	22.9%
	Loan repayment	96.48	62.8%
	Interest paid	22.32	14.5%
	Surplus cash	0.00	0.0%
	Total	153.94	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	85.72	3.82	2.73	3.58	52.37	22.27	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	1.84			0.00	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	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
Pump replacement	0.00																0.00															0.00								
Sub-total	17.93			0.24	0.41	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Total Outflow	103.65	3.82	2.73	3.82	52.78	22.75	1.01	0.90	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
B BENEFIT																																							
1. Water Tariff	49.23	0.00	0.00	0.00	0.36	0.51	0.52	0.89	0.92	0.95	0.98	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47
2. Subsidy	54.67	0.00	0.00	0.24	0.07	0.00	0.01	0.00	0.00	0.00	0.00	1.93	1.93	1.93	1.92	1.93	1.94	1.92	1.91	1.91	1.91	1.89	1.87	1.88	1.87	1.86	1.85	1.82	1.82	1.81	1.79	1.77	1.76	1.73	1.72	1.68	1.66	1.62	1.61	1.57	1.54
Total Inflow	103.90	0.00	0.00	0.24	0.43	0.51	0.53	0.89	0.92	0.95	0.98	3.40	3.40	3.40	3.39	3.40	3.41	3.39	3.38	3.38	3.38	3.36	3.34	3.35	3.34	3.33	3.32	3.29	3.29	3.28	3.26	3.24	3.23	3.20	3.19	3.15	3.13	3.09	3.08	3.04	3.01
NET BENEFIT	0.24	-3.82	-2.73	-3.6	-52.4	-22.2	-0.48	-0.01	0.44	0.47	0.50	2.92	2.92	2.92	2.91	2.92	2.93	2.91	2.90	2.90	2.90	2.88	2.86	2.87	2.86	2.85	2.84	2.81	2.81	2.80	2.78	2.76	2.75	2.72	2.71	2.67	2.65	2.61	2.60	2.56	2.53

FIRR = **0.01%**

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	-31.33	-4.20	-3.00	-3.9	-57.6	-24.5	-0.53	-0.05	0.44	0.47	0.50	2.92	2.92	2.92	2.91	2.92	2.93	2.91	2.90	2.90	2.90	2.88	2.86	2.87	2.86	2.85	2.84	2.81	2.81	2.80	2.78	2.76	2.75	2.72	2.71	2.67	2.65	2.61	2.60	2.56	2.53
	2	Capital cost 20% up	-39.32	-4.58	-3.28	-4.3	-62.8	-26.7	-0.59	-0.09	0.44	0.47	0.50	2.92	2.92	2.92	2.91	2.92	2.93	2.91	2.90	2.90	2.90	2.88	2.86	2.87	2.86	2.85	2.84	2.81	2.81	2.80	2.78	2.76	2.75	2.72	2.71	2.67	2.65	2.61	2.60	2.56	2.53
2	1	OM cost 10% up	-24.58	-3.82	-2.73	-3.6	-52.4	-22.3	-0.53	-0.06	0.39	0.42	0.45	2.87	2.87	2.87	2.86	2.87	2.88	2.86	2.85	2.85	2.85	2.83	2.81	2.82	2.81	2.80	2.79	2.76	2.76	2.75	2.73	2.71	2.70	2.67	2.66	2.62	2.60	2.56	2.55	2.51	2.48
	2	OM cost 20% up	-25.83	-3.82	-2.73	-3.6	-52.4	-22.3	-0.58	-0.11	0.34	0.37	0.40	2.82	2.82	2.82	2.81	2.82	2.83	2.81	2.80	2.80	2.80	2.78	2.76	2.77	2.76	2.75	2.74	2.71	2.71	2.70	2.68	2.66	2.65	2.62	2.61	2.57	2.55	2.51	2.50	2.46	2.43
3	1	Revenue 10% down	-30.24	-3.82	-2.73	-3.6	-52.4	-22.3	-0.53	-0.10	0.35	0.38	0.40	2.58	2.58	2.58	2.57	2.58	2.59	2.57	2.56	2.56	2.56	2.54	2.53	2.54	2.53	2.52	2.51	2.48	2.48	2.47	2.45	2.44	2.43	2.40	2.39	2.36	2.34	2.30	2.29	2.26	2.23
	2	Revenue 20% down	-37.15	-3.82	-2.73	-3.6	-52.4	-22.3	-0.59	-0.19	0.26	0.28	0.30	2.24	2.24	2.24	2.23	2.24	2.25	2.23	2.22	2.22	2.22	2.21	2.19	2.20	2.19	2.18	2.18	2.15	2.15	2.14	2.13	2.11	2.10	2.08	2.07	2.04	2.02	1.99	1.98	1.95	1.93

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.44%	-10.31	-9.70%
	2	Capital cost 20% up	-0.85%	-10.16	-9.84%
2	1	OM cost 10% up	-0.09%	-11.55	-8.66%
	2	OM cost 20% up	-0.19%	-10.72	-9.33%
3	1	Revenue 10% down	-0.60%	-10.23	-9.78%
	2	Revenue 20% down	-1.27%	-10.11	-9.89%