No.11 Geghhovit

Information on Existing Water Sources (Gegharkunik)

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

No.11 Community Geghhovit
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	Springs	40	0	7.3	45	14	43.6	2,320	25.0	30.0	30.0
2	3 wells	40	5	8.1	45	17	14.3	2,109	-	-	30.0
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 the network -60-70%
Alternative sources if any	at 10km distance from the village there are springs, with 8l/sec water discharge

No.11 Community Geghhovit
District Martuni
Marz Gegharkunik
Sampling date 07/Aug/2007

	Parameters analysed	Units	No.1	No.2 well			Guidelines	
							WHO	Armenia
a	pH		7.2	6.2			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	8.7	9.8				
c	TDS	Mg/L	41	91			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	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	0.87	0.85			1.50	
7	Hardness	Mg/L	75	145			500	700
8	Fe:Iron	Mg/L	n.d	0.02			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	2.7			50.0	45.0
13	SO4:Sulfate	Mg/L	2.0	4.0			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	0.02			0.70	0.10
17	Be:Berillium	Mg/L	0.00009	0.00021			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	n.d	nd			0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	<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	<9			-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	nd	nd			0	0
26	Total bacteria	bacteria per 1 ml	30	80			-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.11 Community Geghhovit
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	22	1-15	-	Not identified
2	02	26	1-5	-	Not identified
3	03	13	0-5	-	Not identified
4	04	02	11-55	0.4-0.9	Not identified
5	05	02	1-11 2-5	-	Not identified
6	06	05	1-13 2-5	-	Not identified
7	07	03	2-5 2-6	-	Not identified
8	08	02	10-13 2-4	-	Not identified

No. **11** **Marz** Gegharkunik **Community** Geghhovit

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°00′07.3″	45°14′43.6″	2,320	1970	Concrete	30.0	Yes
2	Groundwater	40°05′08.1″	45°17′14.3″	2,109	1975	Concrete	30.0	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	7,000	300	Steel	30.0	1970	Huge	Yes
2	7,000	200	Steel				
3	3,000	150	Polyethylene	30.0	1975	Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°05′06.0″	45°16′48.0″	2,173	Concrete	Rectangular	12x18x4	750	No
2						12x24x5	1000	No
3						6x15x4	300	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	Polyethylene	1970	Little	No
2	15,000	100	Steel		Huge	Yes
3	10,000	50	Steel		Huge	Yes
4	10,000	32-40	Steel		Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
20	1970		Yes	25	Yes

9. DRAINAGE SYSTEM

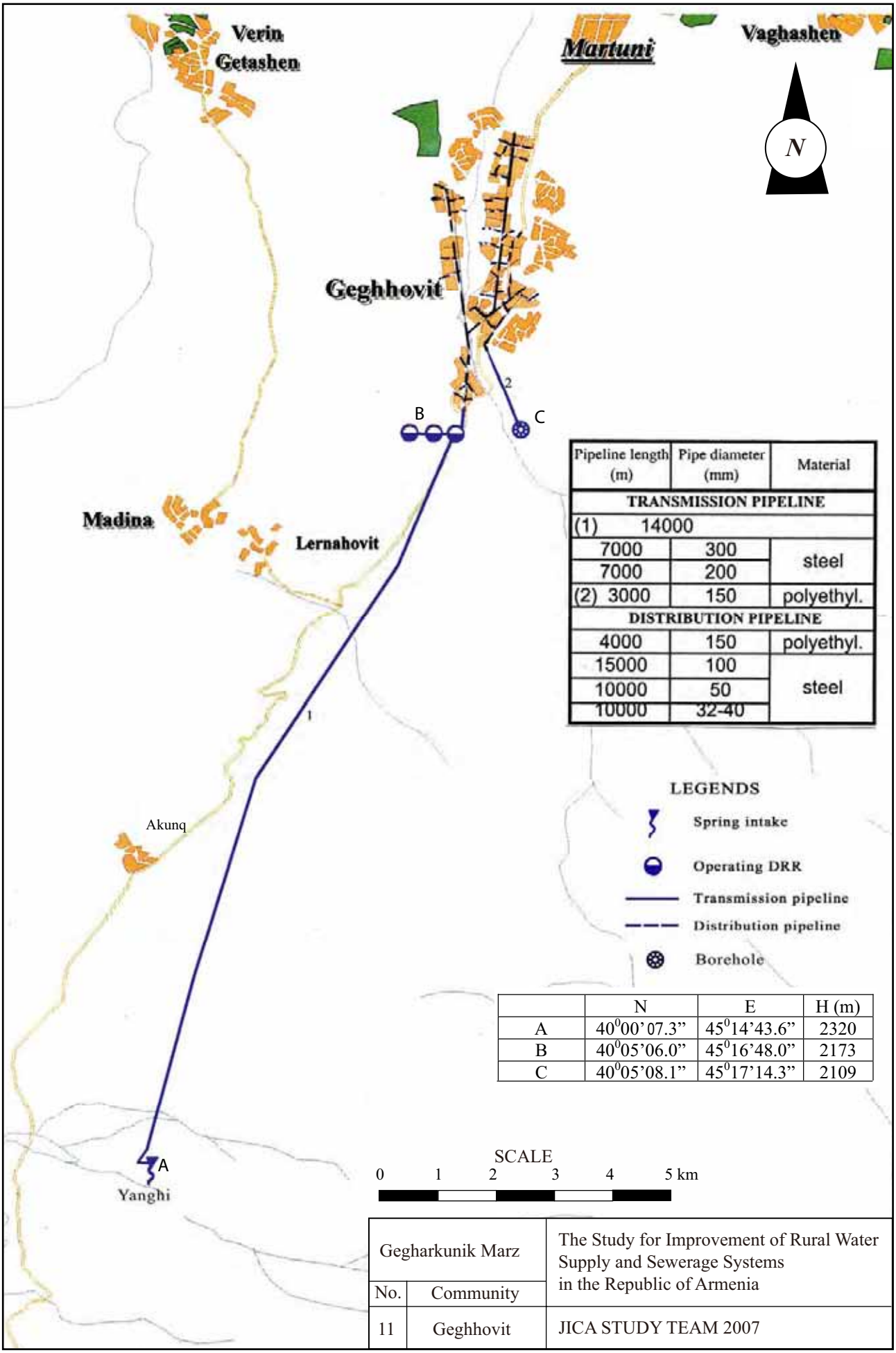
Existence	Rehabilitation	Remarks
Yes	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.11 Geghhovit**
District	**Martini**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	7,400
A2	Actual population in 2007	7,600
A3	Number of households	2,700
A4.1	Elderly people	700
A4.2	Population in labor force (age from 16 to 62)	4,500
A4.3	Children	2,400
A5.1	Pensioners	760
A5.2	Unemployed	500
A5.3	Receiving benefits	405
A6	Average monthly income of household (AMD)	27,000
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	3
A10	Number of pupils	1,150
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,631
	Annual Budget of the community 2005, in thousand AMD	8,685
	Annual Budget of the community 2006, in thousand AMD	5,829
	Annual Budget of the community 2007, in thousand AMD	1,613
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	2,800
	Amount spent in drinking water sector 2005, in thousand AMD	2,800
	Amount spent in drinking water sector 2006, in thousand AMD	2,800
	Amount spent in drinking water sector 2007, in thousand AMD	1,400
	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	2007
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	600
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?	irregularly - 3hrs
D10.2	How is the regime of water supply in your community in the wet season?	irregularly - 5hrs
D11	What time of day water is given?	by districts
D12	Are you pleased with duration of domestic water supply?	generaly displeased
D13	Are hours of water supply convenient?	generaly inconvenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	150
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	spring
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Petrosyan Arayik
E2	Position	service dipartment specialist
E3	Telephone	with the help of administ. head
E4	Quantity and present condition of the water supply facilities: spring/ intake	3-deteriorated, 1- partially rehabilitated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1-deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	2-deteriorated
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
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 fromcommunity(H. Sargsyan)
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)	1,800,000
	Repair cost(AMD)	100,000
	Others(AMD)	0
	Total (AMD)	2,800,000
E16	Do the residents participate in the O&M works?	absent
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.11 Geghhovit



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 14000		
7000	300	steel
7000	200	
(2) 3000	150	polyethyl.
DISTRIBUTION PIPELINE		
4000	150	polyethyl.
15000	100	steel
10000	50	
10000	32-40	

	N	E	H (m)
A	$40^0$00’07.3”	$45^0$14’43.6”	2320
B	$40^0$05’06.0”	$45^0$16’48.0”	2173
C	$40^0$05’08.1”	$45^0$17’14.3”	2109

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

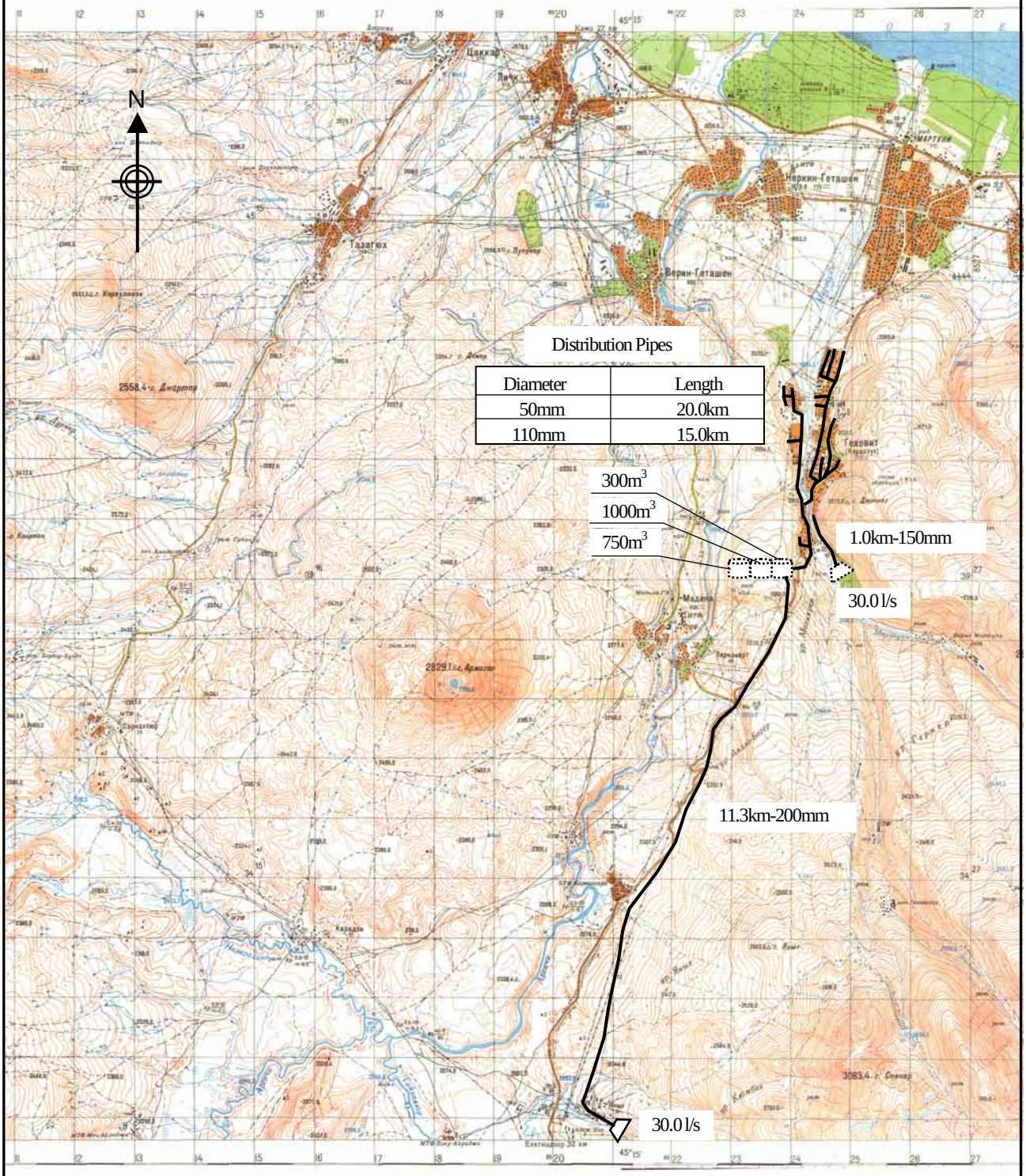
Marz : **Gegharkunik** No.11
Name : **Geghhovit**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	7,600	persons	760.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	1,150	pupils	11.5	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	2,700	household	234.9	
	Sub-total			1006.4	
	Unaccouted for water (20%)			201.3	
1	Average Daily Water Demand			1207.7	m3/day
2	Maximum Daily Water Demand			1449.2	m3/day
3	Maximum Hourly Water Demand			109.9	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	30.0	lit/sec		2592.0	m3/day
	b Borehole	3	30.0	lit/sec		2592.0	m3/day
`	Total					5184.0	m3/day
	2 Required reservoir volume					1319	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3		nos
	2m3	1	nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter	1,000	m
	200mm diameter	11,300	m
	250mm diameter		m
3	Reservoir		
4	Distribution pipe		
	50mm diameter	20,000	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	15,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	2,100	nos
6	Water meter installation	2,700	nos
7	Public tap	27	nos
8	Chlorination	1	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. 11	Gegharhovit	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **11**
Name : **Geghhovit**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3	1	nos	545,000	545,000
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					545,000
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	1,000	m	13,140	13,140,000
		200mm	11,300	m	19,440	219,672,000
		250mm		m	27,040	
	Sub-total					232,812,000
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	20,000	m	5,520	110,400,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	15,000	m	9,680	145,200,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					255,600,000
5	House Connection		2,100	nos	74,000	155,400,000
6	Water Meter Installation		2,700	nos	80,000	216,000,000
7	Public Tap		27	nos	90,000	2,430,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	14,000	m	3,600	50,400,000
	Total				AMD	913,687,000
					Equivalent to USD	2,990,596
					Equivalent to JPY	315,507,916
					AMD	USD
	Investment Cost per household		2,700	HH	338,403	1,108
	Investment Cost per person		7,600	persons	120,222	393

GEGHARKUNIK MARZ
Marutuni District
No 11 Geghhovit

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		367.3																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		2050.45	0.00	0.00	5.42	10.84	13.22	13.66	23.14	23.91	24.70	25.51	38.23	39.50	40.80	42.15	43.54	44.97	46.46	47.99	49.57	51.21	52.90	54.65	56.45	58.31	60.24	62.22	64.28	66.40	68.59	70.85	73.19	75.61	78.10	80.68	83.34	86.09	88.93	91.87	94.90	98.03
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				6																																				
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		106.22			1.44	1.49	1.54	1.59	1.64	1.69	1.75	1.81	1.87	1.93	1.99	2.06	2.13	2.20	2.27	2.34	2.42	2.50	2.58	2.67	2.76	2.85	2.94	3.04	3.14	3.24	3.35	3.46	3.57	3.69	3.81	3.94	4.07	4.20	4.34	4.49	4.63	4.79
2. Chlorine																																									
Pouring volume	kg/yr				2,205																																				
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		96.54			0.54	1.12	1.41	1.46	1.51	1.56	1.61	1.66	1.72	1.77	1.83	1.89	1.95	2.02	2.08	2.15	2.22	2.30	2.37	2.45	2.53	2.62	2.70	2.79	2.88	2.98	3.08	3.18	3.28	3.39	3.50	3.62	3.74	3.86	3.99	4.12	4.26	4.40
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		143.05			0.80	1.66	2.09	2.16	2.23	2.31	2.38	2.46	2.54	2.63	2.71	2.80	2.89	2.99	3.09	3.19	3.30	3.40	3.52	3.63	3.75	3.88	4.00	4.14	4.27	4.41	4.56	4.71	4.86	5.03	5.19	5.36	5.54	5.72	5.91	6.11	6.31	6.52
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					0.8	1.66	2.09	2.16	2.23	2.31	2.38	2.46	2.54	2.63	2.71	2.80	2.89	2.99	3.09	3.19	3.30	3.40	3.52	3.63	3.75	3.88	4.00	4.14	4.27	4.41	4.56	4.71	4.86	5.03	5.19	5.36	5.54	5.72	5.91	6.11	6.31	6.52
5. Pump replacement		0.00																0.00															0.00									
Sub-total		345.81	0.00	0.00	2.78	4.27	5.04	5.21	5.38	5.56	5.74	5.93	6.13	6.33	6.53	6.75	6.97	7.21	7.44	7.68	7.94	8.20	8.47	8.75	9.04	9.35	9.64	9.97	10.29	10.63	10.99	11.35	11.71	12.11	12.50	12.92	13.35	13.78	14.24	14.72	15.20	15.71
C Gross Income (A-B)		1704.64	0.00	0.00	2.64	6.57	8.18	8.45	17.76	18.35	18.96	19.58	32.10	33.17	34.27	35.40	36.57	37.76	39.02	40.31	41.63	43.01	44.43	45.90	47.41	48.96	50.60	52.25	53.99	55.77	57.60	59.50	61.48	63.50	65.60	67.76	69.99	72.31	74.69	77.15	79.70	82.32
D Depreciation cost		868.00						24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80
E Interest paid		258.40	0.04	0.07	4.44	8.95	11.00	11.01	11.01	11.01	11.01	11.01	11.01	10.69	10.37	10.05	9.73	9.40	9.06	8.73	8.39	8.05	7.70	7.35	7.00	6.64	6.28	5.92	5.55	5.18	4.80	4.42	4.04	3.65	3.26	2.87	2.47	2.07	1.66	1.25	0.84	0.42
F Net Income		578.24	-0.04	-0.07	-1.80	-2.38	-2.82	-27.36	-18.05	-17.46	-16.85	-16.23	-3.71	-2.32	-0.90	0.55	2.04	3.56	5.16	6.78	8.44	10.16	11.93	13.75	15.61	17.52	19.52	21.53	23.64	25.79	28.00	30.28	32.64	35.05	37.54	40.09	42.72	45.44	48.23	51.10	54.06	57.10
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		578.24	-0.04	-0.07	-1.80	-2.38	-2.82	-27.36	-18.05	-17.46	-16.85	-16.23	-3.71	-2.32	-0.90	0.55	2.04	3.56	5.16	6.78	8.44	10.16	11.93	13.75	15.61	17.52	19.52	21.53	23.64	25.79	28.00	30.28	32.64	35.05	37.54	40.09	42.72	45.44	48.23	51.10	54.06	57.10
OM Cost Recovery Ratio (A/B)		593%	0%	0%	195%	254%	262%	262%	430%	430%	430%	430%	624%	624%	625%	624%	625%	624%	624%	625%	624%	625%	625%	625%	624%	624%	625%	624%	625%	625%	624%	624%	625%	624%	624%	625%	625%	624%	624%	624%	624%	624%

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	578.24	-0.04	-0.07	-1.80	-2.38	-2.82	-27.36	-18.05	-17.46	-16.85	-16.23	-3.71	-2.32	-0.90	0.55	2.04	3.56	5.16	6.78	8.44	10.16	11.93	13.75	15.61	17.52	19.52	21.53	23.64	25.79	28.00	30.28	32.64	35.05	37.54	40.09	42.72	45.44	48.23	51.10	54.06	57.10
2. Depreciation cost	868.00	0.00	0.00	0.00	0.00	0.00	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80
3. Interest Paid	258.40	0.04	0.07	4.44	8.95	11.00	11.01	11.01	11.01	11.01	11.01	11.01	10.69	10.37	10.05	9.73	9.40	9.06	8.73	8.39	8.05	7.70	7.35	7.00	6.64	6.28	5.92	5.55	5.18	4.80	4.42	4.04	3.65	3.26	2.87	2.47	2.07	1.66	1.25	0.84	0.42
Sub-total	1704.64	0.00	0.00	2.64	6.57	8.18	8.45	17.76	18.35	18.96	19.58	32.10	33.17	34.27	35.40	36.57	37.76	39.02	40.31	41.63	43.01	44.43	45.90	47.41	48.96	50.60	52.25	53.99	55.77	57.60	59.50	61.48	63.50	65.60	67.76	69.99	72.31	74.69	77.15	79.70	82.32
B Finances																																									
1. Project Loan	1101.09	3.91	2.79	437.18	451.16	205.02	0.58	0.45																																	
2. Local fund	377.18	1.29	0.91	148.13	155.50	71.22	0.07	0.06																																	
Sub-total	1478.27	5.20	3.70	585.31	606.66	276.24	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	63.42	0.04	0.07	1.80	2.38	2.82	2.56	0.00	0.00	0.00	0.00	10.56	9.49	8.39	7.26	6.10	4.91	3.64	2.36	1.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	63.42	0.04	0.07	1.80	2.38	2.82	2.56	0.00	0.00	0.00	0.00	10.56	9.49	8.39	7.26	6.10	4.91	3.64	2.36	1.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	3246.33	5.24	3.77	589.75	615.61	287.24	11.66	18.27	18.35	18.96	19.58	42.66	42.66	42.66	42.66	42.67	42.67	42.66	42.67	42.67	43.01	44.43	45.90	47.41	48.96	50.60	52.25	53.99	55.77	57.60	59.50	61.48	63.50	65.60	67.76	69.99	72.31	74.69	77.15	79.70	82.32
APPLICATION OF FUNDS																																								
D Project disbursement	1478.27	5.20	3.70	585.31	606.66	276.24	0.65	0.51																																	
E Total debt services																																								
1. Loan repayment	1101.08											31.65	31.97	32.29	32.61	32.94	33.27	33.60	33.94	34.28	34.62	34.97	35.32	35.67	36.03	36.39	36.75	37.12	37.49	37.86	38.24	38.62	39.01	39.40	39.79	40.19	40.59	41.00	41.41	41.82	42.24
2. Interest paid	258.40	0.04	0.07	4.44	8.95	11.00	11.01	11.01	11.01	11.01	11.01	11.01	10.69	10.37	10.05	9.73	9.40	9.06	8.73	8.39	8.05	7.70	7.35	7.00	6.64	6.28	5.92	5.55	5.18	4.80	4.42	4.04	3.65	3.26	2.87	2.47	2.07	1.66	1.25	0.84	0.42
Sub-total	1359.48	0.04	0.07	4.44	8.95	11.00	11.01	11.01	11.01	11.01	11.01	42.66	42.66	42.66	42.66	42.67	42.67	42.66	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66
Total Cash Outflow	2837.75	5.24	3.77	589.75	615.61	287.24	11.66	11.52	11.01	11.01	11.01	42.66	42.66	42.66	42.66	42.67	42.67	42.66	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.67	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66	42.66
F Net Surplus Cash (A+C2)-E	408.58	0.00	0.00	0.00	0.00	0.00	0.00	6.75	7.34	7.95	8.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	1.76	3.23	4.74	6.29	7.93	9.58	11.32	13.10	14.94	16.84	18.82	20.84	22.94	25.10	27.33	29.65	32.03	34.49	37.04	39.66
Investment Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	125%	0%	0%	59%	73%	74%	77%	161%	167%	172%	178%	75%	78%	80%	83%	86%	88%	91%	94%	98%	101%	104%	108%	111%	115%	119%	122%	127%	131%	135%	139%	144%	149%	154%	159%	164%	170%	175%	181%	187%	193%
Cost recovery by water fee + subsidy ((A+C2)/E)	130%	100%	100%	100%	100%	100%	100%	161%	167%	172%	178%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	104%	108%	111%	115%	119%	122%	127%	131%	135%	139%	144%	149%	154%	159%	164%	170%	175%	181%	187%	193%

GEGHARKUNIK MARZ
Marutuni District
No 11 Geghhovit

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	2,050.45	97.0%
	Subsidy	63.42	3.0%
	Total	2,113.87	100.0%
2	**Expenditure**		
	OM cost	345.81	16.4%
	Loan repayment	1,101.08	52.1%
	Interest paid	258.40	12.2%
	Surplus cash	408.58	19.3%
	Total	2,113.87	100.0%

B. FIRR CALCULATION

Unit: million AMD

Year 1–13:

Description	Total	1	2	3	4	5	6	7	8	9	10	11	12	13
A COST														
1. Investment Cost	981.00	3.82	2.73	398.76	398.82	175.92	0.53	0.42						
2. Operation and Maintenance Cost														
Salary	54.72			1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
Chlorine	50.98			0.54	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
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
Mantenance cost	72.97			0.80	1.61	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96
Pump replacement	0.00													
Sub-total	178.67			2.78	4.17	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77
Total Outflow	1,159.67	3.82	2.73	401.54	402.99	180.69	5.30	5.19	4.77	4.77	4.77	4.77	4.77	4.77
B BENEFIT														
1. Water Tariff	1,287.30	0.00	0.00	5.42	10.84	13.22	13.66	23.14	23.91	24.70	25.51	38.23	38.23	38.23
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
Total Inflow	1,287.30	0.00	0.00	5.42	10.84	13.22	13.66	23.14	23.91	24.70	25.51	38.23	38.23	38.23
NET BENEFIT	127.63	-3.82	-2.73	-396.1	-392.1	-167.5	8.36	17.95	19.14	19.93	20.74	33.46	33.46	33.46

Year 14–27:

Description	14	15	16	17	18	19	20	21	22	23	24	25	26	27
A COST														
1. Investment Cost														
2. Operation and Maintenance Cost														
Salary	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
Chlorine	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
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
Mantenance cost	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96
Pump replacement			0.00											
Sub-total	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77
Total Outflow	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77
B BENEFIT														
1. Water Tariff	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23
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
Total Inflow	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23
NET BENEFIT	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46

Year 28–40:

Description	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST													
1. Investment Cost													
2. Operation and Maintenance Cost													
Salary	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
Chlorine	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
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
Mantenance cost	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96
Pump replacement				0.00									
Sub-total	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77
Total Outflow	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77
B BENEFIT													
1. Water Tariff	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23
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
Total Inflow	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23	38.23
NET BENEFIT	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46

FIRR = 0.62%

C. SENSITIVITY ANALYSIS

No.	Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1 Capital cost 10% up	-266.94	-4.20	-3.00	-436.0	-432.0	-185.1	8.31	17.91	19.14	19.93	20.74	33.46	33.46	33.46
	2 Capital cost 20% up	-358.86	-4.58	-3.28	-475.9	-471.9	-202.7	8.25	17.87	19.14	19.93	20.74	33.46	33.46	33.46
2	1 OM cost 10% up	-187.49	-3.82	-2.73	-396.4	-392.6	-167.9	7.88	17.47	18.66	19.45	20.26	32.98	32.98	32.98
	2 OM cost 20% up	-199.95	-3.82	-2.73	-396.7	-393.0	-168.4	7.41	17.00	18.19	18.98	19.79	32.51	32.51	32.51
3	1 Revenue 10% down	-261.90	-3.82	-2.73	-396.7	-393.2	-168.8	6.99	15.64	16.75	17.46	18.19	29.64	29.64	29.64
	2 Revenue 20% down	-348.78	-3.82	-2.73	-397.2	-394.3	-170.1	5.63	13.32	14.36	14.99	15.64	25.81	25.81	25.81

No.	Description	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	1 Capital cost 10% up	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46
	2 Capital cost 20% up	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46
2	1 OM cost 10% up	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98
	2 OM cost 20% up	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51
3	1 Revenue 10% down	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64
	2 Revenue 20% down	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81

No.	Description	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1 Capital cost 10% up	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46
	2 Capital cost 20% up	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46	33.46
2	1 OM cost 10% up	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98	32.98
	2 OM cost 20% up	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51	32.51
3	1 Revenue 10% down	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64	29.64
	2 Revenue 20% down	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81

No.	Description	FIRR	Sensitivity indicator	Swiching value
1	1 Capital cost 10% up	0.14%	35.94	2.78%
	2 Capital cost 20% up	-0.30%	-30.93	-3.23%
2	1 OM cost 10% up	0.54%	1.58	63.28%
	2 OM cost 20% up	0.45%	3.77	26.49%
3	1 Revenue 10% down	-0.01%	-1123.70	-0.09%
	2 Revenue 20% down	-0.69%	-18.98	-5.27%

No.12 Ddmashen

Information on Existing Water Sources (Gegharkunik)

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

No.12 Community Ddmashen
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	42.3	44	50	41.0	2,256	7.0	7.0	7.0
2	Spring	40	38	27.4	44	50	40.9	2,227	3.0	3.0	3.0
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Acceptable
Notes	The second spring is not connected to the water pipeline
Alternative sources if any	There are free (not captured) springs in this springs' area.

No.12 Community Ddmashen
District Sevan
Marz Gegharkunik
Sampling date 10/Jul/2007

	Parameters analysed	Units	No.1	No.2 Hajar spring	No.3 Prospective spring		Guidelines	
							WHO	Armenia
a	pH		7.79	7.5	7.6		6.5-8	6.0 - 9.0
b	Temperature	Deg.C	14.4	7.6	9.1			
c	TDS	Mg/L	62	69	79		1000	1000
1	Al:Aluminum	Mg/L	0.01	nd	0.01		0.10	0.50
2	B:Boron	Mg/L	n.d	nd	nd		0.70	0.50
3	Cl:Chloride	Mg/L	4	4	4		250	350
4	Cr:Chrome	Mg/L	<0.01	<0.01	<0.01		0.05	0.05
5	Cu:Copper	Mg/L	n.d	nd	nd		2	1
6	F:Fluoride	Mg/L	0.18	0.51	0.51		1.50	
7	Hardness	Mg/L	125	150	130		500	700
8	Fe:Iron	Mg/L	0.04	nd	nd		0.30	0.30
9	Mn:Manganese	Mg/L	n.d	nd	nd		0.40	0.10
10	Mo:Molibdenum	Mg/L	0.060	nd	nd		0.070	0.250
11	Ni:Nickel	Mg/L	0.007	<0.006	<0.006		0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8	2.2	2.7		50.0	45.0
13	SO4:Sulfate	Mg/L	2.0	4.0	3.0		250.0	500.0
14	Zn:Zink	Mg/L	n.d	nd	nd		3.0	5.0
15	As:Arsenic	Mg/L	n.d	nd	nd		0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.01	0.01		0.70	0.10
17	Be:Berillium	Mg/L	n.d	0.00005	0.00005		NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	nd	nd		0.0030	0.0010
19	Pb:Lead	Mg/L	0.001	0.001	0.001		0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002	<0.0002		0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001	<0.001	<0.001		0.010	0.010
22	Sr:Strontium	Mg/L	n.d	<0.7	<0.7		NA	7.0
23	CN:Cyanide	Mg/L	n.d	nd	nd		0.070	0.035
24	Coli form bacteria	bacteria per 100 ml			>1100		-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml			nd		0	0
26	Total bacteria	bacteria per 1 ml			500		-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.12 Community Ddmashen
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	08	40	-	Not identified
2	02	20	40	-	Not identified
3	03	06	45	-	Not identified
4	04	06	45	-	Not identified
5	05	14	45	-	Not identified
6	06	06	45	-	Not identified
7	07	17	40	-	Not identified
8	08	14	45	-	Not identified

No. 12 **Marz** Gegharkunik **Community** Ddmashen

1. ACCESSIBILITY TO THE SITE

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

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°38′42,3″	44°50′41.0″	2,256	1998	Concrete	7.0	No
2	Spring	40°38′27.4″	44°50′40.9″	2,227	1998	Concrete	3.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	5,000	200	Steel	7.0	1998	Little	No
2	5,000	150	Steel			Little	No
3	2,000	100	Steel			Little	No

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°34′24,5″	44°49′20.2″	1,813	reinforced concrete	Rectangular	9x9x4	2x250	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	150	Steel	1968	Huge	Yes
	13,000	100	Steel		Huge	Yes

7. PUMP STATION

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

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
10	1968		Yes	50	Yes

9. DRAINAGE SYSTEM

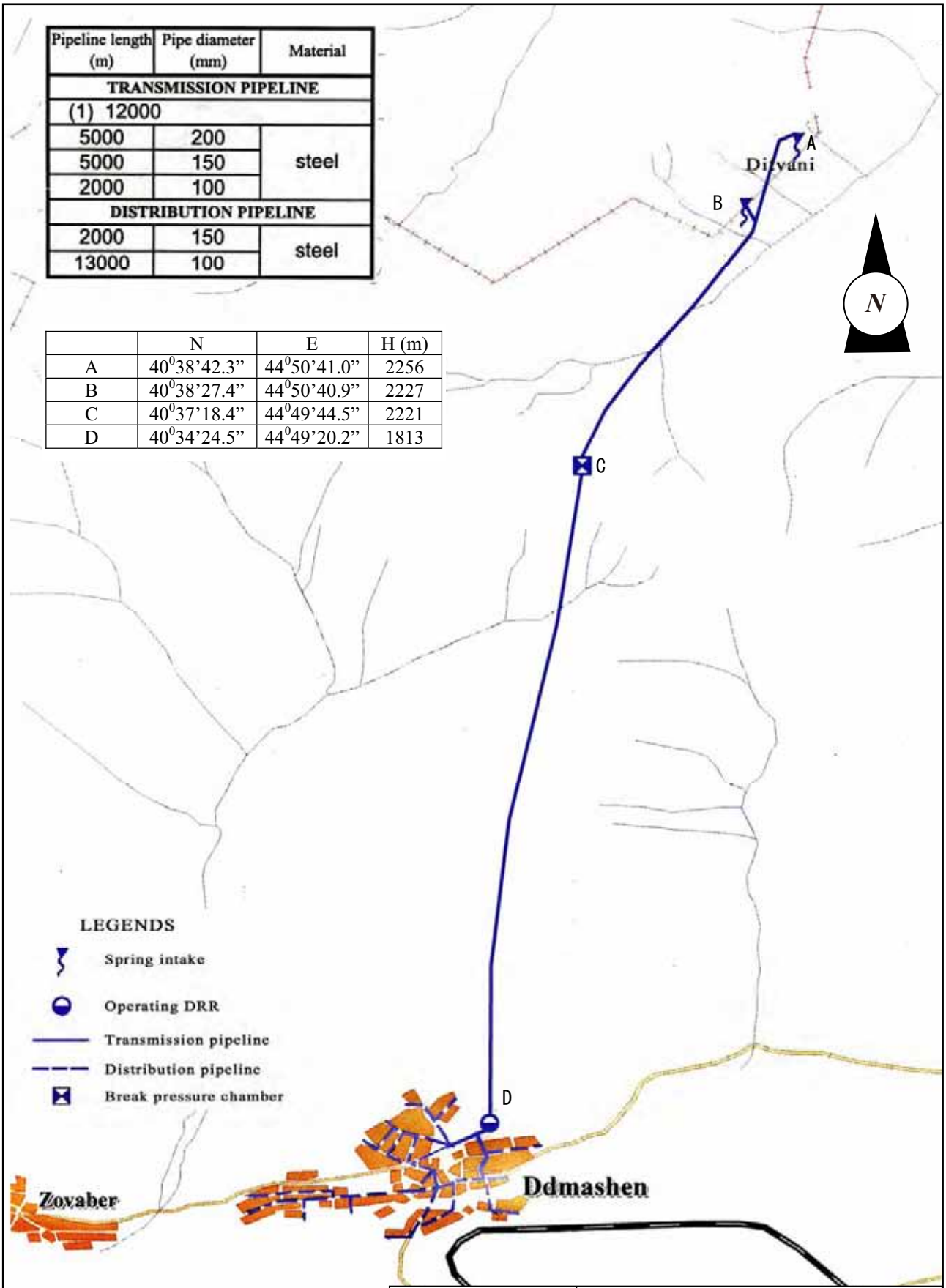
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.12 Ddmashen**
District	**Sevan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	2,712
A2	Actual population in 2007	2,814
A3	Number of households	727
A4.1	Elderly people	318
A4.2	Population in labor force (age from 16 to 62)	1,977
A4.3	Children	644
A5.1	Pensioners	456
A5.2	Unemployed	150
A5.3	Receiving benefits	58
A6	Average monthly income of household (AMD)	17,000
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	400
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,638
	Annual Budget of the community 2005, in thousand AMD	4,913
	Annual Budget of the community 2006, in thousand AMD	2,628
	Annual Budget of the community 2007, in thousand AMD	2,412
	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	150-180
	Amount spent in drinking water sector 2006, in thousand AMD	180-200
	Amount spent in drinking water sector 2007, in thousand AMD	200-300
	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	in the process
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	300
D8	How many house connection household set the water meter	0
D9	Number of public taps	10
D10.1	How is the regime of water supply in your community in the dry season?	regularly 4- 3 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly 4- 3 hrs
D11	What time of day water is given?	8^{00}-12^{00}, 12^{00}-16^{00}
D12	Are you pleased with duration of domestic water supply?	generaly displeased
D13	Are hours of water supply convenient?	generaly 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?	2 hrs
D14.2	Estimate quantity of domestic water use of each household (litter per day)	600 - 1000
D15.1	How long the taps are open to provide the each household for filling	4 hrs
D15.2	Estimate quantity of water for filling containers of each household (litter per	2,000
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	from Hrazdan river by pipelines
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Manukyan Kwryun
E2	Position	administration deputy head
E3	Telephone	(093)660857
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-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-excellent
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	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?	administrarion deputy 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)	180,000
	Repair cost(AMD)	200,000 - 300,000
	Others(AMD)	0
	Total (AMD)	680,000
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.12 Ddmashen



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 12000		
5000	200	steel
5000	150	
2000	100	
DISTRIBUTION PIPELINE		
2000	150	steel
13000	100	

	N	E	H (m)
A	$40^0$38'42.3"	$44^0$50'41.0"	2256
B	$40^0$38'27.4"	$44^0$50'40.9"	2227
C	$40^0$37'18.4"	$44^0$49'44.5"	2221
D	$40^0$34'24.5"	$44^0$49'20.2"	1813

SCALE

0 0.5 1.0 1.5 2.0 2.5 km

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

Marz : **Gegharkunik** No.12
Name : **Ddmashen**

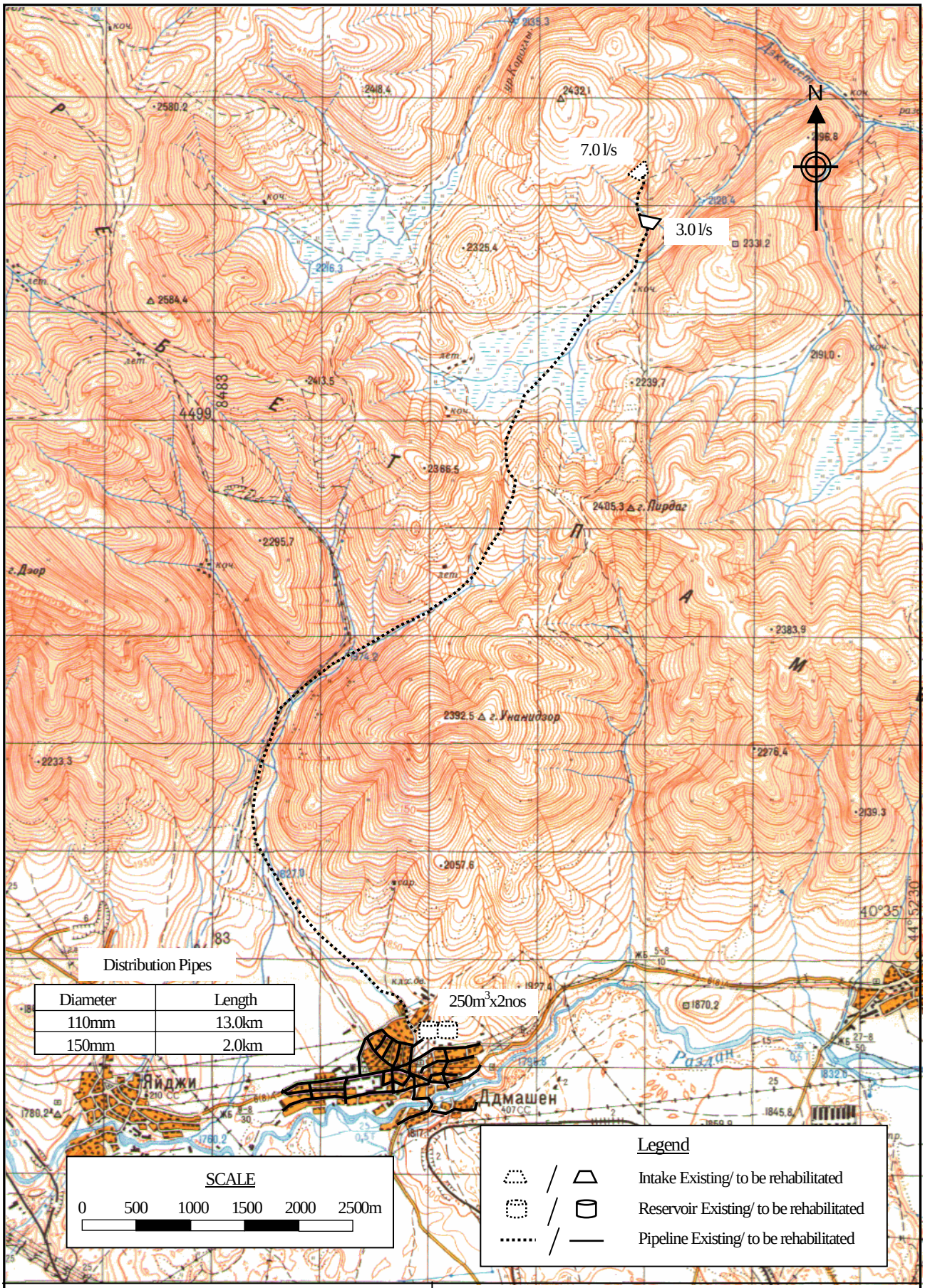
No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	2,814	persons	281.4	
	2 Factory	-	nos	0.0	
	3 School (pupils)	400	pupils	4.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	727	household	63.2	
	Sub-total			348.6	
	Unaccouted for water (20%)			69.7	
1	Average Daily Water Demand			418.3	m3/day
2	Maximum Daily Water Demand			502.0	m3/day
3	Maximum Hourly Water Demand			43.5	m3/hr

B WATER SUPPLY PLAN

		Nr.	Total vol.			
	1 Water source type					
	a Spring	2	10.0	lit/sec	864.0	m3/day
`	Total				864.0	m3/day
	2 Required reservoir volume				522	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
	1 Intake		
	1m3	1	nos
	2m3		nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	4 Distribution pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	13,000	m
	150mm diameter	2,000	m
	200mm diameter		m
	250mm diameter		m
	5 House connection	427	nos
	6 Water meter installation	727	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. 12	Ddmashen	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **12**
Name : **Ddmashen**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	1	nos	367,700	367,700
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					367,700
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	13,000	m	9,680	125,840,000
		150mm	2,000	m	13,140	26,280,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					152,120,000
5	House Connection		427	nos	74,000	31,598,000
6	Water Meter Installation		727	nos	80,000	58,160,000
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	6,000	m	3,600	21,600,000
	Total				AMD	265,065,700
					Equivalent to USD	867,589
					Equivalent to JPY	91,530,608
					AMD	USD
	Investment Cost per household		727	HH	364,602	1,193
	Investment Cost per person		2,814	persons	94,195	308

GEGHARKUNIK MARZ
Sevan District
No 12 Ddmashen

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		127.2																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		713.74	0.00	0.00	4.58	4.58	4.58	4.73	8.02	8.28	8.55	8.84	13.24	13.68	14.13	14.60	15.08	15.58	16.09	16.62	17.17	17.74	18.32	18.93	19.55	20.20	20.86	21.55	22.26	23.00	23.76	24.54	25.35	26.19	27.05	27.95	28.87	29.82	30.80	31.82	32.87	33.96
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				764																																				
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		33.84			0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.59	0.61	0.63	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.21	1.25	1.30	1.34	1.38	1.43	1.48	1.52
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		70.07			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	1.55	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					0.95	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	1.55	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		139.31	0.00	0.00	1.89	1.95	2.01	2.09	2.15	2.22	2.29	2.37	2.44	2.52	2.60	2.71	2.79	2.88	2.98	3.08	3.18	3.28	3.38	3.50	3.62	3.74	3.86	3.98	4.12	4.25	4.40	4.53	4.69	4.85	5.00	5.16	5.34	5.51	5.70	5.89	6.08	6.28
C Gross Income (A-B)		574.43	0.00	0.00	2.69	2.63	2.57	2.64	5.87	6.06	6.26	6.47	10.80	11.16	11.53	11.89	12.29	12.70	13.11	13.54	13.99	14.46	14.94	15.43	15.93	16.46	17.00	17.57	18.14	18.75	19.36	20.01	20.66	21.34	22.05	22.79	23.53	24.31	25.10	25.93	26.79	27.68
D Depreciation cost		251.65						7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19
E Interest paid		78.37	0.04	0.07	3.17	3.20	3.22	3.23	3.23	3.23	3.23	3.23	3.23	3.14	3.05	2.95	2.86	2.76	2.66	2.56	2.46	2.36	2.26	2.16	2.05	1.95	1.84	1.74	1.63	1.52	1.41	1.30	1.19	1.07	0.96	0.84	0.73	0.61	0.49	0.37	0.25	0.12
F Net Income		244.41	-0.04	-0.07	-0.48	-0.57	-0.65	-7.78	-4.55	-4.36	-4.16	-3.95	0.38	0.83	1.29	1.75	2.24	2.75	3.26	3.79	4.34	4.91	5.49	6.08	6.69	7.32	7.97	8.64	9.32	10.04	10.76	11.52	12.28	13.08	13.90	14.76	15.61	16.51	17.42	18.37	19.35	20.37
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		244.41	-0.04	-0.07	-0.48	-0.57	-0.65	-7.78	-4.55	-4.36	-4.16	-3.95	0.38	0.83	1.29	1.75	2.24	2.75	3.26	3.79	4.34	4.91	5.49	6.08	6.69	7.32	7.97	8.64	9.32	10.04	10.76	11.52	12.28	13.08	13.90	14.76	15.61	16.51	17.42	18.37	19.35	20.37
OM Cost Recovery Ratio (A/B)		512%	0%	0%	242%	235%	228%	226%	373%	373%	373%	373%	543%	543%	543%	539%	541%	541%	540%	540%	540%	541%	542%	541%	540%	540%	540%	541%	540%	541%	540%	542%	541%	540%	541%	542%	541%	541%	540%	540%	541%	541%

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	244.41	-0.04	-0.07	-0.48	-0.57	-0.65	-7.78	-4.55	-4.36	-4.16	-3.95	0.38	0.83	1.29	1.75	2.24	2.75	3.26	3.79	4.34	4.91	5.49	6.08	6.69	7.32	7.97	8.64	9.32	10.04	10.76	11.52	12.28	13.08	13.90	14.76	15.61	16.51	17.42	18.37	19.35	20.37
2. Depreciation cost	251.65	0.00	0.00	0.00	0.00	0.00	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19
3. Interest Paid	78.37	0.04	0.07	3.17	3.20	3.22	3.23	3.23	3.23	3.23	3.23	3.23	3.14	3.05	2.95	2.86	2.76	2.66	2.56	2.46	2.36	2.26	2.16	2.05	1.95	1.84	1.74	1.63	1.52	1.41	1.30	1.19	1.07	0.96	0.84	0.73	0.61	0.49	0.37	0.25	0.12
Sub-total	574.43	0.00	0.00	2.69	2.63	2.57	2.64	5.87	6.06	6.26	6.47	10.80	11.16	11.53	11.89	12.29	12.70	13.11	13.54	13.99	14.46	14.94	15.43	15.93	16.46	17.00	17.57	18.14	18.75	19.36	20.01	20.66	21.34	22.05	22.79	23.53	24.31	25.10	25.93	26.79	27.68
B Finances																																									
1. Project Loan	323.26	3.91	2.79	310.44	3.48	1.61	0.58	0.45																																	
2. Local fund	108.97	1.29	0.91	105.18	1.16	0.30	0.07	0.06																																	
Sub-total	432.23	5.20	3.70	415.62	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	7.36	0.04	0.07	0.48	0.57	0.65	0.59	0.00	0.00	0.00	0.00	1.72	1.37	1.00	0.63	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	7.36	0.04	0.07	0.48	0.57	0.65	0.59	0.00	0.00	0.00	0.00	1.72	1.37	1.00	0.63	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	1014.02	5.24	3.77	418.79	7.84	5.13	3.88	6.38	6.06	6.26	6.47	12.52	12.53	12.53	12.52	12.53	12.70	13.11	13.54	13.99	14.46	14.94	15.43	15.93	16.46	17.00	17.57	18.14	18.75	19.36	20.01	20.66	21.34	22.05	22.79	23.53	24.31	25.10	25.93	26.79	27.68
APPLICATION OF FUNDS																																									
D Project disbursement	432.23	5.20	3.70	415.62	4.64	1.91	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	323.27											9.29	9.39	9.48	9.57	9.67	9.77	9.86	9.96	10.06	10.16	10.27	10.37	10.47	10.58	10.68	10.79	10.90	11.01	11.12	11.23	11.34	11.45	11.57	11.68	11.80	11.92	12.04	12.16	12.28	12.40
2. Interest paid	78.37	0.04	0.07	3.17	3.20	3.22	3.23	3.23	3.23	3.23	3.23	3.23	3.14	3.05	2.95	2.86	2.76	2.66	2.56	2.46	2.36	2.26	2.16	2.05	1.95	1.84	1.74	1.63	1.52	1.41	1.30	1.19	1.07	0.96	0.84	0.73	0.61	0.49	0.37	0.25	0.12
Sub-total	401.64	0.04	0.07	3.17	3.20	3.22	3.23	3.23	3.23	3.23	3.23	12.52	12.53	12.53	12.52	12.53	12.53	12.52	12.52	12.52	12.52	12.53	12.53	12.52	12.53	12.52	12.53	12.53	12.53	12.53	12.53	12.53	12.52	12.53	12.52	12.53	12.53	12.53	12.53	12.53	12.52
Total Cash Outflow	833.87	5.24	3.77	418.79	7.84	5.13	3.88	3.74	3.23	3.23	3.23	12.52	12.53	12.53	12.52	12.53	12.53	12.52	12.52	12.52	12.52	12.53	12.53	12.52	12.53	12.52	12.53	12.53	12.53	12.53	12.53	12.53	12.52	12.53	12.52	12.53	12.53	12.53	12.53	12.53	12.52
F Net Surplus Cash (A+C2)-E	180.15	0.00	0.00	0.00	0.00	0.00	0.00	2.64	2.83	3.03	3.24	0.00	0.00	0.00	0.00	0.00	0.17	0.59	1.02	1.47	1.94	2.41	2.90	3.41	3.93	4.48	5.04	5.61	6.22	6.83	7.48	8.13	8.82	9.52	10.27	11.00	11.78	12.57	13.40	14.26	15.16
Investment Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	143%	0%	0%	85%	82%	80%	82%	182%	188%	194%	200%	86%	89%	92%	95%	98%	101%	105%	108%	112%	115%	119%	123%	127%	131%	136%	140%	145%	150%	155%	160%	165%	170%	176%	182%	188%	194%	200%	207%	214%	221%
Cost recovery by water fee + subsidy ((A+C2)/E)	145%	100%	100%	100%	100%	100%	100%	182%	188%	194%	200%	100%	100%	100%	100%	100%	101%	105%	108%	112%	115%	119%	123%	127%	131%	136%	140%	145%	150%	155%	160%	165%	170%	176%	182%	188%	194%	200%	207%	214%	221%

GEGHARKUNIK MARZ
Sevan District
No 12 Ddmashen

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	713.74	99.0%
	Subsidy	7.36	1.0%
	Total	721.10	100.0%
2	**Expenditure**		
	OM cost	139.31	19.3%
	Loan repayment	323.27	44.8%
	Interest paid	78.37	10.9%
	Surplus cash	180.15	25.0%
	Total	721.10	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	295.36	3.82	2.73	283.19	3.21	1.46	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	17.85			0.46	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	36.10			0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pump replacement	0.00																0.00															0.00										
Sub-total	72.19			1.89	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
Total Outflow	367.55	3.82	2.73	285.08	5.11	3.36	2.43	2.32	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
B BENEFIT																																								
1. Water Tariff	449.36	0.00	0.00	4.58	4.58	4.58	4.73	8.02	8.28	8.55	8.84	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24
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	449.36	0.00	0.00	4.58	4.58	4.58	4.73	8.02	8.28	8.55	8.84	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24
NET BENEFIT	81.81	-3.82	-2.73	-280.5	-0.5	1.2	2.30	5.70	6.38	6.65	6.94	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34

FIRR = 1.22%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-54.83	-4.20	-3.00	-308.8	-0.9	1.1	2.25	5.66	6.38	6.65	6.94	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34
	2	Capital cost 20% up	-82.87	-4.58	-3.28	-337.1	-1.2	0.9	2.19	5.62	6.38	6.65	6.94	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34	11.34
2	1	OM cost 10% up	-31.86	-3.82	-2.73	-280.7	-0.7	1.0	2.11	5.51	6.19	6.46	6.75	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15
	2	OM cost 20% up	-36.92	-3.82	-2.73	-280.9	-0.9	0.8	1.92	5.32	6.00	6.27	6.56	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96
3	1	Revenue 10% down	-57.22	-3.82	-2.73	-281.0	-1.0	0.8	1.83	4.90	5.55	5.80	6.06	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02	10.02
	2	Revenue 20% down	-87.64	-3.82	-2.73	-281.4	-1.4	0.3	1.35	4.10	4.72	4.94	5.17	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69	8.69

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.74%	6.62	15.11%
	2	Capital cost 20% up	0.30%	30.37	3.29%
2	1	OM cost 10% up	1.12%	0.92	109.25%
	2	OM cost 20% up	1.02%	2.03	49.36%
3	1	Revenue 10% down	0.58%	11.22	8.91%
	2	Revenue 20% down	-0.13%	-102.32	-0.98%

No.13 Dprabak

Information on Existing Water Sources (Gegharkunik)

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

No.13 Community Dprabak
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	40	34.8	45	7	15.2	1,475	6.0	6.5	2.0
2	Spring	40	42	8.0	45	9	11.4	1,522			3.0
3	Spring	40	42	15.5	45	9	51.8	1,731			1.5
4											
5											
6											
7											
8											
9											
10											

Notes:

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

Users Acceptnce for water quality	Acceptable
Notes	70% leakage in the network
Alternative sources if any	There are free springs in this springs' area and 1l/sec water amount can be added.

No.13 Community Dprabak
District Krasnoselsk
Marz Gegharkunik
Sampling date 25/Jul/2007

	Parameters analysed	Units	No.1 from corn field	No.2 Andranik home side	No.3 Andranik homeside		Guidelines WHO	Guidelines Armenia
a	pH		7.9	6.7	8.1		6.5-8	6.0 - 9.0
b	Temperature	Deg.C	19.3	15.5	21.5			
c	TDS	Mg/L	115	303	167		1000	1000
1	Al:Aluminum	Mg/L	n.d.	0.05	n.d.		0.10	0.50
2	B:Boron	Mg/L	n.d.	n.d.	n.d.		0.70	0.50
3	Cl:Chloride	Mg/L	4	5	6		250	350
4	Cr:Chrome	Mg/L	n.d.	n.d.	<0.01		0.05	0.05
5	Cu:Copper	Mg/L	n.d.	n.d.	n.d.		2	1
6	F:Fluoride	Mg/L	0.02	0.37	0.07		1.50	
7	Hardness	Mg/L	225	580	365		500	700
8	Fe:Iron	Mg/L	n.d.	n.d.	n.d.		0.30	0.30
9	Mn:Manganese	Mg/L	n.d.	n.d.	n.d.		0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d.	n.d.	n.d.		0.070	0.250
11	Ni:Nickel	Mg/L	n.d.	0.010	n.d.		0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.3	0.9	2.2		50.0	45.0
13	SO4:Sulfate	Mg/L	3.0	81.0	3.0		250.0	500.0
14	Zn:Zink	Mg/L	n.d.	n.d.	n.d.		3.0	5.0
15	As:Arsenic	Mg/L	n.d.	n.d.	n.d.		0.0	0.1
16	Ba:Barium	Mg/L	<0.01	<0.01	<0.01		0.70	0.10
17	Be:Berillium	Mg/L	n.d.	n.d.	n.d.		NA	0.00020
18	Cd:Cadmium	Mg/L	0.0002	0.0001	0.0002		0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001	<0.001		0.010	0.030
20	Hg:Mercury	Mg/L	n.d.	<0.0002	n.d.		0.00100	0.00050
21	Se:Selenium	Mg/L	0.001	0.001	0.001		0.010	0.010
22	Sr:Strontium	Mg/L	<0.7	<0.7	<0.7		NA	7.0
23	CN:Cyanide	Mg/L	n.d.	n.d.	n.d.		0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.13 Community Dprabak
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	30	-	Not identified
2	01	26	30	-	Not identified
3	02	15	40	-	Not identified
4	03	13	30	-	Not identified
5	03	19	35	-	Not identified
6	04	10	40	-	Not identified
7	05	02	35	-	Not identified
8	06	05	35	-	Not identified
9	08	02	45	-	Not identified
10	08	20	60	0.9-1.4	Not identified

No. 13 **Marz** Gegharkunik **Community** Dprabak

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Fair	Possible	
	Intake	Fair	Possible	
	Intake	Fair	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°40′34.8″	45°07′15.2″	1,475	1960	Concrete	2.0	Yes
2	Spring	40°42′08.0″	45°09′11.4″	1,522	1996	Concrete	3.0	Yes
3	Spring	40°42′15.5″	45°09′51.8″	1,731	1950	Concrete	1.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	700	100	Steel	0.6	1960	Huge	Yes
	800	150	Steel				
2	2,500	60	Polyethylene	3	1996	Little	No
3	3,500	80	Steel	0.6	1950	Huge	Yes

4. RESERVOIR

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

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,000	100	Steel	1960	Huge	Yes
2	5,000	50	Steel		Huge	Yes
3	1,000	60	Polyethylene		Little	No

7. PUMP STATION

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

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
3	1960		No	0	Yes

9. DRAINAGE SYSTEM

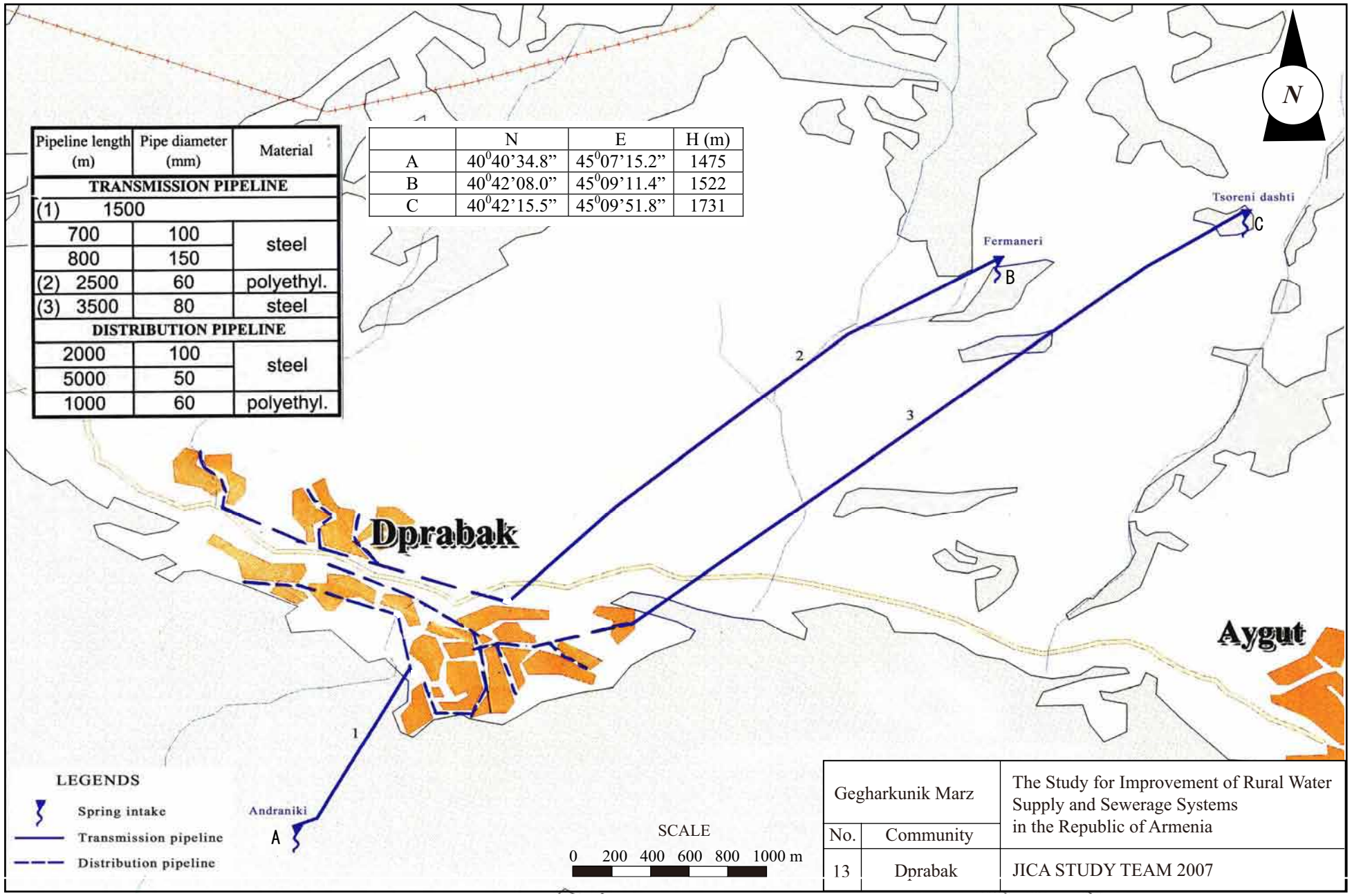
Existence	Rehabilitation	Remarks			
No	Yes				

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.13 Dprabak**
District	**Kranoseisk**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	599
A2	Actual population in 2007	360
A3	Number of households	256
A4.1	Elderly people	134
A4.2	Population in labor force (age from 16 to 62)	300
A4.3	Children	100
A5.1	Pensioners	134
A5.2	Unemployed	0
A5.3	Receiving benefits	25
A6	Average monthly income of household (AMD)	20,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	120
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	1,000
	Annual Budget of the community 2005, in thousand AMD	1,090
	Annual Budget of the community 2006, in thousand AMD	1,080
	Annual Budget of the community 2007, in thousand AMD	1,070
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat, cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	unknown
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	absent
D7	Number of house connection to drinking water system	200
D8	How many house connection household set the water meter	0
D9	Number of public taps	3
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	pleased
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	according to the supplied water
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	absent
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	nobody
E2	Position	-
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	absent
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	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	valunteers from community
E14	How you prepare O&M costs?	community budget, donation from residents
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	0
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	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.13 Dprabak



Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 1500		
700	100	steel
800	150	
(2) 2500	60	polyethyl.
(3) 3500	80	steel
DISTRIBUTION PIPELINE		
2000	100	steel
5000	50	
1000	60	polyethyl.

	N	E	H (m)
A	$40^0$40’34.8”	$45^0$07’15.2”	1475
B	$40^0$42’08.0”	$45^0$09’11.4”	1522
C	$40^0$42’15.5”	$45^0$09’51.8”	1731

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

Marz : **Gegharkunik** No.13
Name : **Dprabak**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	360	persons	36.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	120	pupils	1.2	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	256	household	22.3	
	Sub-total			59.5	
	Unaccouted for water (20%)			11.9	
1	Average Daily Water Demand			71.4	m3/day
2	Maximum Daily Water Demand			85.7	m3/day
3	Maximum Hourly Water Demand			16.2	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	3	6.5	lit/sec		561.6	m3/day
`	Total					561.6	m3/day
	2 Required reservoir volume					195	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	2,500	m
	90mm diameter	1,000	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	100m3 capacity	2	nos
4	Distribution pipe		
	50mm diameter	5,000	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	2,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	56	nos
6	Water meter installation	256	nos
7	Public tap	3	nos
8	Chlorination	2	nos
9	Pumps	-	nos

Diameter	Length
50mm	5.0km
110mm	2.0km

Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 13	Dprabak	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **13**
Name : **Dprabak**

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	2,500	m	7,160	17,900,000
		90mm	1,000	m	8,040	8,040,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					25,940,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3	2	nos	12,968,300	25,936,600
		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					25,936,600
4	Distribution Pipe					
		50mm	5,000	m	5,520	27,600,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	2,000	m	9,680	19,360,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					46,960,000
5	House Connection		56	nos	74,000	4,144,000
6	Water Meter Installation		256	nos	80,000	20,480,000
7	Public Tap		3	nos	90,000	270,000
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	135,913,700
					Equivalent to USD	444,860
					Equivalent to JPY	46,932,755
					AMD	USD
	Investment Cost per household		256	HH	530,913	1,738
	Investment Cost per person		360	persons	377,538	1,236

GEGHARKUNIK MARZ
Marutuni District
No 13 Dprabak

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		21.7																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		121.26	0.00	0.00	0.32	0.64	0.78	0.81	1.37	1.41	1.46	1.51	2.26	2.34	2.41	2.49	2.57	2.66	2.75	2.84	2.93	3.03	3.13	3.23	3.34	3.45	3.56	3.68	3.80	3.93	4.06	4.19	4.33	4.47	4.62	4.77	4.93	5.09	5.26	5.43	5.61	5.80
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				131																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		5.76			0.03	0.07	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	0.20	0.21	0.22	0.22	0.23	0.24	0.24	0.25	0.26
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		39.45			0.22	0.46	0.58	0.60	0.61	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.22	1.26	1.30	1.34	1.38	1.43	1.48	1.53	1.58	1.63	1.68	1.74	1.80
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.22	0.46	0.58	0.60	0.61	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.22	1.26	1.30	1.34	1.38	1.43	1.48	1.53	1.58	1.63	1.68	1.74	1.80
5. Pump replacement		0.00																0.00															0.00									
Sub-total		62.91	0.00	0.00	0.49	0.78	0.92	0.95	0.97	1.01	1.05	1.08	1.11	1.15	1.19	1.22	1.27	1.31	1.35	1.40	1.44	1.50	1.54	1.59	1.64	1.70	1.75	1.82	1.87	1.94	2.00	2.07	2.14	2.20	2.28	2.36	2.43	2.51	2.59	2.67	2.76	2.86
C Gross Income (A-B)		58.35	0.00	0.00	-0.17	-0.14	-0.14	-0.14	0.40	0.40	0.41	0.43	1.15	1.19	1.22	1.27	1.30	1.35	1.40	1.44	1.49	1.53	1.59	1.64	1.70	1.75	1.81	1.86	1.93	1.99	2.06	2.12	2.19	2.27	2.34	2.41	2.50	2.58	2.67	2.76	2.85	2.94
D Depreciation cost		129.15						3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69
E Interest paid		41.71	0.04	0.07	0.75	1.45	1.76	1.77	1.77	1.77	1.77	1.77	1.77	1.72	1.67	1.62	1.57	1.51	1.46	1.40	1.35	1.30	1.24	1.18	1.13	1.07	1.01	0.95	0.89	0.83	0.77	0.71	0.65	0.59	0.53	0.46	0.40	0.33	0.27	0.20	0.14	0.07
F Net Income		-112.51	-0.04	-0.07	-0.92	-1.59	-1.90	-5.60	-5.06	-5.06	-5.05	-5.03	-4.31	-4.22	-4.14	-4.04	-3.96	-3.85	-3.75	-3.65	-3.55	-3.46	-3.34	-3.23	-3.12	-3.01	-2.89	-2.78	-2.65	-2.53	-2.40	-2.28	-2.15	-2.01	-1.88	-1.74	-1.59	-1.44	-1.29	-1.13	-0.98	-0.82
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		-112.51	-0.04	-0.07	-0.92	-1.59	-1.90	-5.60	-5.06	-5.06	-5.05	-5.03	-4.31	-4.22	-4.14	-4.04	-3.96	-3.85	-3.75	-3.65	-3.55	-3.46	-3.34	-3.23	-3.12	-3.01	-2.89	-2.78	-2.65	-2.53	-2.40	-2.28	-2.15	-2.01	-1.88	-1.74	-1.59	-1.44	-1.29	-1.13	-0.98	-0.82
OM Cost Recovery Ratio (A/B)		193%	0%	0%	65%	83%	85%	85%	141%	140%	139%	140%	204%	203%	203%	204%	202%	203%	204%	203%	203%	202%	203%	203%	204%	203%	203%	202%	203%	203%	203%	202%	202%	203%	203%	202%	203%	203%	203%	203%	203%	203%

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	-112.51	-0.04	-0.07	-0.92	-1.59	-1.90	-5.60	-5.06	-5.06	-5.05	-5.03	-4.31	-4.22	-4.14	-4.04	-3.96	-3.85	-3.75	-3.65	-3.55	-3.46	-3.34	-3.23	-3.12	-3.01	-2.89	-2.78	-2.65	-2.53	-2.40	-2.28	-2.15	-2.01	-1.88	-1.74	-1.59	-1.44	-1.29	-1.13	-0.98	-0.82
2. Depreciation cost	129.15	0.00	0.00	0.00	0.00	0.00	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69	3.69
3. Interest Paid	41.71	0.04	0.07	0.75	1.45	1.76	1.77	1.77	1.77	1.77	1.77	1.77	1.72	1.67	1.62	1.57	1.51	1.46	1.40	1.35	1.30	1.24	1.18	1.13	1.07	1.01	0.95	0.89	0.83	0.77	0.71	0.65	0.59	0.53	0.46	0.40	0.33	0.27	0.20	0.14	0.07
Sub-total	58.35	0.00	0.00	-0.17	-0.14	-0.14	-0.14	0.40	0.40	0.41	0.43	1.15	1.19	1.22	1.27	1.30	1.35	1.40	1.44	1.49	1.53	1.59	1.64	1.70	1.75	1.81	1.86	1.93	1.99	2.06	2.12	2.19	2.27	2.34	2.41	2.50	2.58	2.67	2.76	2.85	2.94
B Finances																																									
1. Project Loan	177.24	3.91	2.79	68.19	69.94	31.38	0.58	0.45																																	
2. Local fund	59.76	1.29	0.91	23.09	23.55	10.79	0.07	0.06																																	
Sub-total	237.00	5.20	3.70	91.28	93.49	42.17	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.59	0.00	0.00	0.17	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	160.07	0.04	0.07	0.75	1.45	1.76	1.77	1.37	1.37	1.36	1.34	5.72	5.68	5.65	5.60	5.57	5.52	5.47	5.42	5.38	5.34	5.28	5.23	5.17	5.12	5.06	5.01	4.94	4.88	4.81	4.75	4.68	4.60	4.53	4.46	4.37	4.29	4.20	4.11	4.02	3.93
Sub-total	160.66	0.04	0.07	0.92	1.59	1.90	1.91	1.37	1.37	1.36	1.34	5.72	5.68	5.65	5.60	5.57	5.52	5.47	5.42	5.38	5.34	5.28	5.23	5.17	5.12	5.06	5.01	4.94	4.88	4.81	4.75	4.68	4.60	4.53	4.46	4.37	4.29	4.20	4.11	4.02	3.93
Total Cash Inflow	456.01	5.24	3.77	92.03	94.94	43.93	2.42	2.28	1.77	1.77	1.77	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87
APPLICATION OF FUNDS																																								
D Project disbursement	237.00	5.20	3.70	91.28	93.49	42.17	0.65	0.51																																	
E Total debt services																																								
1. Loan repayment	177.30											5.10	5.15	5.20	5.25	5.30	5.36	5.41	5.46	5.52	5.57	5.63	5.69	5.74	5.80	5.86	5.92	5.98	6.04	6.10	6.16	6.22	6.28	6.34	6.41	6.47	6.54	6.60	6.67	6.73	6.80
2. Interest paid	41.71	0.04	0.07	0.75	1.45	1.76	1.77	1.77	1.77	1.77	1.77	1.77	1.72	1.67	1.62	1.57	1.51	1.46	1.40	1.35	1.30	1.24	1.18	1.13	1.07	1.01	0.95	0.89	0.83	0.77	0.71	0.65	0.59	0.53	0.46	0.40	0.33	0.27	0.20	0.14	0.07
Sub-total	219.01	0.04	0.07	0.75	1.45	1.76	1.77	1.77	1.77	1.77	1.77	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87
Total Cash Outflow	456.01	5.24	3.77	92.03	94.94	43.93	2.42	2.28	1.77	1.77	1.77	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.86	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87	6.87
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)	27%	0%	0%	0%	0%	0%	0%	23%	23%	23%	24%	17%	17%	18%	18%	19%	20%	20%	21%	22%	22%	23%	24%	25%	25%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	36%	38%	39%	40%	41%	43%
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
Marutuni District
No 13 Dprabak

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	121.26	43.1%
	Subsidy	160.07	56.9%
	Total	281.33	100.0%
2	**Expenditure**		
	OM cost	62.91	22.4%
	Loan repayment	177.30	63.0%
	Interest paid	41.71	14.8%
	Surplus cash	0.00	0.0%
	Total	281.92	100.0%

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

Description	Total	Year																																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																								
1. Investment Cost	158.65	3.82	2.73	62.30	61.93	26.92	0.53	0.42																																
2. Operation and Maintenance Cost																																								
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	2.98			0.03	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	20.10			0.22	0.44	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Pump replacement	0.00																0.00															0.00									
Sub-total	32.21			0.49	0.75	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Total Outflow	190.86	3.82	2.73	62.79	62.68	27.78	1.39	1.28	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
B BENEFIT																																								
1. Water Tariff	76.10	0.00	0.00	0.32	0.64	0.78	0.81	1.37	1.41	1.46	1.51	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
2. Subsidy	120.59	0.00	0.00	0.17	0.14	0.14	0.14	0.00	0.00	0.00	0.00	3.95	3.96	3.98	3.98	4.00	4.01	4.01	4.02	4.03	4.04	4.04	4.05	4.04	4.05	4.05	4.06	4.05	4.05	4.04	4.04	4.03	4.01	4.00	4.00	3.97	3.96	3.93	3.91	3.88	3.86
Total Inflow	196.69	0.00	0.00	0.49	0.78	0.92	0.95	1.37	1.41	1.46	1.51	6.21	6.22	6.24	6.24	6.26	6.27	6.27	6.28	6.29	6.30	6.30	6.31	6.30	6.31	6.31	6.32	6.31	6.31	6.30	6.30	6.29	6.27	6.26	6.26	6.23	6.22	6.19	6.17	6.14	6.12
NET BENEFIT	5.83	-3.82	-2.73	-62.3	-61.9	-26.9	-0.44	0.09	0.55	0.60	0.65	5.35	5.36	5.38	5.38	5.40	5.41	5.41	5.42	5.43	5.44	5.44	5.45	5.44	5.45	5.45	5.46	5.45	5.45	5.44	5.44	5.43	5.41	5.40	5.40	5.37	5.36	5.33	5.31	5.28	5.26

FIRR = **0.17%**

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	-56.27	-4.20	-3.00	-68.5	-68.1	-29.6	-0.49	0.05	0.55	0.60	0.65	5.35	5.36	5.38	5.38	5.40	5.41	5.41	5.42	5.43	5.44	5.44	5.45	5.44	5.45	5.45	5.46	5.45	5.45	5.44	5.44	5.43	5.41	5.40	5.40	5.37	5.36	5.33	5.31	5.28	5.26
	2	Capital cost 20% up	-71.15	-4.58	-3.28	-74.8	-74.3	-32.2	-0.55	0.01	0.55	0.60	0.65	5.35	5.36	5.38	5.38	5.40	5.41	5.41	5.42	5.43	5.44	5.44	5.45	5.44	5.45	5.45	5.46	5.45	5.45	5.44	5.44	5.43	5.41	5.40	5.40	5.37	5.36	5.33	5.31	5.28	5.26
2	1	OM cost 10% up	-43.63	-3.82	-2.73	-62.3	-62.0	-26.9	-0.53	0.00	0.46	0.51	0.56	5.26	5.27	5.29	5.29	5.31	5.32	5.32	5.33	5.34	5.35	5.35	5.36	5.35	5.36	5.36	5.37	5.36	5.36	5.35	5.35	5.34	5.32	5.31	5.31	5.28	5.27	5.24	5.22	5.19	5.17
	2	OM cost 20% up	-45.88	-3.82	-2.73	-62.4	-62.1	-27.0	-0.61	-0.08	0.38	0.43	0.48	5.18	5.19	5.21	5.21	5.23	5.24	5.24	5.25	5.26	5.27	5.27	5.28	5.27	5.28	5.28	5.29	5.28	5.28	5.27	5.27	5.26	5.24	5.23	5.23	5.20	5.19	5.16	5.14	5.11	5.09
3	1	Revenue 10% down	-54.38	-3.82	-2.73	-62.3	-62.0	-27.0	-0.54	-0.05	0.41	0.45	0.50	4.73	4.74	4.76	4.76	4.77	4.78	4.78	4.79	4.80	4.81	4.81	4.82	4.81	4.82	4.82	4.83	4.82	4.82	4.81	4.81	4.80	4.78	4.77	4.77	4.75	4.74	4.71	4.69	4.67	4.65
	2	Revenue 20% down	-67.37	-3.82	-2.73	-62.4	-62.1	-27.0	-0.63	-0.18	0.27	0.31	0.35	4.11	4.12	4.13	4.13	4.15	4.16	4.16	4.16	4.17	4.18	4.18	4.19	4.18	4.19	4.19	4.20	4.19	4.19	4.18	4.18	4.17	4.16	4.15	4.15	4.12	4.12	4.09	4.08	4.05	4.04

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.27%	-16.16	-6.19%
	2	Capital cost 20% up	-0.67%	-12.52	-7.99%
2	1	OM cost 10% up	0.08%	12.23	8.18%
	2	OM cost 20% up	-0.02%	-105.00	-0.95%
3	1	Revenue 10% down	-0.42%	-14.02	-7.13%
	2	Revenue 20% down	-1.07%	-11.58	-8.64%