No.43 Verin Getashen

Information on Existing Water Sources (Gegharkunik)

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

No.43 Community Verin Getashen
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	3	42.9	45	4	51.6	2,710	15.0	15.0	15.0
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	15l/sec water is taken from the water main, the rest amount is given to village N. Getashen .
Alternative sources if any	

No.43 Community Verin Getashen
District Martuni
Marz Gegharkunik
Sampling date 04/Aug/2007

	Parameters analysed	Units	No.1 OKJ	No.2			Guidelines	
							WHO	Armenia
a	pH		7.8	7.6			6.5-8	6.0 - 9.0
b	Temperature	Deg.C	9.6	7.8				
c	TDS	Mg/L	29	12			1000	1000
1	Al:Aluminum	Mg/L	0.01	nd			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	0.63	0.52			1.50	
7	Hardness	Mg/L	65	35			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	1.8	1.3			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	n.d	nd			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					-	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.43 Community Verin Getashen
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	16	2-5	-	Not identified
2	02	14	2-5	-	Not identified
3	03	26	1-5	-	Not identified
4	04	05	1-5	-	Not identified
5	05	24	1-4	-	Not identified
6	06	15	1-5	-	Not identified
7	07	17	1-5	-	Not identified
8	08	21	2-6	-	Not identified

No. 43 **Marz** Gegharkunik **Community** Verin Getashen

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°03′42.9″	45°04′51.6″	2,710	1999	Concrete	15.0	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	15,000	530	Steel	15.0	1990	Little	No
2	5,000	300	Steel				
3	3,000	250	Steel				
4	2,000	200	Steel				

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°08′15.0″	45°11′11.5″	2,150	Reinforsed concrete	Circle	D=12, H=5	500	No

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	Yes	Reservoir	Other	Daily

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	15,000	20-50	Steel	1999	Huge	Yes
2	2,000	100	Steel		Huge	Yes
3	3,000	150	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	1999		No	0	Yes

9. DRAINAGE SYSTEM

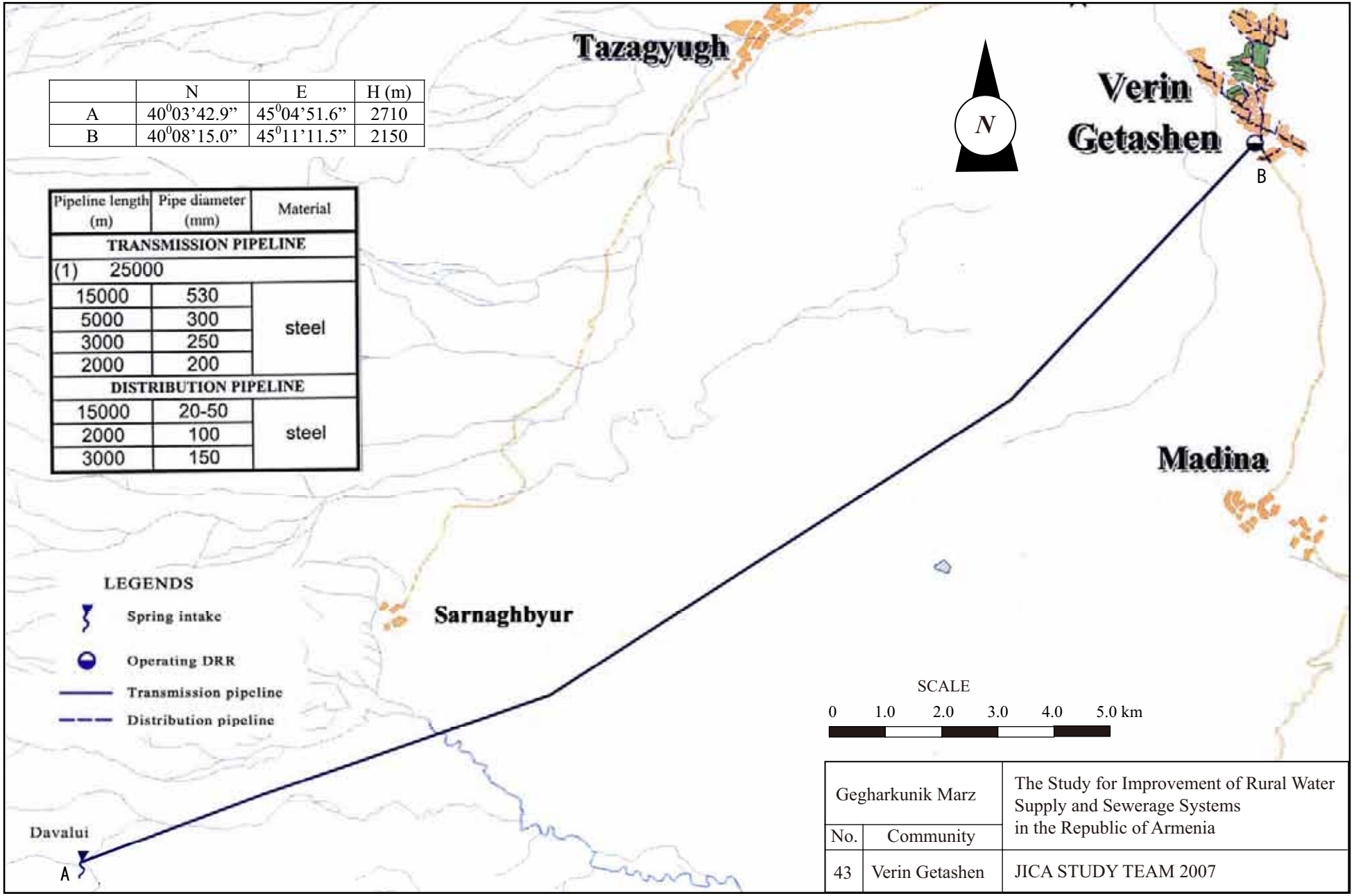
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.43. Verin Getashen**
District	**Martini**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	5,030
A2	Actual population in 2007	5,138
A3	Number of households	1,537
A4.1	Elderly people	505
A4.2	Population in labor force (age from 16 to 62)	3,000
A4.3	Children	1,846
A5.1	Pensioners	552
A5.2	Unemployed	70
A5.3	Receiving benefits	267
A6	Average monthly income of household (AMD)	60,000
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	1,095
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,800
	Annual Budget of the community 2005, in thousand AMD	4,950
	Annual Budget of the community 2006, in thousand AMD	5,704
	Annual Budget of the community 2007, in thousand AMD	5,100
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	3
	Amount spent in drinking water sector 2005, in thousand AMD	3
	Amount spent in drinking water sector 2006, in thousand AMD	3
	Amount spent in drinking water sector 2007, in thousand AMD	3
	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	yes
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	yes
D2	Water use permit number	1070
D3	Date of expiry of water use permit	22.08.06-22.08.11
D4	Planned date of obtaining water use permit	-
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	800
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 12hrs
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?	8^{00}-20^{00},
D12	Are you pleased with duration of domestic water supply?	pleased
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?	2 hrs
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300-400
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	difficult to answer
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	from the river
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Davtyan Sayat - Nova
E2	Position	water supply specialist
E3	Telephone	with the help of administ. head
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-rehabilitated, 8-new
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	2-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	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?	hired specialist fromcommunity (G. Martirosyan)
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)	1,000,000
	Repair cost(AMD)	2,000,000
	Others(AMD)	0
	Total (AMD)	3,000,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	difficult to answer
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Gegharkunik
No.43. Verin Getashen



	N	E	H (m)
A	$40^0$03'42.9"	$45^0$04'51.6"	2710
B	$40^0$08'15.0"	$45^0$11'11.5"	2150

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 25000		
15000	530	steel
5000	300	
3000	250	
2000	200	
DISTRIBUTION PIPELINE		
15000	20-50	steel
2000	100	
3000	150	

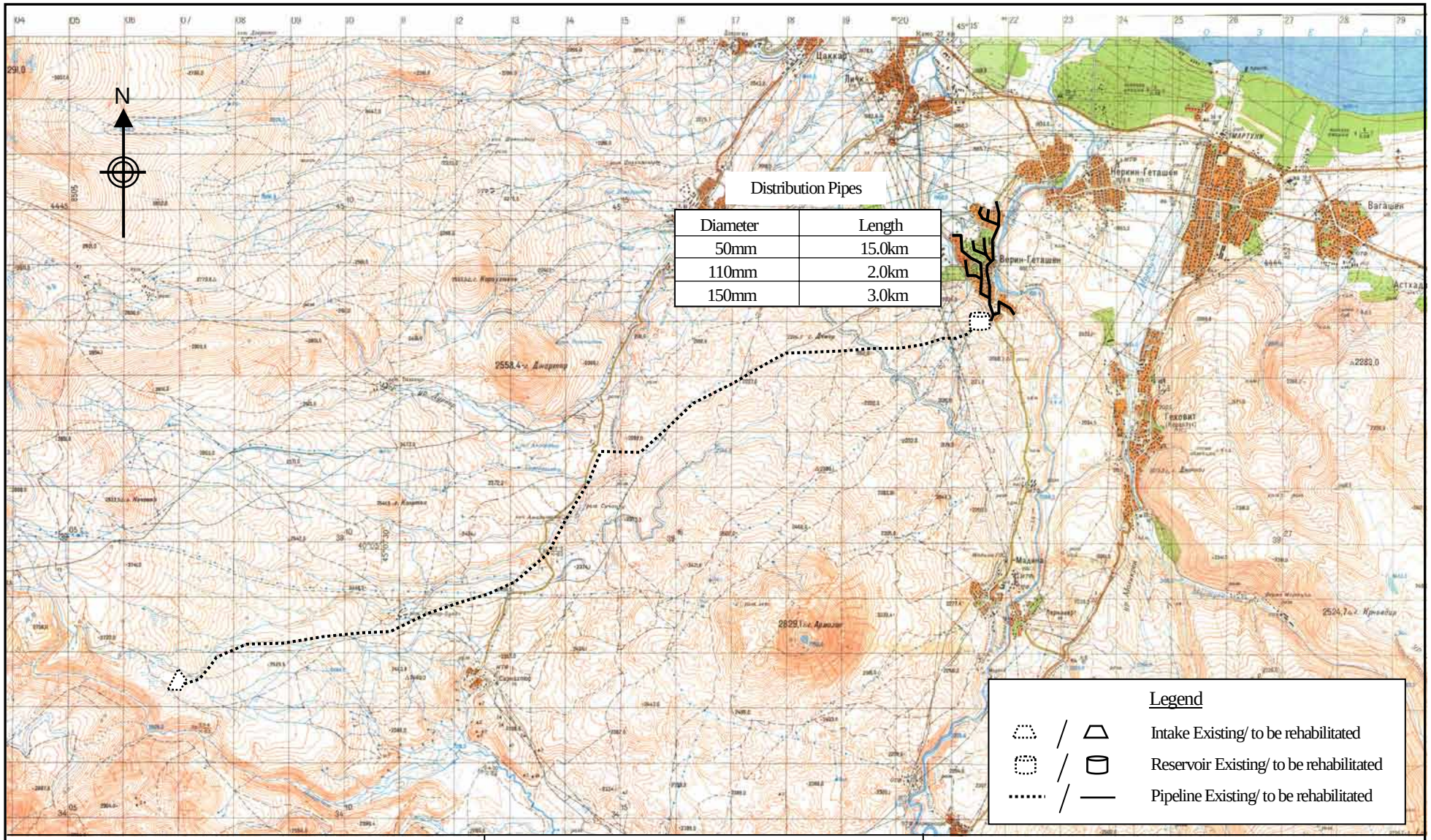
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
43	Verin Getashen	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.43
Name : **Verin Getashen**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	5,138	persons	513.8	
	2 Factory	-	nos	0.0	
	3 School (pupils)	1,095	pupils	11.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	1,537	household	133.7	
	Sub-total			658.5	
	Unaccouted for water (20%)			131.7	
1	Average Daily Water Demand			790.2	m3/day
2	Maximum Daily Water Demand			948.2	m3/day
3	Maximum Hourly Water Demand			77.0	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	15.0	lit/sec		1,296.0	m3/day
`	Total					1,296.0	m3/day
	2 Required reservoir volume					925	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**		
No	Item	Quantity	Unit
	1 Intake		
	1m3		nos
	2m3		nos
	3m3		nos
	4m3		nos
	2 Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	4 Distribution pipe		
	50mm diameter	15,000	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter	2,000	m
	150mm diameter	3,000	m
	200mm diameter		m
	250mm diameter		m
	5 House connection	737	nos
	6 Water meter installation	1,537	nos
	7 Public tap	16	nos
	8 Chlorination	1	nos
	9 Pumps	-	nos


N
Distribution Pipes
Diameter | Length
50mm | 15.0km
110mm | 2.0km
150mm | 3.0km
Legend
Intake Existing/ to be rehabilitated
Reservoir Existing/ to be rehabilitated
Pipeline Existing/ to be rehabilitated
SCALE
0 1000 2000 3000 4000 5000m
Water Supply Facilities Rehabilitation Plan
Marz
Gegharkunik
No. 43
Verin Getashen
The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **43**
Name : **Verin Getashen**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3		nos	367,700	
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					
4	Distribution Pipe					
		50mm	15,000	m	5,520	82,800,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	2,000	m	9,680	19,360,000
		150mm	3,000	m	13,140	39,420,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					141,580,000
5	House Connection		737	nos	74,000	54,538,000
6	Water Meter Installation		1,537	nos	80,000	122,960,000
7	Public Tap		16	nos	90,000	1,440,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	8,000	m	3,600	28,800,000
	Total				AMD	349,818,000
					Equivalent to USD	1,144,992
					Equivalent to JPY	120,796,671
					AMD	USD
	Investment Cost per household		1,537	HH	227,598	745
	Investment Cost per person		5,138	persons	68,084	223

GEGHARKUNIK MARZ
Marutuni District
No 43 Verin Getashen

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		240.4																																							
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		1341.65	0.00	0.00	3.55	7.10	8.65	8.94	15.14	15.64	16.16	16.69	25.02	25.84	26.70	27.58	28.49	29.43	30.40	31.40	32.44	33.51	34.61	35.76	36.94	38.15	39.41	40.71	42.06	43.45	44.88	46.36	47.89	49.47	51.10	52.79	54.53	56.33	58.19	60.11	62.09	64.14
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				1,443																																					
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		63.20			0.36	0.73	0.92	0.95	0.99	1.02	1.05	1.09	1.12	1.16	1.20	1.24	1.28	1.32	1.36	1.41	1.46	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	2.45	2.53	2.61	2.70	2.79	2.88
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		115.31			0.65	1.34	1.69	1.74	1.80	1.86	1.92	1.98	2.05	2.12	2.19	2.26	2.33	2.41	2.49	2.57	2.66	2.74	2.83	2.93	3.02	3.12	3.23	3.33	3.44	3.56	3.68	3.80	3.92	4.05	4.18	4.32	4.47	4.61	4.77	4.92	5.08	5.25
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					0.65	1.34	1.69	1.74	1.80	1.86	1.92	1.98	2.05	2.12	2.19	2.26	2.33	2.41	2.49	2.57	2.66	2.74	2.83	2.93	3.02	3.12	3.23	3.33	3.44	3.56	3.68	3.80	3.92	4.05	4.18	4.32	4.47	4.61	4.77	4.92	5.08	5.25
5. Pump replacement		0.00																0.00															0.00									
Sub-total		249.30	0.00	0.00	1.97	3.06	3.63	3.75	3.88	4.01	4.14	4.27	4.41	4.57	4.72	4.87	5.03	5.19	5.36	5.54	5.73	5.91	6.10	6.31	6.52	6.73	6.96	7.19	7.42	7.67	7.92	8.19	8.45	8.73	9.01	9.32	9.63	9.94	10.28	10.61	10.96	11.32
C Gross Income (A-B)		1092.35	0.00	0.00	1.58	4.04	5.02	5.19	11.26	11.63	12.02	12.42	20.61	21.27	21.98	22.71	23.46	24.24	25.04	25.86	26.71	27.60	28.51	29.45	30.42	31.42	32.45	33.52	34.64	35.78	36.96	38.17	39.44	40.74	42.09	43.47	44.90	46.39	47.91	49.50	51.13	52.82
D Depreciation cost		332.50						9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50
E Interest paid		101.39	0.04	0.07	1.76	3.51	4.31	4.31	4.31	4.31	4.31	4.31	4.32	4.19	4.07	3.94	3.81	3.69	3.56	3.42	3.29	3.16	3.02	2.88	2.74	2.60	2.46	2.32	2.18	2.03	1.88	1.74	1.59	1.43	1.28	1.13	0.97	0.81	0.65	0.49	0.33	0.17
F Net Income		658.46	-0.04	-0.07	-0.18	0.53	0.71	-8.62	-2.55	-2.18	-1.79	-1.39	6.79	7.58	8.41	9.27	10.15	11.05	11.98	12.94	13.92	14.94	15.99	17.07	18.18	19.32	20.49	21.70	22.96	24.25	25.58	26.93	28.35	29.81	31.31	32.84	34.43	36.08	37.76	39.51	41.30	43.15
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		658.46	-0.04	-0.07	-0.18	0.53	0.71	-8.62	-2.55	-2.18	-1.79	-1.39	6.79	7.58	8.41	9.27	10.15	11.05	11.98	12.94	13.92	14.94	15.99	17.07	18.18	19.32	20.49	21.70	22.96	24.25	25.58	26.93	28.35	29.81	31.31	32.84	34.43	36.08	37.76	39.51	41.30	43.15
OM Cost Recovery Ratio (A/B)		538%	0%	0%	181%	232%	238%	238%	390%	390%	390%	391%	567%	565%	566%	566%	566%	567%	567%	567%	566%	567%	567%	567%	567%	567%	566%	566%	567%	566%	567%	566%	567%	567%	567%	566%	566%	567%	566%	567%	567%	567%

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	658.46	-0.04	-0.07	-0.18	0.53	0.71	-8.62	-2.55	-2.18	-1.79	-1.39	6.79	7.58	8.41	9.27	10.15	11.05	11.98	12.94	13.92	14.94	15.99	17.07	18.18	19.32	20.49	21.70	22.96	24.25	25.58	26.93	28.35	29.81	31.31	32.84	34.43	36.08	37.76	39.51	41.30	43.15
2. Depreciation cost	332.50	0.00	0.00	0.00	0.00	0.00	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50
3. Interest Paid	101.39	0.04	0.07	1.76	3.51	4.31	4.31	4.31	4.31	4.31	4.31	4.32	4.19	4.07	3.94	3.81	3.69	3.56	3.42	3.29	3.16	3.02	2.88	2.74	2.60	2.46	2.32	2.18	2.03	1.88	1.74	1.59	1.43	1.28	1.13	0.97	0.81	0.65	0.49	0.33	0.17
Sub-total	1092.35	0.00	0.00	1.58	4.04	5.02	5.19	11.26	11.63	12.02	12.42	20.61	21.27	21.98	22.71	23.46	24.24	25.04	25.86	26.71	27.60	28.51	29.45	30.42	31.42	32.45	33.52	34.64	35.78	36.96	38.17	39.44	40.74	42.09	43.47	44.90	46.39	47.91	49.50	51.13	52.82
B Finances																																									
1. Project Loan	431.93	3.91	2.79	169.68	174.85	79.67	0.58	0.45																																	
2. Local fund	147.35	1.29	0.91	57.49	60.06	27.47	0.07	0.06																																	
Sub-total	579.28	5.20	3.70	227.17	234.91	107.14	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	0.29	0.04	0.07	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	0.29	0.04	0.07	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	1671.92	5.24	3.77	228.93	238.95	112.16	5.84	11.77	11.63	12.02	12.42	20.61	21.27	21.98	22.71	23.46	24.24	25.04	25.86	26.71	27.60	28.51	29.45	30.42	31.42	32.45	33.52	34.64	35.78	36.96	38.17	39.44	40.74	42.09	43.47	44.90	46.39	47.91	49.50	51.13	52.82
APPLICATION OF FUNDS																																								
D Project disbursement	579.28	5.20	3.70	227.17	234.91	107.14	0.65	0.51																																	
E Total debt services																																								
1. Loan repayment	431.92											12.42	12.54	12.67	12.79	12.92	13.05	13.18	13.31	13.45	13.58	13.72	13.85	13.99	14.13	14.27	14.42	14.56	14.71	14.85	15.00	15.15	15.30	15.46	15.61	15.77	15.92	16.08	16.24	16.41	16.57
2. Interest paid	101.39	0.04	0.07	1.76	3.51	4.31	4.31	4.31	4.31	4.31	4.31	4.32	4.19	4.07	3.94	3.81	3.69	3.56	3.42	3.29	3.16	3.02	2.88	2.74	2.60	2.46	2.32	2.18	2.03	1.88	1.74	1.59	1.43	1.28	1.13	0.97	0.81	0.65	0.49	0.33	0.17
Sub-total	533.31	0.04	0.07	1.76	3.51	4.31	4.31	4.31	4.31	4.31	4.31	16.74	16.73	16.74	16.73	16.73	16.74	16.74	16.73	16.74	16.74	16.74	16.73	16.73	16.73	16.73	16.74	16.74	16.74	16.73	16.74	16.74	16.73	16.74	16.74	16.74	16.73	16.73	16.73	16.74	16.74
Total Cash Outflow	1112.59	5.24	3.77	228.93	238.42	111.45	4.96	4.82	4.31	4.31	4.31	16.74	16.73	16.74	16.73	16.73	16.74	16.74	16.73	16.74	16.74	16.74	16.73	16.73	16.73	16.73	16.74	16.74	16.74	16.73	16.74	16.74	16.73	16.74	16.74	16.74	16.73	16.73	16.73	16.74	16.74
F Net Surplus Cash (A+C2)-E	559.33	0.00	0.00	0.00	0.53	0.71	0.88	6.95	7.32	7.71	8.11	3.87	4.54	5.24	5.98	6.73	7.50	8.30	9.13	9.97	10.86	11.77	12.72	13.69	14.69	15.72	16.78	17.90	19.04	20.23	21.43	22.70	24.01	25.35	26.73	28.16	29.66	31.18	32.77	34.39	36.08
Investment Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	205%	0%	0%	90%	115%	116%	120%	261%	270%	279%	288%	123%	127%	131%	136%	140%	145%	150%	155%	160%	165%	170%	176%	182%	188%	194%	200%	207%	214%	221%	228%	236%	244%	251%	260%	268%	277%	286%	296%	305%	316%
Cost recovery by water fee + subsidy ((A+C2)/E)	205%	100%	100%	100%	115%	116%	120%	261%	270%	279%	288%	123%	127%	131%	136%	140%	145%	150%	155%	160%	165%	170%	176%	182%	188%	194%	200%	207%	214%	221%	228%	236%	244%	251%	260%	268%	277%	286%	296%	305%	316%

GEGHARKUNIK MARZ
Marutuni District
No 43 Verin Getashen

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

Item	Millon AMD	Rate
1 Revenue		
Water fee revenue	1,341.65	100.0%
Subsidy	0.29	0.0%
Total	1,341.94	100.0%
2 Expenditure		
OM cost	249.30	18.6%
Loan repayment	431.92	32.2%
Interest paid	101.39	7.6%
Surplus cash	559.33	41.7%
Total	1,341.94	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	385.41	3.82	2.73	154.84	154.64	68.43	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	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	33.13			0.36	0.73	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
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	58.83			0.65	1.30	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
Pump replacement	0.00																0.00															0.00										
Sub-total	128.43			1.97	2.99	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43
Total Outflow	513.84	3.82	2.73	156.81	157.63	71.86	3.96	3.85	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43
B BENEFIT																																									
1. Water Tariff	842.47	0.00	0.00	3.55	7.10	8.65	8.94	15.14	15.64	16.16	16.69	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02
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	842.47	0.00	0.00	3.55	7.10	8.65	8.94	15.14	15.64	16.16	16.69	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02	25.02
NET BENEFIT	328.63	-3.82	-2.73	-153.3	-150.5	-63.2	4.98	11.29	12.21	12.73	13.26	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59

FIRR = 3.38%

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	81.61	-4.20	-3.00	-168.7	-166.0	-70.1	4.93	11.25	12.21	12.73	13.26	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59
	2	Capital cost 20% up	45.49	-4.58	-3.28	-184.2	-181.5	-76.9	4.87	11.21	12.21	12.73	13.26	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59	21.59
2	1	OM cost 10% up	108.78	-3.82	-2.73	-153.5	-150.8	-63.6	4.64	10.95	11.87	12.39	12.92	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25
	2	OM cost 20% up	99.82	-3.82	-2.73	-153.7	-151.1	-63.9	4.29	10.60	11.52	12.04	12.57	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90
3	1	Revenue 10% down	60.88	-3.82	-2.73	-153.6	-151.2	-64.1	4.09	9.78	10.65	11.11	11.59	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09
	2	Revenue 20% down	4.02	-3.82	-2.73	-154.0	-151.9	-64.9	3.19	8.26	9.08	9.50	9.92	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	2.81%	2.03	49.34%
	2	Capital cost 20% up	2.31%	4.65	21.51%
2	1	OM cost 10% up	3.26%	0.36	274.26%
	2	OM cost 20% up	3.14%	0.76	131.69%
3	1	Revenue 10% down	2.63%	2.87	34.85%
	2	Revenue 20% down	1.81%	8.68	11.52%

No.44 Torfavan

Information on Existing Water Sources (Gegharkunik)

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

No44 Community Torfavan
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	Springs	40	9	49.0	45	41	43.9	1,971	10.0	10.0	10.0
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	Leakage in the network - 70-80%
Alternative sources if any	150l/sec spring water is supplied for irrigation

No44 Community Torfavan
District Vardenis
Marz Gegharkunik
Sampling date 15/Aug/2007

	Parameters analysed	Units	No.1 Khachagh byur				Guidelines	
							WHO	Armenia
a	pH		7.8				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	8.8					
c	TDS	Mg/L	74				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	0.41				1.50	
7	Hardness	Mg/L	125				500	700
8	Fe:Iron	Mg/L	n.d.				0.30	0.30
9	Mn:Manganese	Mg/L	n.d.				0.40	0.10
10	Mo:Molibdenum	Mg/L	0.170				0.070	0.250
11	Ni:Nickel	Mg/L	n.d.				0.020	0.100
12	Nitrate(NO3+)	Mg/L	3.1				50.0	45.0
13	SO4:Sulfate	Mg/L	4.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d.				3.0	5.0
15	As:Arsenic	Mg/L	n.d.				0.0	0.1
16	Ba:Barium	Mg/L	0.01				0.70	0.10
17	Be:Berillium	Mg/L	n.d.				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d.				0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d.				0.00100	0.00050
21	Se:Selenium	Mg/L	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.44 Community Torfavan
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	16	20	0.3	Not identified
2	02	06	20	0.3	Not identified
3	03	02	20	0.3	Not identified
4	05	16	20	0.3	Not identified
5	06	13	24	0.3	Not identified
6	07	25	20	0.3	Not identified
7	08	13	24	0.3	Not identified

No. 44 **Marz** Gegharkunik **Community** Torfavan

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°09′49.0″	45°41′43.9″	1,971	2005	Concrete	10.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,500	150	Steel	10.0	2002	Little	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	1,000	100	Steel	1980	Huge	Yes
2	500	75	Steel		Huge	Yes
3	1,500	40	Steel		Huge	Yes

7. PUMP STATION

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

8. PUBLIC TAPS

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

9. DRAINAGE SYSTEM

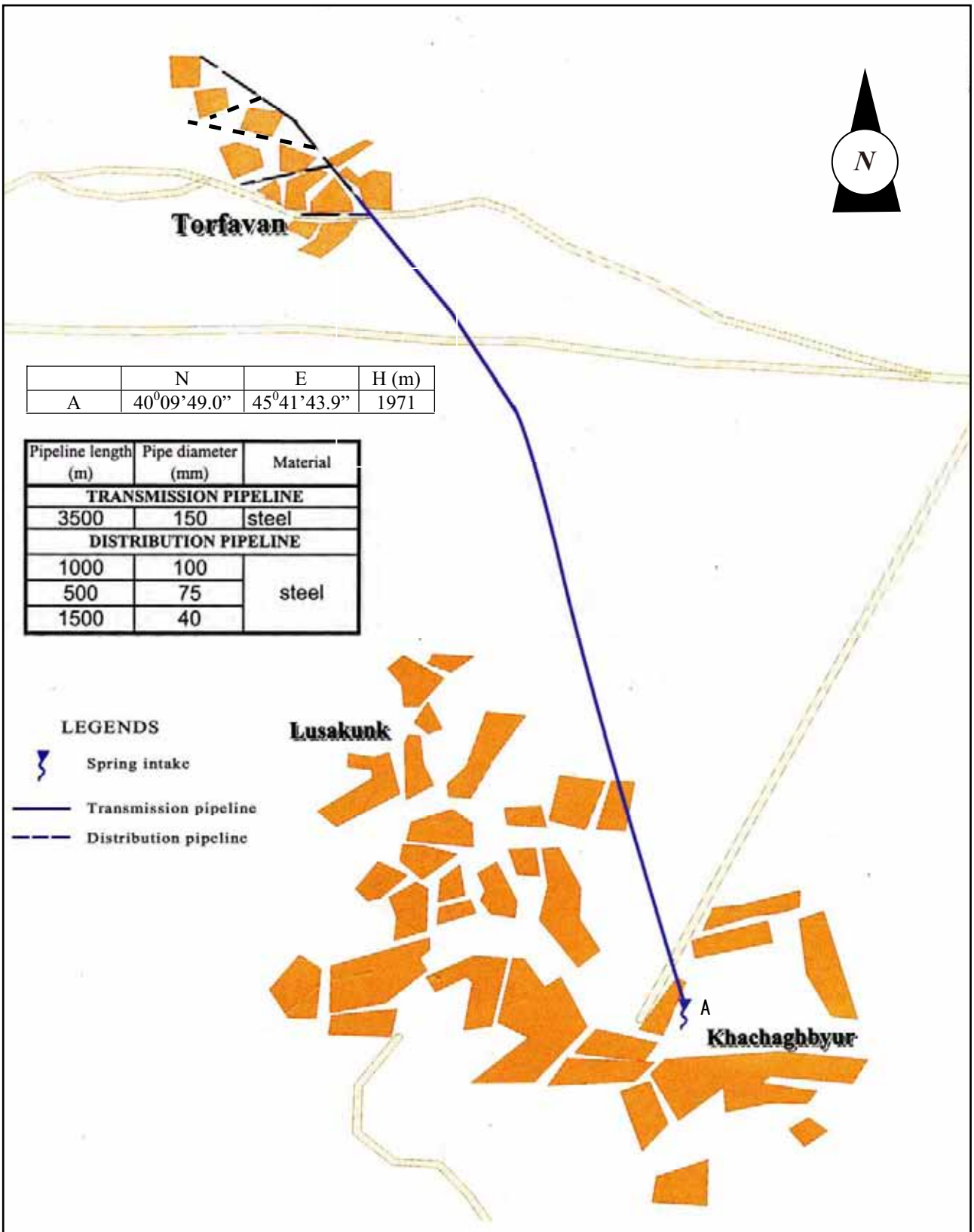
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.44 Torfavan**
District	**Vardenis**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	524
A2	Actual population in 2007	530
A3	Number of households	133
A4.1	Elderly people	96
A4.2	Population in labor force (age from 16 to 62)	275
A4.3	Children	198
A5.1	Pensioners	90
A5.2	Unemployed	125
A5.3	Receiving benefits	44
A6	Average monthly income of household (AMD)	9,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	absent
A10	Number of pupils	absent
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	500
	Annual Budget of the community 2005, in thousand AMD	500
	Annual Budget of the community 2006, in thousand AMD	500
	Annual Budget of the community 2007, in thousand AMD	250
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	80
	Amount spent in drinking water sector 2005, in thousand AMD	100
	Amount spent in drinking water sector 2006, in thousand AMD	90
	Amount spent in drinking water sector 2007, in thousand AMD	70
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes,
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	in the near future
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	22
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?	no water at all, freezes in winter
D10.2	How is the regime of water supply in your community in the wet season?	20% of village - 24 hrs
D11	What time of day water is given?	-
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?	-
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	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?	deep well
D20	Are you satisfied with irrigation water supply volume?	sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Minasyan Robert
E2	Position	waterline inspector
E3	Telephone	with the help of administ. head
E4	Quantity and present condition of the water supply facilities: spring/ intake	1-good
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1- good
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	hired specialist from community
E14	How you prepare O&M costs?	50%-residents, 50%-community
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	40,000
	Repair cost(AMD)	250,000
	Others(AMD)	0
	Total (AMD)	290,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	as manpower, 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.44 Torfavan



	N	E	H (m)
A	$40^0$09'49.0"	$45^0$41'43.9"	1971

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
3500	150	steel
DISTRIBUTION PIPELINE		
1000	100	steel
500	75	
1500	40	

SCALE

0 200 400 600 800 1000 m

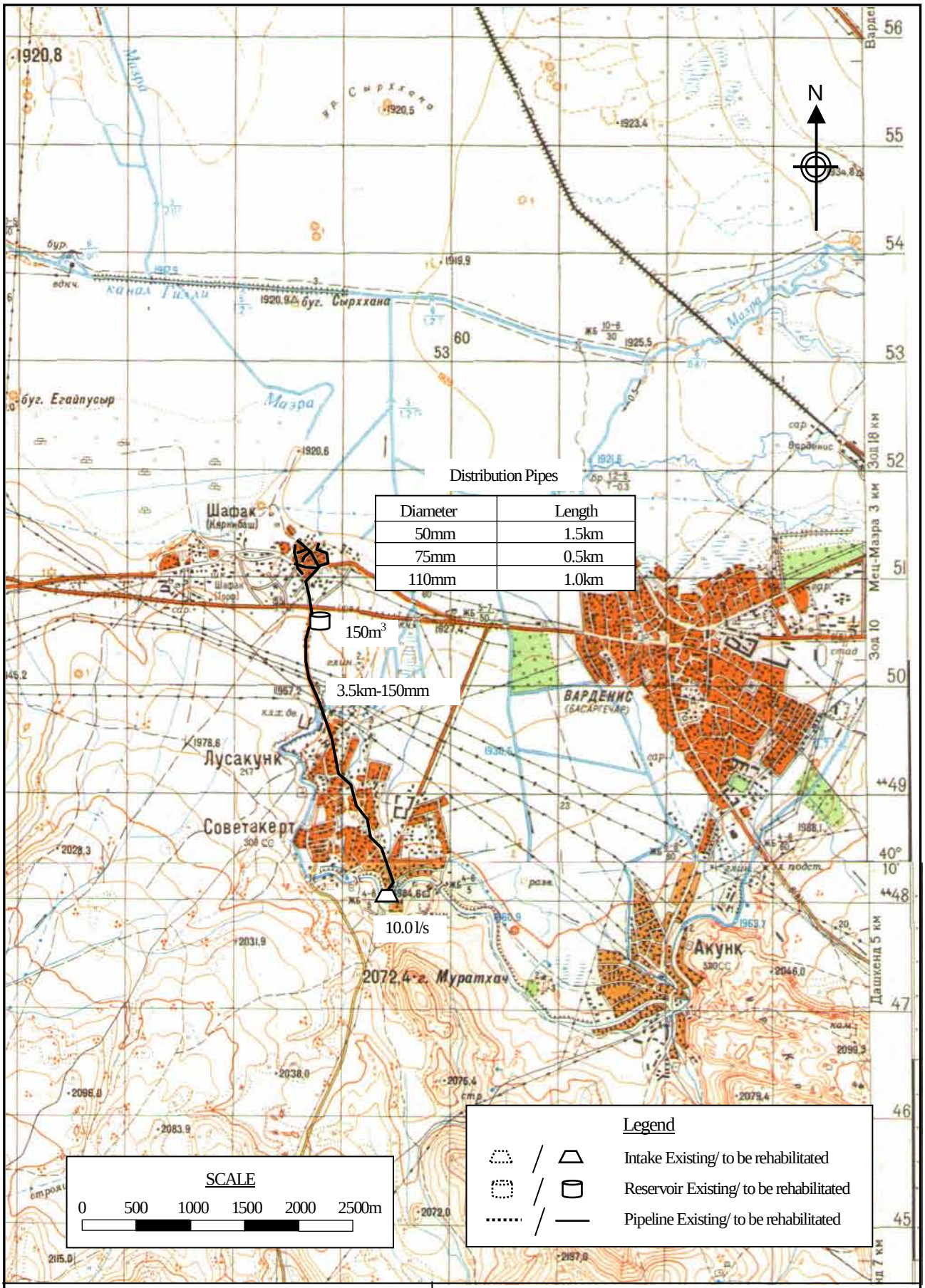
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
44	Torfavan	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.44
Name : **Torfavan**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	530	persons	53.0	
	2 Factory	-	nos	0.0	
	3 School (pupils)	-	pupils	0.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	133	household	11.6	
	Sub-total			64.6	
	Unaccouted for water (20%)			12.9	
1	Average Daily Water Demand			77.5	m3/day
2	Maximum Daily Water Demand			93.0	m3/day
3	Maximum Hourly Water Demand			12.6	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	10.0	lit/sec		864.0	m3/day
`	Total					864.0	m3/day
	2 Required reservoir volume					151	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	3,500	m
	200mm diameter		m
	250mm diameter		m
	3 Reservoir		
	150m3 capacity	1	nos
	4 Distribution pipe		
	50mm diameter	1,500	m
	75mm diameter	500	m
	90mm diameter		m
	110mm diameter	1,000	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
	5 House connection	111	nos
	6 Water meter installation	133	nos
	7 Public tap	2	nos
	8 Chlorination	1	nos
	9 Pumps	-	nos



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 44	Torfavan	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **44**
Name : **Torfavan**

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	3,500	m	13,140	45,990,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					45,990,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3	1	nos	18,804,500	18,804,500
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					18,804,500
4	Distribution Pipe					
		50mm	1,500	m	5,520	8,280,000
		75mm	500	m	7,160	3,580,000
		90mm		m	8,040	
		110mm	1,000	m	9,680	9,680,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					21,540,000
5	House Connection		111	nos	74,000	8,214,000
6	Water Meter Installation		133	nos	80,000	10,640,000
7	Public Tap		2	nos	90,000	180,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,200	m	3,600	4,320,000
	Total				AMD	110,556,200
					Equivalent to USD	361,862
					Equivalent to JPY	38,176,483
					AMD	USD
	Investment Cost per household		133	HH	831,250	2,721
	Investment Cost per person		530	persons	208,597	683

GEGHARKUNIK MARZ
Marutuni District
No 44 Torfavan

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		23.6																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		131.64	0.00	0.00	0.35	0.70	0.85	0.88	1.49	1.53	1.59	1.64	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	3.74	3.87	3.99	4.13	4.26	4.40	4.55	4.70	4.85	5.01	5.18	5.35	5.53	5.71	5.90	6.09	6.29
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				142																																				
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		6.21			0.04	0.07	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.19	0.19	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.25	0.26	0.27	0.27	0.28
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		16.77			0.09	0.19	0.25	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.49	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.72	0.74	0.76
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					0.09	0.19	0.25	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.49	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.72	0.74	0.76
5. Pump replacement		0.00																0.00															0.00										
Sub-total		40.68	0.00	0.00	0.37	0.51	0.60	0.60	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	0.97	0.99	1.03	1.06	1.09	1.13	1.18	1.21	1.25	1.29	1.33	1.38	1.43	1.48	1.52	1.57	1.62	1.67	1.74	1.78	1.84
C Gross Income (A-B)		90.96	0.00	0.00	-0.02	0.19	0.25	0.28	0.86	0.88	0.92	0.94	1.73	1.80	1.85	1.92	1.97	2.04	2.11	2.18	2.25	2.32	2.41	2.48	2.56	2.65	2.74	2.81	2.92	3.01	3.11	3.22	3.32	3.42	3.53	3.66	3.78	3.91	4.04	4.16	4.31	4.45
D Depreciation cost		105.00						3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
E Interest paid		34.87	0.04	0.07	0.63	1.21	1.47	1.48	1.48	1.48	1.48	1.48	1.48	1.44	1.39	1.35	1.31	1.26	1.22	1.17	1.13	1.08	1.04	0.99	0.94	0.89	0.84	0.80	0.75	0.70	0.65	0.59	0.54	0.49	0.44	0.39	0.33	0.28	0.22	0.17	0.11	0.06
F Net Income		-48.91	-0.04	-0.07	-0.65	-1.02	-1.22	-4.20	-3.62	-3.60	-3.56	-3.54	-2.75	-2.64	-2.54	-2.43	-2.34	-2.22	-2.11	-1.99	-1.88	-1.76	-1.63	-1.51	-1.38	-1.24	-1.10	-0.99	-0.83	-0.69	-0.54	-0.37	-0.22	-0.07	0.09	0.27	0.45	0.63	0.82	0.99	1.20	1.39
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		-48.91	-0.04	-0.07	-0.65	-1.02	-1.22	-4.20	-3.62	-3.60	-3.56	-3.54	-2.75	-2.64	-2.54	-2.43	-2.34	-2.22	-2.11	-1.99	-1.88	-1.76	-1.63	-1.51	-1.38	-1.24	-1.10	-0.99	-0.83	-0.69	-0.54	-0.37	-0.22	-0.07	0.09	0.27	0.45	0.63	0.82	0.99	1.20	1.39
OM Cost Recovery Ratio (A/B)		324%	0%	0%	95%	136%	142%	147%	237%	235%	237%	234%	340%	343%	340%	343%	340%	340%	343%	342%	342%	339%	343%	341%	342%	343%	342%	338%	341%	341%	341%	342%	341%	339%	339%	341%	341%	341%	342%	339%	342%	342%

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	-48.91	-0.04	-0.07	-0.65	-1.02	-1.22	-4.20	-3.62	-3.60	-3.56	-3.54	-2.75	-2.64	-2.54	-2.43	-2.34	-2.22	-2.11	-1.99	-1.88	-1.76	-1.63	-1.51	-1.38	-1.24	-1.10	-0.99	-0.83	-0.69	-0.54	-0.37	-0.22	-0.07	0.09	0.27	0.45	0.63	0.82	0.99	1.20	1.39
2. Depreciation cost	105.00	0.00	0.00	0.00	0.00	0.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
3. Interest Paid	34.87	0.04	0.07	0.63	1.21	1.47	1.48	1.48	1.48	1.48	1.48	1.48	1.44	1.39	1.35	1.31	1.26	1.22	1.17	1.13	1.08	1.04	0.99	0.94	0.89	0.84	0.80	0.75	0.70	0.65	0.59	0.54	0.49	0.44	0.39	0.33	0.28	0.22	0.17	0.11	0.06
Sub-total	90.96	0.00	0.00	-0.02	0.19	0.25	0.28	0.86	0.88	0.92	0.94	1.73	1.80	1.85	1.92	1.97	2.04	2.11	2.18	2.25	2.32	2.41	2.48	2.56	2.65	2.74	2.81	2.92	3.01	3.11	3.22	3.32	3.42	3.53	3.66	3.78	3.91	4.04	4.16	4.31	4.45
B Finances																																									
1. Project Loan	148.03	3.91	2.79	56.17	58.11	26.02	0.58	0.45																																	
2. Local fund	50.07	1.29	0.91	19.02	19.55	9.17	0.07	0.06																																	
Sub-total	198.10	5.20	3.70	75.19	77.66	35.19	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	91.91	0.04	0.07	0.63	1.02	1.22	1.20	0.62	0.60	0.56	0.54	4.01	3.94	3.88	3.81	3.77	3.69	3.63	3.55	3.49	3.41	3.33	3.26	3.18	3.08	2.99	2.93	2.82	2.73	2.63	2.51	2.41	2.31	2.21	2.08	1.95	1.83	1.69	1.58	1.42	1.29
Sub-total	91.93	0.04	0.07	0.65	1.02	1.22	1.20	0.62	0.60	0.56	0.54	4.01	3.94	3.88	3.81	3.77	3.69	3.63	3.55	3.49	3.41	3.33	3.26	3.18	3.08	2.99	2.93	2.82	2.73	2.63	2.51	2.41	2.31	2.21	2.08	1.95	1.83	1.69	1.58	1.42	1.29
Total Cash Inflow	380.99	5.24	3.77	75.82	78.87	36.66	2.13	1.99	1.48	1.48	1.48	5.74	5.74	5.73	5.73	5.74	5.73	5.74	5.73	5.74	5.73	5.74	5.74	5.74	5.73	5.73	5.74	5.74	5.74	5.74	5.73	5.73	5.73	5.74	5.74	5.73	5.74	5.73	5.74	5.73	5.74
APPLICATION OF FUNDS																																								
D Project disbursement	198.10	5.20	3.70	75.19	77.66	35.19	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	148.02											4.26	4.30	4.34	4.38	4.43	4.47	4.52	4.56	4.61	4.65	4.70	4.75	4.80	4.84	4.89	4.94	4.99	5.04	5.09	5.14	5.19	5.24	5.30	5.35	5.40	5.46	5.51	5.57	5.62	5.68
2. Interest paid	34.87	0.04	0.07	0.63	1.21	1.47	1.48	1.48	1.48	1.48	1.48	1.48	1.44	1.39	1.35	1.31	1.26	1.22	1.17	1.13	1.08	1.04	0.99	0.94	0.89	0.84	0.80	0.75	0.70	0.65	0.59	0.54	0.49	0.44	0.39	0.33	0.28	0.22	0.17	0.11	0.06
Sub-total	182.89	0.04	0.07	0.63	1.21	1.47	1.48	1.48	1.48	1.48	1.48	5.74	5.74	5.73	5.73	5.74	5.73	5.74	5.73	5.74	5.73	5.74	5.74	5.74	5.73	5.73	5.74	5.74	5.74	5.74	5.73	5.73	5.73	5.74	5.74	5.73	5.74	5.73	5.74	5.73	5.74
Total Cash Outflow	380.99	5.24	3.77	75.82	78.87	36.66	2.13	1.99	1.48	1.48	1.48	5.74	5.74	5.73	5.73	5.74	5.73	5.74	5.73	5.74	5.73	5.74	5.74	5.74	5.73	5.73	5.74	5.74	5.74	5.74	5.73	5.73	5.73	5.74	5.74	5.73	5.74	5.73	5.74	5.73	5.74
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)	50%	0%	0%	0%	15%	17%	19%	58%	59%	62%	64%	30%	31%	32%	34%	34%	36%	37%	38%	39%	40%	42%	43%	45%	46%	48%	49%	51%	52%	54%	56%	58%	60%	61%	64%	66%	68%	71%	72%	75%	78%
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 44 Torfavan

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	131.64	58.9%
	Subsidy	91.91	41.1%
	Total	223.55	100.0%
2	**Expenditure**		
	OM cost	40.68	18.2%
	Loan repayment	148.02	66.2%
	Interest paid	34.87	15.6%
	Surplus cash	0.00	0.0%
	Total	223.57	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	132.74	3.82	2.73	51.34	51.54	22.36	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	3.35			0.04	0.07	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
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	8.56			0.09	0.19	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Pump replacement	0.00																0.00															0.00								
Sub-total	21.03			0.37	0.50	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Total Outflow	153.77	3.82	2.73	51.71	52.04	22.92	1.09	0.98	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
B BENEFIT																																								
1. Water Tariff	82.53	0.00	0.00	0.35	0.70	0.85	0.88	1.49	1.53	1.59	1.64	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45
2. Subsidy	61.38	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.53	2.50	2.49	2.46	2.46	2.43	2.41	2.38	2.36	2.33	2.29	2.27	2.24	2.19	2.15	2.13	2.07	2.03	1.98	1.92	1.87	1.82	1.77	1.69	1.62	1.55	1.47	1.41	1.31	1.23
Total Inflow	143.91	0.00	0.00	0.37	0.70	0.85	0.88	1.49	1.53	1.59	1.64	4.98	4.95	4.94	4.91	4.91	4.88	4.86	4.83	4.81	4.78	4.74	4.72	4.69	4.64	4.60	4.58	4.52	4.48	4.43	4.37	4.32	4.27	4.22	4.14	4.07	4.00	3.92	3.86	3.76	3.68
NET BENEFIT	-9.86	-3.82	-2.73	-51.3	-51.3	-22.1	-0.21	0.51	0.97	1.03	1.08	4.42	4.39	4.38	4.35	4.35	4.32	4.30	4.27	4.25	4.22	4.18	4.16	4.13	4.08	4.04	4.02	3.96	3.92	3.87	3.81	3.76	3.71	3.66	3.58	3.51	3.44	3.36	3.30	3.20	3.12

FIRR = **-0.38%**

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	-55.04	-4.20	-3.00	-56.5	-56.5	-24.3	-0.26	0.47	0.97	1.03	1.08	4.42	4.39	4.38	4.35	4.35	4.32	4.30	4.27	4.25	4.22	4.18	4.16	4.13	4.08	4.04	4.02	3.96	3.92	3.87	3.81	3.76	3.71	3.66	3.58	3.51	3.44	3.36	3.30	3.20	3.12
	2	Capital cost 20% up	-67.49	-4.58	-3.28	-61.6	-61.6	-26.5	-0.32	0.43	0.97	1.03	1.08	4.42	4.39	4.38	4.35	4.35	4.32	4.30	4.27	4.25	4.22	4.18	4.16	4.13	4.08	4.04	4.02	3.96	3.92	3.87	3.81	3.76	3.71	3.66	3.58	3.51	3.44	3.36	3.30	3.20	3.12
2	1	OM cost 10% up	-44.05	-3.82	-2.73	-51.4	-51.4	-22.1	-0.27	0.45	0.91	0.97	1.02	4.36	4.33	4.32	4.29	4.29	4.26	4.24	4.21	4.19	4.16	4.12	4.10	4.07	4.02	3.98	3.96	3.90	3.86	3.81	3.75	3.70	3.65	3.60	3.52	3.45	3.38	3.30	3.24	3.14	3.06
	2	OM cost 20% up	-45.52	-3.82	-2.73	-51.4	-51.4	-22.2	-0.32	0.40	0.86	0.92	0.97	4.31	4.28	4.27	4.24	4.24	4.21	4.19	4.16	4.14	4.11	4.07	4.05	4.02	3.97	3.93	3.91	3.85	3.81	3.76	3.70	3.65	3.60	3.55	3.47	3.40	3.33	3.25	3.19	3.09	3.01
3	1	Revenue 10% down	-52.25	-3.82	-2.73	-51.4	-51.4	-22.2	-0.30	0.36	0.82	0.87	0.92	3.92	3.90	3.89	3.86	3.86	3.83	3.81	3.79	3.77	3.74	3.71	3.69	3.66	3.62	3.58	3.56	3.51	3.47	3.43	3.37	3.33	3.28	3.24	3.17	3.10	3.04	2.97	2.91	2.82	2.75
	2	Revenue 20% down	-61.91	-3.82	-2.73	-51.4	-51.5	-22.2	-0.39	0.21	0.66	0.71	0.75	3.42	3.40	3.39	3.37	3.37	3.34	3.33	3.30	3.29	3.26	3.23	3.22	3.19	3.15	3.12	3.10	3.06	3.02	2.98	2.94	2.90	2.86	2.82	2.75	2.70	2.64	2.58	2.53	2.45	2.38

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.83%	-5.48	-18.26%
	2	Capital cost 20% up	-1.24%	-6.96	-14.36%
2	1	OM cost 10% up	-0.46%	-1.80	-55.69%
	2	OM cost 20% up	-0.54%	-3.06	-32.73%
3	1	Revenue 10% down	-0.97%	-6.11	-16.36%
	2	Revenue 20% down	-1.62%	-7.68	-13.02%

No.45 Pokr Masrik

Information on Existing Water Sources (Gegharkunik)

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

No.45 Community Pokr Masrik
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	Borehole	40	15	44.4	45	44	21.7	1,987	-	-	40.0
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	Well operates for 4 hours daily
Alternative sources if any	Water amount can be added through increasing the number of operation hours of deep-well pump

No.45 Community Pokr Masrik
District Vardenis
Marz Gegharkunik
Sampling date 30/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	19.8					
c	TDS	Mg/L	148				1000	1000
1	Al:Aluminum	Mg/L	0.02				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	0.20				1.50	
7	Hardness	Mg/L	285				500	700
8	Fe:Iron	Mg/L	n.d.				0.30	0.30
9	Mn:Manganese	Mg/L	n.d.				0.40	0.10
10	Mo:Molibdenum	Mg/L	<0.02				0.070	0.250
11	Ni:Nickel	Mg/L	n.d.				0.020	0.100
12	Nitrate(NO3+)	Mg/L	4.0				50.0	45.0
13	SO4:Sulfate	Mg/L	6.0				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	0.00				0.70	0.10
17	Be:Berillium	Mg/L	0.00005				NA	0.00020
18	Cd:Cadmium	Mg/L	0.0001				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	<3				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	nd				0	0
26	Total bacteria	bacteria per 1 ml	40				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.45 Community Poqr Masrik
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	16	20	0.3	Not identified
2	01	23	20	0.3	Not identified
3	02	06	20	0.3	Not identified
4	03	28	20	0.3	Not identified
5	04	26	24	0.3	Not identified
6	05	31	20	0.3	Not identified
7	06	25	24	0.3	Not identified
8	07	25	22	0.3	Not identified
9	08	27	22	0.3	Not identified

No. **45** **Marz** Gegharkunik **Community** Pokr Masrik

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	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Groundwater	40°15′44.4″	45°44′21.7″	1,987	1960	Concrete	40.0	No

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,200	150	Steel	40.0	1960	Medium	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°15′48.5″	45°48′53.0″	1,981	Concrete	Rectangular	12x12x4	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	1,600	150	Cast iron		Huge	Yes
2	2,000	100	Steel	1960	Medium	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
Yes (1nos)	Commercial	Centrifugal	-	-	-	-	No

8. PUBLIC TAPS

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

9. DRAINAGE SYSTEM

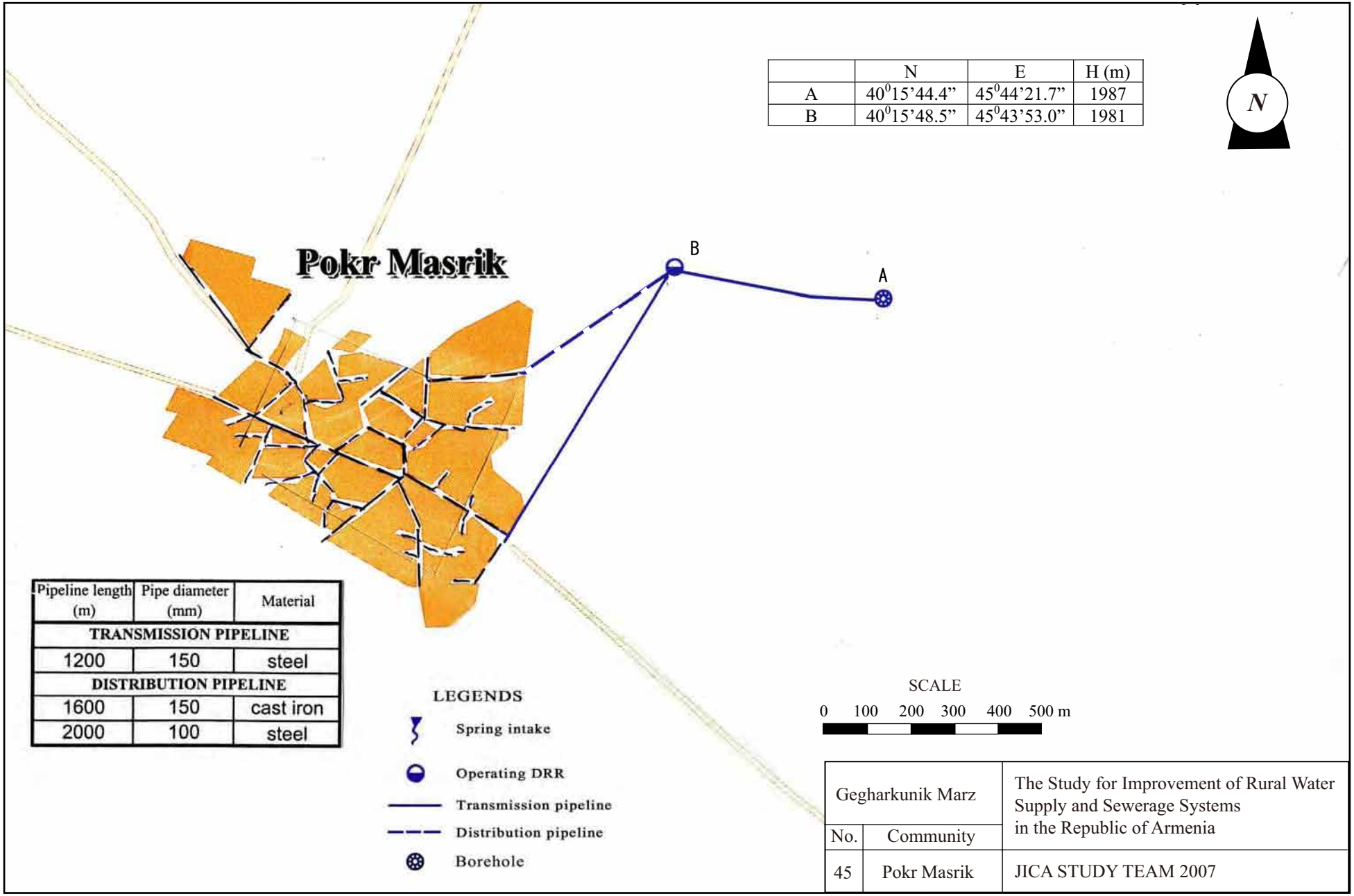
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.45 Pokr Masrik**
District	**Vardenis**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	986
A2	Actual population in 2007	801
A3	Number of households	298
A4.1	Elderly people	81
A4.2	Population in labor force (age from 16 to 62)	540
A4.3	Children	189
A5.1	Pensioners	190
A5.2	Unemployed	55
A5.3	Receiving benefits	69
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	170
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	4,500
	Annual Budget of the community 2005, in thousand AMD	4,500
	Annual Budget of the community 2006, in thousand AMD	1,300
	Annual Budget of the community 2007, in thousand AMD	1,100
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	610
	Amount spent in drinking water sector 2005, in thousand AMD	610
	Amount spent in drinking water sector 2006, in thousand AMD	610
	Amount spent in drinking water sector 2007, in thousand AMD	610
	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	unknown
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	298
D8	How many house connection household set the water meter	0
D9	Number of public taps	8
D10.1	How is the regime of water supply in your community in the dry season?	regularly - 2hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly - 4hrs
D11	What time of day water is given?	10^{00}-12^{00}, 12^{00}-14^{00}, (irrigation), 10^{00}-12^{00}
D12	Are you pleased with duration of domestic water supply?	generaly displeased
D13	Are hours of water supply convenient?	mainly convenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	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	600
D16	Drinking water monthly water fee per household	according to the electric fee
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1Flate rate, 2 Having water tariff	according to the electric fee
D19	Where do you acquire the irrigation water?	deep well
D20	Are you satisfied with irrigation water supply volume?	almost sufficient
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Qimishyan Andranik
E2	Position	electrician
E3	Telephone	(093)177262
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-rehabilat. deep wells
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	2-rehabilitated, 3-non - operation
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-rehabilitated
E7	Quantity and present condition of the water supply facilities: net/distribution	partially rehabilitated
E8	Quantity and present condition of the water supply facilities: public tap	6-partially rehabilitated. 2-deteriorated
E9	Quantity and present condition of the water supply facilities: pump	2-rehabilitated
E10	Who is the owner of the water supply facilities?	WUA
E11	Who is engaged in the water supply facilities repairing works?	WUA, community
E12	How do you repair the water supply facilities?	inviting a specialist
E13	Who is in charge of the repair work in the community?	hired specialist fromcommunity (A.Qishmiryan)
E14	How you prepare O&M costs?	administration budget, water fee, WUA
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	360 000
	Labor cost (AMD)	250,000
	Repair cost(AMD)	250 000
	Others(AMD)	0
	Total (AMD)	860 000
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.45 Pokr Masrik



	N	E	H (m)
A	$40^0$15'44.4"	$45^0$44'21.7"	1987
B	$40^0$15'48.5"	$45^0$43'53.0"	1981

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
1200	150	steel
DISTRIBUTION PIPELINE		
1600	150	cast iron
2000	100	steel

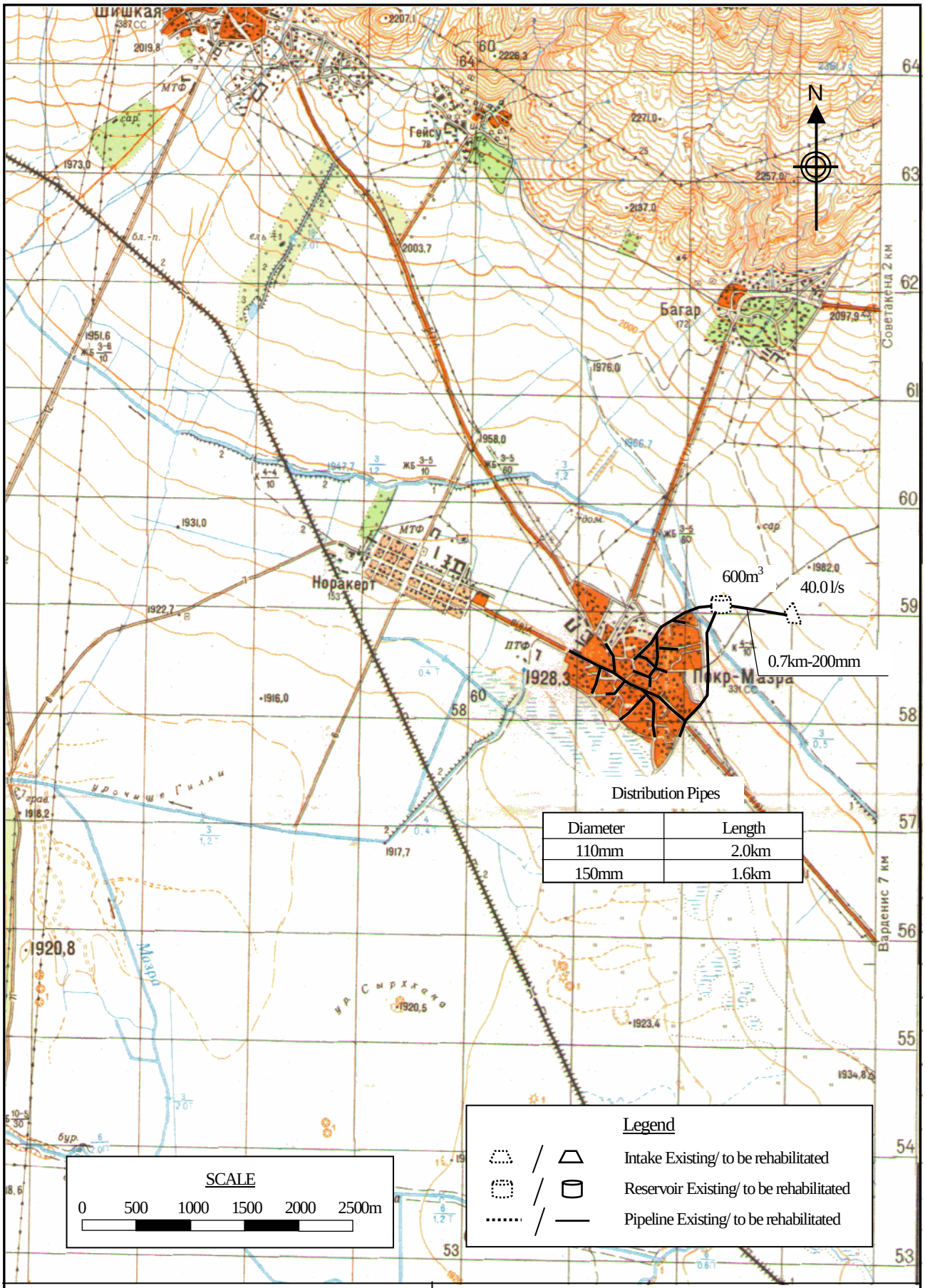
Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
45	Pokr Masrik	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.45
Name : **Pokr Masrik**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	801	persons	80.1	
	2 Factory	-	nos	0.0	
	3 School (pupils)	170	pupils	1.7	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	298	household	25.9	
	Sub-total			107.7	
	Unaccouted for water (20%)			21.5	
1	Average Daily Water Demand			129.2	m3/day
2	Maximum Daily Water Demand			155.1	m3/day
3	Maximum Hourly Water Demand			18.5	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Borehole	1	40.0	lit/sec		3,456.0	m3/day
`	Total					3,456.0	m3/day
	2 Required reservoir volume					222	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	700	m	
	250mm diameter		m	
3	Reservoir			
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter	2,000	m	
	150mm diameter	1,600	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	-	nos	
6	Water meter installation	298	nos	
7	Public tap	3	nos	
8	Chlorination	1	nos	
9	Pumps	-	nos	



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 45	Pokr Marsrik	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **45**
Name : **Pokr Masrik**

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	700	m	19,440	13,608,000
		250mm		m	27,040	
	Sub-total					13,608,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm	2,000	m	9,680	19,360,000
		150mm	1,600	m	13,140	21,024,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					40,384,000
5	House Connection			nos	74,000	
6	Water Meter Installation		298	nos	80,000	23,840,000
7	Public Tap		3	nos	90,000	270,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,440	m	3,600	5,184,000
	Total				AMD	83,786,000
					Equivalent to USD	274,241
					Equivalent to JPY	28,932,387
					AMD	USD
	Investment Cost per household		298	HH	281,161	920
	Investment Cost per person		801	persons	104,602	342

GEGHARKUNIK MARZ
Marutuni District
No 45 Pokr Masrik

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		39.3																																							
Unit rate	AMD/m3				120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	123.96	128.05	132.28	136.64	141.15	145.81	150.62	155.59	160.73	166.03	171.51	177.17	183.01	189.05	195.29	201.74	208.39	215.27	222.38	229.71	237.29	245.13	253.21	261.57	270.20	279.12	288.33	297.84	307.67
Sub-total		242.83	0.00	0.00	1.74	3.48	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.39	4.53	4.68	4.83	4.99	5.16	5.33	5.50	5.69	5.87	6.07	6.27	6.47	6.69	6.91	7.14	7.37	7.62	7.87	8.13	8.40	8.67	8.96	9.25	9.56	9.88	10.20	10.54	10.89
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				1																																				
Pump operators	person				1																																				
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				236																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		10.35			0.06	0.12	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	0.25	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
3. Electricity (for pump)		84.97			0.48	0.99	1.24	1.28	1.33	1.37	1.41	1.46	1.51	1.56	1.61	1.66	1.72	1.78	1.83	1.89	1.96	2.02	2.09	2.16	2.23	2.30	2.38	2.46	2.54	2.62	2.71	2.80	2.89	2.98	3.08	3.18	3.29	3.40	3.51	3.63	3.75	3.87
4. Maintenance cost		34.29			0.19	0.40	0.50	0.52	0.54	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.72	0.74	0.76	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.06	1.09	1.13	1.17	1.21	1.24	1.29	1.33	1.37	1.42	1.46	1.51	1.56
Pump repair					0.12	0.25	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.63	0.65	0.68	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.88	0.90	0.93	0.97	1.00
Pipe repair					0.07	0.14	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.30	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	0.50	0.51	0.53	0.55	0.57
5. Pump replacement		25.65																9.76															15.89									
Sub-total		190.66	0.00	0.00	1.20	2.01	2.40	2.49	2.58	2.65	2.73	2.83	2.92	3.02	3.12	3.22	3.33	13.21	3.55	3.66	3.80	3.92	4.04	4.18	4.32	4.46	4.61	4.76	4.92	5.08	5.25	5.42	21.49	5.78	5.97	6.17	6.38	6.58	6.81	7.03	7.26	7.50
C Gross Income (A-B)		52.17	0.00	0.00	0.54	1.47	1.85	1.76	1.67	1.60	1.52	1.42	1.33	1.37	1.41	1.46	1.50	-8.22	1.61	1.67	1.70	1.77	1.83	1.89	1.95	2.01	2.08	2.15	2.22	2.29	2.37	2.45	-13.36	2.62	2.70	2.79	2.87	2.98	3.07	3.17	3.28	3.39
D Depreciation cost		79.45						2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27
E Interest paid		27.39	0.04	0.07	0.50	0.95	1.15	1.16	1.16	1.16	1.16	1.16	1.16	1.13	1.09	1.06	1.03	0.99	0.96	0.92	0.88	0.85	0.81	0.78	0.74	0.70	0.66	0.62	0.59	0.55	0.51	0.47	0.43	0.39	0.34	0.30	0.26	0.22	0.18	0.13	0.09	0.04
F Net Income		-54.67	-0.04	-0.07	0.04	0.52	0.70	-1.67	-1.76	-1.83	-1.91	-2.01	-2.10	-2.03	-1.95	-1.87	-1.80	-11.48	-1.62	-1.52	-1.45	-1.35	-1.25	-1.16	-1.06	-0.96	-0.85	-0.74	-0.64	-0.53	-0.41	-0.29	-16.06	-0.04	0.09	0.22	0.34	0.49	0.62	0.77	0.92	1.08
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		-54.67	-0.04	-0.07	0.04	0.52	0.70	-1.67	-1.76	-1.83	-1.91	-2.01	-2.10	-2.03	-1.95	-1.87	-1.80	-11.48	-1.62	-1.52	-1.45	-1.35	-1.25	-1.16	-1.06	-0.96	-0.85	-0.74	-0.64	-0.53	-0.41	-0.29	-16.06	-0.04	0.09	0.22	0.34	0.49	0.62	0.77	0.92	1.08
OM Cost Recovery Ratio (A/B)		127%	0%	0%	144%	173%	177%	171%	165%	160%	156%	150%	146%	145%	145%	145%	145%	38%	145%	146%	145%	145%	145%	145%	145%	145%	145%	145%	145%	145%	145%	145%	38%	145%	145%	145%	145%	145%	145%	145%	145%	145%

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	-54.67	-0.04	-0.07	0.04	0.52	0.70	-1.67	-1.76	-1.83	-1.91	-2.01	-2.10	-2.03	-1.95	-1.87	-1.80	-11.48	-1.62	-1.52	-1.45	-1.35	-1.25	-1.16	-1.06	-0.96	-0.85	-0.74	-0.64	-0.53	-0.41	-0.29	-16.06	-0.04	0.09	0.22	0.34	0.49	0.62	0.77	0.92	1.08
2. Depreciation cost	79.45	0.00	0.00	0.00	0.00	0.00	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27
3. Interest Paid	27.39	0.04	0.07	0.50	0.95	1.15	1.16	1.16	1.16	1.16	1.16	1.16	1.13	1.09	1.06	1.03	0.99	0.96	0.92	0.88	0.85	0.81	0.78	0.74	0.70	0.66	0.62	0.59	0.55	0.51	0.47	0.43	0.39	0.34	0.30	0.26	0.22	0.18	0.13	0.09	0.04
Sub-total	52.17	0.00	0.00	0.54	1.47	1.85	1.76	1.67	1.60	1.52	1.42	1.33	1.37	1.41	1.46	1.50	-8.22	1.61	1.67	1.70	1.77	1.83	1.89	1.95	2.01	2.08	2.15	2.22	2.29	2.37	2.45	-13.36	2.62	2.70	2.79	2.87	2.98	3.07	3.17	3.28	3.39
B Finances																																									
1. Project Loan	116.14	3.91	2.79	43.46	44.60	20.35	0.58	0.45																																		
2. Local fund	38.56	1.29	0.91	14.72	15.01	6.50	0.07	0.06																																		
Sub-total	154.70	5.20	3.70	58.18	59.61	26.85	0.65	0.51																																		
C Subsidy from Government																																									
1. Subsidy for O&M cost	21.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	73.22	0.04	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.17	3.13	3.09	3.04	3.00	4.50	2.89	2.83	2.80	2.73	2.67	2.62	2.55	2.49	2.42	2.35	2.29	2.21	2.13	2.05	4.50	1.89	1.80	1.71	1.63	1.52	1.44	1.33	1.22	1.11
Sub-total	94.80	0.04	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.17	3.13	3.09	3.04	3.00	12.72	2.89	2.83	2.80	2.73	2.67	2.62	2.55	2.49	2.42	2.35	2.29	2.21	2.13	2.05	17.86	1.89	1.80	1.71	1.63	1.52	1.44	1.33	1.22	1.11
Total Cash Inflow	301.67	5.24	3.77	58.72	61.08	28.70	2.41	2.18	1.60	1.52	1.42	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50
APPLICATION OF FUNDS																																								
D Project disbursement	154.70	5.20	3.70	58.18	59.61	26.85	0.65	0.51																																		
E Total debt services																																									
1. Loan repayment	116.16											3.34	3.37	3.41	3.44	3.47	3.51	3.54	3.58	3.62	3.65	3.69	3.73	3.76	3.80	3.84	3.88	3.92	3.95	3.99	4.03	4.07	4.12	4.16	4.20	4.24	4.28	4.33	4.37	4.41	4.46
2. Interest paid	27.39	0.04	0.07	0.50	0.95	1.15	1.16	1.16	1.16	1.16	1.16	1.16	1.13	1.09	1.06	1.03	0.99	0.96	0.92	0.88	0.85	0.81	0.78	0.74	0.70	0.66	0.62	0.59	0.55	0.51	0.47	0.43	0.39	0.34	0.30	0.26	0.22	0.18	0.13	0.09	0.04
Sub-total	143.55	0.04	0.07	0.50	0.95	1.15	1.16	1.16	1.16	1.16	1.16	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50
Total Cash Outflow	298.25	5.24	3.77	58.68	60.56	28.00	1.81	1.67	1.16	1.16	1.16	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50	4.50	4.51	4.50	4.50	4.50
F Net Surplus Cash (A+C2)-E	3.42	0.00	0.00	0.04	0.52	0.70	0.60	0.51	0.44	0.36	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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%	107%	154%	161%	152%	144%	138%	131%	122%	30%	30%	31%	32%	33%	0%	36%	37%	38%	39%	41%	42%	43%	45%	46%	48%	49%	51%	53%	54%	0%	58%	60%	62%	64%	66%	68%	70%	73%	75%
Cost recovery by water fee + subsidy ((A+C2)/E)	102%	100%	100%	107%	154%	161%	152%	144%	138%	131%	122%	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 45 Pokr Masrik

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	242.83	71.9%
	Subsidy	94.80	28.1%
	Total	337.63	100.0%
2	**Expenditure**		
	OM cost	190.66	56.5%
	Loan repayment	116.16	34.4%
	Interest paid	27.39	8.1%
	Surplus cash	3.42	1.0%
	Total	337.63	100.0%

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

Description	Total	Year																																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																									
1. Investment Cost	104.35	3.82	2.73	39.75	39.56	17.54	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	5.58			0.06	0.12	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Electricity	42.63			0.48	0.39	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Mantenance cost	17.50			0.19	0.39	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
Pump replacement	12.00																6.00															6.00									
Sub-total	95.94			1.20	1.38	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	8.26	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	8.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
Total Outflow	200.29	3.82	2.73	40.95	40.94	19.80	2.79	2.68	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	8.26	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	8.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
B BENEFIT																																								
1. Water Tariff	158.22	0.00	0.00	1.74	3.48	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2. Subsidy	75.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.01	2.00	2.00	1.98	1.97	11.73	1.93	1.91	1.92	1.88	1.86	1.84	1.81	1.79	1.76	1.73	1.70	1.66	1.62	1.58	17.43	1.50	1.46	1.41	1.37	1.30	1.26	1.20	1.13	1.07
Total Inflow	234.03	0.00	0.00	1.74	3.48	4.25	4.25	4.25	4.25	4.25	4.25	6.26	6.25	6.25	6.23	6.22	15.98	6.18	6.16	6.17	6.13	6.11	6.09	6.06	6.04	6.01	5.98	5.95	5.91	5.87	5.83	21.68	5.75	5.71	5.66	5.62	5.55	5.51	5.45	5.38	5.32
NET BENEFIT	33.74	-3.82	-2.73	-39.2	-37.5	-15.6	1.46	1.57	1.99	1.99	1.99	4.00	3.99	3.99	3.97	3.96	7.72	3.92	3.90	3.91	3.87	3.85	3.83	3.80	3.78	3.75	3.72	3.69	3.65	3.61	3.57	13.42	3.49	3.45	3.40	3.36	3.29	3.25	3.19	3.12	3.06

FIRR = **1.50%**

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	-14.01	-4.20	-3.00	-43.2	-41.4	-17.3	1.41	1.53	1.99	1.99	1.99	4.00	3.99	3.99	3.97	3.96	7.72	3.92	3.90	3.91	3.87	3.85	3.83	3.80	3.78	3.75	3.72	3.69	3.65	3.61	3.57	13.42	3.49	3.45	3.40	3.36	3.29	3.25	3.19	3.12	3.06
	2	Capital cost 20% up	-23.80	-4.58	-3.28	-47.2	-45.4	-19.1	1.35	1.49	1.99	1.99	1.99	4.00	3.99	3.99	3.97	3.96	7.72	3.92	3.90	3.91	3.87	3.85	3.83	3.80	3.78	3.75	3.72	3.69	3.65	3.61	3.57	13.42	3.49	3.45	3.40	3.36	3.29	3.25	3.19	3.12	3.06
2	1	OM cost 10% up	-10.85	-3.82	-2.73	-39.3	-37.6	-15.8	1.23	1.34	1.76	1.76	1.76	3.77	3.76	3.76	3.74	3.73	6.89	3.69	3.67	3.68	3.64	3.62	3.60	3.57	3.55	3.52	3.49	3.46	3.42	3.38	3.34	12.59	3.26	3.22	3.17	3.13	3.06	3.02	2.96	2.89	2.83
	2	OM cost 20% up	-17.50	-3.82	-2.73	-39.5	-37.7	-16.0	1.01	1.12	1.54	1.54	1.54	3.55	3.54	3.54	3.52	3.51	6.07	3.47	3.45	3.46	3.42	3.40	3.38	3.35	3.33	3.30	3.27	3.24	3.20	3.16	3.12	11.77	3.04	3.00	2.95	2.91	2.84	2.80	2.74	2.67	2.61
3	1	Revenue 10% down	-20.23	-3.82	-2.73	-39.4	-37.8	-16.0	1.04	1.15	1.57	1.57	1.57	3.37	3.37	3.37	3.35	3.34	6.12	3.30	3.28	3.29	3.26	3.24	3.22	3.19	3.18	3.15	3.12	3.10	3.06	3.02	2.99	11.25	2.92	2.88	2.83	2.80	2.74	2.70	2.65	2.58	2.53
	2	Revenue 20% down	-36.25	-3.82	-2.73	-39.6	-38.2	-16.4	0.61	0.72	1.14	1.14	1.14	2.75	2.74	2.74	2.72	2.72	4.52	2.68	2.67	2.68	2.64	2.63	2.61	2.59	2.57	2.55	2.52	2.50	2.47	2.44	2.40	9.08	2.34	2.31	2.27	2.24	2.18	2.15	2.10	2.04	2.00

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.98%	5.39	18.54%
	2	Capital cost 20% up	0.51%	19.49	5.13%
2	1	OM cost 10% up	1.10%	3.68	27.16%
	2	OM cost 20% up	0.68%	12.19	8.20%
3	1	Revenue 10% down	0.49%	20.70	4.83%
	2	Revenue 20% down	-0.67%	-32.55	-3.07%