

No.22 Tsaghkashen

Information on Existing Water Sources (Gegharkunik)

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

No.22 Community Tsaghkashen
District Kamo (Gavar)
Marz Gegharkunik

| No | Water source | Latitude | | | Longitude | | | Altitude (m) | Yield(L/sec) | | |
|----|--------------|----------|-----|------|-----------|-----|------|-----------------|--------------|-----|---------|
| | | deg | min | sec | deg | min | sec | | Min | Max | At site |
| 1 | Spring | 40 | 18 | 40.3 | 45 | 1 | 26.8 | 2,426 | 2.0 | 5.0 | 2.5 |
| 2 | Borehole | 40 | 19 | 15.1 | 45 | 5 | 6.2 | 2,064 | 2.0 | 5.0 | 4.5 |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

Notes:

| | |
|--------------------------------|--|
| Latitude, Longitude, Altitude: | 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 | It has been repaired under "Save the children" project in 1998 |
| Alternative sources if any | No need of alternative source |

No.22 Community Tsaghkashen
District Kamo (Gavar)
Marz Gegharkunik
Sampling date 18/Jul/2007

| | Parameters analysed | Units | No.1 | | | | Guidelines | |
|----|------------------------------------|---------------------|---------|--|--|--|------------|-----------|
| | | | | | | | WHO | Armenia |
| a | pH | | 7 | | | | 6.5-8 | 6.0 - 9.0 |
| b | Temperature | Deg.C | 6.8 | | | | | |
| c | TDS | Mg/L | 95 | | | | 1000 | 1000 |
| 1 | Al:Aluminum | Mg/L | 0.01 | | | | 0.10 | 0.50 |
| 2 | B:Boron | Mg/L | n.d | | | | 0.70 | 0.50 |
| 3 | Cl:Chloride | Mg/L | 4 | | | | 250 | 350 |
| 4 | Cr:Chrome | Mg/L | 0.03 | | | | 0.05 | 0.05 |
| 5 | Cu:Copper | Mg/L | n.d | | | | 2 | 1 |
| 6 | F:Fluoride | Mg/L | 0.63 | | | | 1.50 | |
| 7 | Hardness | Mg/L | 40 | | | | 500 | 700 |
| 8 | Fe:Iron | Mg/L | n.d | | | | 0.30 | 0.30 |
| 9 | Mn:Manganese | Mg/L | n.d | | | | 0.40 | 0.10 |
| 10 | Mo:Molibdenum | Mg/L | n.d | | | | 0.070 | 0.250 |
| 11 | Ni:Nickel | Mg/L | n.d | | | | 0.020 | 0.100 |
| 12 | Nitrate(NO3+) | Mg/L | 1.3 | | | | 50.0 | 45.0 |
| 13 | SO4:Sulfate | Mg/L | 2.0 | | | | 250.0 | 500.0 |
| 14 | Zn:Zink | Mg/L | n.d | | | | 3.0 | 5.0 |
| 15 | As:Arsenic | Mg/L | n.d | | | | 0.0 | 0.1 |
| 16 | Ba:Barium | Mg/L | 0.01 | | | | 0.70 | 0.10 |
| 17 | Be:Berillium | Mg/L | 0.00010 | | | | NA | 0.00020 |
| 18 | Cd:Cadmium | Mg/L | n.d | | | | 0.0030 | 0.0010 |
| 19 | Pb:Lead | Mg/L | <0.001 | | | | 0.010 | 0.030 |
| 20 | Hg:Mercury | Mg/L | <0.0002 | | | | 0.00100 | 0.00050 |
| 21 | Se:Selenium | Mg/L | n.d | | | | 0.010 | 0.010 |
| 22 | Sr:Strontium | Mg/L | <0.7 | | | | NA | 7.0 |
| 23 | CN:Cyanide | Mg/L | n.d | | | | 0.070 | 0.035 |
| 24 | Coli form bacteria | bacteria per 100 ml | | | | | - | 0 |
| 25 | Thermo-tolerant coli form bacteria | bacteria per 100 ml | | | | | 0 | 0 |
| 26 | Total bacteria | bacteria per 1 ml | | | | | - | 50 |

No. 22 Marz Gegharkunik Community Tsaghkashen**1. ACCESSIBILITY TO THE SITE**

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

2. INTAKE STRUCTURE

| No. | Water source | N | E | El. (m) | Year | Material | Volume (l/s) | Rehabilitation Necessity (Y/N) |
|-----|--------------|-------------|-------------|------------|------|----------|-----------------|--------------------------------------|
| 1 | Spring | 40°18'40.3" | 45°01'26.8" | 2,426 | 1997 | Concrete | 2.5 | Yes |
| 2 | Groundwater | 40°19'15.1" | 45°05'06.2" | 2,064 | 1998 | Steel | 4.5 | No |

3. TRANSMISSION PIPELINE

| No. | Pipeline length (m) | Pipe diameter | Material | Flow rate (l/s) | Year | Leakage | Rehabilitation Necessity (Y/N) |
|-----|---------------------|---------------|----------------|-----------------|------|---------|--------------------------------|
| 1 | 1,000 | 150 | AsbestosCement | 2.5 | 1958 | Huge | Yes |
| | 1,000 | 80 | Steel | | 1998 | Little | No |
| 2 | 1,700 | 100 | Steel | 4.5 | 1998 | Little | No |

4. RESERVOIR

| No. | N | E | El. (m) | Material | Shape | Dimension (m) | Volume (m ³) | Rehabilitation Necessity (Y/N) |
|-----|-------------|-------------|------------|----------|-------------|------------------|-----------------------------|--------------------------------------|
| 1 | 40°18'20.4" | 45°03'13.0" | 2,212 | Concrete | Rectangular | 6x9x4 | 150 | Yes |

5. CHLORINATION EQUIPMENT

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

6. DISTRIBUTION PIPELINE

| No. | Pipeline length (m) | Pipe diameter | Material | Year | Leakage | Rehabilitation Necessity (Y/N) |
|-----|---------------------|---------------|----------|------|---------|--------------------------------|
| 1 | 2,000 | 100 | Steel | 1958 | Huge | Yes |
| 2 | 1,000 | 50 | Steel | 1998 | Little | Yes |

7. PUMP STATION

| Existence (Y/N) | Power source | Type | Capacity (l/s) | Pump head (m) | Tank cap. (m ³) | 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) |
|-------------|----------------|----------------|--------------|----------------|--------------------------------|
| 7 | 1998 | 2003 | No | 0 | Yes |

9. DRAINAGE SYSTEM

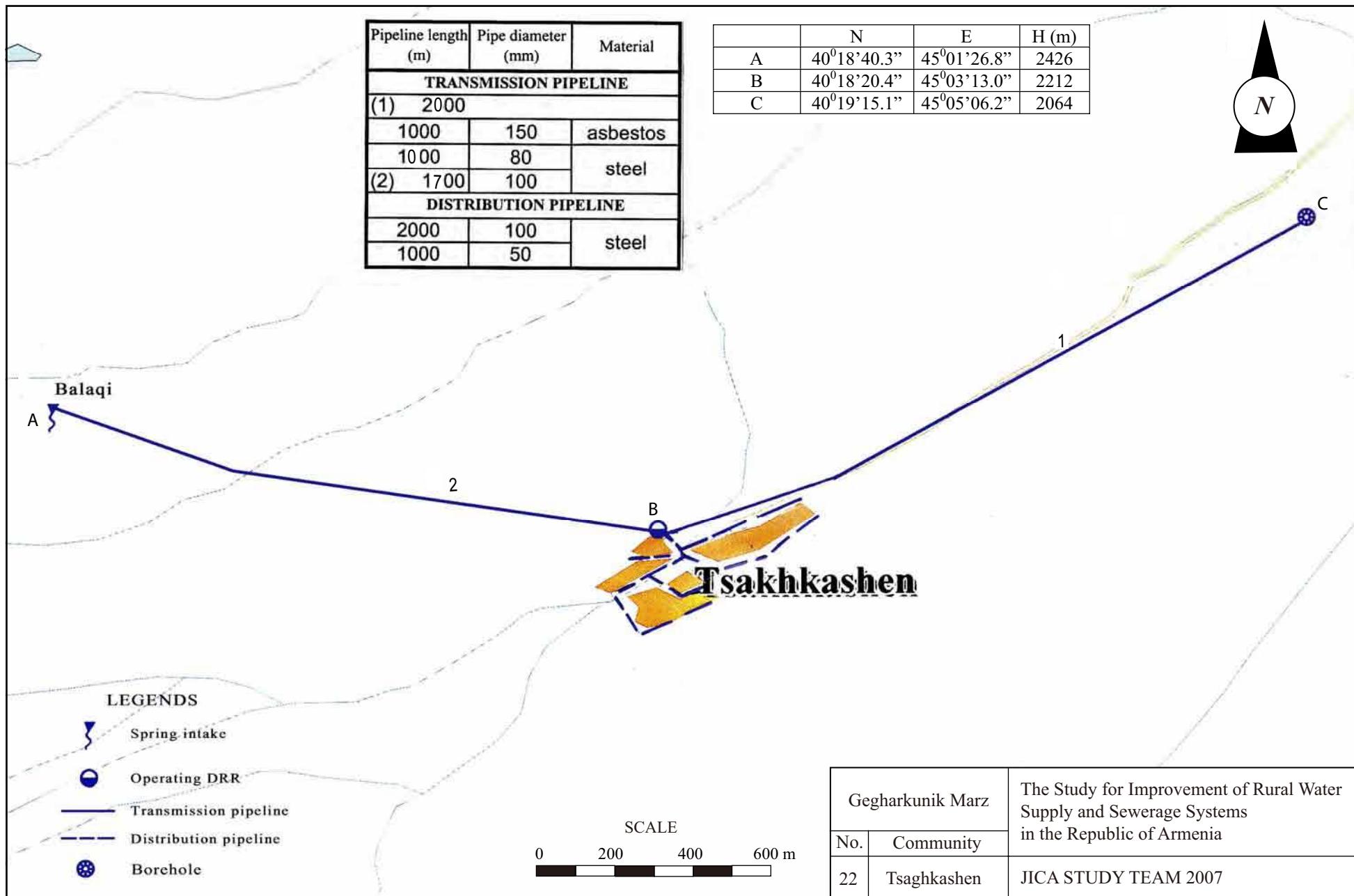
| Existence | Rehabilitation | Remarks |
|-----------|----------------|---------|
| No | Yes | |

**Questionnaire on Existing Water Supply Conditions
by Socio-Economic Survey**

| | |
|------------------------------|-------------------|
| Marz | Gegharkunik |
| Number and Name of Community | No.22 Tsaghkashen |
| District | Kamo |

| No. | Question | Answer |
|---|--|--|
| A: Baseline Data | | |
| A1 | Actual population in 2001 | 621 |
| A2 | Actual population in 2007 | 670 |
| A3 | Number of households | 181 |
| A4.1 | Elderly people | 20 |
| A4.2 | Population in labor force (age from 16 to 62) | 460 |
| A4.3 | Children | 140 |
| A5.1 | Pensioners | 80 |
| A5.2 | Unemployed | 30 |
| A5.3 | Receiving benefits | 37 |
| 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 | 113 |
| B: Budget | | |
| B1 | Annual Budget of the community 2004, in thousand AMD | 1,857 |
| | Annual Budget of the community 2005, in thousand AMD | 2,484 |
| | Annual Budget of the community 2006, in thousand AMD | 3,435 |
| | Annual Budget of the community 2007, in thousand AMD | 1,097 |
| | 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: | potatoes,cabbage, cereals, dairy, meat, wool |
| C2 | Is there any community activities carrying out by women? 1-Yes, 2-No | no |
| D: Water Usage and Water Demand Survey | | |
| D1 | Does the community hold water use permit? 1.Yes 2.No | yes |
| D2 | Water use permit number | 47 |
| D3 | Date of expiry of water use permit | 2005-2008 |
| D4 | Planned date of obtaining water use permit | - |
| D5 | Present condition of the water supply volume of Domestic use | insufficient |
| D6 | Present condition of the water supply volume of Irrigation water | insufficient |
| D7 | Number of house connection to drinking water system | 0 |
| D8 | How many house connection household set the water meter | 0 |
| D9 | Number of public taps | 5 |
| D10.1 | How is the regime of water supply in your community in the dry season? | regularly - 5hrs |
| 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? | 10 ⁰⁰ -15 ⁰⁰ |
| D12 | Are you pleased with duration of domestic water supply? | mainly displeased |
| D13 | Are hours of water supply convenient? | mainly convenient |
| D14.1 | How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each household a day? | 12 hrs |
| D14.2 | Estimate quantity of domestic water use of each household (liter per day) | 1,200 |

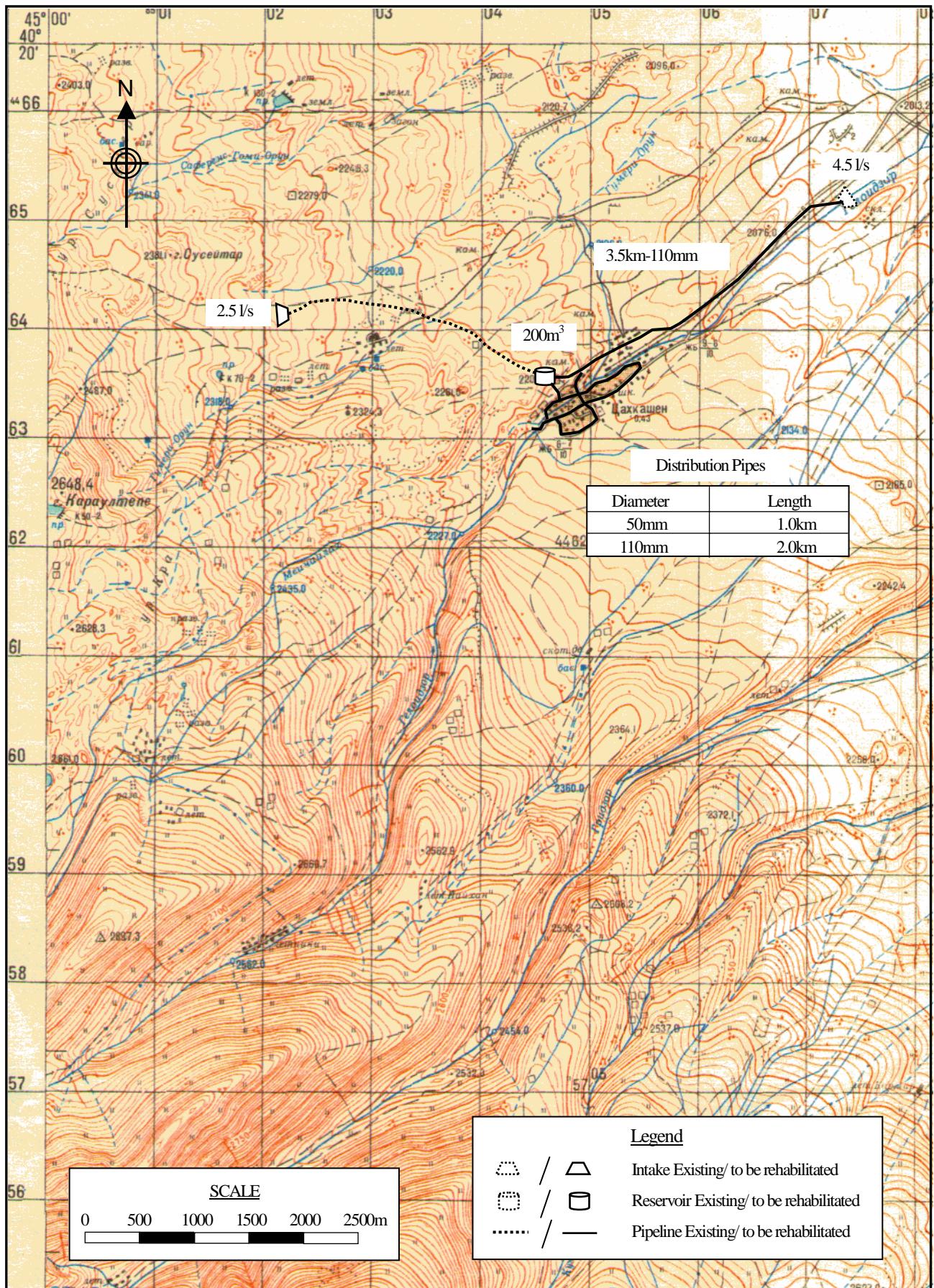
| No. | Question | Answer |
|---|---|---------------------------|
| D15.1 | How long the taps are open to provide the each household for filling | 18 hrs |
| D15.2 | Estimate quantity of water for filling containers of each household (liter per | 1,900 |
| D16 | Drinking water monthly water fee per household | 0 |
| D17 | How often do you usually pay water fees? | - |
| D18 | Water fee structure 1Flat rate, 2 Having water tariff | - |
| D19 | Where do you acquire the irrigation water? | from spring |
| D20 | Are you satisfied with irrigation water supply volume? | insufficient. |
| E: Present Operation and Maintenance Works | | |
| E1 | Name of responsible for water supply | Nersisan Ashot |
| E2 | Position | leading specialist |
| E3 | Telephone | - |
| E4 | Quantity and present condition of the water supply facilities: spring/intake | 2-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) | 1-partially 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 | 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? | inviting a specialist |
| E13 | Who is in charge of the repair work in the community? | specialist from community |
| E14 | How you prepare O&M costs? | not collect |
| E15 | Please indicate the O&M cost breakdown per year for water supply | |
| | Electricity (AMD) | 0 |
| | Labor cost (AMD) | 0 |
| | Repair cost(AMD) | 0 |
| | Others(AMD) | 0 |
| | Total (AMD) | 0 |
| E16 | Do the residents participate in the O&M works? | manpower |
| E17 | What kind of OM method is preferable to you? | 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 |



Marz : Gegharkunik
 Name : Tsaghkashen

No.22

| No. | Item | Quantity | Unit | Water demand (m3/d) |
|---|------------------------------|----------|------------|---------------------|
| A. WATER DEMAND | | | | |
| 1 | Population | 670 | persons | 67.0 |
| 2 | Factory | - | nos | 0.0 |
| 3 | School (pupils) | 113 | pupils | 1.1 |
| 4 | Medical Ambulance Station | - | nos | - |
| 5 | Policlinic | - | nos | - |
| 6 | Livestocks (87lit/household) | 181 | household | 15.7 |
| | Sub-total | | | 83.8 |
| | Unaccounted for water (20%) | | | 16.8 |
| 1 | Average Daily Water Demand | | | 100.6 m3/day |
| 2 | Maximum Daily Water Demand | | | 120.7 m3/day |
| 3 | Maximum Hourly Water Demand | | | 16.3 m3/hr |
| B. WATER SUPPLY PLAN | | | | |
| | 1 Water source type | Nr. | Total vol. | |
| | a Spring | 2 | 7.0 | lit/sec |
| | | | | 604.8 m3/day |
| | ^ Total | | | 604.8 m3/day |
| | 2 Required reservoir volume | | | 196 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 | | 3,500 | m | |
| 150mm diameter | | | m | |
| 200mm diameter | | | m | |
| 250mm diameter | | | m | |
| 3 | Reservoir | | | |
| 200m3 capacity | | 1 | nos | |
| 4 | Distribution pipe | | | |
| 50mm diameter | | 1,000 | m | |
| 75mm diameter | | | m | |
| 90mm diameter | | | m | |
| 110mm diameter | | 2,000 | m | |
| 150mm diameter | | | m | |
| 200mm diameter | | | m | |
| 250mm diameter | | | m | |
| 5 | House connection | 181 | nos | |
| 6 | Water meter installation | 181 | 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. 22 | Tsaghkashen | JICA STUDY TEAM |

STUDY FOR IMPROVEMENT OF
RURAL WATER SUPPLY AND
SEWAGE SYSTEMS IN RA

Marz : **Gegharkunik**

No. : **22**

Name : **Tsaghkashen**

| 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 | 3,500 | m | 9,680 | 33,880,000 |
| | | 150mm | | m | 13,140 | |
| | | 200mm | | m | 19,440 | |
| | | 250mm | | m | 27,040 | |
| | Sub-total | | | | | 33,880,000 |
| 3 | Reservoir | | | | | |
| | | 50m3 | | nos | 8,363,900 | |
| | | 100m3 | | nos | 12,968,300 | |
| | | 150m3 | | nos | 18,804,500 | |
| | | 200m3 | 1 | nos | 22,524,600 | 22,524,600 |
| | | 250m3 | | nos | 25,952,800 | |
| | | 300m3 | | nos | 29,630,400 | |
| | | 350m3 | | nos | 33,528,700 | |
| | | 400m3 | | nos | 36,388,000 | |
| | | 450m3 | | nos | 39,392,500 | |
| | | 500m3 | | nos | 42,520,900 | |
| | Sub-total | | | | | 22,524,600 |
| 4 | Distribution Pipe | | | | | |
| | | 50mm | 1,000 | m | 5,520 | 5,520,000 |
| | | 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 | | | | | 24,880,000 |
| 5 | House Connection | | 181 | nos | 74,000 | 13,394,000 |
| 6 | Water Meter Installation | | 181 | nos | 80,000 | 14,480,000 |
| 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 | 114,526,300 |
| | | | | | Equivalent to USD | 374,857 |
| | | | | | Equivalent to JPY | 39,547,410 |
| | | | | | AMD | USD |
| Investment Cost per household | | | | 181 | HH | 632,742 |
| Investment Cost per person | | | | 670 | persons | 170,935 |
| | | | | | | 559 |

No.23 Tsaghkunq

Information on Existing Water Sources (Gegharkunik)

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

No.23 Community Tsaghkunq
District Sevan
Marz Gegharkunik

| No | Water source | Latitude | | | Longitude | | | Altitude (m) | Yield(L/sec) | | |
|----|--------------|----------|-----|------|-----------|-----|------|-----------------|--------------|-----|---------|
| | | deg | min | sec | deg | min | sec | | Min | Max | At site |
| 1 | Spring | 40 | 35 | 3.3 | 44 | 54 | 10.0 | 1,964 | 0.5 | 1.0 | 0.5 |
| 2 | Spring | 40 | 34 | 40.0 | 44 | 52 | 31.2 | 1,872 | 0.5 | 1.0 | 0.5 |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

Notes:

| | |
|--------------------------------|--|
| Latitude, Longitude, Altitude: | 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 | Water supply service is poor |
| Alternative sources if any | The small rivers of the area can be selected as an alternative source. |

No.23 Community Tsaghkunq
District Sevan
Marz Gegharkunik
Sampling date 11/Jul/2007

| | Parameters analysed | Units | No.1 Mo-serry side | No.2 | | | Guidelines | |
|----|------------------------------------|---------------------|--------------------|---------|--|--|------------|-----------|
| | | | | | | | WHO | Armenia |
| a | pH | | 7.87 | 7.5 | | | 6.5-8 | 6.0 - 9.0 |
| b | Temperature | Deg.C | 15.1 | 11 | | | | |
| c | TDS | Mg/L | 27 | 140 | | | 1000 | 1000 |
| 1 | Al:Aluminum | Mg/L | n.d | nd | | | 0.10 | 0.50 |
| 2 | B:Boron | Mg/L | n.d | nd | | | 0.70 | 0.50 |
| 3 | Cl:Chloride | Mg/L | 6 | 43 | | | 250 | 350 |
| 4 | Cr:Chrome | Mg/L | n.d | nd | | | 0.05 | 0.05 |
| 5 | Cu:Copper | Mg/L | n.d | nd | | | 2 | 1 |
| 6 | F:Fluoride | Mg/L | 0.18 | 0.20 | | | 1.50 | |
| 7 | Hardness | Mg/L | 260 | 810 | | | 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 | 5.3 | 19.5 | | | 50.0 | 45.0 |
| 13 | SO4:Sulfate | Mg/L | 2.5 | 63.0 | | | 250.0 | 500.0 |
| 14 | Zn:Zink | Mg/L | <0.5 | nd | | | 3.0 | 5.0 |
| 15 | As:Arsenic | Mg/L | n.d | nd | | | 0.0 | 0.1 |
| 16 | Ba:Barium | Mg/L | 0.01 | <0.1 | | | 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 | 0.002 | 0.002 | | | 0.010 | 0.030 |
| 20 | Hg:Mercury | Mg/L | <0.0002 | 0.00022 | | | 0.00100 | 0.00050 |
| 21 | Se:Selenium | Mg/L | <0.001 | 0.001 | | | 0.010 | 0.010 |
| 22 | Sr:Strontium | Mg/L | <0.7 | 0.7 | | | NA | 7.0 |
| 23 | CN:Cyanide | Mg/L | n.d | 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 |

No. 23 Marz Gegharkunik Community Tsaghkunk**1. ACCESSIBILITY TO THE SITE**

| No. | Structures | Access by vehicle | Machine construction | Remarks |
|-----|-----------------------|-------------------|----------------------|--|
| 1 | Intake | Possible | Possible | |
| | Intake | Possible | Possible | |
| 2 | Transmission pipeline | Fair | 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°35'03.3" | 44°54'10.0" | 1,964 | 1950 | Concrete | 0.5 | Yes |
| 2 | Spring | 40°34'40.0" | 44°52'31.2" | 1,872 | 1950 | Concrete | 0.5 | Yes |

3. TRANSMISSION PIPELINE

| No. | Pipeline length (m) | Pipe diameter | Material | Flow rate (l/s) | Year | Leakage | Rehabilitation Necessity (Y/N) |
|-----|---------------------|---------------|-----------|-----------------|------|---------|--------------------------------|
| 1 | 2,000 | 100 | Cast iron | 0.5 | 1950 | Little | No |
| 2 | 50 | 100 | Steel | 0.5 | 1950 | Little | No |

4. RESERVOIR

| No. | N | E | El. (m) | Material | Shape | Dimension (m) | Volume (m³) | Rehabilitation Necessity (Y/N) |
|-----|-------------|-------------|------------|----------|-------------|------------------|----------------|--------------------------------------|
| 1 | 40°34'42.5" | 44°53'09.9" | 1,920 | Concrete | Rectangular | 5x5x3 | 50 | 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 | 500 | 100 | Steel | 1950 | 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 | | | | | | | Yes |

8. PUBLIC TAPS

| No. of taps | Old one (year) | New one (year) | Valves (Y/N) | Valve rate (%) | Rehabilitation Necessity (Y/N) |
|-------------|----------------|----------------|--------------|----------------|--------------------------------|
| 3 | 1950 | | Yes | 75 | 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.23 Tsaghkunkq |
| District | Sevan |

| No. | Question | Answer |
|---|---|---|
| A: Baseline Data | | |
| A1 | Actual population in 2001 | 1,075 |
| A2 | Actual population in 2007 | 1,132 |
| A3 | Number of households | 316 |
| A4.1 | Elderly people | 175 |
| A4.2 | Population in labor force (age from 16 to 62) | 680 |
| A4.3 | Children | 285 |
| A5.1 | Pensioners | 195 |
| A5.2 | Unemployed | 0 |
| A5.3 | Receiving benefits | 25 |
| A6 | Average monthly income of household (AMD) | 30,000 |
| A7 | Number of medical ambulance staion/first and health post | absent |
| A8 | Number of beds in each medical ambulance staion | 0 |
| A9 | Number of school | 1 |
| A10 | Number of pupils | 165 |
| B: Budget | | |
| B1 | Annual Budget of the community 2004, in thousand AMD | 2,513 |
| | Annual Budget of the community 2005, in thousand AMD | 1,809 |
| | Annual Budget of the community 2006, in thousand AMD | 7,232 |
| | Annual Budget of the community 2007, in thousand AMD | 3,273 |
| | 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 | in the future |
| 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 | 210 |
| 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? | regularly - 5hrs |
| D10.2 | How is the regime of water supply in your community in the wet season? | regularly - 8hrs |
| D11 | What time of day water is given? | 08 ⁰⁰ -13 ⁰⁰ , 08 ⁰⁰ -16 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? | 12 hrs |
| D14.2 | Estimate quantity of domestic water use of each household (liter per day) | 600 |

| No. | Question | Answer |
|---|---|---------------------------|
| D15.1 | How long the taps are open to provide the each household for filling | 12 hrs |
| D15.2 | Estimate quantity of water for filling containers of each household (liter per | 1,000 |
| D16 | Drinking water monthly water fee per household | 0 |
| D17 | How often do you usually pay water fees? | - |
| D18 | Water fee structure_ 1Flat 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 | - |
| E2 | Position | - |
| E3 | Telephone | - |
| E4 | Quantity and present condition of the water supply facilities: spring/ intake pipeline/transmission | 2-partially rehabilitated |
| E5 | Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir) | 2-partially rehabilitated |
| E6 | Quantity and present condition of the water supply facilities: net/distribution | 1-deteriorated |
| E7 | Quantity and present condition of the water supply facilities: public tap | rehabilitated |
| E8 | Quantity and present condition of the water supply facilities: pump | absent |
| E9 | Who is the owner of the water supply facilities? | community |
| E10 | Who is engaged in the water supply facilities repairing works? | community and residents |
| E11 | How do you repair the water supply facilities? | by ourselves |
| E12 | Who is in charge of the repair work in the community? | none |
| E13 | How you prepare O&M costs? | community budget |
| E14 | 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? | water fee |
| F: Initial Environmental Examination (IEE) | | |
| F1 | Are any of the following areas located inside or around the project site? | |
| F1.1 | National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas. | absent |
| F1.2 | Virgin forests, tropical forests | absent |
| F1.3 | Ecological improvement habits areas (coral reef, mangrove wetland, tidal | absent |
| F1.4 | Habit of valuable species protected by domestic laws or international treaties | absent |
| F1.5 | Likely salts cumulus or soil erosion areas on a massive scale | absent |
| F1.6 | Remarkable desertification trend areas | absent |
| F1.7 | Archaeological historical or cultural valuable areas | absent |
| F1.8 | Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas | absent |

| Pipeline length (m) | Pipe diameter (mm) | Material |
|------------------------------|-----------------------|-----------|
| TRANSMISSION PIPELINE | | |
| (1) 2000 | 100 | cast iron |
| (2) 50 | 100 | steel |
| DISTRIBUTION PIPELINE | | |
| 500 | 100 | steel |

| | N | E | H (m) |
|---|-------------|-------------|-------|
| A | 40°35'03.3" | 44°54'10.0" | 1964 |
| B | 40°34'40.0" | 44°52'31.2" | 1872 |
| C | 40°34'42.5" | 44°53'09.9" | 1920 |



Tsaghkunq

LEGENDS

- Spring intake
- Operating DRR
- Transmission pipeline
- Distribution pipeline

Zuyg aghbyur

A

C

Geghamavan

SCALE

0 200 400 600 m

Gegharkunik Marz

The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia

No. Community

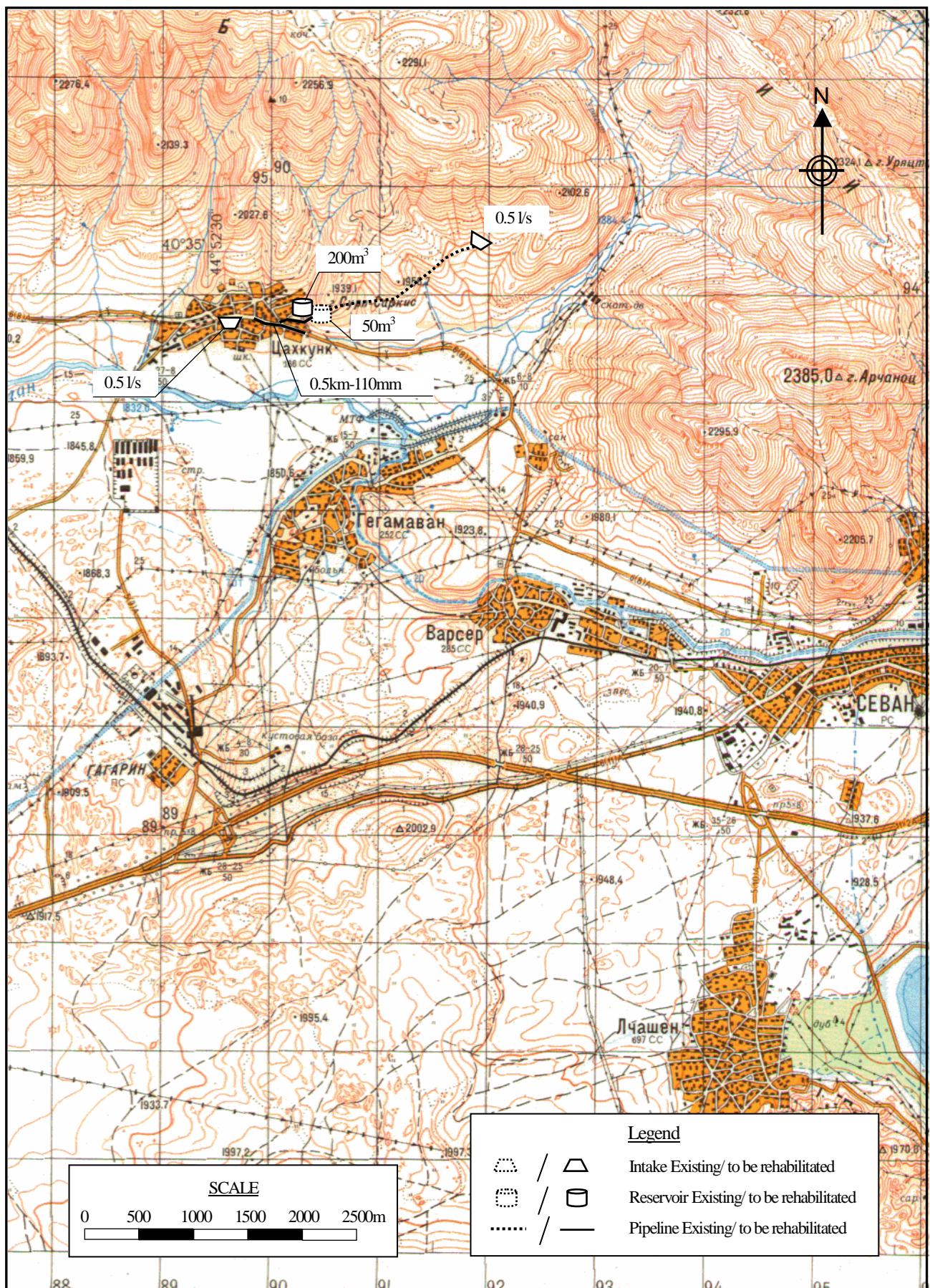
23 Tsaghkunq

JICA STUDY TEAM 2007

Marz : Gegharkunik
 Name : Tsaghkunq

No.23

| No. | Item | Quantity | Unit | Water demand (m3/d) |
|---|------------------------------|----------|------------|---------------------|
| A. WATER DEMAND | | | | |
| 1 | Population | 1,132 | persons | 113.2 |
| 2 | Factory | - | nos | 0.0 |
| 3 | School (pupils) | 165 | pupils | 1.7 |
| 4 | Medical Ambulance Station | - | nos | - |
| 5 | Policlinic | - | nos | - |
| 6 | Livestocks (87lit/household) | 316 | household | 27.5 |
| | Sub-total | | | 142.4 |
| | Unaccounted for water (20%) | | | 28.5 |
| 1 | Average Daily Water Demand | 103.0 | | 170.9 m3/day |
| 2 | Maximum Daily Water Demand | | | 205.1 m3/day |
| 3 | Maximum Hourly Water Demand | | | 22.2 m3/hr |
| B. WATER SUPPLY PLAN | | | | |
| | 1 Water source type | Nr. | Total vol. | |
| | a Spring | 2 | 1.0 | lit/sec |
| | | | | 86.4 m3/day |
| | Total | | | 86.4 m3/day |
| | 2 Additional water source | | | |
| | 2 Required reservoir volume | | | 267 m3 |
| C. WATER SUPPLY FACILITIES REHABILITATION PLAN | | | | |
| No | Item | Quantity | Unit | |
| 1 | Intake | | | |
| | 1m3 | 2 | nos | |
| | 2m3 | | nos | |
| | 3m3 | | nos | |
| | 4m3 | | nos | |
| 2 | Transmission pipe | | | |
| | 50mm diameter | | m | |
| | 75mm diameter | | m | |
| | 90mm diameter | | m | |
| | 110mm diameter | | m | |
| | 150mm diameter | | m | |
| | 200mm diameter | | m | |
| | 250mm diameter | | m | |
| 3 | Reservoir | | | |
| | 200m3 capacity | 1 | nos | |
| 4 | Distribution pipe | | | |
| | 50mm diameter | | m | |
| | 75mm diameter | | m | |
| | 90mm diameter | | m | |
| | 110mm diameter | 500 | m | |
| | 150mm diameter | | m | |
| | 200mm diameter | | m | |
| | 250mm diameter | | m | |
| 5 | House connection | 106 | nos | |
| 6 | Water meter installation | 316 | nos | |
| 7 | Public tap | 4 | 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. 23

Tsaghkunq

JICA STUDY TEAM

STUDY FOR IMPROVEMENT OF
RURAL WATER SUPPLY AND
SEWAGE SYSTEMS IN RA

Marz : **Gegharkunik**

No. : **23**

Name : **Tsaghkunq**

| No | Item | Specification | Quantity | Unit | Unit Price | Total |
|----|--------------------------------------|---------------|----------|---------|-------------------|------------|
| 1 | Intake | | | | | |
| | | 1m3 | 2 | nos | 367,700 | 735,400 |
| | | 2m3 | | nos | 545,000 | |
| | | 3m3 | | nos | 669,100 | |
| | | 4m3 | | nos | 805,100 | |
| | Sub-total | | | | | 735,400 |
| 2 | Transmission Pipe | | | | | |
| | | 50mm | | m | 5,520 | |
| | | 75mm | | m | 7,160 | |
| | | 90mm | | m | 8,040 | |
| | | 110mm | | 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 | 1 | nos | 22,524,600 | 22,524,600 |
| | | 250m3 | | nos | 25,952,800 | |
| | | 300m3 | | nos | 29,630,400 | |
| | | 350m3 | | nos | 33,528,700 | |
| | | 400m3 | | nos | 36,388,000 | |
| | | 450m3 | | nos | 39,392,500 | |
| | | 500m3 | | nos | 42,520,900 | |
| | Sub-total | | | | | 22,524,600 |
| 4 | Distribution Pipe | | | | | |
| | | 50mm | | m | 5,520 | |
| | | 75mm | | m | 7,160 | |
| | | 90mm | | m | 8,040 | |
| | | 110mm | 500 | m | 9,680 | 4,840,000 |
| | | 150mm | | m | 13,140 | |
| | | 200mm | | m | 19,440 | |
| | | 250mm | | m | 27,040 | |
| | Sub-total | | | | | 4,840,000 |
| 5 | House Connection | | 106 | nos | 74,000 | 7,844,000 |
| 6 | Water Meter Installation | | 316 | nos | 80,000 | 25,280,000 |
| 7 | Public Tap | | 4 | nos | 90,000 | 360,000 |
| 8 | Chlorilation Equipment | | 1 | nos | 500,000 | 500,000 |
| 9 | Pump Replacement | | | nos | 10,000,000 | |
| 10 | Drainage and Sewerage concrete surfa | | 200 | m | 3,600 | 720,000 |
| | Total | | | | AMD | 62,804,000 |
| | | | | | Equivalent to USD | 205,564 |
| | | | | | Equivalent to JPY | 21,687,032 |
| | | | | | AMD | USD |
| | Investment Cost per household | | 316 | HH | 198,747 | 651 |
| | Investment Cost per person | | 1,132 | persons | 55,481 | 182 |

