6. KAPAN PILOT PROJECT

6.1 Socio-Economic Condition

6.1.1 Brief history of Kapan city.

Kapan history has been inhabited for centuries. Deep within the mountains it is still possible upon flat enclaves, usually near walnut trees and berry vines, suggesting that earliest inhabitants were mountain people who may have built houses in these tree clearings. The modern city of Kapan, however, owes its existence to the discovery of copper deposits in the early 19th century.

(1) Population

Kapan city (the area of the city is 3567,6 hectares) has been recognized as such on 1938 as the administrative center of Kapan district by then. The city had 36.000 populations on 1976. The population of the city remains relatively stable during the last 14 years[1].

Table 6.1.1 History of Population in Kapan

Years	Population (thousands)	Population Growth rate (%)
1991	46.5	-
1992	47.1	1.29
1993	46.7	-0.84
1994	46.7	0
1995	46.8	0.21
1996	46.8	0
1997	46.8	0
1998	46.7	-0.21
1999	46.6	0
2000	46.6	-0.21
2001	46.5	0
2002	46.5	-0.21
2003	46.4	-0.21
2004	46.7	-1.50

(2) Industry

1) Industrial Output

[1] This statistics are taken from Syunik region's state statistical board. The data is official and may not be accurate. There is a high chance that the numbers are exaggerated especially after 1993-94.

The leading industry is mining. Simultaneously, such plants as auto-repairing, textile, furniture, cannery, dairy, soft beverages, food processing, and poultry started to open and operate since early 1970s. Construction and electricity production was also developed. More than 100 industrial organizations were operating during early 1980s.

After the soviet era, the industry of Kapan was drastically setback. As shown below, the city experienced a sharp decline in output of industry in 1997

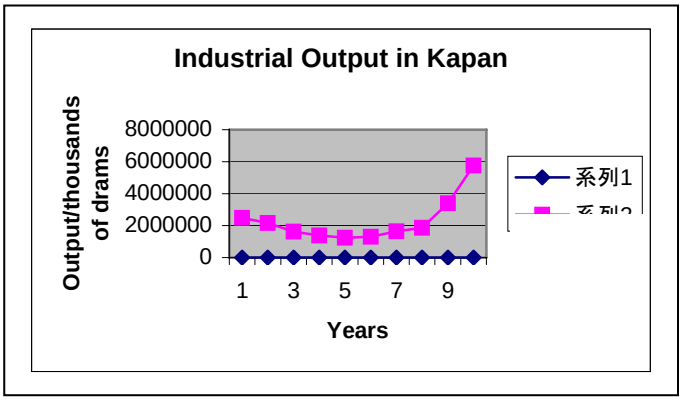


Figure 6.1.1 Historical Change of Industrial Output

Years	Output/*10^3drams
1995	2,485,204.8
1996	2,164,956.4
1997	1,619,855
1998	1,383,735
1999	1,233,310
2000	1,290,056
2001	1,648,473
2002	1,865,979
2003	3,402,194
2004	5,752,197

2) Employment

Kapan city has the following work force history. Number of employee has not change as industrial output.

In 1996, Number of employee of Kapan was 10,728 and that was decreased gradually to 7,335 in 2004.

6.1.2 Administrative System

(1) Kapan City

The city council and its executive committee governed the city by soviet era. This was a typical soviet administrative, regional government structure. After Armenia's independence and democratization the regional governing was substituted by the local self-governance. According regional administrative division of Armenia and the Law on local self-governance adopted on 1996, Kapan city's community has been organized based on the Kapan city. The law on local self-governance was amended on 2002, which clarified certain rules and introduced standards. The local self-governance is both the right and capacity to

manage the resources of the community for the improvement of the living standards of the population of community. The organization of Kapan city is shown in the Appendix 6.1.1

The governing bodies of the community are the Mayor and the Community Council.

1) Community Council[2]

The community council is consisted of 15 members. The members are elected through direct election method for three years duration. The members can be elected among the residence of the local population.

(a) The roles of community council are:

- ✓ Approves the community development project
- ✓ Budget of the community
- ✓ Oversees the performance of the budget and development project
- ✓ Monitors the process of the implementation of the decisions
- ✓ Decides the payment/compensation for the Mayor
- ✓ Can initiate the impeachment before Marzpet
- ✓ Decides to organize inter-community unions and initiates the unification procedure with other community
- ✓ Decides to manage the property of the community, rent and/or alienation

2) Responsibility and authority of The Mayor are:

(a) Responsibility

The Mayor is elected among the residents of the community, over 25 years of age who is the citizen of Armenia. The candidate must reside in the community at least one year in the community. He/she must have high education or undergraduate degree.

- ✓ Presents a three years development project to Community Council's approval
- ✓ Presents Annual budget
- ✓ Reports on the performance of the annual budget and the development project

Essentially, the mayor implements executive governance of the community.

(b) Election of the Mayer

The electorate for the mayor's election is comprised of the adult population (over 18 years

[2] The structure of community council and mayors are provided in appendix 6.1.1

of age) of the community who is the citizen of Armenia. The elections are carried out directly, with equal right through closed and confidential method. In the case if none of them earned less than 50%, the highest two candidates enter into the next phase of the election process. In the second stage, the winner is the one who earns the higher votes.

Previous elections had the following statistics: there are 29,000 voters in the city. The actual number of participants was 17,000 out of which 9,400 voted for the current mayor and 7,600 voted for the opponent.

3) Budget

- Income: As shown in the Table 6.1.2 Kapan city has generated 157,797.6 thousand drams in 2001 that increases 445,520.0 thousands drams in 2005.

- Expenditure: The public expenditures of the city during 2001-2003 are shown in the Table 6.1.3. It is almost balance with annual income of the city.

4) Investment by Kapan city

Mostly, the investments on infrastructures of local importance are being made of local budget. The infrastructures of the local importance include water pipes, streets, entertainment parks, bridges, local roads, etc. For example there are capital expenditures on 2003 made from Kapan city budget.

Marzpetaran coordinates and implements the investment made on infrastructure of the state importance.

Each community plans and manages activities on infrastructure development. Simultaneously, the government plans and invests on some road construction and community based infrastructures.

Table 6.1.2 Income of Kapan City (1000AMD)

N	Classification of income	2001	2002	2003	2004[3]	2005
	Income total	**157,797.6**	**362,333.7**	**382,693.8**	**358,013.9**	**445,520.0**
1	Tax income and tolls	48,228.7	52,024.7	107,632.7		
1.1	Taxes from land	5,524.3	1,710.6	27,335.3		
1.2	Property tax	32,912.7	37,790.9	68,638.6		
1.3	Income tax		1,642.7			
1.4	State fees	8,595.1	8,340.8	8,508.8		
1.5	Local fees	1,196.6	2,535.2	31,50.0		
2	**Non-tax income**	17,392.7	21,136.0	27,173.1		
2.1	Rent from land			500.0		
2.2	Property lease			2,173.0		
2.3	Local tolls			16,600.1		
2.4	Administrative penalties, charges and fines					
2.5	Other non tax income			79,00.0		
3	**Income from capital operations**					
4	**Official transfers**	82,285.6	258,463.9	140,288.0		
4.1	Subsidy	82,285.6	258,463.9	140,288.0		
4.2	Transfers from other sources					
5	**Loans and bonds**					
5.1	Bonds					
6	Beginning balance	6,899.1	512.5	20,600.0		

Table 6.1.3 Annual Expenditure of Kapan City (1000 AMD)

N	**Expenditures; Disbursements based on operational classification Expenditures total,**	**2001 Actual 154,335.5**	**2002 Actual 311,392.4**	**2003 Actual 295,693.8**
1	Public expenditures of general type	14,431.8	23,582.1	31,955.4
2	Education and science	44,579.1	61,515.3	84,591.6
3	Social security and social insurance	357.0	5,018.0	5,000.0
4	Sports and culture	39,978.9	50,872.3	61,346.6
5	Housing	21,378.4	347,260.2	37,740.0
6	Transport and communications	687.9	661.0	7,448.0
7	Other services			
8	Expenditures out of basic categories	32,922.9	135,017.5	67,612.7

[3] The income decomposition for 2004 and 2005 years are not available yet.

Table 6.1.4 Investment by Kapan city in 2003

N	The name of Project	Total Sum (1000 AMD)
1	Repair of Mayor's Office	2.000
2	Repair of city residential buildings' roofs	7.500
3	Repair of water supply and drainage system	6000
4	Repair of elevators	5000
5	Develop and repair of Nzdeh memorial	50.000
6	Repair of Kapan streets	10.000
7	Repair of Lernagorts street's bridge	5.000
8	Repair and development of M. Harutunyan street fence	1.500
		Total: 87.000

(2) Marz[4]

1) Marzpet

According to the constitution of the RA, the Marzpet is implementing the regional governance through marzpetaran staff and the organizations of regional ordinance. The organization of the marzpetaran of Syunik marz is shown in the Appendix 6.1.2.

The Marzpet is implementing the regional policy on the following fields:

1. Finances
2. Civil construction
3. Transport and road construction
4. Agriculture and land utilization
5. Education
6. Social security
7. Culture and Sports
8. Environmental protection

Marzpet also coordinates the activities of the central government (i.e. ministries, agencies and inspections) through the unification of the efforts of marzpetaran staff and local self-governance bodies. Syunik marzpetaran is comprised of Marzpet and the staff. Marzpet is appointed and dismissed by the government. He reports to the government and is responsible to him.

The government confirms the structure and the charter of marzpetaran, and the prime minister approves the size of the staff. The financing of the marzpetaran is done from the

[4]The organizational structure can be viewed in appendix 6.1.2

state budget.

The government of RA and marzpet govern the staff of marzpetaran. The personal administrator is implementing the activities of marzpetaran, as well as the current activities of the staff.

Brief description of duties and jurisdiction of marzpet, deputy marzpet and Marzpetaran are shown in the table 6.1.5.

Table 6.1.5 Duty and Jurisdiction of Marzpet, Deputy Marzpet and Marzpetaran

Position	Description of duties
Marzpet	Heads of marzpetaran
Deputy marzpet	Coordinate the work in the area assigned by marzpet. Performs professional revision the activities done by divisions and boards of marzpettaran.
Counselor of marzpet Assistant of marzpet Press secretary	Marzpet performs the division of the duties among them.
Administrator of personal	- Manages the current operations and staff of marzpetaran. - Coordinates the work of divisions and boards - Organizes the reception of citizens. - Initiates the discussions on the applications, appeals and objections of the citizens.
Chief finance specialist	- Manages financial and accounting services. - Organizes the reports on financial/budgeting, tax, statistical, and tolls.

2) Structual divisions

Marzpataran has the following structural divisions:

1. Boards
2. Secretariat
3. Divisions
4. Separated units

The government of Armenia approves the structure of marzpetaran.

There are certain areas where marzpet implements regional policy of Armenian government.

3) Finances:

- Manages and controls the resources designated to marz, also he oversees monitors the target usage of the communities' resources.
- Supports and coaches local self-governance bodies in the planning the budget project proposals.

4) Civil construction and Housing/utility

In the area of civil construction and housing/utility services marzpet:

- ✓ Organizes the main projects for the region's settlements and presents for the approval of the government
- ✓ Initiates the demarcation lines with administrative borders and makes the proposals to the government for the changes
- ✓ Organizes apartment constructions, implements civil construction monitoring, controls and oversees the construction process to make sure of the legacy
- ✓ Coordinates the construction work with the communities
- ✓ Organizes wastes and garbage disposal

5) Transport and Road Building

In the area of transportation and road building:

- ✓ Organizes intercommunity public transportation
- ✓ Organizes the construction of roads, tunnels, other engineering construction, and supports road building and maintenance

6) Agriculture and Land Utilization

In the area of agriculture and land utilization, marzpet:

Possesses and utilizes the lands residing out of communities' control under the state's property

- ✓ Oversees and maintains the demarcation of borders
- ✓ Presents the land utilization schemes to the government
- ✓ Controls the utilization of the land, its usage, and maintenance. Suspends unlawful usage of the land
- ✓ Implements the construction, maintenance and exploitation of the irrigation systems

6.1.3 History of Natural Disaster

Main natural disasters in Syunik region are considered earthquake, floods and landslides.

(1) Earthquake in 1968

There has been one strong earthquake in 1968 in Kajaran/Kapan city. No great destructions and casualties were recorded.

(2) Flood in 1972

In 1972, there was great flood in Kapan city. There were 3 casualties. The Voxhji and Vachagan rivers were overflowed by causing large destructions. The next large flood was on 2005, May 25. There were 2 casualties in Kapan city.

To combat these disasters requires large sums and efforts. No community has necessary resources for these purposes. So, the government is in charge of disaster management.

(3) M. Harutunyan street landslide in 1994

M. Harutunyan street landslide occurred in 1994, August. Some 400.000[5] m^3 lands had been moved affecting huge damage to the neighboring areas and three (3) people died. Another slide occurred in 1996, February. To compensate the families around 83.9 million drams were disbursed from the state budget. Thirty five(35) families were compensated for immediate housing needs. 1.5 million drams were spent on fence building along the Harutunyan street in 2003. Overall, 620 million drams were planned for anti-slide measurement activities. Out of this sum, in fact 558 million drams were allocated and disbursed.

(4) Flood in 2005

The May 29 torrential rainstorm with a rainfall of 18mm/sec, supported by a wind at a speed of 18m/sec, started at $17^{\underline{15}}$ and lasted till $18^{\underline{00}}$, which turned into a serious disaster for the population **.** The disaster took losses in 2 human lives. In order to assess damages caused by the rainstorm an official commission has been formed on the Decree of the Town Mayor**.** The total cost of the damage caused to the town has been estimated at approximately 85mln. AMD (or 185000USD).

The main activity against natural disasters is being carried out by EMA (Emergency Agency). This agency, while being a government agency, makes its plans along with government plans.

6.1.4 Culture of Kapan and Moral Environment in the city

Kapan city has a very unique cultural values and traditions. The population of the city (as well as in the region) speaks its own dialect which roots back to the centuries. All of the

[5] The source of these data is from the “Reference of Syunik marz land slides”, Syunik marzpataran

Armenian manuscripts mention Syunik region starting from an ancient times that indicates the existence of core Armenians living in the region. People place high value of their national origin and huge cultural heritage from their ancestors.

(1) Language- Kapan

One of the key elements of the unique nature of the social life in the city is the language-Kapanian dialect. It is prevailing language at any level of communication. Although literal Armenian is widely used in the formal relationships, local people are very quick at slipping into the native dialect.

(2) Religious

Generally, Syunik region is well known of its great religious past especially in medieval ages. There has been a spiritual/religious complex operating in Tatev village during the medieval ages up to the Soviet times. It is located some 40km far from the city. There have been similar complexes in the area coming from 10th century-called Vahanvank. It is situated 10km off the city.

Christianity is the only religion for Armenians, which is not exception with Kapan. Recently, some sects are intruding into Armenians' life but they seem to be tiny part of the society's life and people have extremely negative attitude towards them.

(3) Event and holiday

Most ceremonial events are coming from the Christian religion and well set by Armenian Church. During Soviet era those events were almost extinct and replaced with communist holidays, like May Day or the Red October day. The only Soviet celebration day is remaining is May 9, a victory day with World War II. Old Christian holidays are now in force-Christmas, Easter, etc. Also, the independence day of Armenia, the day of the Armenian constitution is added into the new holiday list.

Locals promote any event of the local importance. Elections of local and national governments are viewed as the events of great importance. There are events of cultural, traditional, and ritualistic nature. There is an event called sabbatical, when people go out with communities and clean the neighborhood. Community leaders along with formal leaders, i.e. the leaders of the legal entities manage the operations.

Usually, people have three meals for a day. Sometimes people share dinners with relatives

and friends.

(5) Homogenous population

Kapan city has pretty homogenous population, as is the case with the whole Armenia. There is only small Russian community that can be up to 1% of the population. The population of the city is located among tagamas have similar characteristics. The lifestyle and the values of different tagamas are almost the same. There can be slight differences in lifestyles of people living in tall buildings and private houses.

(6) Influence of Soviet era

People are still under the influence of Soviet autocratic leading traditions, especially the old population. As it is well known, the Soviet system discouraged people from being initiative in communities and up brought generation who are mostly followers to the communist leaders. Today, after 14 years of independence and local self-governance, people start to realize the importance of the inter-communities' union. Under the conditions of being well informed and making sure that the individuals can be actively involved in local community's life and assuming that the community leaders can well define the roles of individuals there can be stated that people will be initiative and socially active.

(7) Water supply system

Until 1950s there has been no integrated water supply system in Kapan city. Since 1960s potable water supply system has been created along with development of the city's infrastructure. Still, some tagamases (including in tagamas of landslide area) use natural spring waters along with centrally supplied water. For irrigation purposes river waters, spring waters, and partly from Kapan-Uzhanis water pipe that operates since 1980s. Nowadays, the potable water pipeline system has very poor network. Mostly, it is depreciated.

6.1.5 Outline of tagamas and condominium in Pilot Project Research

(1) Condominium

The Condominium is established to manage the real estate and the common property of multi-apartment buildings. The common property includes elevators, entrances, roofs, and communications of the buildings. The chairman of the condominium is elected by the activists of the buildings that are unified within the condominium. Each condominium is comprised of typically 5-6 building, sometimes up to 15 buildings. The activists are

elected among and by the residents of the buildings. According to the law of Armenia the condominium is NGO. Each member of condominium pays membership fee based the property size. The size of the fee is calculated on the area. The rate is regulated by the government; the upper and lower bounds are set according to regions in Armenia.

The income generated by the fees is mostly utilized to finance the maintenance and the development of the estate. Sometimes, there are other donors supporting the communities. Such organizations as Urban Institute, Save the Children initiated the establishment and further operations of Kapan condominiums.

(2) Taghamas

Tagahmas is an organization established by private houses. The residents of private houses of the neighborhood area elect tagamas representative. The election method is direct, i.e. the residents directly vote for the representative. The tagamas representative is a legal person to act on the behalf of the residents and present various problems to local authorities.

Taghamas does not have common property. This is the reason that it does not have a budget. The consensus is reached through the general meeting of the residents.

Usually, the residents initiate to conduct small scale operations such as cleaning or repairing something of great importance. This could be the case in condominiums.

The condominiums and tagamases have very small capacity to carry out any operation of larger scale as the combat against natural disaster or landslide. There are some cases when a strong wind destroyed the roof or apartment windows. In those cases, the chairman or tagamas leaders present the problems to the local authorities who are in their turn to the government for compensation.

6.1.6 Social Survey

Social survey is carried out for the assessment of the needs of Kapan community related to the landslide management in M.Harutunyan street. Some 45 families are under the direct influence of the landslide and approximately 250 families live in a close neighborhood and can be considered as potential victims in the case if the landslide extends. The number of the people affected in this case could be summed up to 1000 people.

(1) Method of Survey

The survey was conducted by KCU, through questionnaire designed by JICA study team. A sample size of 20 people was selected; 10 people were picked out of landslide area another 10 was selected among the people living outside of the landslide. There are four groups of questions.

Result of need survey is attached in the Appendix 6.1.3

(2) Consideration on Need Survey

1) Population structure in the survey

The first group of the questions tries to identify the population structure. According to the survey design, 10 people interviewed were from affected and neighborhood area. Out of 10 people, 5 live directly in the affected zone and all of them think that their houses have been greatly damaged.

2) Source of income

The main source of income for those 10 questioned is as follows:

1 out of the 10 interviewed is coming from tourism, 2 is from trade, and the rest of the 7 are generating their income from other sources but not from agriculture, cattle breeding, industry, tourism, construction or trade. The other 10 people questioned are living far from the landslide area. One is busy with agriculture, 1 with cattle rising; the other 8 are earning their income from other sources. It does not include agriculture, cattle breeding, industry, tourism, construction or trade.

Supposedly, this information about the income generation helps us to conclude that 15 people out of 20 generates its income basically from state funded jobs, state benefits, social security incomes, and transfer payments from abroad.

3) Will to live in Kapan city

Out of 20 questioned only 7 mentioned that they do not have anybody left Armenia. Three of them are from landslide area. It is supposed that those who live in the slide area left the city or the country more than those living far from it. The majority of those who live (4 out of 7) have been settled out of Armenia, a small portion of the affected population (one out of seven) have been settled in another part of Armenia. One out of seven leaves the country for the seasonal job; another one leaves for the seasonal job within the territory of Armenia.

The picture is the same for those who live far from the landslide area. There is a very slight difference that there were no people who left for a seasonal jobs.

Nine out of 20 answered that they would not like to leave the city; out of this nine people only three lives in the affected area.

Around 10% of the questioned said that they will leave the city as soon as they have the opportunity. Five out of 10 who lives in the affected area would like to leave the city but only for short time.

Some 15% of the questioned would like to live in the city but they would like their children to live in other places.

4) Landslide Knowledge and Actions

Mostly, people believe that the landslide is the result of rainfalls. Ten people out of twenty think that the landslide is due to the rains and humidity; out of ten two lives in the affected area.

Some part of the interviewees has no idea where the landslide is stemming from. Three out of 20 lacks knowledge about how the landslide is being originated.

The rest of the questioned believe that the cause of the landslide is the construction works made in no proper time, bad conditions of entrails, man made reasons, agricultural works, etc.

It turned out that people have vague idea how to cope with landslide and what actions should be taken. This is why people were guessing randomly among different answers like engineering survey, drainage survey, drilling, drainage building, nothing just resettlement of population, strengthening of soil bases. The answers are almost evenly distributed across the sample of 20.

The population is basically willing to invest labor voluntarily to cope with the landslide problem. Seven out of 20 is willing to support with their labor. Especially, people are willing to assist the planting process. Unfortunately, there are people who are not willing to help to anti slide measures activities and do not have an idea that they can be helpful in any way.

People believe that it is possible to cope with the landslide. However, they think it is not possible to do it in a short time. Most of them believe that it is possible to successfully

combat with the landslide only with the joint efforts of appropriate specialists. Some 25% of the respondents think that landslide demands long term managements and lots of efforts. Especially, people living near the slide area think in this way; 4 out of 5.

Some 28% of the respondents think that landslide is a natural phenomenon and can be reduced only in part.

5) Treatment against the landslide

As a continuation of the last question, some 76% of the respondents are sure that it is necessary to perform large scale professional construction works (drilling, dam construction, large drainage).

Six out of twenty interviewees think JICA countermeasure works should include study and drainage system for underground water (five of them are from the outside of the landslide area). Five of the respondents think that the soil should be removed. All of these people are from the landslide area. This issue is of the highest concern of the local residents.

Some people expect professional and financial investments, some believe that the population should relocate and some do not know.

The implementation with the experts from JICA is the most favored approach for the respondents; seven out of twenty. Four people stress the active participation of the local residents. The works should be coordinated from one center as three respondents see.

6) Knowledge on Formal and Non-formal Organizations.

The respondents basically are aware of the formal organizations. Especially, people know those NGOs operating in Kapan region such as KCU, OXFAM and World Vision. Eighteen respondents out of twenty identified the above mentioned organizations. Four of them mentioned mining company; others identified various types of governmental and commercial organizations as they appeared on a list.

Simultaneously, six of the respondents are members of the above mentioned organizations or cooperate with them as there is a necessity to do so. Meanwhile, there are people who did not know or participate with any of the organizations.

Nine of the respondents are satisfied with the current activities of the organizations they are familiar with. Five out of twenty would like to change the current affairs in the organizations but they fail to mention what and how. Some 10% of the respondents could

not answer the question.

The overwhelming majority of the respondents (13 people out of 20) are sure that there is no a general assembly in Kapan city. Five of the respondents do not know anything about it (general assembly of the city).

However, two of the respondents think that there exists such an assembly, sometimes take part of the sessions. These sessions take place once for a year according to these two people. These two people did not know what issues have been discussed during the assembly meetings but they are sure that the issues of the landslide must be discussed in general assembly meetings.

7) Future Development Plan of the City

Most respondents believe that the most promising fields for future development of the city are industry, tourism and construction.

Eight out of twenty respondents believe that for the development of the city a special committee must be established. This committee must take into the account the proposals coming from the population. Nine of them believe that the Mayor must develop the development plan of the city, and seven of them think that the Mayor must get consulted with the local authorities. Three of the respondents think that the community council must do it on its own.

The vast majority of the respondents would like to participate on those works with high interest; four out twenty would like to take part on those works depending on the conditions; three people would like to participate from time to time and only one person refused to cooperate in any way.

6.2 Formulating a Mechanism for Community Initiative

The agreement between JICA Study Team and by the Marzpetaran of Syunik Marz, Kapan City Hall, the Ministry of Urban Development (MOUD) of RA and Kapan Communities Union (KCU) NGO was signed to confirm the purposes and procedures of the pilot project to be implemented in the Harutunyan str. land slide 1n3rd of June, 2005.

6.2.1 Planning of Executing Procedure

Major target of pilot project is establishing of a working commission to execute the landslide disaster management independently. The structure to implement the pilot project was planed and executed as shown in the Figure 6.2.1.

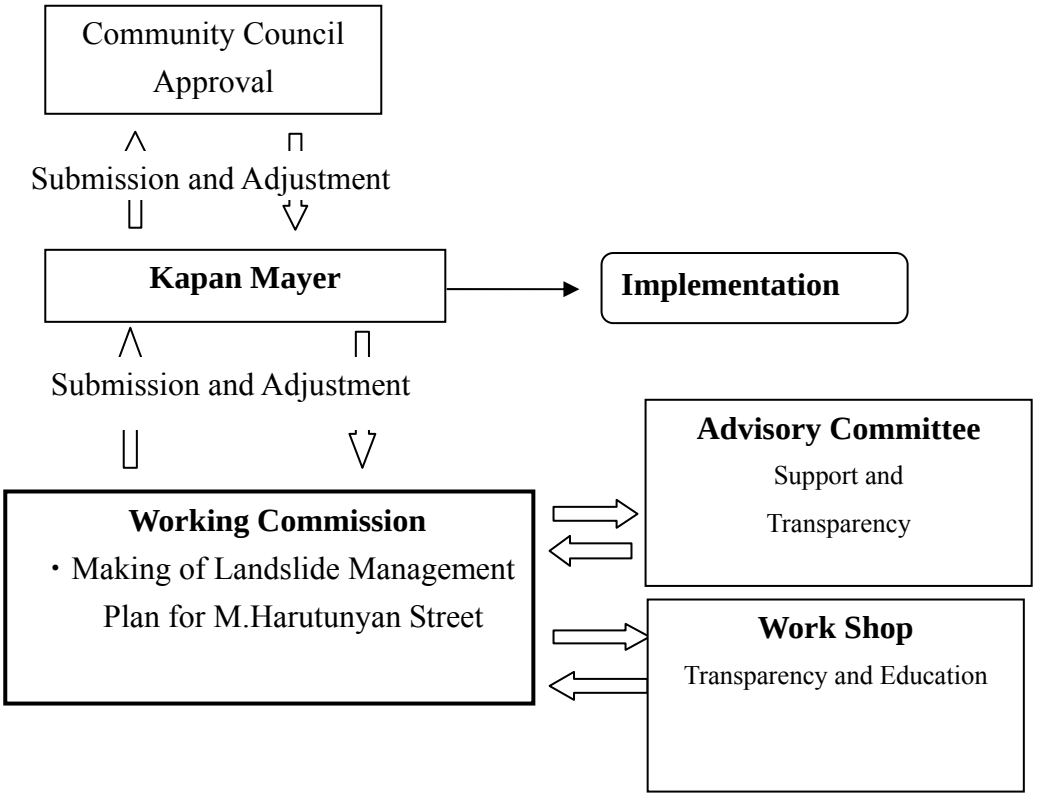


Figure 6.2.1 Process for the Pilot Project in Kapan

The working commission operated activity on landslide management for M.Harutunyan street landslide such as need assessment, monitoring of the landslide, field survey in corporation with JICA study team. By the result of the activities, the working commission made up a plan of disaster management for the landslide that is proposing to the city Mayer.

6.2.2 Formulating Working Commission and Advisory Committee

(1) Working Commission

The JICA study team selects the Kapan Community Union as important partner to implement the pilot project successfully.

Formulation of working commission was made by KCU who have experiences in various field for over five years as NGO in Shunik marz and is well acquainted with the social condition in Kapan city and its vicinity areas.

Member ship of the Working Commission was consisting of two representatives of Kapan municipality, one Syunik martpetaran, two taghamas leader, three staffs KCU and staffs of JICA study team as shown in the Table 6.2.1.

Mr. Armen Sargystan who was the executive director of KCU was selected Leader of the woking commission.

Table 6.2.1 Working Commission Member List

Name	Position/Occupation
Armen Sargsyan	Chair of Wk/C Executive Director of Kapan Communities Union
Vilen Badalyan	Head of Department of Urban Development of Kapan City Hall
Hamlet Hayrapetyan	1st degree Specialist of of Urban Development Department of Kapan Municipality, Tagh Representative of Yerkatukhayin str,
Razmik Avetisyan	Vice Head of Urban Development Department of Syunik Mazpetran
David Voskanyan	Condominium Leader of M. Harutyunyan str. Kapan
Gevorgyan Henrik	Condominium Leader of "Achapnyak" region in Kapan
Levon Avanesyan	Chief Specialist of "Kapan Community Union
Ara Ghonyan	Kapan Communities Union, lawyer
Makito Noda	JICA Study Team
Masatoshi Eto	JICA Study Team
Masatoke Tsuda	JICA Study Team
Mikihiro Mori	JICA Study Team

(2) Advisory Committee

Advisory committee was organized by MoUD as shown in the table 6.2.2. That is composed of three MoUD staffs, two executive staffs of Shunik marzpetran and one executive staff EMA' Shunik branch office.

Table 6.2.2 Advisory Committee Member List

Name	Position/Occupation
M.Alexander Movsisyan	Head of the scientific & technical policy MoUD)
Sargis Margaryan	Deputy Head of the scientific & technical policy MoUD)
Gevorg Gevorgyan	Chief specialist of the scientific & technical policy MoUD
Rouben Sargisyan	Deputy Marzpet of Shuni Marz
Archak Ustabashiyan	Head of Department of Urban Development of Shunik Marz
Artur Harutyunyan	Head of EMA of Shunik Marz

6.3 Activity of the Working Commission

6.3.1 Activity of the Working Commission

Major works of the working commission are planned as listed below that was carried out by the JICA study team and Working Commission.

a) Formulation of the "Working Commission"
b) Coordination between the resident, Kapan city and Marzpetran.
c) Need assessment of the resident, Kapan city and Marzpetran.
d) Research on the social structure of Kapan city and Taghamas concerned.
e) Implementation of monitoring devices and monitoring
f) Field survey of hazard condition in cooperation with JICA study team
g) Planning of the rehabilitation work and management system for the M.Harutyunyan Street Landslide to propose the city Mayer.
h) Opening workshops to transfer the result of the activity

6.3.2 Process of Activity

(1) Working Commission

Pilot project in Kapan city was started from 3rd June 2005 when the agreement was signed between concerned organizations. And, it was finished 30th November 2005 after the 7th working commission was held that activities were continuing for the next stage. Process of working commission activity is summarized as shown in the Table 6.2.3.

Table 6.3.1 Process of Working Commission

Wk/C	**Date**(2005)	Theme/ Result
1St	22nd Jul.	- Policy to execute the pilot project. - Discussion on how to prepare the PDM. - Discussion on need survey result.
2nd	10th Aug.	- Discussion of policy to execute the pilot project - Planning the workshop and discussion on Advisory Committee meeting. - Discussion on landslide mechanism.
3rd	16th Aug.	- Discussion of the PDM. - Planning work shop issues, and propose to. - Organization of Landslide Disaster Risk Control Team.
4th	16th Sept.	Discussion for finalization of the Project Design Matrix.
5th	12th Oct.	- Discussion on countermeasure methods. - Decision; Plan II (recover two lane traffic plan).
6th	2nd Vov.	- Discussion of proposal for the Mayer and approval for the draft. - Discussion on financial preparation implements the countermeasure works.
7th	30th Nov.	- Discussion on the economic evaluation. - Confirmation of the policy of countermeasure work for Plan II. - Discussion on financial preparation to execute the countermeasure work. (In the 3rd Advisory Committee, the city Mayer and the Deputy Marzpet recommend the plan III- the full rehabilitation plan)

(2) Advisory Committee

The process of the working commission was presented to the Advisory Committee that approved the process of the working commission activity or recommended for next stage.

Advisory committee was opened three times as shown in the course of the pilot project.

Table 6.3.2 Meetings of Advisory Committee

Ad/C	**Date**(2005)	Theme/ Recommendation
1St	6th Jul.	Advice for the pilot project implementation process and approve Working Commissions members
2nd	15thAug.	Advice for the Pilot Project implementation process and discussion of future works budget
3rd	22nd Nov.	- Discussion on the landslide mechanism of M.Harutunyan street landslide - Discussion on the "Landslide Management Plan" especially for the countermeasure planning. Advisory Committee recommended to select the Plan III; full implementation plan of landslide.

(3) Transparency and public relation

In the course of opening working commission meetings and advisory committees, materials and details of meetings are delivered and reported to concerned persons of the Kapan city

hall, the marzpetran, and people of the taghamas and the condominium. And, for every meeting, a local TV net-work came to collect information on the meeting and reported to residents how the pilot projects were going in TV news.

Transparency and public relation was achieved to some extent.

6.4 Result of the Pilot Project

6.4.1 Proposal for the city Mayer

As a result of activities in the pilot project, a proposal on "Disaster Management Plan for The M.Harutunyan Street Landslide" was prepared to submit it to the Mayer that was made up by the working commission. This proposal is composed of two plans to manage the landslide disaster of the project site. (refer to Appendix 6.4.1 & 6.4.2)

(1)Disaster management plan for M.Harutunyan Street landslide

(2)Countermeasure implementation Plan

These plans are going to propose to the city Mayer to introduce the infrastructure implementation plan of Kapan city.

(1) Disaster management plan for M.Harutunyan Street Landslide

In the process of the pilot project, a group was formulated to manage the landslide of M. Harutunyan street. Active people were being involved in the group living in the neighboring area. The main tasks of the group were:

1. Monitoring for identification of landslide features.
2. Monitoring and recording of the results.
3. Maintenance and control over monitoring devices.
4. Reporting to the governing and interested entities.

Each member of the group had its area to monitor. He periodically reported to the leader of the group on the changes on its area. The leader and the members of the group were instructed how to act in the case of emergency: they call to the Mayor, Marzpet, the board of emergency in Syunik region and Kapan community union.

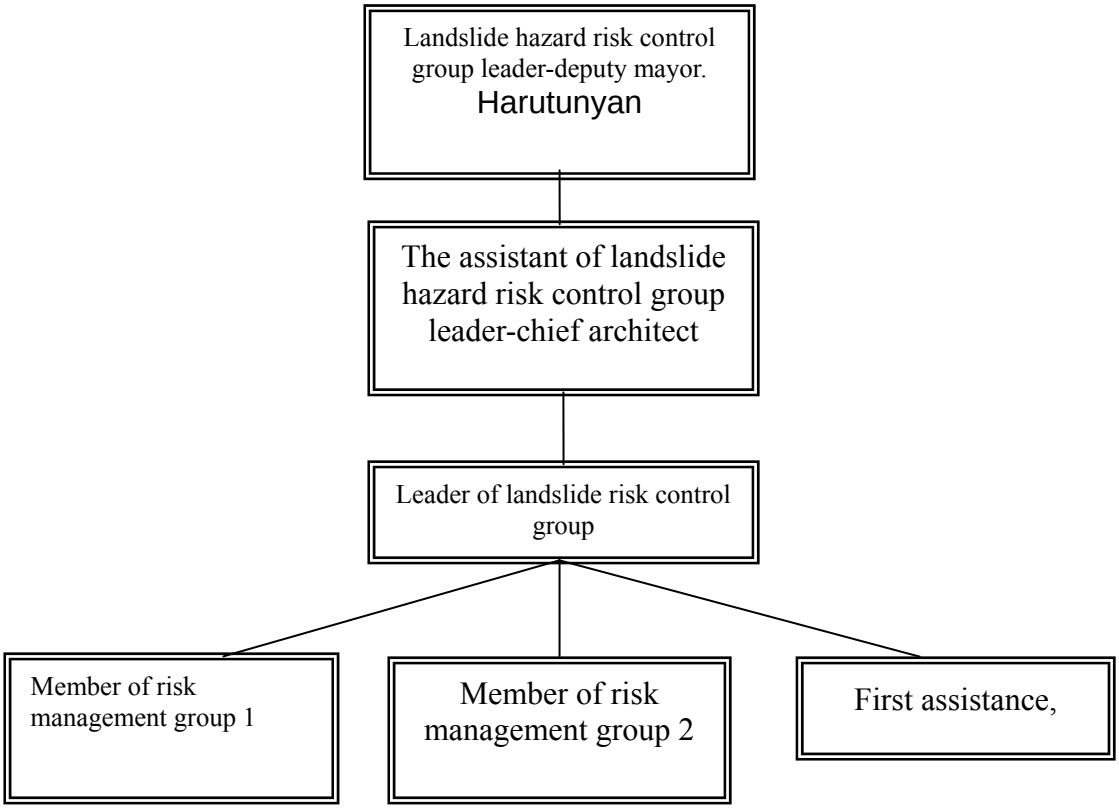


Figure 6.2.2 Risk Management Organization in the Pilot Project

The structure of the proposing "Disaster Management Plan" is based on these activities in the pilot project. This plan is comprised of following content.

1. Introduction
- 1.1 Back Ground
- 1.2 Objective of the Committee
- 1.3 Area

2. Organization
- 2.1 Organization
- 2.2 Role of Unit

3. Activities of the Committee
- 3.1 Annual Conference
- 3.2 Regular Monitoring
- 3.3 Seasonal Inspection
- 3.3 Crisis Management and Urgent Inspection
- 3.5 Maintenance of Countermeasure Facility
- 3.6 Public relation and Data Filing
- 3.7 Promotion of Make up DTM in Non-organized area

In Kapan city, it is known another seven areas are being suffered by landslides. It is recommended to develop the proposing risk management structure to these areas.

(2) Countermeasure Implementation Plan

Three countermeasure alternatives were planned by JICA study team in the beginning of October after the field survey was completed that was presented to the working group.

Concepts of three countermeasures are:

1) Plan I :To keep the existing one lane traffic and control the landslide hazard
2) Plan II: To recover the two lane traffic and control the landslide hazard
3) Plan III: Full rehabilitation

In the discussion in the 5th working commission, every members of the commission liked to go Plan III, but, finally plan II was selected because of its cost performance was reasonable. Although strong recommendation to take Plan III from the Deputy Marzpet and the city Mayer, the working commission kept his decision in the last working commission. Preparation to implement the Plan II has started by KCU.

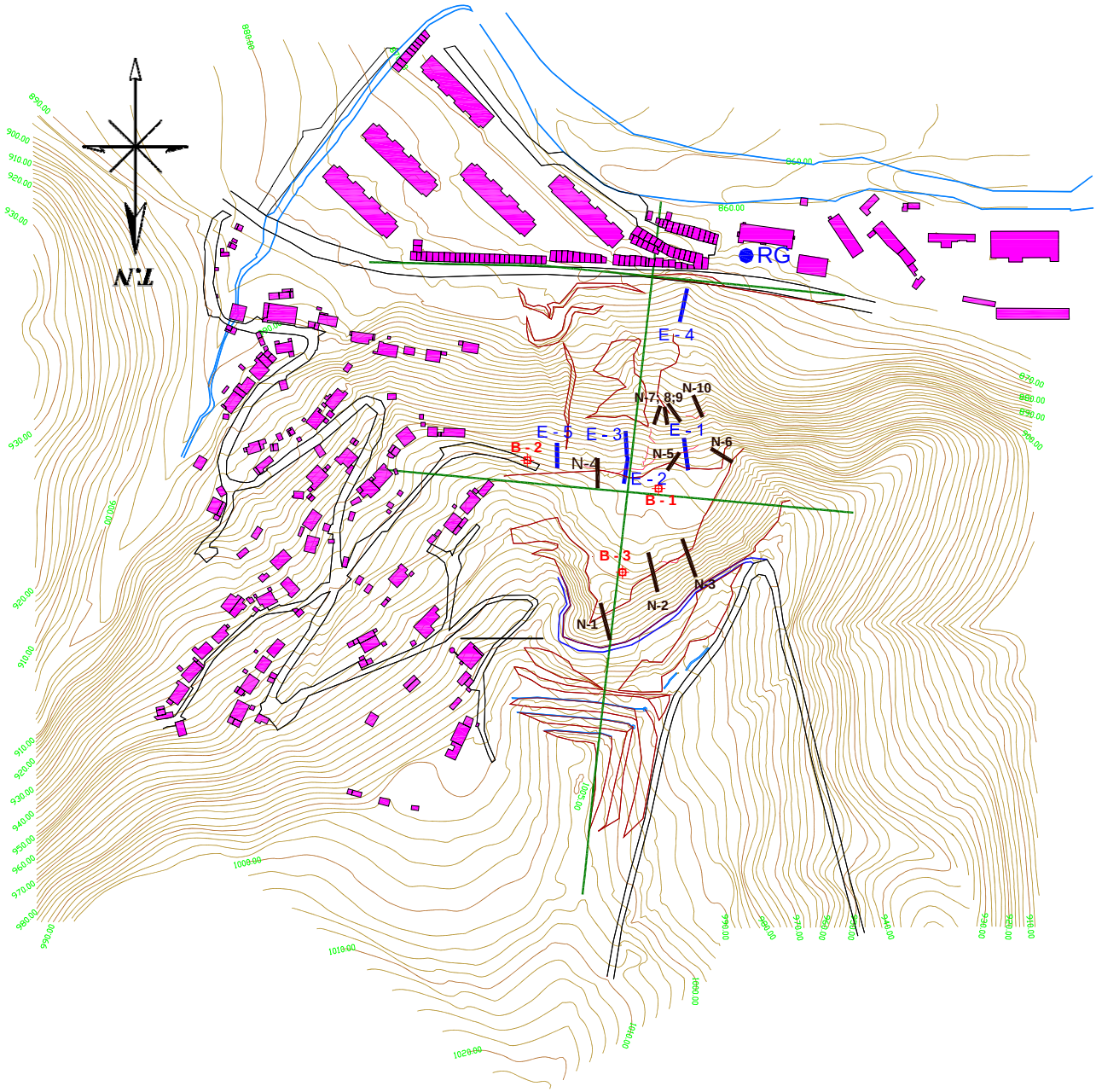
6.4.2 Supporting works to make the Disaster Management Plan

In the pilot project, social survey and need assessment were carried out by KCU that is summarized in the Chapter 6.1. And, in the field survey, hazard map, geological map/section, monitoring of “nukiita”, extensor-meter, and strain gage were arranged that are compiled in the Chapter 6.5

These social and geological data generated in the pilot project supported to make up the Disaster Management Plan.

6.5 Field Investigation

The field investigation was carried out to clarify the landslide mechanism and to make suitable disaster management plan for M.Harutunyan street landslide. This investigation was held by staffs of JICA study team, members of the Working Commission, and engineers of a subcontracted engineering company. (Quantity and specification of investigations are shown in Appendix 6.5.1 and location is shown in the Figure 6.5.1 and 6.5.2 with general view)



Legend

Drilling Point ● Seismic Investigation Line ———

Extenso-meter —— Nukiita ——

0 500

Figure 6.5.1 Location of Investigation

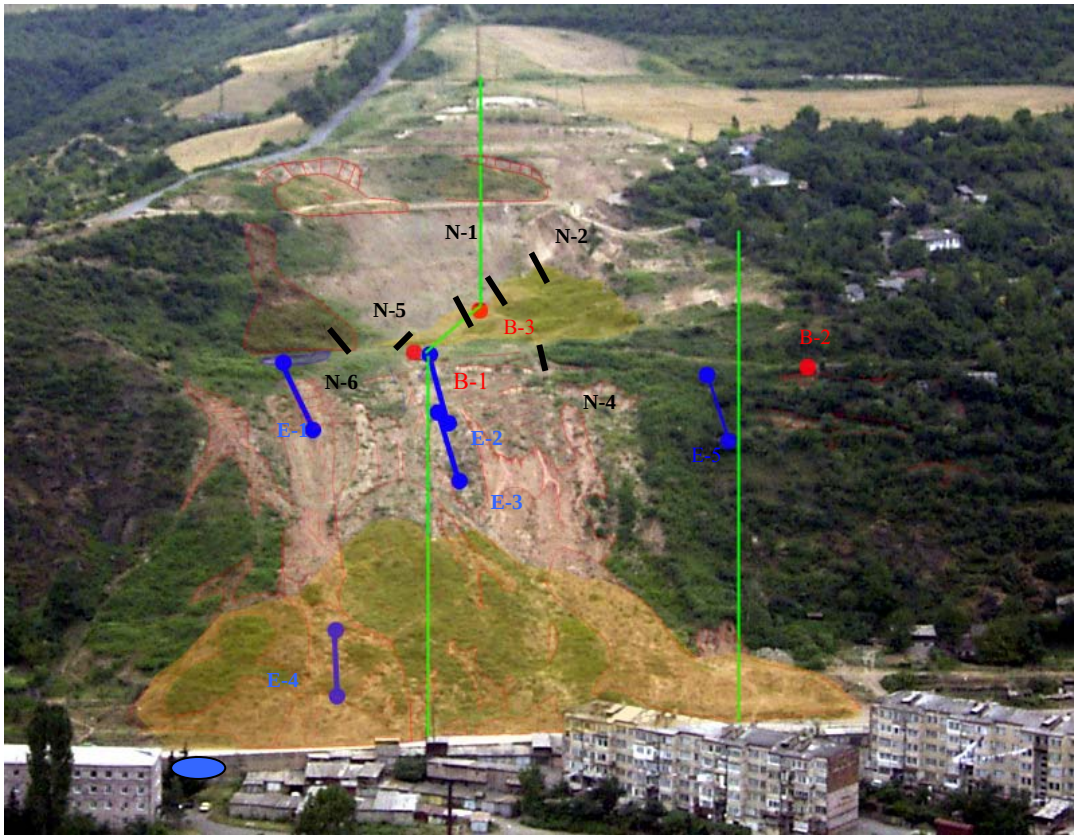


Figure 6.5.2General View and Location of Investigation

Legend

Boring（B-1 to B-3）		Geophysical Survey	
Extenso-meter		Raingauge	
Nukiita			

6.5.2 Hazard Condition

(1) Landslide Hazard Map

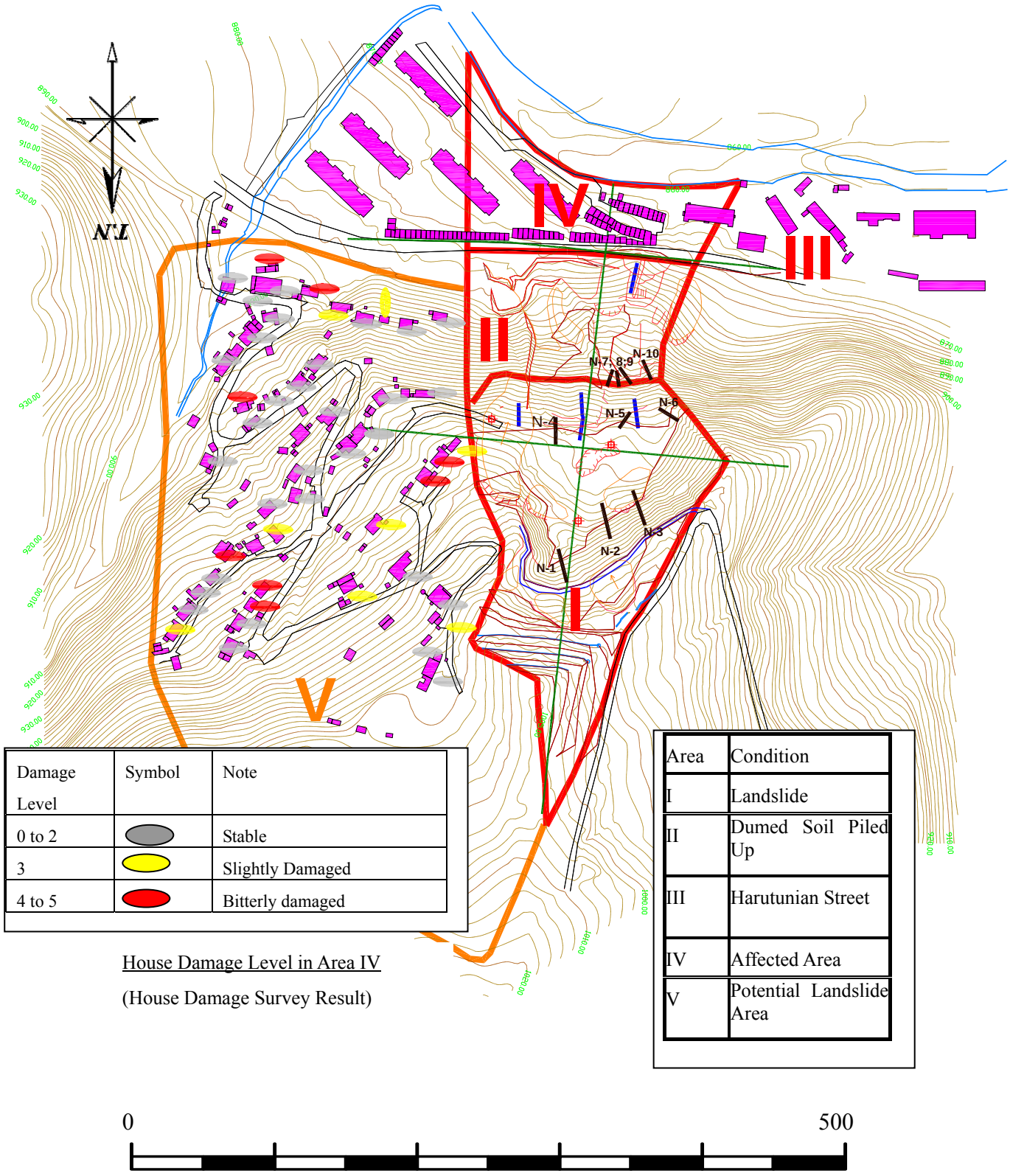
In 1994, the big landslide of 300,000 to 400,000 thousand M^3 occurred that killed three residents of Kapan city and blocked the railway and the M.Hartunyan street. From 1996, many effort had been done to rehabilitate the landslide, but in vain, because both of financially and technically.

At present, the M.Harutunyan street landslide area can be divided into following 5 sub-areas from the view point of hazard conditions and risk management. (Figure 6.5.3)

Area I and II is landslide zone that have potential to affect the road when they are in a critical condition such as heavy rain or a snow melting season. Zone III is the M. Harutunyan street and zone IV is the condominium. Those areas shall be protected by proper risk management. Area V is an area where the slope is formed by old landslides. For this area periodical monitoring is required to keep present safety condition.

Table 6.5.1 Hazard and Risk of the Areas

Area	Hazard and Risk	Required Activity and Treatment
I	・ 1.1 ha, Around 40 thousand M^3 of soils are still creeping. ・ Surface and subsurface water is concentrating to this area. ・ Creeping gently.(0.15mm/day; refer to the Appendix Figure 6.5A-1, 2)	・Monitoring and crisis management. ・Drainage of the surface water.
II	・ 0.9ha,Around 60 thousand M^3 of soils are ・ Surface water from the Area I make soils unstable in this area. ・ In dry season almost stable, but slip down in wet season.	・Monitoring and crisis management. ・ Drainage of the surface water. ・ Soil works for stabilization.
III	・ Around 150m of M.Harutunyan street. ・ Being affected by the landslide.	・Monitoring and crisis management ・Removal of soils to recover the two lane traffic
IV	700 families are being affected by the landslide.	・Monitoring and crisis management
V	・ 8ha, Fifty (51) families are living in the landslide area. Area made by landslide, at present stable. ・ Some families are being worried about their house damages.	・Regular inspection twice a year ・Improvement of drainage system ・Renovation for some houses heavily damaged.



Damage Level	Symbol	Note
0 to 2		Stable
3		Slightly Damaged
4 to 5		Bitterly damaged

House Damage Level in Area IV

(House Damage Survey Result)

Area	Condition
I	Landslide
II	Dumed Soil Piled Up
III	Harutunian Street
IV	Affected Area
V	Potential Landslide Area

Figure 6.5.3 Zonal Map of M. Harutunyan Street Landslide Area

6.5.3 Geological Condition

(1) Geological Setting and Structure

1) Geological Layers of the Site

The geological layers of the project area are consisted of basalt, pebble & gravel layer and pyroclastic loam layer. (From lower to upper) These layers are deposited discordantly that boundary are dipping to downward gently .Pyroclastic loam has bedding band that is also inclining gently to downward (northern side).

Table 6.5.2 Layers of Project Site

Geological Layer	Color	Geological Condition
Pyroclastic Loam	Yellowish brown to dark brown	・Homogeneous loess type loam interbeded with thin grayish pumice layer. ・ Classified CL or OL near to CHor OH in plasticity chart(Fig.6.5.4) N value=23 to 43 ・ This layer slide in 1994.
Pebble and Gravel	Dark brown to light grey	Pebble & gravel of sedimentary and granitic rock. Maximum diameter is up to 20cm. Well consolidated in outcrops.
Basalt	Dark Blue	Cracks well developed, but very sound and hard rock. Compressive strength over 500kgf/cm^2

Geological map of the site is shown in the Appendix 6.5.2

2) Geological Structure

As shown in the figure 6.5.4,

Three boring was carried out in the Area I that results are shown in the Appendix Figure 6.5.3. By the result of three nos. of borings and existing boring data that had been carried out in 1996 and 1999, the geological structure of the site is presumed shown in the Figure 6.5.4.

Pyroclastic loam layer/sand and gravel layer/basalt are deposited discordantly discordantly. Boundary of each layers are dipping to downward (southward) gently. Major fault is not found.

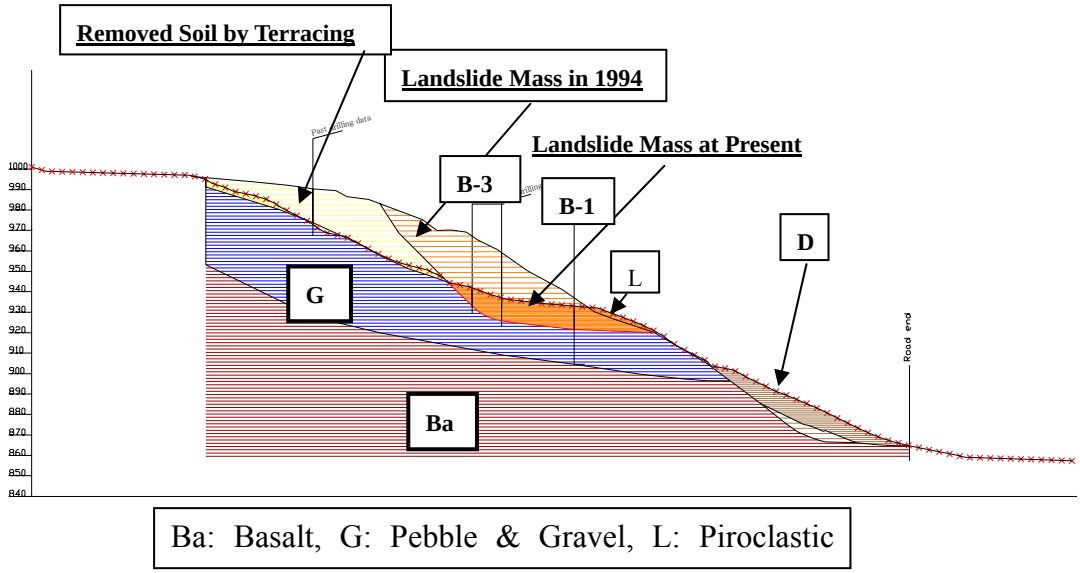


Figure 6.5.4Geological Section of Hartunyan Street Landslide

3) Depth of Slip Surface

Strain gage was installed in boring holes of B-1 and B-2 and monitored that is indicating depth of slip surface as below. (refer to Figure 6.5.6 and Appendix 6.5.12)

B-1: 7 to 10 meter depth; boundary of the loam layer/pebble & Gravel

B-3: 2 to 3m

4) Water level of depleted mass is around – 4m that observed in B-1.

(2) Stability of Each Zonal Area

1) Zone I: Landslide Area

Landslide movement was monitored from the middle of August by extensor-meters in this area. (E-1, E-2, and E-5, refer to Appendix 6.5.6; extensor-meter monitoring data). These are set in the front parts of the Area –I that shows total displacement until the end of October during around 80 days as shown in the Table 6.5.3. These monitoring results indicate that the Area I is creeping intermittently. The speed of main part of the area is creeping in a speed of 0.10 to 0.25 mm/day that is rather high considering the gradient of the gentle slip surface.

Table 6.5.3 Monitoring Result in the Area I

Location	Total Displacement(mm)	Speed(mm/day)	Remarks
E-1	－20mm	0.25	Shows intermittent movement
E-2	－7.7mm	0.10	
E-5	-95.2mm	1.75	

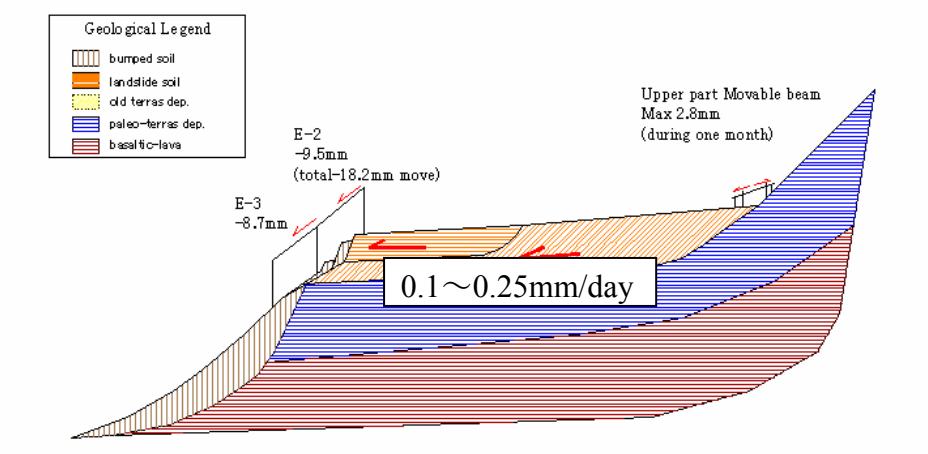


Figure 6.5.5 Schematic Profile of Stability of Area I

2) Cause of Instability of the Area

a) Presumed Strength of Slip Surface

Soil strength of former and present slip surface that is estimated by conducting back analysis is estimated as below. (Refer to appendix 6.5.9 and 6.5.10; estimation of slip surface: document in Japanese)

a) Former surface line (before landslide occurrence):

C= 5 tf/m^2, φ＝17.27°

b) Present surface line: C= 1.2 tf/m^2, φ＝8°

The strength of soil before occurrence of landslide August 26th 1994 is estimated rather high. It is presumed that very high pore pressure was act to the slip surface at that moment when the landslide occurred in 1994. But, it is considered the soils in the landslide changed to weak and soft by the abrupt movement of the soil mass. This calculation result shows that soil along present slip surface is near the condition of residual strength.

b) High Water Level

A small basin has been formed by the depression of landslide movement in this area where the surface water easily concentrates. So, the ground water level of this area is kept rather high, even if in dry season that the water level is found around 4m by the result of Boring B-1 and B-3. The water level will be higher level in a wet season that will make the soil mass more unstable. (Refer to Appendix 6.5.11; document in Japanese)

2) Zone II: Dumped Soil Area

Extenso-meter E-3 and E-4 is set in this area. Monitoring result in these places is shown in the Table 6.5.4 that shows small block of soil mass slips intermittently under the very few rainfall condition.

Table 6.5.4 Monitoring Result in the Area II

Location	Total Displacement(mm)	Speed(mm/day)	Remarks
E-3	+108.8mm	1.38	Shows intermittent movement
E-4	+110.2mm	1.39	

3) Zone III: M.Harutunyan Street and Zone IV Hartunyan Street Condominium

Zone III and Zone VI are affected areas by the landslides of Area-I and II. They are stable themselves. But proper risk management shall be done for these areas.

4) Zone V: Yerkatughain Taghamas

Yerkatughain taghamas, Zone V is situated in an area which had been formed by old landslides. But, it is judged stable at present, because no deformation was found in the slope. Result of house damage survey is shown in the figure 6.5.3 and Appendix 6.5.8. Some houses are deformed heavily that is judged settlement of ground or they are deteriorated itself.

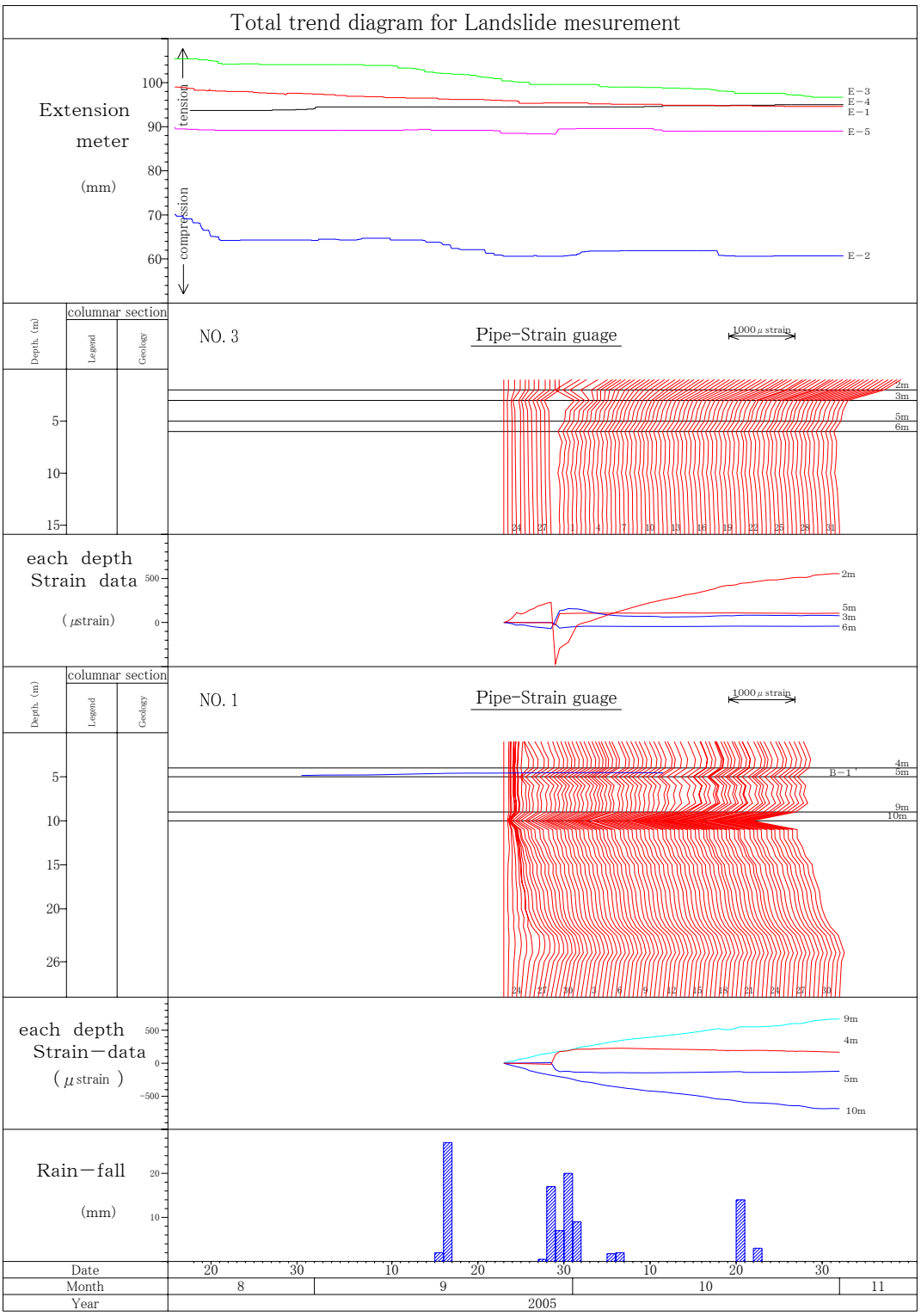


Figure 6.5.6 Monitoring Result

(3) Soil Test

Five (5) samples of various soil samples were delivered for the testing. The number of tests is listed in Table 6.5.5 and results of them are shown in the Table 6.5.6 and detail data is shown in the Appendix 6.5.15.Tests were conducted by the US standard ASTM.

Table 6.5.5 Sample for Soil Test

	Work Item	**Quantity/ Sampling Site**					**Total**
		SP-ka-01	**SP-ka-02**	**SP-ka-03**	**SP-ka-04**	**SP-ka-05**	
Sampling depth		GL-3.75m	GL-4.5m	surface	active cliff	dumped area	
Type of Sample		core	core	hand	hand	hand	
1	Specific gravity test	1	1	1	1	1	5
2	Moisture content test	1	1	1	1	1	5
3	Atterberg limit test	1	1	1	1	1	5
4	Grain size /Hydrometer test	1	1	–	1	–	3
5	Organic matter content						
	- N: Nitrogen				1	1	2
	- P: Phosphoric acid				1	1	2
	- K: potssium				1	1	2

1) Specific gravity test: Specific gravity is in the range of 2.71 to 2.75 that is common soil property.

2) Moisture content: Moisture contents of samples are in the range of 6 to 25 % that is very low as natural soil. It is supposed the samples are dried before testing.

3) Grain size test: The obtained results are summarized in the Table 6.5.6 and Appendix 6.5.15

4) Atterberg limit test: The results is plotted on the Figure6.5.7 placidity cart. All samples are plotted near the boundary of CL or OL/CH or OH.

Table 6.5.6 Result of Soil test

Project Site					Pilot Project for M. Harutunyan street Landslide				
Location					M. Harutunyan street, Kapan city, R.A.				
Sample Name					SP-ka-01	SP-ka-02	SP-ka-03	SP-ka-04	SP-ka-05
Sampling Depth (m)					GL-3.75m	GL-4.50m	surface	active cliff	dumped area
Type of sample					core	core	hand	hand	hand
Test Item				unit	result data of each test				
Specific gravity test		ASTM D 854-92	G	g/cm³	2.708	2.700	2.728	2.748	2.713
Moisture content test		ASTM D 2216-92	W	%	9.18	3.23	21.65	6.47	25.77
Atterberg limit test	Liquid Limit	ASTM D 4318-95a	LL	%	45.79	46.66	46.24	51.99	45.34
	Plastic Limit		PL	%	23.41	22.26	23.30	23.41	25.17
	Plasticity Index		PI	–	22.38	24.40	22.94	28.58	20.17
Grain size / hydrometer test ASTM D 422-63 (Reapproved 1990)	breccia size (2～75mm)			%	0.76	0.11		0.03	
	sand size (0.075～2mm)			%	10.98	18.22		0.88	
	silt size (0.005～0.075mm)			%	29.1263	22.6873		27.0504	
	clay size (under 0.005mm)			%	59.1337	58.9827		72.0396	
	Maximum diamater			mm	<19	<4.75		<4.75	
	uniformity coefficient		Uc		–	5.5		–	
	curvature coefficient		Cg		–	0.40909091		–	
	60% grain size		D_{60}	mm	0.005	0.0055		0.003	
	50% grain size		D_{50}	mm	0.0035	0.0027		0.0016	
	30% grain size		D_{30}	mm	–	0.0015		–	
	20% grain size		D_{20}	mm	–	–		–	
	10% grain size		D_{10}	mm	–	0.001		–	
	fine grain contents ratio		Fc	%	88.26	81.67		99.09	
classification	Name of classification				volcanic cohesive soil	volcanic cohesive soil	volcanic cohesive soil	volcanic cohesive soil	volcanic cohesive soil
	symbol of classification				[VL]	[VL]	[VL]	[VH_1]	[VL]
Chemistry Analysis	K			%				1.64	1.64
	Na	exchangable		%				–	–
	N	(by Kjehldahl)		%				0.12	0.14
	PO_4			%				0.13	0.19
	Total Organic Matter Content			%				14.08	14.02

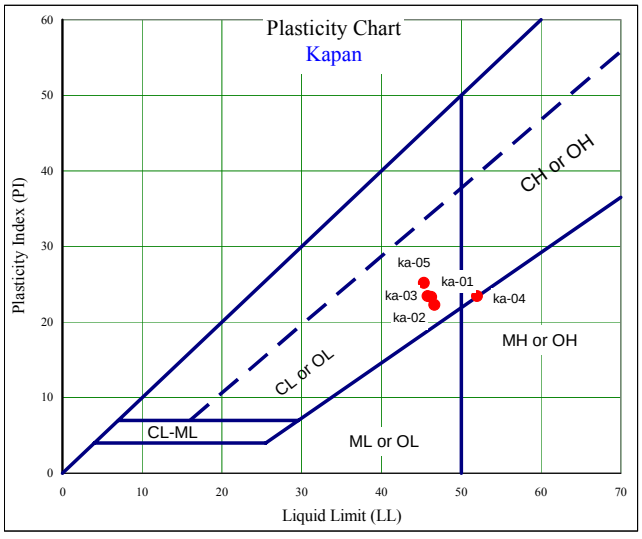


Figure 6.5.7 Plasticity Chart

5) Exchangeable sodium percentage of soil (ESP) and organic matter content tests

The results of analyses are presented in Table 6.5.7.

Table 6.5.7 Total Organic Matter Content Test

N	Sampling Site	K	Na (exchangeable)	N (by Kjehldahl)	PO_4	Total Organic Matter Content
		%	%	%	%	%
	Kapan					
1	sp-ka-04	1.64		0.12	0.13	14.08
2	sp-ka-05	1.64		0.14	0.19	14.02

Total organic matter content shows the proportion of rotted animals and plants. Laboratory test result indicates 14% of organic matters are including in samples. But, the feature of sample seems such high organic matter is included in samples. The unit is supposed not % but ‰ that is suitable value of organic content.

Content of K (1.64%)is not common that is supposed the unit is also ‰.
Kontent of N and PO4 obtained normal value.

6.5.4 Planning of Countermeasure Work

Considering conditions of project site, countermeasure alternatives to mitigate the landslide hazard has been studied.

(1) Countermeasure Alternatives

Wk/C cooperated with JICA study team has been studied how to improve the hazard condition of M.Hartunyan Street Landslide. Alternatives of countermeasure of three cases have been studied as below.

(Refer to Appendix 6.2.2)

Case I: To keep one lane traffic + Detouring road + Stabilization of slope by soil removing, gabion work and surface drainage work; Total cost; Around 80 thousand AMD

Case II: To recover two lane traffic + Stabilization of slope by soil removing, gabion work and surface drainage work＋Pavement of 800m pavement; Total cost; Around 90

thousand AMD

Case III: Full rehabilitation with stabilization of slope by soil removing, gabion work and surface drainage work; Total cost; Around 360 thousand AMD

(For each cases foresting by “Armenian Forest”; NGO is expected)

(2) Selected Rehabilitation Plan

The Working Commission has select case II alternative (6.4.2-3 &4)“Two Lane Traffic and Slope Stabilization” plan, which is the conclusion of discussion on three alternatives. The reasons to recommend the case II are as follows.

1.Today, local community in Hartunyan Street needs more secure land area on the affected zone.

- The social survey in the pilot project indicates that the local people hope to make the area to be safer. They are willing to participate in the management in any possible ways to reduce the risk of landslide. They also want the road full operated.

- The main road (M-2) at present is passing through the tunnel which is quite old and has not enough space for today’s big requirement. The Case II will give the solution on this issue.

- Cost for the countermeasure is reasonable comparing with the Case III; Full Rehabilitation.

Image scope for the selected plan is shown in the appendix 6.5.13.

Table 6.5.8 Rough Cost Estimation of Counterneasure Alternatives

CASE	Countermeasure	Unit	Unit Price	Quantity	Cost	Total Cost (AMD)
I	Cut	m3	1,800	5,600	10,080,000	(AMD)
	Gabion	m3	12,500	910	11,375,000	
	Open Ditch	m	14,000	1,100	15,400,000	
	Horizontal Drilling	m	6,000	720	4,320,000	
	Concrete （Sedimentation Pool）	m3	35,000	150	5,250,000	
	Detour Road	m	30,000	46	1,380,000	
	Grass Planting	m2	3,000	3,110	9,330,000	
	Free Frame	m2	3,500	5,890	20,615,000	77,750,000
II	Cut	m3	1,800	8,300	14,940,000	
	Gabion	m3	12,500	920	11,500,000	
	Open Ditch	m	14,000	1,220	17,080,000	
	Horizontal Drilling	m	6,000	720	4,320,000	
	Concrete （Sedimentation Pool）	m3	35,000	150	5,250,000	
	Grass Planting	m2	3,000	4,900	14,700,000	
	Free Frame	m2	3,500	5,890	20,615,000	88,405,000
III	Cut	m3	1,800	139,200	250,560,000	
	Gabion	m3	12,500	240	3,000,000	
	Open Ditch	m	14,000	2,080	29,120,000	
	Grass Planting	m2	3,000	14,720	44,160,000	
	Free Frame	m2	3,500	8,340	29,190,000	356,030,000

(3) Stability Analysis for Lower Slope

The lower slope will be formed the gradient at 1:2 with step of 3m width in every 7m height by soil work. The strength of soils here was investigated by the “portable dynamic cone penetration test”. Applying the investigation data the stability of the slope was checked by “Fellenius Method” that indicate the slope is safety. (refer to Appendix 6.5.14)

(4) Recommendation for the Costruction

Recommendations for the construction work are as below:

1) Construction shall be carried out during dry season.

2) Temporary guard fence shall be placed on the road during construction.

3) Soil work shall be carried out from upper slope to down slope.

4) Construction shall be stopped and monitoring for slope the slope shall be carried out with simple devices such as nuki-ita with inspection.