

5.3 ROADS AND TRANSPORT

5.3.1 Situation of Roads and Road Transport Facilities before and after Disaster

(1) Roads

Road transport is the most common means of transport in Banda Aceh City. Before disaster, total length of the road network in Banda Aceh City was about 495 km, consisting of the national roads of 12.7 km, the province roads of 22.4 km and the city roads of 460 km. In view of urban road role and function the roads in the city could be classified into four (4) categories as follows:

a) Main arterial road

It connects Banda Aceh City with other major cities/towns outside its boundaries and has major role to handle intercity traffics. The numbers of lane are 4 or more and total length is measured at 18 km.

b) Arterial road

It links one center to another within the city and has the numbers of lane of 2 or 4. Its total length is 29 km.

c) Sub-arterial road (collector road)

It has a role to complement the arterial roads and has the numbers of lane of 2 or 4. The total length is measured at 30 km.

d) Access road (street)

Access road is defined that is to handle the traffics of going in and out from the buildings. It has a total distance of 418 km.

Figure 5.3.1 presents the distribution of classified roads within the city.



Source: JICA Study Team

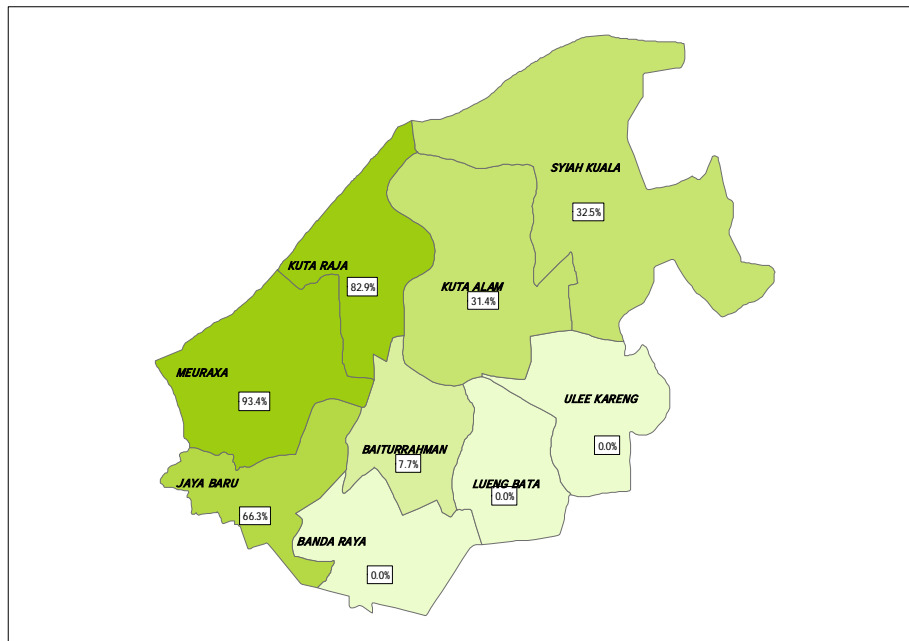
Figure 5.3.1 Classification of Roads

Damage on existing roads was assessed based on IKNOS satellite images taken before and after disaster. There is no damage on main arterial road, while damages are observed on arterial, collector and street at rates of 4, 7 and 40 % respectively. Table 5.3.1 shows road situation before and after disaster. Aerial distribution of the road damages are also shown in Figure 5.3.2.

Table 5.3.1 Roads Situation before and after Disaster

	Main arterial road (km)				Arterial road (km)				Collector road (km)				Street (km)			
	No damaged	Damaged	Total	Damage %	No damaged	Damaged	Total	Damage %	No damaged	Damaged	Total	Damage %	No damaged	Damaged	Total	Damage %
MEURAXA	0.0	0.0	0.0	-	7.6	0.5	8.0	5.9	0.0	0.0	0.0	-	1.2	55.3	56.5	97.9
JAYA BARU	3.5	0.0	3.5	0.0	1.5	0.7	2.1	31.0	0.5	0.0	0.5	0.0	13.3	27.3	40.6	67.3
BANDA RAYA	2.1	0.0	2.1	0.0	2.6	0.0	2.6	0.0	4.1	0.0	4.1	0.0	32.3	0.0	32.3	0.0
BAITURRAHMAN	3.3	0.0	3.3	0.0	1.9	0.0	1.9	0.0	5.2	1.0	6.2	16.2	43.9	3.3	47.2	7.0
LUENG BATA	2.8	0.0	2.8	0.0	0.3	0.0	0.3	0.0	3.9	0.0	3.9	0.0	28.7	0.0	28.7	0.0
KUTA ALAM	3.6	0.0	3.6	0.0	5.4	0.0	5.4	0.0	6.5	1.1	7.6	14.2	45.5	25.0	70.5	35.4
KUTA RAJA	0.0	0.0	0.0	-	0.6	0.0	0.6	0.0	0.7	0.0	0.7	0.0	5.7	33.7	39.4	85.5
SYIAH KUALA	2.2	0.0	2.2	0.0	4.3	0.0	4.3	0.0	4.0	0.0	4.0	0.0	50.4	24.4	74.8	32.6
ULEE KARENG	0.0	0.0	0.0	-	3.7	0.0	3.7	0.0	3.1	0.0	3.1	0.0	28.0	0.0	28.0	0.0
TOTAL	17.6	0.0	17.6	0.0	27.7	1.1	28.8	3.9	27.9	2.1	29.9	7.0	249.1	169.0	418.1	40.4

Source: JICA Study Team



Source: JICA Study Team

Figure 5.3.2 Aerial Distribution of Damages on City Roads

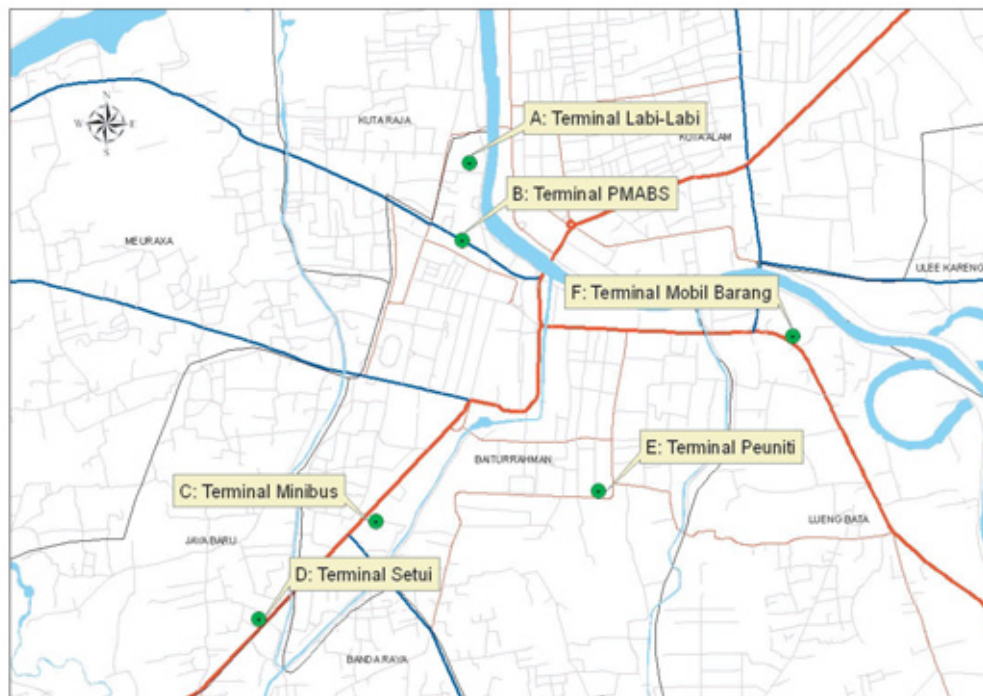
(2) Road Traffic and Safety Facilities Before and After Disaster

a) Traffic Signs and Road Marking

469 of traffic signs and about 12 km of road marking were set up in the Banda Aceh City, but 225 of traffic signs and about 6 km of road marking were damaged by the disaster.

b) Bus and Truck Terminals

There are 5 bus terminals and 1 truck terminal in Banda Aceh City. Both the Labi-labi and the PMABS terminals are located in the downtown, and Minibus and Setui terminals are located along the national road to Meulaboh, while truck terminal is located along the national road to Medan.



Source: JICA Study Team

Figure 5.3.3 Location of Bus and Truck Terminals

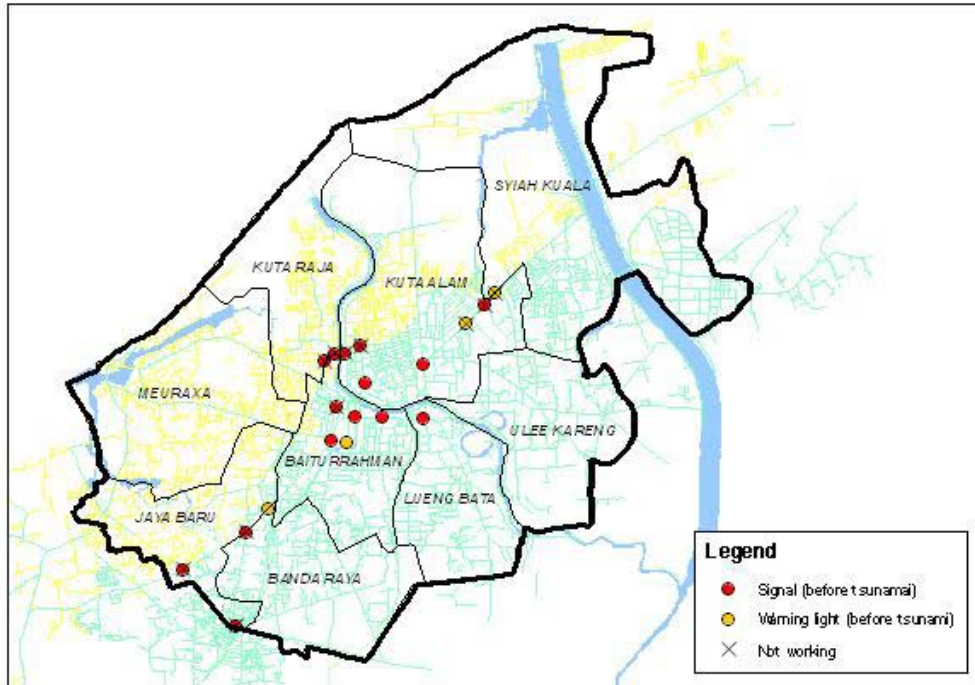
Labi-labi terminal was destroyed and now many of Labi-labi park on the nearby road in the vicinity of the PMABS. Also Damri and L300 park in front of the PMABS building and behind of the PMABS building respectively.

c) Traffic Control Facilities

Out of 15 signals and 4 warning lights existing, 9 signals and 2 warning lights are out of order after disaster. The location of such signals and warning lights is shown in Fig. 5.3.4.

d) Parking Lot

There are not sufficient parking lots in Banda Aceh City, in particular in the central area. It is common that a large number of cars park road side, resulting in hampering traffic flow and causing traffic jam.



Source: JICA Study Team

Figure 5.3.4 Road Signals

5.3.2 Bridges before and after Disaster

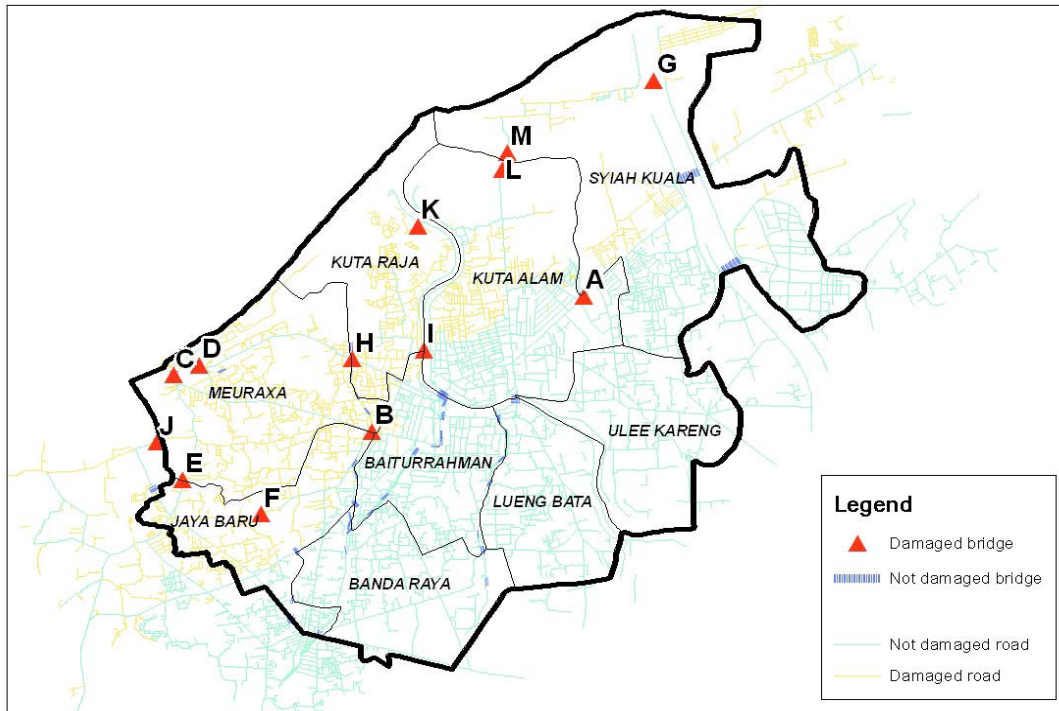
Banda Aceh City is divided into several sub-urban areas by rivers such as Aceh River and Floodway and their tributaries. There are therefore a number of bridges, 54 according to PU Dinas. Of those bridges 13 bridges are reported damaged with various magnitudes. Table 5.3.2 summarizes 13 damaged bridges and Figure 5.3.5 their locations.

Table 5.3.2 Details of Damaged Bridges

No	Bridge Names	River/Path	Location/Road	Desa	Type	Long (m)	Wide (m)	Condition
A	Lamprit	Kr. Titi Panjang	H.M. Daud Beureuh St.	Bandar Baru	Concrete	31	17	
B	Punge I	Kr. Doy	Slt. Iskandar Muda St.	Punge Jurong	Concrete	15	10	x fixed
C	Laguna I	Muara (Estuary)	Slt. Iskandar Muda St.	Ulee Lheue	Concrete	64	7.5	
D	Laguna II	Muara (Estuary)	Rama Setia St.	Ulee Lheue	Concrete	40	6	x
E	Lamjame	Kr. Lamjame	Soekarno-Hatta St.	Lamjame	Concrete	33	4	
F	Bitai	Kr. Neng	Surin-Bitai St.	Bitai	Concrete wood	8	5.5	x fixed
G	Aleu Naga	Kr. Cut	Alue Naga St.	Alue Naga	Concrete	325	2.5	x
H	Titi Tungkat	Kr. Doy	Rama Setia St.	Lampaseh	Concrete	16	10	
I	Peunayong	Kr. Aceh	Supratman St.	Peunayong	Concrete	102	17	
J	Lamteh (Ulee Lheue)	Kr. Lamteh	Lamteh St.	Gampong Blang	Concrete	40	4	x
K	TPA Kp. Jawa	Kp. Jawa Path	TPA St.	Kampong Jawa	Concrete	20	7	
L	Syiah Kuala I	Syiah Kuala Path	Syiah Kuala St.	Lambaro Skep	Concrete	11	11	
M	Syiah Kuala II	Syiah Kuala Path	Syiah Kuala St.	Deah Raya	Concrete	32	10	

Location/Road : : This road is specified as the (main) arterial road. : Others
 Condition : : Slightly damaged, : Heavily damaged, x: Broken/fallen

Source: JICA Study Team



Source: JICA Study Team

Figure 5.3.5 Location of Damaged Bridges

Plunge I bridge on the Doy River and on the Slt. Iskandar Muda street fallen down. In order to ensure traffic within the city, a temporarily bridge has been installed.

Laguna II bridge <D> on the Doy River and on Rama Setia street also fallen down. The road is still impassable as of July 2005.

Titi Tungkat bridge <H> on the same street and the same river was heavily damaged though it is passable.

Aleu Naga pedestrian bridge on Aceh floodway and Lamtech bridge on Kr. Lamtech also fallen down and they are still impassable.

5.3.3 Ferry Services before and after Disaster

There is ferry service between Kota Banda Aceh and Sabang Island, two (2) round trip services in a day. In Banda Aceh a ferry terminal was existed at Ulee Lheu as seen in Figure 5.3.6. The capacity of each ferry is 200 and 300 people, and the average number of passengers is about 50-100 people.

The ferry terminal was completely destroyed including a new terminal building in progress. The land around the ferry site also subsided, and thus it is not possible to access to the original ferry site. The ferry services are however resumed by means of constructing temporary jetty as shown in Figure 5.3.7.



Source: JICA Study Team : * Pre-tsunami road networks are drawn on the IKONOS post tsunami image.

Figure 5.3.6 Location of Ulee Lheu Ferry Terminal



Source: JICA Study Team

Figure 5.3.7 Temporary Ulee Lheu Ferry Terminal

(2) Rehabilitation and Reconstruction Plan by PU Dinas

PU DINAS also estimated rehabilitation and reconstruction requirement. It basically consists of the rehabilitation of streets over 223 km and the reconstruction of streets for a length of 106 km. The required total cost is estimated at Rp. 139,840 million.

5.3.5 Mission, Strategy and Goal for Transport Sector

Mission:

- ▶ To re-build efficient and effective transportation array within and to and from outside Banda Aceh City
- ▶ To restore main arterial and arterial roads promptly as possible to accelerate rehabilitation and reconstruction activities as a whole
- ▶ To align the road network systematically in conformity with the proposed urban development of Banda Aceh City and be effective in view of evacuation/relief against future possible disaster

Goals:

- ▶ To rehabilitate substantial portion of main arterial and arterial roads within a rehabilitation period, by 2007
- ▶ To rehabilitate damaged bridge also until 2007
- ▶ To also restore substantial portion of collector and street until 2007
- ▶ To reconstruct Ulee Lheu ferry terminal by 2009
- To restore Labi-Labi bus terminal and road traffic signal and warning lights by 2007

Strategy:

- ▶ To rehabilitate ferry terminal to sustain and to enhance economic development activities in harmony of Banda Aceh City and remote islands
- ▶ To employ local technology as much as possible in order to save rehabilitation and reconstruction cost
- ▶ To deploy priority implementation approach in order to minimize concentration of investment in short time

5.3.6 Roads Rehabilitation and Reconstruction Plan

(1) Road Framework

One of the missions of road and transport sector is to create a systematic and rational road framework within Banda Aceh City in conformity with its future city development. In Chapter 4 city development plans are studied and as a result most adaptable city development plan is selected. In addition it is one of the important elements to create Banda Aceh City with preparedness against future potential disaster like experienced in 2004. Also in Chapter 4 of the main report Disaster Preparedness is studied and various measures are proposed including layout of relief and escape roads in case of emergency. Such road framework plan is reported in Section 4.7 of Chapter 4 of this report.

(2) Roads Rehabilitation and Reconstruction in Most Devastated Areas

a) Arterial road

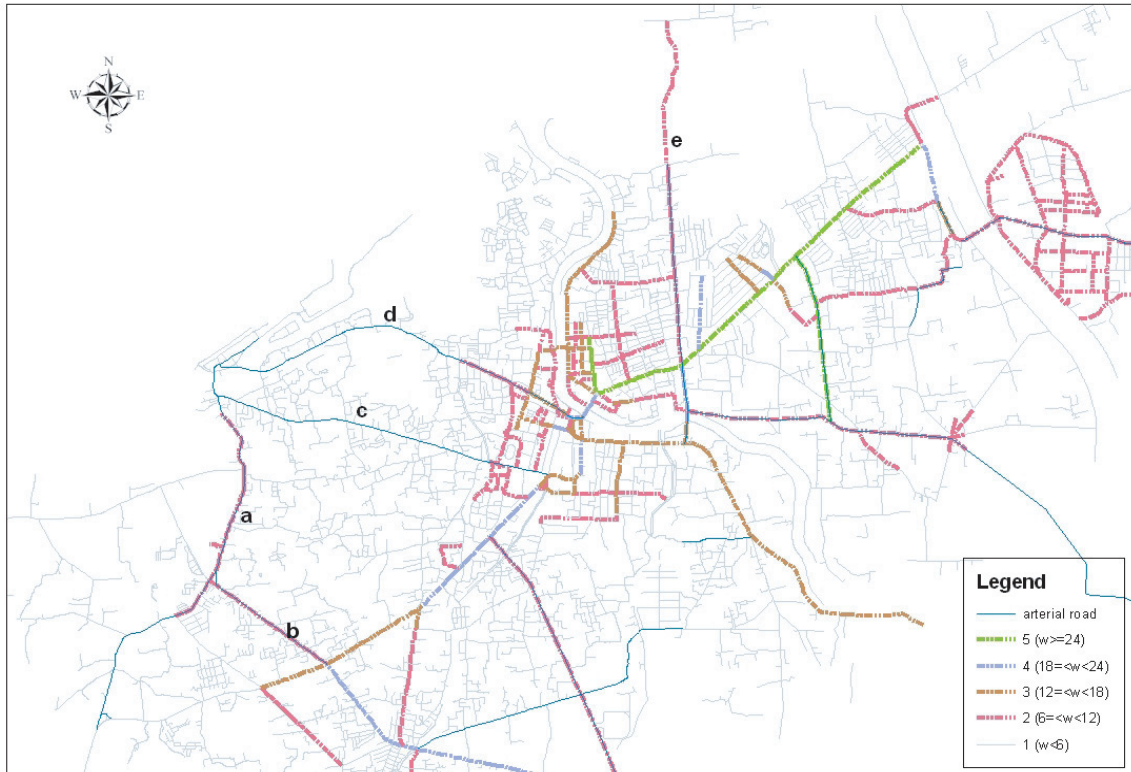
Through the investigation of the arterial roads the following 5 roads are judged to be rehabilitated in conjunction with bridge rehabilitation urgently as possible.

Table 5.3.4 Damaged Arterial Roads

ID	Roads	Road Width	Bridge Condition	
A-a	JL. Lhoknga	6-12m	Lamjame	Heavily damaged
A-b	JL. TGK. ABD Rahman Meunasah Mencab	6-12m	-	
A-c	JL. Iskandar Muda	6-12m	Laguna I Punge I	Slightly damaged Slightly damaged
A-d	JL. Habib Abdurrahman	Less than 6m	Laguna II TitiTungkat	Fallen Heavily damaged
A-e	JL. Syiah Kuala	6-12m	Syiah Kuala I/II	Heavily damaged

Source: JICA Study Team

The locations of the above roads are as shown in Figure. 5.3.8.



Source: JICA Study Team

Figure 5.3.8

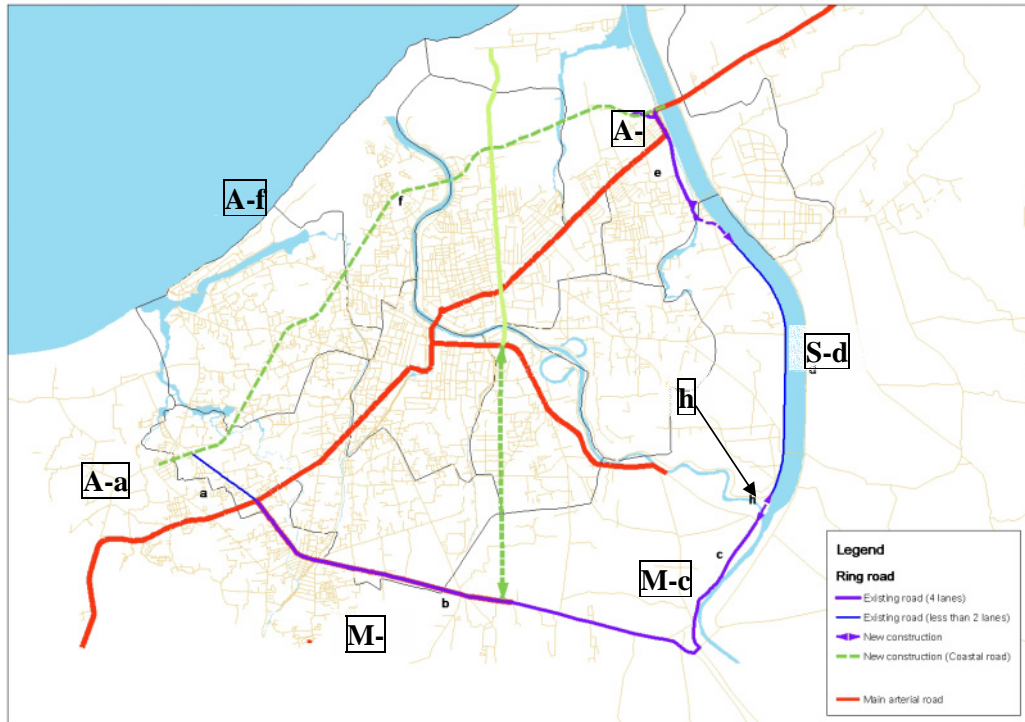
Rehabilitation and Reconstruction of Arterial Roads

b) Ring road (north part)

The ring road (northern part) comprises part of the arterial roads and is proposed to be completed at earlier stage of rehabilitation and reconstruction. The functions of the road are as follows:

- ▶ It has the function as the arterial road where the Ulee Lheue port, the Meulaboh district, and the Krueng Raya port are connected.
- ▶ It has the bypass function to connect the sub city centers while making a detour.
- ▶ It has the function to activate an economic growth in the redevelopment area.
- ▶ It has the function as escape road and relief road while the rescue supply can be transported in case of emergency.

The proposed alignment of the ring road is as shown in Figure 5.3.9.



Source: JICA Study Team

Figure 5.3.9 Schematic Section of Ring Road (North Part)

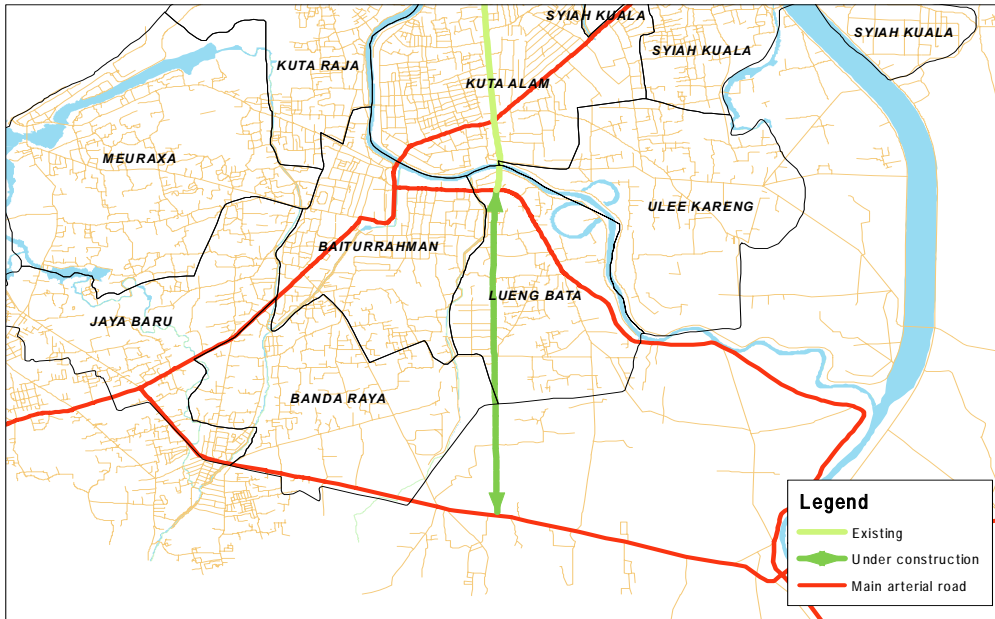
c) Street

It is proposed to urgently restore the streets in both kecamatan Meuraxa and Kuta Raja. The total rehabilitation length is 57 km in kecamatan Meuraxa and 39km in kecamatan Kuta Raja.

(3) Roads Rehabilitation and Reconstruction in Less Devastated Area

a) Extension of Jl. Syiah Kuala

Jl. Syiah Kuala lies between north part and center part and forms a part of arterial road. It is also designated to be integral part of main relief roads. The extension to connect to Jl. Soekarno Hatta is under construction. Layout of extension plan is as shown in Figure 5.3.10.



Source: JICA Study Team

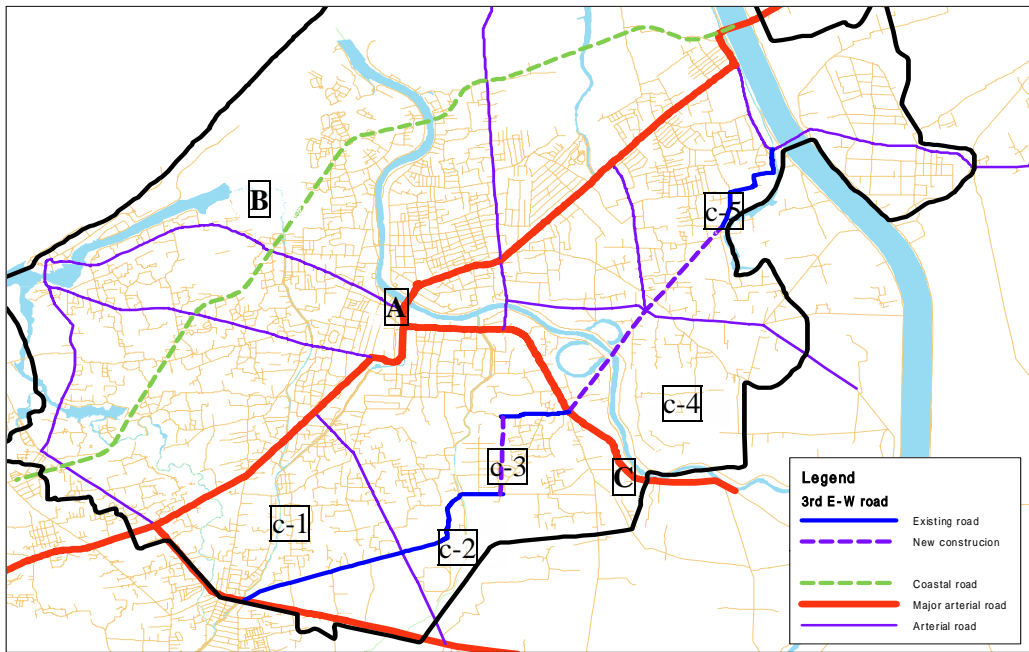
Figure 5.3.10 Extension of Jl. Syiah Kuala

b) Ring road (south part)

This contemplated road consists of existing Jl. TGK. ABD Rahman Meunasah <A-a>, Jl. Soekarno Hatta <M-b>, Jl. Imum Lueng Bata <M-c>, the left bank road of Aceh floodway <S-d>, Jl. Laksamana Malahayati <A-e>, and road <A-f>. In order to complete the ring, the roads <M-c> and <S-d> are to be constructed including Bridge <h> as shown in Figure 5.3.9.

c) Third east-west road

Refer to Figure 5.3.11. The third east-west road <C> is planned to run in parallel with the national roads <A> and in between the national road <A> and the ring road on the south. Now some links such as <c-1>, <c-3> and <c-5> should be widened. The link <c-4> should be newly constructed.



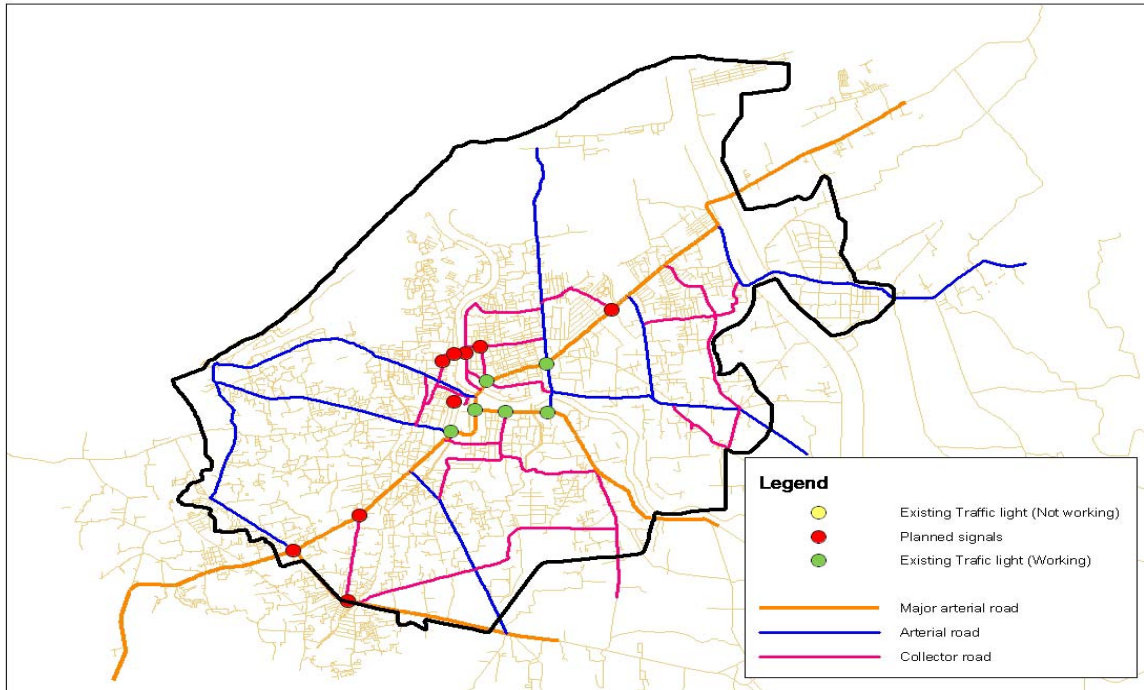
Source: JICA Study Team

Figure 5.3.11 Third East-West Road

(4) Road Safety Facilities

a) Signal

9 out of order signals will be repaired, while it is proposed to install new signals at 28 intersections.



Source: JICA Study Team

Figure 5.3.12 Location of Traffic Signals

- b) Traffic sign and road marking

It is proposed to re-install 225 broken traffic signs. Also it is necessary to install the new road signs on the arterial roads and main intersections.
- (5) Rehabilitation and Reconstruction of Road Transport Facilities
 - a) Parking lot

It is necessary to provide enough parking lot to avoid traffic congestion in downtown and bus terminal areas.
 - b) Car inspection place

There is one car inspection place in Banda Aceh City, whereas about 400 cars are inspected every month. Car inspection place will be needed in the future.
 - c) Bus terminal and truck terminal

It is proposed to rebuild the Labi-labi terminal. It is also recommendable to construct intercity bus terminal on Jl. Soekarno Hatta to improve intercity and city bus network. Moreover it is advisable to move the truck terminal outside of ring road in the future.

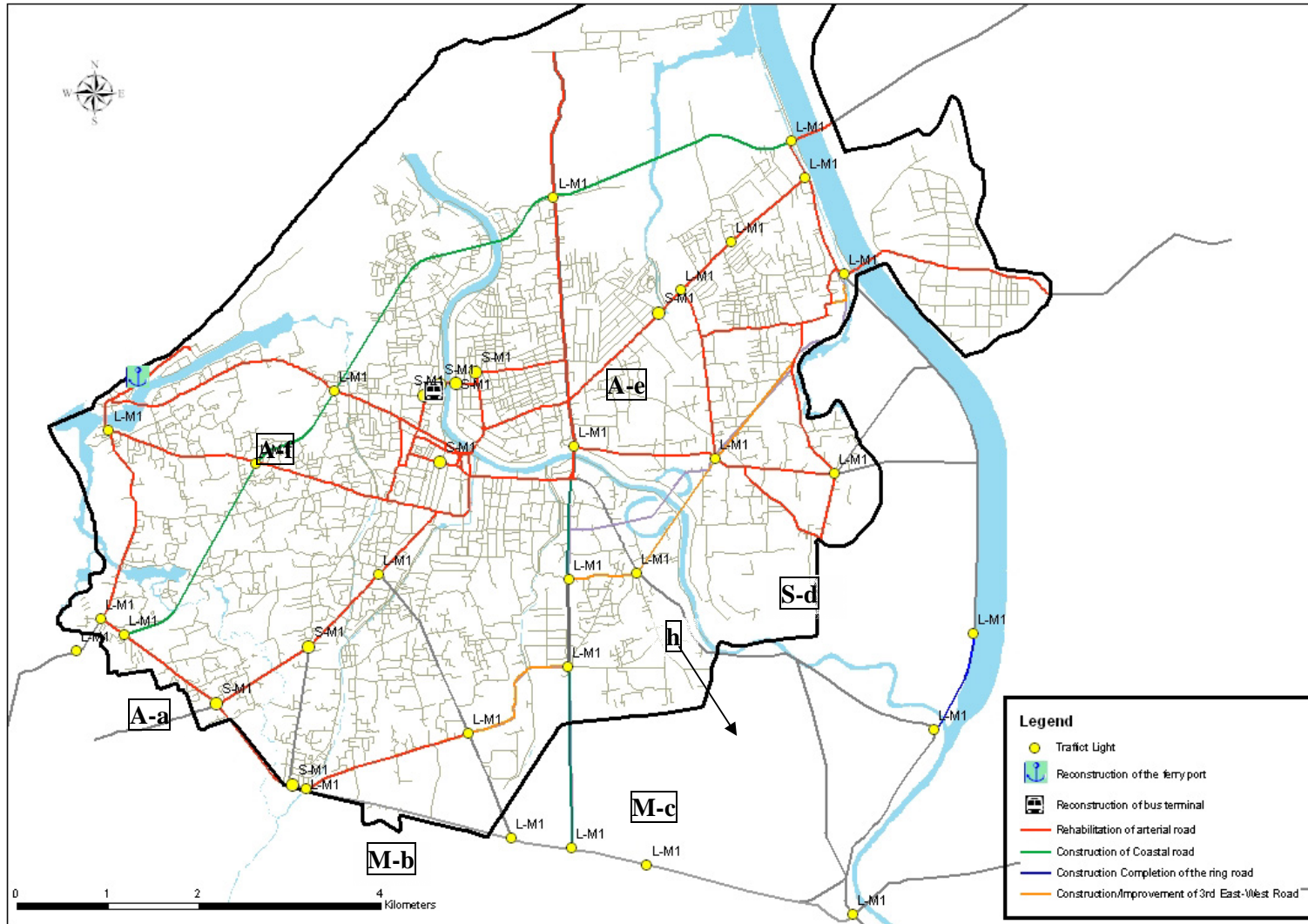
5.3.7 Reconstruction Plan of Ferry Terminal

The ferry service is most important means of transport for the people and economic development of isolated islands. In July 2005 it is reported that the Australian Government committed for reconstruction of this ferry terminal. It is therefore no planning is made in this report.

5.3.8 Preliminary Project Cost Estimate and Tentative Implementation Plan

(1) Preliminary Project Cost Estimate

It is proposed to implement the following the rehabilitation and reconstruction works for roads including safety facilities and road traffic facilities: Their location is presented in Figure 5.3.13 and Table 5.3.5.



Source: JICA Study Team

Figure 5.3.13 Location of Proposed Rehabilitation and Reconstruction Works

Table 5.3.5 Proposed Road and Road Traffic Facilities Rehabilitation and Reconstruction Plan

No.	Works	Work Items	Features of Works
R1: Road			
R1-1	Rehabilitation of arterial road	JL. Lhoknga (including Lamjame bridge)	Road: 2.6km; Bridge: 33m
		JL. TGK. ABD Rahman Meunasah Mencab	Road: 1.6km
		JL. Iskandar Muda (including Punge I, Laguna I bridge)	Road: 3.6km; Bridge: 80m
		JL. Habib Abdurrahman (including Titi Tungkat, Laguna II bridge)	Road: 3.7km; Bridge: 56m
		JL. Syiah Kuala (including Syiah Kuala I/II bridge)	Road: 3.9km; Bridge: 43m
R1-2	Rehabilitation of sub-arterial and other roads	Roads in the city	Road: 165.1 km
R1-3	Construction of coastal road (Ring road, north part)	Road construction with bridges, road facilities and drain facilities (box culvert etc.)	Road: 10.2km, (20-25m wide, 1.5m elevation, 5-15m slope both sides), Bridge: 150m
R1-4	Extension of Jl. Syiah Kuala	Road construction	Road: 4 km
R1-5	Improvement of escape roads	Road improvement	Road: 6 km
R1-6	Completion of the ring road and construction of new arterial roads (including 3 rd east-west road)	Road and bridge construction	Road: , Bridge
R2: Traffic Safety Facilities			
R2-1	Reconstruction of traffic management systems	Signals Traffic signs Road marking	9 signals 225 traffic signs 6km road marking
R3: Road Traffic Facilities			
R3-1	Reconstruction of bus (labi-labi) terminal	Construction of bus terminal (building, traffic management, utilities)	Area: 34,000 m ²
R3-2	Vehicle inspection center		
R3-3	Car park	-	-
R3-4	New bus terminals	-	-
R3-5	Truck terminal and Logistic Center	-	-
R4: Ferry Terminal			
R3-2	Reconstruction of ferry port	To be implemented by Australian Government	-

Source: JICA Study Team

The preliminary cost estimate is made referring to actual contract prices of similar works (refer to Appendix 5 for details) and under the conditions and assumptions set forth below:

- a) Land acquisition and compensation cost is not included.
- b) The direct construction cost is assumed not to include the amount of VAT and but include import duties.
- c) The physical and price contingencies are assumed to be 10 % of the direct construction cost respectively.

- d) The engineering services is assumed also to be 10 % of the direct construction for design and construction supervision.

Table 5.3.6 shows the preliminary cost estimate of the proposed rehabilitation and reconstruction works.

Table 5.3.6 Preliminary Cost Estimate

		(Rp. billion)
Proposed Project/Program	Works	Amount
A. Projects		
Road	(1) Rehabilitation of Arterial Roads and Bridges	75.98
	(2) Rehabilitation of Sub-arterial and Other Roads	543.22
	(3) Construction of Coastal Road	247.00
	(4) Extension of Jl. Syiah Kuala	43.87
	(5) Improvement of Existing Road for Escape Road	19.74
	(6) Construction of New Arterial Roads	200.22
Traffic Safety Facility	(7) Reconstruction of Traffic Management System	4.15
	(8) Improvement of Signals	9.21
Road Traffic Facility	(9) Reconstruction of Bus Terminal	63.39
	(10) Construction of Terminals and Inspection Center	93.21
Ferry Terminal	(11) Construction of Ferry Terminal	67.60
Total		1,367.59

Source: JICA Study Team

(2) Tentative Implementation Plan

There are a huge amount of works on roads, road traffic facilities and other such as ferry terminal, and corresponding investment requirement is estimated as large as Rp. 1,370 billion approximately. Two different development scenarios are set as summarized in Table 5.3.7.

Table 5.3.7 Development Scenario

Priority	Stage	Proposed Works
Scenario-1		
1	Rehabilitation	Rehabilitation of arterial roads and bridges
		Rehabilitation of damaged sub-arterial and other roads
2	Reconstruction	Reconstruction of road safety facilities
		Reconstruction of bus (labi-labi) terminal
3	Long term	Construction of coastal road and extension of Jl. Syiah Kuala (north-south road)
		Completion of the ring road and construction of new arterial roads
		Construction of transportation facilities
Scenario-2		
1	Rehabilitation	Rehabilitation of arterial roads and bridges
		Rehabilitation of damaged sub-arterial and other roads
2	Reconstruction	Reconstruction of traffic management systems and transportation facilities
		Reconstruction of bus (labi-labi) terminal
		Construction of coastal road and extension of Jl. Syiah Kuala (north-south road)
3	Long term	Completion of the ring road and construction of new arterial roads

Source: JICA Study Team

Development Scenario-1 aims at concentrating on rehabilitation and reconstruction until end of planning horizon of 2009. Major new development works are therefore postponed beyond 2009. Development Scenario-2 is presented for consideration as an alternative and focuses on creating national road traffic within the city without much attention to the magnitude of investment in a short time.

It is however considered to adopt Development Scenario-1 as is more realistic than the other in terms of actual implementation.

On a basis of quantities of the proposed sector development plan implementation schedule is prepared for each development scenario as presented in Table 5.2.8.

Table 5.3.8 Tentative Implementation Schedule (Development Senario-1)

Projects/Programs		Implementation Schedule				
		Rehabilitation Stage		Reconstruction Stage		
		2005	2006	2007	2008	2009
A. Projects						
Road	(1) Rehabilitation of Arterial Roads and Bridges	■	■			
	(2) Rehabilitation of Sub-arterial and Other Roads	■	■			
	(3) Construction of Coastal Road			Beyond 2009		
	(4) Extension of Jl. Syiah Kuala			Beyond 2009		
	(5) Improvement of Existing Road for Escape Road			■		
	(6) Construction of New Arterial Roads			Beyond 2009		
Traffic Safety Facility	(7) Reconstruction of Traffic Management System				■	
	(8) Improvement of Signals			Beyond 2009		
Road Traffic Facility	(9) Reconstruction of Bus Terminal			■	■	
	(10) Construction of Terminals and Inspection			Beyond 2009		
Ferry Terminal	(11) Construction of Ferry Terminal			■	■	

Source: JICA Study Team

(3) Annual Fund Requirement

The annual fund requirement is estimated for proposed Development Scenario-1 as given in Table 5.3.9. It is resulted that approximately 45 % of the total investment requirement concentrates in two (2) years of rehabilitation period. Such heavy concentration of investment is deemed unavoidable in order to restore roads and bridges to the pre-disaster state for the purpose of acceleration of the rehabilitation and reconstruction activities as a whole.

Table 5.3.9 Annual Fund Requirement

(Rp. billion)

Projects/Programs	Rehabilitation		Reconstruction			Long-term	Total
	2005	2006	2007	2008	2009	2010/15	
Project							
(1) Rehabilitation of Arterial Roads and Bridges	37.99	37.99					75.98
(2) Rehabilitation of Sub-arterial and Other Roads	271.61	271.61					543.22
(3) Construction of Coastal Road						247.00	247.00
(4) Extension of Jl. Syiah Kuala						43.87	43.87
(5) Improvement of Existing Road for Escape Road			19.74				19.74
(6) Construction of New Arterial Roads						200.22	200.22
(7) Reconstruction of Traffic Management System				4.15			4.15
(8) Improvement of Signals						9.21	9.21
(9) Reconstruction of Bus Terminal			31.69	31.70			63.39
(10) Construction of Terminals and Inspection Center						93.21	93.21
(11) Construction of Ferry Terminal							
(12) Rehabilitation of Arterial Roads and Bridges			22.53	22.53	22.54		67.6
Total	309.60	309.60	73.96	58.38	22.54	593.51	1,367.59

Source: JICA Study Team

5.4 HEALTH AND MEDICAL CARE

5.4.1 Pre-Disaster Situation

(1) Health Condition

a) Survival and Diseases

Indicators related to survivals are shown in the following table. Generally, health condition in Banda Aceh City might be different from the other districts in NAD Province, as usually the condition in urban areas is better than the rural areas.

Life expectancy rate in NAD Province was longer compared to the national average. Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR) in Banda Aceh City were quite lower than the national average. However, mortality rate of children under 5 years old (U5MR) in NAD Province was higher than the national average.

Table 5.4.1 Survivals in Banda Aceh and NAD

	Banda Aceh ^{*1}		NAD ^{*2}		Indonesia ^{*3}	
	Year		Year		Year	
Estimated Life Expectancy at Birth (years)	n.a.		2001	69.7	2000-05	66.8
Infant Mortality Rate (per 1,000 live births)	2003	7	2000	36	2002	33
Maternal Mortality Rate (per 100,000 live births)	2002	114	1995	373	2000	230
Under 5 Mortality Rate (per 1,000 live births)	n.a.		2000	69	2001	45

Note: NAD= Nangore Aceh Darussalam Province

Source: *1: Laporan Kegiatan Juni S/D 2004 (Annual Report for 2004), Banda Aceh City Health Office, 2004

*2: Profil Kesehatan Indonesia 2001 (Indonesia Health Profil 2001), Ministry of Health, 2002

*3: Human Development Report 2004, United Nations Development Programme (UNDP), 2004

Infectious diseases and diseases related to nutrition and/or sanitation condition such as Acute Respiratory Infection (ARI), diarrhea, skin diseases, tuberculosis and malaria were still popular in NAD Province as well as Banda Aceh City. However, hypertension was also one of major causes of morbidity.

b) Maternal and Child Health

As presented in the table below, access to maternal and child health services in Banda Aceh City was better than provincial level and it might be one of key factors for low maternal mortality rate.

Table 5.4.2 Maternal and Child Health in Banda Aceh City and NAD in 2001

	Banda Aceh City	NAD
Number of pregnant women	5,751	105,145
Pregnant women receive prenatal check-up 4 times (%)	91.9	75.1
Birth attended skilled birth attendant (%)	86.4	66.2
Active Family Planning Acceptors (%)	56.4	47.7
Low birth weight (%)	0.1	0.5
Fully Immunized Children under one-year-old against Measles (%)	87.3	72.1
Under-nutrition among children under 5 years old (%)	16.4	22.4

Source: Profile Kesehatan Provinsi NAD 2001 (NAD Province Health Profile 2001), NAD Provincial Health Office, December 2002

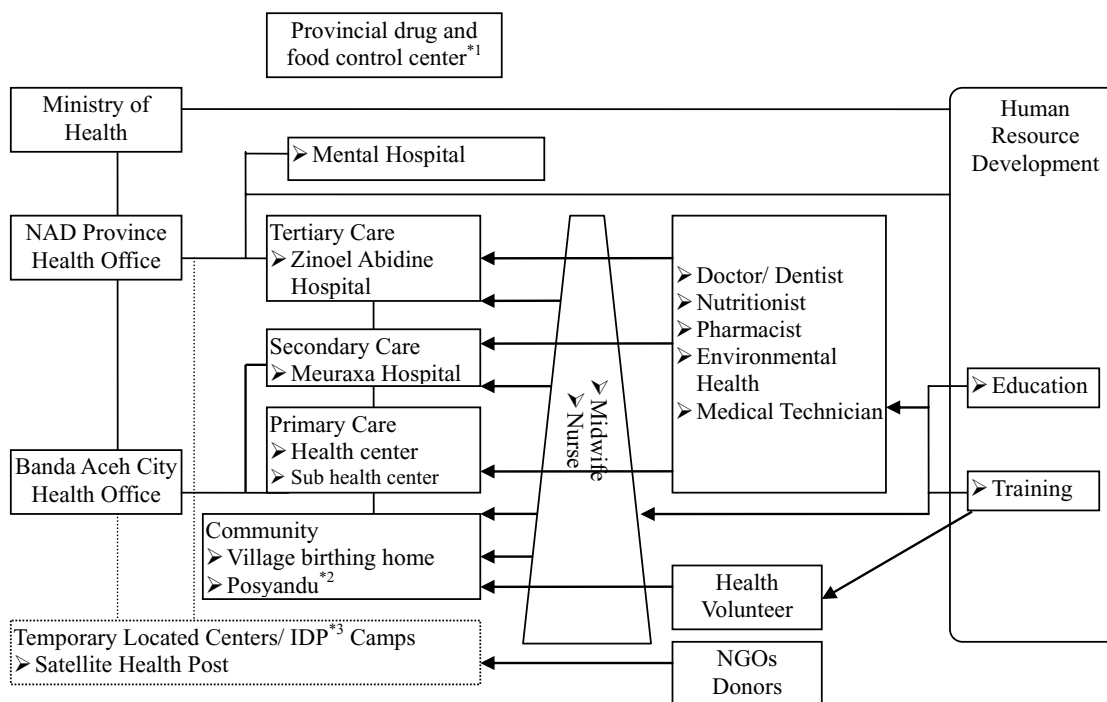
c) Mental Health

Major causes of mental disorders were stress caused by economic difficulty, human relations and extreme experiences. In conflict areas, people have been suffering from trauma even before the disaster. Bed occupancy rate of Mental Hospital in Banda Aceh City was more than 200 % in 2001¹, and average of recent years is around 130 %. Because it is the only mental hospital and lower level health facilities such as health centers or secondary hospitals could not provide sufficient mental health care and support. Period of inpatient was longer as patients could not go back their family or community because of stigma, difficulty in taking medicines, livelihoods, and insufficient supporting system in their community.

(2) Health Service Providers

The outline of structure of health service providers in Banda Aceh City is shown in the following figure. Other than the providers presented in the figure, lots of private health service providers such as private clinics are available in Banda Aceh City.

¹ Kondisi dan Permasalahan Prasarana/Sarana Kesehatan, Kebudayaan, dan Pariwisata Kota Banda Aceh Tahun 2004 (Condition and Problems of Infrastructure/ Facilities of Health, Culture and Tourism in Banda Aceh City in 2004), Banda Aceh City BAPPEA, December 2004



*1: Food drug and food control center is under National Agency of Drug and Food Control
 *2: Posyandu= Integrated Health Service Post (Pos Pelayanan Terpadu =community primary health care and maternal and child health care services)
 *3: IDP=Internal Displaced People

Figure 5.4.1 Outline of Health Service Delivery Structure

a) Human Resources

Health human resources in Banda Aceh City and NAD Province in 2001 are as shown in the following table. As mentioned in the previous section, because of concentration of private clinics and hospitals, the number of doctors per 100,000 populations in Banda Aceh City was much higher than the provincial average.

Table 5.4.3 Health Human Resources in Banda Aceh City and NAD Province (2001)

Category	Banda Aceh City		NAD	
	No.	Per 100,000 populations	No.	Per 100,000 populations
Doctors	47	21.1	325	7.8
Dentists	13	5.8	114	2.8
Specialist Doctors	27	12.1	77	1.9
Nurses	46	20.7	1,846	44.6
Midwives	68	30.5	5,710	137.9

Source: Profile Kesehatan Provinsi NAD 2001 (NAD Province Health Profile 2001), NAD Provincial Health Office, December 2002

b) Primary Care Service Facilities

As shown in the table below, private providers concentrated in Banda Aceh City. Accessibility to those facilities from the residents was better than other areas in NAD province because of road network and public transportation, therefore, the numbers of

public primary health services facilities per 100,000 populations were less than in other districts.

Table 5.4.4 Primary Health Service Facilities in Banda Aceh City and NAD Province (2001)

Category	Banda Aceh City		NAD	
	No.	Per 100,000	No.	Per 100,000
Private clinics (including dentists) ^{*1}	169	75.9	475	11.5
Health Centers ^{*1}	6	2.7	220	5.3
Sub Health Centers	21 ^{*3}	9.0	802 ^{*1}	19.4
Mobile Health Centers ^{*1}	6	2.7	194	4.7
Village Birthing Homes	44 ^{*2}	19.8	2,495 ^{*1}	60.2
Private Birthing Clinics ^{*3}	12	5.4	n.a.	n.a.

Source: *1: Profile Kesehatan Provinsi NAD 2001 (NAD Province Health Profile 2001), NAD Provincial Health Office, December 2002

*2: Kecamatan Dalam Angka (Sub-district statistical books) 2002, BPS Banda Aceh City, 2002

*3: Kondisi dan Permasalahan Prasarana/Sarana Kesehatan, Kebudayaan, dan Pariwisata Kota Banda Aceh Tahun 2004 (Condition and Problems of Infrastructure/ Facilities of Health, Culture and Tourism in Banda Aceh City in 2004), Banda Aceh City BAPPEA, December 2004

c) Secondary and Tertiary Care

As shown in the table below, there were 26 hospitals and 2,190 beds in NAD Province and about 35 % of hospital beds were in Banda Aceh City.

Table 5.4.5 Number of Major Hospitals and Beds in NAD Province and Banda Aceh City (2001)

() = number in Banda Aceh City^{*1}

	Gov't	Private	Army	Total	Beds
General Hospitals	15 (3)	4 (2)	3 (1)	22 (6)	1,934 (629 ^{*2})
Maternal and Child Health Hospitals	0 (0)	3 (1)	0 (0)	3 (1)	130 (30)
Mental Hospitals	1 (1)	0 (0)	0 (0)	1 (1)	126 (126)
Total	16 (4)	7 (3)	3 (1)	26 (8)	2,190 (785 ^{*2})

Note: *2 Number of beds in Permata Hati Hospital is not included.

Source: Profile Kesehatan Provinsi NAD 2001 (NAD Province Health Profile 2001), NAD Provincial Health Office, December 2002

*1: Kondisi dan Permasalahan Prasarana/Sarana Kesehatan, Kebudayaan, dan Pariwisata Kota Banda Aceh Tahun 2004 (Condition and Problems of Infrastructure/ Facilities of Health, Culture and Tourism in Banda Aceh City in 2004), Banda Aceh City BAPPEA, December 2004

5.4.2 Post-Disaster Situation

(1) Health Condition

a) General Conditions

The Ministry of Health, Provincial Health Office and WHO have been jointly monitoring incidence of major infectious diseases, such as diarrhea, malaria, measles, and acute respiratory infection (ARI), in the affected areas based on weekly reports from related agencies.

Infectious diseases related to sanitary condition have been controlled. However, ARI is still popular, especially among internally displaced people not only young children but also adults. Because the number of reports has been decreasing as demobilization of emergency relief agencies, it might be under reporting.

Many agencies such as donors and NGOs provide infectious disease control services, which are generally distribution of bed nets, anti-malaria spray, Expanded Immunization Programs (EIP), and enhancement of diseases surveillance system.

b) Maternal and Child Health

Access to maternal and child health services might be worse because of damages on related facilities such as community birthing homes, sub-health centers and health centers as well as loss of health personnel, especially midwives. Provincial/district/city health offices, donors and NGOs have been providing basic health services including primary medical care, preventive activities and nutrition support for internally displaced people, however it is difficult to maintain the coverage because people could move frequently.

According to the results of “Rapid Nutrition Assessment in Tsunami Affected Districts in NAD” conducted by UNICEF², nutrition status of children and women of reproductive age in Banda Aceh City is in moderate and preventive measures is required.

Four hundred thousand (400,000)³ mother and child health handbooks (modified Aceh version) have been distributed by UNICEF to all districts in NAD province. WHO and UNICEF are providing socialization on the handbook for the provincial health office staff, health personnel in health centers, community midwives and health volunteers.

c) Mental Health

Most of the survivors showed one or more of stress-related symptoms such as fear, panic, helplessness, emotional numbing, disbelief, confusion, nightmares and flashbacks, hyper-activity, fear of returning to original place, fear of water, fear of being inside a building, restlessness and fatigue⁴. Because Post Traumatic Stress Disorder (PTSD) might start several years after, long term, continuous and comprehensive follow up might also be necessary.

Numerous NGOs working in various sector including health education and community support have been providing various forms of mental care services or mental support for internally displaced people since the disaster. WHO is coordinating integrated mental health program focusing on community awareness rising and primary care.

² Data was collected in February 22 to March 15, 2005 in 13 districts/ municipals.

³ According to Provincial Health Office, those are enough to distribute to pregnant women, mothers feeding under-5 children and related health personnel for one year.

⁴ WHO Mental Health Assessment in Aceh, WHO, January 2005

(2) Health Service Providers

a) Health Human Resources

Health human resources could be lost because of the disaster. In Banda Aceh City, about 20 % of staff in city health office and health centers were lost. In Meuraxa area, only 65 % of pre-disaster staff is remaining as shown in the table below.

Table 5.4.6 Losses of Health Personnel in Banda Aceh City
(Health Office and Health Centers)

Institution	Before Disaster (2004)	Victims	After Disaster (% of pre-disaster)
Banda Aceh City Health Office	85	17	68 (80 %)
Kuta Alam Health Center	64	19	45 (70 %)
Komplema Health Center	52	12	40 (77 %)
Meuraxa Health Center	65	23	42 (65 %)
Batoh Health Center	50	5	45 (90 %)
Mibo Health Center	31	1	30 (97 %)
Ulee Kareng Health Center	52	6	46 (88 %)
Total	399	83	316 (79 %)

Source: Banda Aceh City Health Office, May 2005

Health education facilities were also damaged. In medical department of Syiah Kuala University, education and research activities have been hindered because equipment and teaching materials were damaged and lost. Some of school buildings of public health school were heavy damaged or destroyed. Teachers and instructors were also lost and some of students could not continue their study because of financial difficulty.

b) Primary Care Services

Two of 6 health centers were damaged and 1 was totally damaged as shown in the Figure 5.4.2. Health center and its network in Meuraxa sub-district some sub-health centers located in coastal areas in other sub-districts were totally destroyed. However, relocation of those facilities might be difficult especially in Banda Aceh City because the city government has to procure the alternative land and the land market in the city has been rising in post-disaster period, while land for health center and its network could be provided by community with free of charge in the other districts.

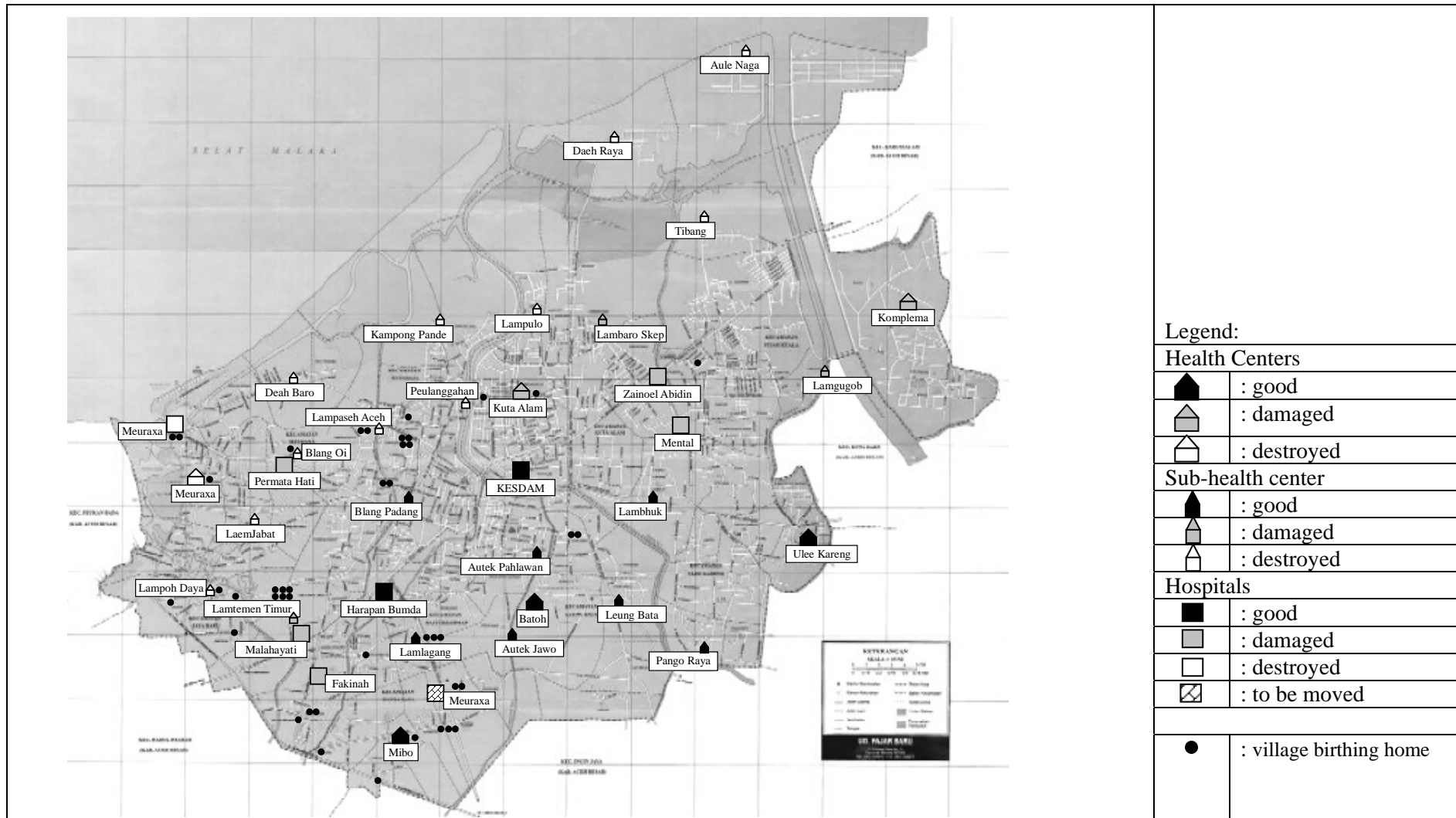
To response emergency needs, satellite health posts were established in or near temporary location centers and supported by aid agencies.

c) Secondary and Tertiary Care Services

Two out of 7 major hospitals in Banda Aceh City were not functioning because those were destroyed or heavy damaged as shown in the Figure 5.4.2.

NGOs and foreign governments established field hospitals in the emergency stage, however, some of them have withdrawn because of transition from the emergency to

rehabilitation stage. Numerous local and international agencies mobilize health personnel to Zainoel Abidin Hospital to substitute for lost human resources, and to satisfy increased needs (patients seek for care in the hospital directory from primary facilities as the municipal hospital in Meuraxa was totally damaged).



Source: Damage Assessment Result of Health Center, March 2005; Aceh Health Facility Mapping, WHO (<http://www.acehealthinfo.net/document.php?id=43>; accessed on 5 May 2005) and Provincial Health Office

Figure 5.4.2 Map of Health Facilities with Damage Levels in Banda Aceh City

5.4.3 Related Plans

(1) Master Plan for Rehabilitation and Reconstruction of Aceh Region and Nias

Objectives, targets and principles identified in the “Master Plan for Rehabilitation and Reconstruction of Aceh Region and Nias” (called as the Blue Print) by the Government of Indonesia for health sector are summarized in Appendix 6.

The plan is focused on providing emergency health services to the affected population, recovering regular health services and strengthening the services to prepare against extreme cases in the future.

In the emergency stage (up to June 2005), those programs focused on emergency relief activities for the affected areas and people. Rehabilitation or compensation of damage or loss to resume regular health services are to be implemented in the rehabilitation stage (from June 2005 to December 2006) and revitalization and strengthening of the services including establishment of emergency health system to prepare against extremely cases are to be implemented in the reconstruction stage (from January 2007 to December 2009).

All the programs except from the research and development are to be implemented continuously from the emergency stage to the reconstruction stage. The research and development program is to be started from the rehabilitation stage.

(2) Revised Master Plan of Regional Space Layout (RTRW), Banda Aceh City, Year 2001-2010

According to the health care facility development policy mentioned in the RTRW(called as the City Master Plan), the number of health care facilities including health canters, sub health centers, public hospitals and clinics should be adopted to population coverage.

In the plan, a health center should cover 30,000 people and a sub health center should cover about 10,000 people. Four health centers and 11 sub health centers were suggested to be established up to 2010 in accordance with population projection. Regarding hospital development, 3 more “section hospitals” were to be established up to 2010.

(3) Healthy Indonesia 2010

Vision, mission and strategy of national health development are defined in “Healthy Indonesia 2010” aiming that people live in healthy environment with healthy and sanitary practice, and satisfying and utilizing with health services, as well as good health condition as a result. Fifty indicators identified as targets include life expectancy rate, Infant Mortality Rate (IMR), mortality rate of under-5 children (5MR) and Maternal Mortality Rate (MMR), morbidity of mayor infectious diseases and coverage and quality of health services.

5.4.4 Urgent Rehabilitation and Reconstruction Plan

(1) Mission, Strategy and Goals

Some health service providers located in Banda Aceh City are expected to provide their services not only for population in the City but also for suburbs areas or whole NAD Province. Those are;

- Zainoel Abidin Hospital: Top referral general hospital in NAD Province
- Mental Hospital: The only mental hospital in NAD Province
- Drug and Food Control Center: Monitoring and controlling drugs, medicines, cosmetics and other chemical products, and foods in markets in NAD Province
- Syiah Kuala University: Turning out medical and health human resources
- Public Health School: Turning out medical and health human resources

Therefore, the rehabilitation and reconstruction of the health sector in Banda Aceh City might affect on other districts in NAD Province, and planning and implementation of the programs and projects should be closely coordinated among city and provincial governments, especially for tertiary care, mental care, human resources development and drug and food control.

Mission, strategy and goals could be proposed as follows.

Table 5.4.7 Mission and Strategy of Urgent Rehabilitation and Reconstruction Plan

Mission	Strategy
1. Revitalization of health service providing system.	1-1. Rehabilitation and reconstruction of health facilities and equipment at all levels.
2. Providing sustainable health services to maintain and improve physical and mental health condition of people properly and equally.	2-1 Capacity building of implementing organizations and service providers.
	2-2 Development of human resources including doctors, co-medical staff, government officials and health volunteers to provide health services for people.
	2-3 Strengthening of referral system among community, health centers and those networks and hospitals.
	2-4 Consideration for vulnerable groups such as children, aged people and women.
3. Encouraging people to take initiative in health development.	3-1 Mobilization of community to sustain primary health care and health promotion activities

Source: JICA Study Team

Table 5.4.8 Goals of Urgent Rehabilitation and Reconstruction Plan

2015	Overall goal: Health indicators are improved as a result of sustainable health development.
~2009	Reconstruction Stage: Revitalizing and sustaining of health services to maintain and improve health service indicators.
	1-1-1. Permanent health human resources receive necessary refresher's training.
	2-1-1. Maintenance system of health facilities and equipment is established.
	2-1-2. Policy planning and management capacity is revitalized.
	2-2-1. Health education institutions turn out health personnel regularly.
	2-2-2. Health personnel and health volunteers receive regular training.
	2-3-1. Patients referred to appropriate health facilities properly.
	2-4-1. Vulnerable people (the poor, women and children) can access to appropriate health services.
3-1-1. Primary health care system in the community is revitalized.	
~2006	Rehabilitation Stage: Recovering of damages and losses of health service providers.
	1-1-1. Damaged health facilities including equipment are rehabilitated, reconstructed or repaired.
	1-1-2. Damaged drug and medical supply system are rehabilitated.
	1-1-3. Lost human resources are recruited by temporally human resources.
	2-1-1. Health information system is established.
	3-1-1. Community awareness rising system is established.

Source: JICA Study Team

At the earlier stage in rehabilitation period, assessments on existing situation at all stakeholders including community, health service providers and health policy planners and implementers are required. Based on the results, details and priority of programs might be identified.

In the reconstruction stage, situation analyses are also required to evaluate the achievement of rehabilitation programs and to review the reconstruction plan. Sustainability of the recovered health services providing system should be focused in the stage, therefore, enhancement of routine and regular services through monitoring and training might be prioritized.

Revitalizing of health service providing system could achieve improvement of accessibility to health services presented by the health service indicators such as immunization coverage, health facility utilization rate, coverage of health service providers, and coverage ratio of health services including antenatal care, post natal care, growth monitoring, health promotion activities and infectious diseases prevention and care⁵.

Improvement and maintaining of accessibility to health services might achieve preferable health condition of the people, however, it generally takes time. Health condition could be presented by health outcome indicators such as mortality and morbidity. Although the indicators to be monitored vary among programs, the followings might be proposed as those are included in both Millennium Development Goals (MDGs) for 2015 and also targeted in Healthy Indonesia 2010.

⁵ Infectious diseases prevention and care in this context include direct observation and treatment - short term (DOTS) for tuberculosis, volunteer testing and counseling (VCT) for HIV/AIDS, malaria control and so on.

- ▶ Infant Mortality Rate
- ▶ Maternal Mortality Rate
- ▶ Under-5 Mortality Rate
- ▶ Morbidity and mortality of major infectious diseases (tuberculosis, HIV/AIDS, malaria, etc.)

For sustainable health development after rehabilitation, reconstruction and revitalization of health system, continuous efforts on health system management including human resource development and ensuring financial sources such as budget allocation are required. The regular monitoring and evaluation on health policy implementation is also necessary.

(2) Urgent Rehabilitation and Reconstruction Plan

The urgent rehabilitation and reconstruction plan for health sector in Banda Aceh City is formulated based on the following criteria.

Resuming of regular health service providing system by restoring damaged facilities and lost human resources.

Coherence with related plan of the Government of Indonesia, including “Master Plan for Rehabilitation and Reconstruction Aceh Region and Nias”, health sector action plan of Banda Aceh City, and other health sectoral plan and strategy such as “Healthy Indonesia 2010”.

Based on the above criteria, following projects are proposed for the Urgent Rehabilitation and Reconstruction Plan.

Table 5.4.9 Projects for Urgent Rehabilitation and Reconstruction Plan

Program	
Project	Major Activities
Environmental health	
Improvement of environmental health	<ul style="list-style-type: none"> - Improvement of environmental condition in disaster affected areas - Sensitization on environmental health and hygiene practice for general population - Monitoring and control of quality of drinking water
Health service	
Rehabilitation/ reconstruction of damaged health centers and those networks	<ul style="list-style-type: none"> - Rehabilitation of 6 damaged health centers/ sub health centers - Reconstruction of 12 destroyed health centers and sub health centers
Reconstruction of destroyed and damaged public hospitals	<ul style="list-style-type: none"> - Relocation and reconstruction of Meuraxa Hospital - Rehabilitation of Zainoel Abidin Hospital
Revitalization of basic health services including primary care, public health programs and health promotion, and referral services	<ul style="list-style-type: none"> - Training on technical and management skills improvement for health personnel and community - Awareness rising on community health for general population
Maternal and child health system improvement	<ul style="list-style-type: none"> - Training on maternal and child health for health workers and community - Establishment of community referral system

Program	
Project	Major Activities
Community nutrition improvement	<ul style="list-style-type: none"> - Provision of supplemental nutrition (vitamin A, iron tablets, etc.) - Establishment of nutrition surveillance system - Training on nutrition surveillance system
Mental Health Care Improvement	<ul style="list-style-type: none"> - Training on physiological care for health personnel at all levels - Establishment of down referral system for ex-patients
Trauma treatment for disaster victims	<ul style="list-style-type: none"> - Establishment of trauma rehabilitation center and rehabilitation programs - Training on trauma treatment and rehabilitation for health personnel and community
Diseases prevention and control	
Revitalization of infectious diseases prevention and control system	<ul style="list-style-type: none"> - Post-disaster epidemiology survey - Establishment of health information system and regular epidemiology surveillance system - Training on health information system and epidemiology surveillance
Communicable diseases control enhancement	<ul style="list-style-type: none"> - Capacity building on quality control of laboratory works - Establishment of laboratory referral system - Establishment of communicable diseases alert system
Drug and medical supply	
Rehabilitation of drug and medical supply system	<ul style="list-style-type: none"> - Rehabilitation of drug and medical distribution facilities and equipment including storage and transportation - Revitalization of drug and medical management system
Health resources	
Health human resources development	<ul style="list-style-type: none"> - Revitalization of health education facilities - Educating and encouraging local human resources
Health development policy and management	
Revitalization of Banda Aceh City Health Office	<ul style="list-style-type: none"> - Rehabilitation of Banda Aceh City Health Office - Capacity building for health policy development and management - Establishment of program coordination body - Establishment of health database
Drug and food control	
Revitalization of drug and food security system	<ul style="list-style-type: none"> - Rehabilitation of Drug and Food Control Center - Capacity building for drug and food control system
Emergency Health and Medical Services	
Emergency health and medical service system development	<ul style="list-style-type: none"> - Establishment and development of emergency service providing structure among health service providers - Training on emergency health and medical services

Source: JICA Study Team

(3) Preliminary Cost Estimate and Tentative Implementation Schedule

Preliminary project cost for the urgent rehabilitation and reconstruction works proposed in this study is estimated based on the following conditions and assumptions, however, these are subject to change due to finalization of the Indonesian authorities.

Conditions and Assumptions for Preliminary Cost Estimate

- 1) Physical contingency and price escalation are assumed to be 10 % each of the direct construction cost.
- 2) Engineering service is assumed to be 10 % of the direct construction cost for detailed study & design and construction supervision.
- 3) If project is purely program type and/or procurement, only price contingency is considered.
- 4) VAT is included in the cost, however, import duties are not included in the cost.
- 5) Land acquisition and compensation costs are not included in the Project cost.

Total project cost is shown below. Each project cost which estimated based on the city action plan and other related information is presented in the foregoing tentative implementation schedule.

Table 5.4.10 Preliminary Cost Estimate

		(Rp. billion)
Proposed Project/Program	Works	Amount
A. Projects	(1) Improvement of Environmental Health	58.40
	(2) Basic Health Service/Referral Services	255.00
	(3) Infectious Diseases Prevention and Control	17.60
	(4) Preparation of Medicine and Medical Supply	1.00
	(5) Dispatching Health Personnel and Revitalization of Education Facilities	94.50
	(6) Improving Health Development Policy and Management	19.90
	(7) Revitalization of Drug and Food Security Function	26.00
	(8) Emergency Health and Medical Services	25.40
	Total	497.8

Source: JICA Study Team

Note: Costs for land acquisition and compensation are not included.

*1: CHO=Banda Aceh City Health Office

*2: PHO=NAD Provincial Health Office

*3: BPOM=Drug and Food Control Center

Table 5.4.11 Tentative Implementation Schedule

Projects/Programs	Implementation Schedule				
	Rehabilitation Stage		Reconstruction Stage		
	2005	2006	2007	2008	2009
A. Projects					
(1) Improvement of Environmental Health					
(2) Basic Health Service/Referral Services					
(3) Infectious Diseases Prevention and Control					
(4) Preparation of Medicine and Medical Supply					
(5) Dispatching Health Personnel and Revitalization of Education Facilities					
(6) Improving Health Development Policy and					
(7) Revitalization of Drug and Food Security Function					
(8) Emergency Health and Medical Services					

Source: JICA Study Team

(4) Annual Fund Requirement

In accordance with the preliminary project cost estimate and tentative implementation schedule presented above, annual fund requirement is set as follows.

Table 5.4.12 Annual Fund Requirement

Proposed Project/Program	Works	(Rp. billion)
		Amount
A. Projects	(1) Improvement of Environmental Health	58.40
	(2) Basic Health Service/Referral Services	255.00
	(3) Infectious Diseases Prevention and Control	17.60
	(4) Preparation of Medicine and Medical Supply	1.00
	(5) Dispatching Health Personnel and Revitalization of Education Facilities	94.50
	(6) Improving Health Development Policy and Management	19.90
	(7) Revitalization of Drug and Food Security Function	26.00
	(8) Emergency Health and Medical Services	25.40
	Total	497.8

Source: JICA Study Team

(5) Priority Projects

The following projects are identified as higher priority projects for urgent rehabilitation and reconstruction of health sector in Banda Aceh City and the affected areas.

a) Rehabilitation/ Reconstruction of Damaged/ Destroyed Health Centers and Sub Health Centers

As described in the prior section, health centers and sub health centers in the coastal areas are destroyed or heavily damaged. To recover basic health services including primary medical care and community health services, restore of damaged facilities

should be implemented at earlier stage. Rehabilitation and reconstruction works have been planned and some of them are being undertaken supported by NGOs.

Based on the population distribution projection and distance among related health facilities in district referral system, such as hospitals, health centers and sub health centers, shown by ARRIS, the numbers of health center and sub health center in 2009 could be proposed as follows.

Table 5.4.13 Number of Primary Care Service Facilities based on Projected Population by ARRIS

	Projected population in 2009	Health center		Sub health center	
		Functioning [†] (pre-disaster)	2009	Functioning [†] (pre-disaster)	2009
Inland Areas					
Ulee Kareng	37,658	1 (1)	1	2 (2)	2
Banda Raya	34,784	1 (1)	1	1 (1)	1
Lueng Bata	36,144	1 (1)	1	1 (1)	1
Central Areas					
Syiah Kuala	38,559	0 (1)	1	1 (4)	2
Baiurrahman	37,480	0 (0)	1	2 (3)	2
Kuta Alam	45,484	0 (1)	1	0 (2)	3
Coastal Areas					
Jaya Baru	11,417	0 (0)	0	0 (2)	2
Kuta Raja	6,791	0 (0)	0	0 (2)	1
Meuraxa	5,683	0 (1)	0	0 (4)	1
Total	254,000	3 (6)	6	7 (21)	15

Source: *1: Facilities with good condition and slightly damaged in damage Assessment Result of Health Center, March 2005 are included as "functioning".

Note: Capacity of a health center and a sub health center is estimated based on the regional plan of Banda Aceh City, i.e., 30,000 people for a health center and 6,000 people for a sub health center. Sub health center is considered to cover the population which is not included in the coverage of the health center.

In the coastal areas, Jaya Baru, Kuta Raja and Meuraxa, which were seriously damaged, 4 more sub health centers are to be established. As these areas are near to the new city center areas, referring to hospitals might not be a problem. In central areas, Syiah Kuala, Baiturrahman and Kuta Alam, 3 more health centers and 4 more sub health centers are to be established. In inland areas, Ulee Kareng, Banda Raya and Leung Bata, as damage by disaster was not very serious, the existing health centers and sub health centers could cover the population in 2009.

Proposed layout plan of health facilities including public primary care facilities and major hospitals are presented in the following figure.

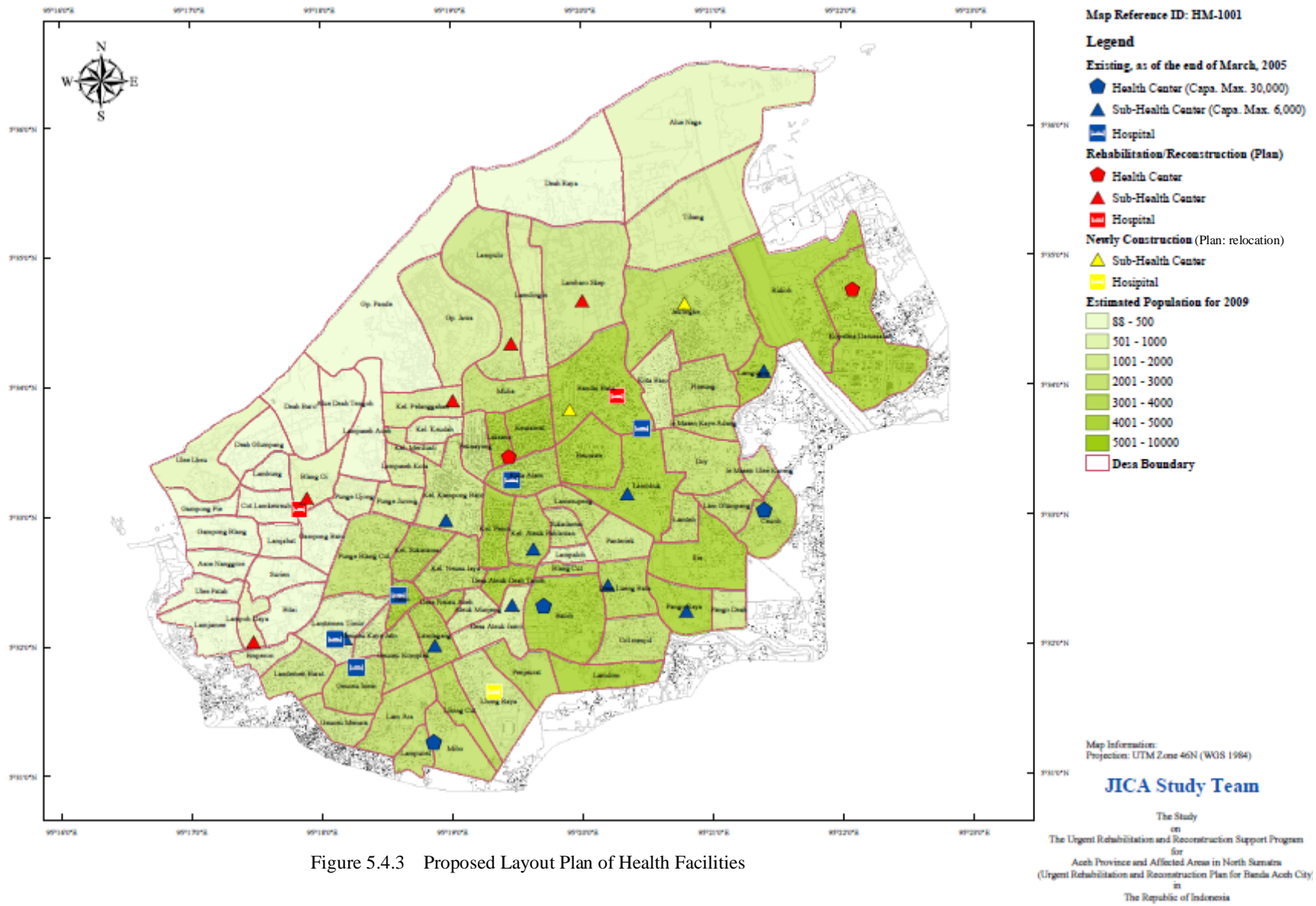


Figure 5.4.3 Proposed Layout Plan of Health Facilities

- b) **Rehabilitation/ Reconstruction of Damaged/ Destroyed Public Hospitals**
Meuraxa Hospital located at Ulee Lheu provided secondary care before the disaster. Although it has been providing the services in temporary place, the capacity is not enough. Therefore, reconstruction is required urgently. And actually, the reconstruction plan is being formulated. It should be relocated to inland areas to cover increasing population in the new central business district as shown in the Figure 5.4.3. Zainoel Abidin Hospital should also be urgently rehabilitated to provide tertiary care as a top referral hospital in NAD Province. Rehabilitation works and revitalization activities such as training of medical personnel are being implemented by NGOs and donors.
- c) **Rehabilitation of Drug and Medical Supply System**
Appropriate drug and medical supply, the management for health facilities at all levels including regular facilities (health centers and hospitals) as well as temporary facilities (satellite health posts) are essential to provide sufficient health services and medical care. Drug and medical supply and management system is being refined in provincial level and widely supported by donors.
- d) **Maternal and Child Health System Improvement Project**
Reducing maternal mortality rate (MMR) is one of the highest priorities in the health sector in Indonesia. Although MMR in Banda Aceh City was estimated lower than the national average, 114 per 100,000 live births (2003) was still high and it might be getting worse because of damage and losses in health service providers. Awareness of pregnant women and their families is one of key factors to avoid 2 delays from 4 delays⁶, i.e., delays in recognizing a developing complication and delays in detecting to act. Community empowerment and sensitization approach could be efficient and it could be coordinated with the prior program done by UNICEF and WHO which focus on socialization among health service providers. Detailed proposed activities are summarized in Appendix 10.
- e) **Mental Health Care System Improvement Project**
Because of social, economical and practical reasons (stigma, joblessness, difficulty in taking medicine regularly, etc.), patients in the mental health hospital could not return to their community and it causes high bed occupancy rate. After the disaster, the number of patients with mental disorders caused by trauma of tsunami or earthquake has been increasing. However, human resources for mental health care are quite limited and information on treatment of those is also inadequate. To improve the quality of mental health care, developing human resources and supporting rehabilitation of discharged patients and maintaining proper bed occupancy

⁶ Other 2delays are delays in arranging transport and delays in reaching services.

rate in the mental hospital in coordination with the prior programs coordinated by WHO might be recommended. Detailed proposed activities are summarized in Appendix 10.

f) Communicable Diseases Control Enhancement Project

In Banda Aceh City and its suburbs, communicable diseases are still major causes of morbidity. After the disaster, because laboratory equipment in health service providers in health centers and the city hospital were damaged, laboratory examinations on communicable diseases such as tuberculosis and malaria have been concentrated to provincial hospital. Therefore, quality and accuracy might not be well controlled.

To control outbreak of communicable diseases, rehabilitation of damaged laboratories are to be implemented at earlier stage. Establishment of accuracy control system and provincial wide referral network are proposed to improve communicable diseases control system. Detailed proposed activities are summarized in Appendix 10.

g) Revitalization of Drug and Food Security

Controlling drugs and foods distributed in markets is closely related to daily life of general population and diseases control caused by contaminated food or drugs. It also might be important to control counterfeit, substandard and illegal drugs as geographical situation of Banda Aceh. Although it includes diverse functions, many skilled and experienced human resources were lost because of the disaster. As the function is temporally covered by the Food and Drug Control Center in Medan, distribution of drugs and medical supplies provided by aid agencies might be a subject of delay.

Rehabilitation of damaged equipment and recruitment of staff are to be implemented in the rehabilitation stage, followed by the capacity building of the management and technical staff to enhance the food and drug control function. Detailed proposed activities are summarized in Appendix 10.