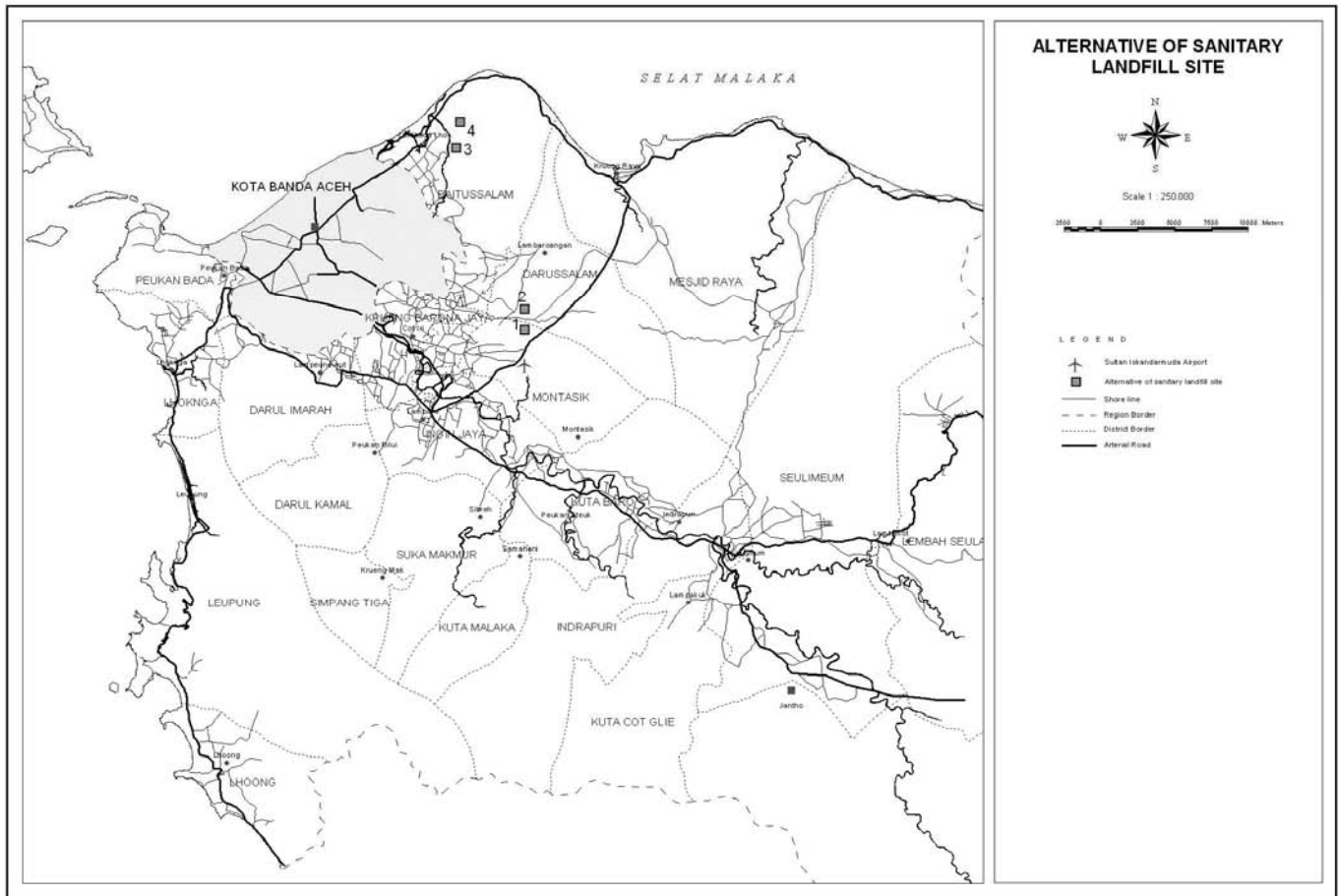


Figure 4.6.12 Alternatives of Sanitary Landfill Site



Source: Additional Study Team, 2006

## 2. Surrounding Area

The predicted solid waste generation in surrounding area is illustrated in Table 4.6.23.

Table 4.6.23 Projected Solid Waste Generation from Surrounding Area

Description	unit	2006	2007	2008	2009	2010	2015
Population		212,893	225,767	239,206	254,000	307,695	360,304
Lhoong	m <sup>3</sup> /year	7,714	8,458	9,212	9,978	10,127	10,836
Lhoknga	m <sup>3</sup> /year	12,262	13,022	13,792	14,574	14,793	15,829
Indrapuri	m <sup>3</sup> /year	15,150	15,377	15,608	15,842	16,080	17,206
Mesjid Raya	m <sup>3</sup> /year	11,123	11,921	12,731	13,553	13,756	14,719
Darussalam	m <sup>3</sup> /year	15,012	15,376	15,744	16,119	16,361	17,506
Baitussalam	m <sup>3</sup> /year	10,850	12,386	13,944	15,525	15,758	16,861
Sukamakmur	m <sup>3</sup> /year	11,039	11,204	11,373	11,543	11,716	12,536
Darul Imarah	m <sup>3</sup> /year	48,287	44,946	41,554	38,112	38,683	41,391
<b>Total</b>	m <sup>3</sup> /year	<b>131,437</b>	<b>132,690</b>	<b>133,958</b>	<b>135,246</b>	<b>137,274</b>	<b>146,883</b>

Source: Additional Study Team, 2006

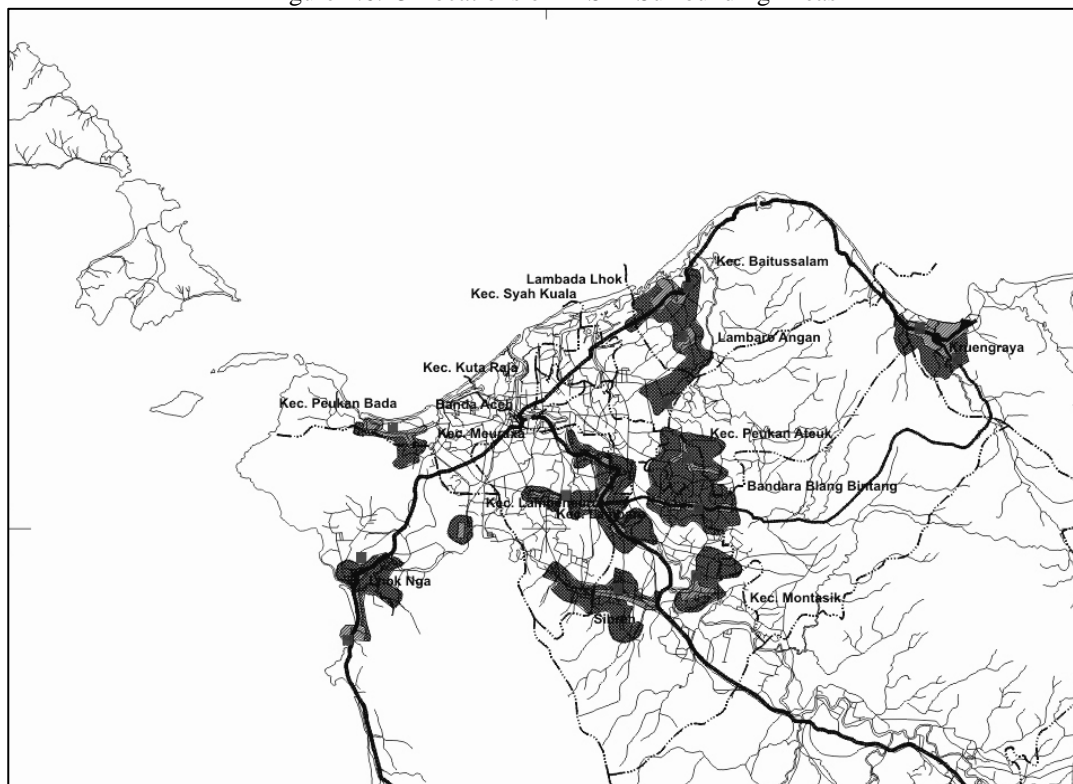
The plan for solid waste management in surrounding area is as follows:

- 1) Establish DKP (Sanitation and Park Department of ABR)
- 2) Collection by local neighborhood
- 3) Solid waste transportation and selection of temporary dumping site (TPS) shall be handled by local government
  - TPS will be made available in each satellite city
  - TPS will be made available at or close to traditional markets

This is illustrated in Figure 4.6.13.

- 4) Sanitary landfill will be managed by local government (as in sanitary landfill alternatives in BAC)

Figure 4.6.13 Locations of TPS in Surrounding Areas



Source: Additional Study Team, 2005

#### 4.6.6 Maritime Transport

##### a. Planning Concept

Maritime transportation priority programs will be addressed to: reconstruct Ulee Lheue Ferry Port to serve domestic passengers across the island especially for passengers from and to Sabang and re-improving the Malahayati Port both for passengers and goods. The Ulee Lheue reconstruction is now being carried out by the government of BAC. Ulee Lheue in future will be allocated to serve inter-island ferry services and acted as feeder port.

Malahayati Port development will focus on improving service facilities especially for international passengers and goods. Malahayati will be dedicated to be the trunk port, serving both domestic and international routes.

Sabang Port will be designated as a regional feeder port. It supports and feeds trips to and from Sabang City, Malahayati and BAC by providing safe, convenient and fast journey. It also provides high access

for Ulee Lheue port with small scale jet boat, facilitating passengers a pleasurable journey attractive enough for tourism.

#### b. Facilities Development

Ulee Lheue ferry port will need fast and entire reconstruction as the physical condition was totally collapsed while tsunami attacked in December 2004. Meanwhile, Sabang and Malahayati will need both reconstruction and development. The reconstruction is dedicated for facilities which are destructed by tsunami, while the development is required to meet future demand as the rate of arrival and departure of passenger and goods has been continuing to rise. The improvement programs for Malahayati and Sabang Port are described in Table 4.6.24.

Table 4.6.24 Improvement Programs for Sabang and Malahayati

No.	Items	Unit	Malahayati	Sabang
<b>I Passenger Port</b>				
1.	No. Passengers	pass/day	439	375
2.	No. Trips	ship/day	16	6
3.	Wharf Capacity	ship	4	1
4.	Terminal Building	m <sup>2</sup>	1,097	937
5.	Parking Area	m <sup>2</sup>	4,011	3,864
<b>II Cargo Port</b>				
1.	No. Goods	m <sup>3</sup> /day	3,936	448
2.	Wharf Capacity		2	
3.	Cargo Building	m <sup>2</sup>	984	
4.	Container Yard	m <sup>2</sup>	1,968	

Source: Additional Study Team, 2006

#### c. Preliminary Project Cost

The preliminary project cost in Table 4.6.25 is presented for the planning program of Malahayati and Sabang Port. The extension and new construction cost is roughly estimated as shown in Table 4.6.21, on the basis of experiences of the similar works.

Table 4.6.25 Preliminary Cost Estimate

Ports	Works	Amount (billion rupiahs)
Sabang	Passengers terminal building	22.68
	Parking Area	0.266
	Cargo terminal building	1.12
	Sub Total	24.066
Malahayati	Passengers terminal building	4.388
	Parking Area	0.8022
	Cargo terminal building	0.984
	Container Yard	1.3776
	Sub Total	7.5581

Source: Additional Study Team, 2006

#### d. Tentative Implementation Plan

The implementation schedule of air transport plan is set up as shown in Table 4.6.26. From the figure. The reconstruction and development of Sabang port is proposed started at 2010 and finish no later than 2012. For Malahayati, the program can begin at 2013 after the Sabang port is finished and continue to complete at 2015.

Table 4.6.26 Tentative Implementation Schedule for Sea Transport Plan

Proposed Project/Program	2010	2011	2012	2013	2014	2015
Sabang						
Malahayati						

Source: Additional Study Team, 2006

#### e. Annual Fund Requirement

The annual fund requirement is estimated based on the project cost estimate and implementation schedule as prior proposed. The fund program in Table works in assumption that funding will spread flatly each year.

Table 4.6.27 Annual Fund Requirement for Sea Transport Plan (Rp billion)

Proposed Project/Program	2010	2011	2012	2013	2014	2015	Total
Sabang	8.022	8.022	8.022				24.066
Malahayati				2.517	2.517	2.517	7.551
<b>Total</b>	<b>8.022</b>	<b>8.022</b>	<b>8.022</b>	<b>2.517</b>	<b>2.517</b>	<b>2.517</b>	<b>31.617</b>

Source: Additional Study Team, 2006

#### 4.6.7 Electric Power Supply

The electric power supply development plan is directed toward the provision of electricity to fulfill the pre-determined target of service in the end of target year.

##### (1) Planning Criteria

###### i) General Criteria

- Target year : 2015
- Target area : BAC
- Population in 2015 : 360,304 (As projected under this study)

###### ii) Design Criteria

- Average power demand per household : 900 – 1300 watt
- Electric power demand for facilities : 30% of domestic power demand
- Electric power demand for street lighting : 10% of domestic power demand
- Load Factor : 80% of total power demand

##### (2) Electric Power Supply Development Plan

The calculation of future power demand is based on prevailing standard, according to design assumption. Future power demand in BAC is described in Table 4.6.28.

Table 4.6.28 Future Electric Power Demand in BAC (2006 – 2015)

No	Description	Electric Power Demand (MW)		
		2006	2009	2015
1	Population	204,893	254,000	360,304
2	Number of household	40,979	50,800	72,061
3	Power demand:			
	- Domestic	53.27	66.04	93.68
	- Public facility (30%)	16.61	19.81	28.10
	- Street lighting (10%)	5.33	6.60	9.37
4	Total demand	75.21	92.46	131.15
	- Load factor (80%)	60.16	73.96	104.92

Source : Additional Study Team, 2006

The provision of electricity would have to be increased in order to fulfill future electricity demand. Supply capacity will be increased by planning a new steam powered plant in Iseuem area (Krueng Raya), by harnessing natural heat from Seulawah Mountain.

**(a) Preliminary project cost estimate**

The extension and new construction cost is roughly estimated as shown in Table 4.6.29, on the basis of experiences of the similar works.

Table 4.6.29 Preliminary Cost Estimate

Proposed Project/Program	Works	Amount (billion rupiahs)
A. Projects	(1) New construction of step down voltage regulator/transformer	1,3
	(2) New construction of Distribution Network (domestic, public facilities)	2,5
	(3) New construction of street lighting	3,7
	<b>Total</b>	<b>7,5</b>

Source: Additional Study Team, 2006

**(b) Tentative Implementation Plan**

The implementation schedule of Electric Power Supply is set up as shown in Table 4.6.30.

Table 4.6.30 Tentative Implementation Schedule for Electric Power Supply

Description	2010	2011	2012	2013	2014	2015
(1) New construction of step down voltage regulator/transformer						
(2) New construction of Distribution Network (domestic, public facilities)						
(3) New construction of street lighting						

Source: Additional Study Team, 2006

**(c) Annual fund requirement**

The annual fund requirement is estimated based on the project cost estimate and implementation schedule as shown below:

Table 4.6.31 Annual Fund Requirement for Electric Power Supply

Components	(unit: million rupiahs)						
	2010	2011	2012	2013	2014	2015	Total
(1) New construction of step down voltage regulator/transformer	0.4	0.3	0.3	0.3			1.3
(2) New construction of Distribution Network (domestic, public facilities)	0.7	0.6	0.6	0.6			2.5
(3) New construction of street lighting			1.0	1.0	0.9	0.8	3.7
<b>Total</b>	<b>1.1</b>	<b>0.9</b>	<b>1.9</b>	<b>1.9</b>	<b>0.9</b>	<b>0.8</b>	<b>7.5</b>

Source: Additional Study Team, 2006

#### 4.6.8 Communication

Communication system and network plan is directed toward the fulfillment of telephone and postal service demand particularly in new development areas according to the target of service in the end of target year.

##### (1) Planning Criteria

###### i) General Criteria

- Target year : 2015
- Target area : BAC
- Population in 2015 : 360,304 (As projected under this study)

###### ii) Design Criteria

- Residential, commercial, government, public services : 17 service connections/100 people
- Industry, tourism, warehouse : 1 service connection/plot (0.5 ha)
- Telephone kiosk : 1 service connection/5000 people
- Public telephone : 1 service connection/1000 people

##### (2) Telecommunication network plan

The calculation of communication demand in BAC is based on prevailing standard according to the design assumption. The result is described in Table 4.6.32.

Table 4.6.32 Communication Demand in BAC (2006 – 2015)

No	Description	Service Connection (SST)		
		2006	2009	2015
1	Population	204,893	254,000	360,304
2	Number of household	40,979	50,800	72,061
3	Service connection demand			
	- Residential, commercial, services, government, public & social facilities	38,831	43,180	61,252
	- Industry, tourism, warehouse	340	435	654
	- Telephone kiosk	41	51	72
	- Public telephone	204	254	360

Source : Additional Study Team, 2006

There has been a very significant growth of cellular customers (such as Telkom Flexi users) in BAC during post-disaster time. Based on this, besides land telephone, cellular telephone usage is projected to increase in the future. As an anticipation of future demand, 21 Base Transceiver System (BTS) will be built to serve Telkom Flexi customers in BAC. Other cellular providers such as Telkomsel, Indosat, Excelcomindo, Mobil 8, etc also have plans to expand their service in the city.

Postal service will be provided by post offices built in activity centers. The location of each office is determined according to service area and progress of service improvement achieved through the rehabilitation and reconstruction of postal infrastructures and facilities.

The need of postal infrastructure and facility will be fulfilled by the rehabilitation of 8 post office buildings and procurement of 3 motorcycles.

**(a) Preliminary project cost estimate**

The extension and new construction cost is roughly estimated as shown in Table 4.6.33, on the basis of experiences of the similar works.

Table 4.6.33 Preliminary Cost Estimate

<b>Proposed Project/Program</b>	<b>Works</b>	<b>Amount (billion rupiahs)</b>
A. Projects	(1) New construction of Base Transceiver System (BTS)	6.0
	(2) New construction of Distribution Network (domestic, public facilities)	2.5
	<b>Total</b>	<b>8.5</b>

Source: Additional Study Team, 2006

**(c) Tentative Implementation Plan**

The implementation schedule of Electric Power Supply is set up as shown in Table 4.6.34.

Table 4.6.34 Tentative Implementation Schedule for Communication

<b>Description</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
(1) New construction of Base Transceiver System (BTS)						
(2) New construction of Distribution Network (domestic, public facilities)						

Source: Additional Study Team, 2006

**(c) Annual fund requirement**

The annual fund requirement is estimated based on the project cost estimate and implementation schedule as shown below:

Table 4.6.35 Annual Fund Requirement for Electric Power Supply

<b>Components</b>	<b>(unit: million rupiahs)</b>						
	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Total</b>
(1) New construction of Base Transceiver System (BTS)	4.2	2.0					<b>6.0</b>
(2) New construction of Distribution Network (domestic, public facilities)		0.5	0.5	0.5	0.5	0.5	<b>2.5</b>
<b>Total</b>	<b>4.0</b>	<b>2.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>8.5</b>

Source: Additional Study Team, 2006

**4.7 HOUSING**

Housing development in disaster area has become main priority in rehabilitation and reconstruction in BAC and the whole disaster area of NAD and Nias.

The housing development implementation for disaster victims conducted by the Government, NGO's, donors, and the community itself. Housing development financial fund accepted from international and domestic party organized by the Government through BRR.

Based on BRR Housing Program for disaster area in BAC Data and programs of in every BAC disaster area is as follow:

- Housing needs = 17,269 units (in 68 villages)
- Committed = 14,161 units
- Gap = 3,319 units
- In progress = 3,383 units
- Complete = 2,498 units
- Occupied = 414 units

**Preliminary Project Cost Estimate for 2006 - 2007**

The extension and new house construction cost is roughly estimated as shown in Table 4.7.1 on the basis of experiences of the similar works.

Table 4.7.1 Preliminary Cost Estimate

Proposed Project/Program	Works	Amount (billion rupiahs)
A. Projects	New Housing Development (3,319 units)	165,950
	<b>Total</b>	<b>165,950</b>

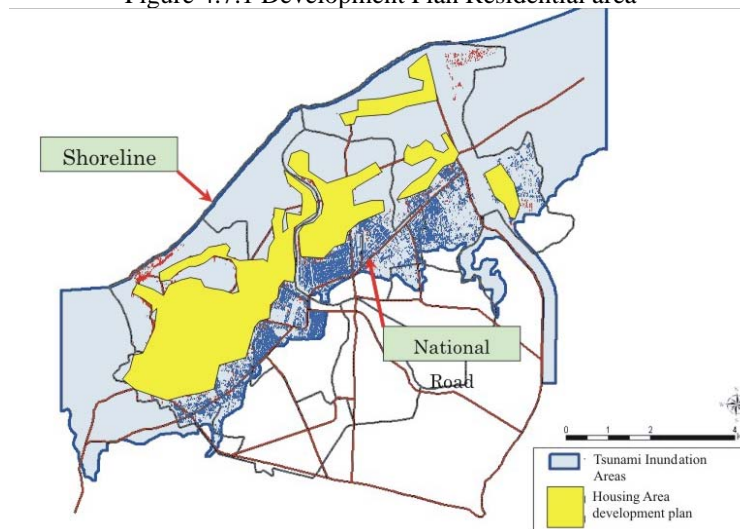
Source: Additional Study Team, 2006

**(1) Housing Development Plan**

Based on JICA Study Team, the required number of houses for dislocated people is estimated at 13,100, assuming average family size of 5. Another 10,800 houses would be required in 2009 due to influx of population. The required number of houses would therefore amount to 23,900 in 2009. The Additional Study Team calculated that based on population projection for target year 2015, 31,038 units of houses would be needed. Therefore, the total houses required until the year 2015 would be 54,938 units.

Most of returnees demanded that these houses be reconstructed on the exact pre-tsunami location, as it is irrevocably of utter importance to maintain their former livelihoods and cultural historic values.

Figure 4.7.1 Development Plan Residential area



Source: JICA Study Team and Additional Study Team, 2006



The residential area reconstruction will be supported with mitigation facilities for each village that is integrated with the city mitigation system and the population rearrangement.

According to the news release, the Indonesian Government proposes the following measures for housing scheme:

Table 4.7.2 Housing Scheme Proposed by the Government

	Low Income People	Medium - High Income People	
		Rental	Owned
Return to original village	Public low-cost rental flats as 'escape buildings' will be constructed in coastal area for people without assets.  Support for formation of fishermen's union, agricultural union and retail union will be made. Aids for funds, facilities and housing will be given through the union.	Structural Measures	
		Public facilities including escape road, escape building (school, mosque, health center, market, rental flat etc.), infrastructure (water supply, drainage and sanitation) and parks on disaster preparedness will be planned and implemented. Participatory village plan will be supported to be made by the residents. The structure of buildings shall be strong enough for earthquake-proof and shall be high-floored for tsunami.	
		Rental houses will be constructed mainly by aid of NGOs and donors.	Land consolidation system will be promoted. Reduced land area for public facilities will be paid that will be part of fund for reconstruction of houses. Low interest housing loan will be made. Tax reduction will be considered.
		Non-structural Measures	
		Public mediation between the house owner (lender) and the tenant will be facilitated. Preferential taxation system will be applied.	Consultation system will be made in the city for Housing loan of low interest rate will be made. Preferential taxation system will be applied.
Resettled to inland area	Public low-cost rental flats will be constructed in inland area for people without assets.  Subsidy to rent or tax reduction will be given.	Structural Measures	
		Promotion and incentive will be given to landowners in the inland area to prepare decent rental houses.	The structure of buildings shall be strong enough for earthquake-proof.
		Development of residential neighborhood will be promoted with public incentive measures. Public low price housing will be prepared. Infrastructure (road, water supply, drainage, sanitation, electricity) will be developed.	
		Non-structural Measures	
		Subsidy to rent or tax reduction will be given.	Tax reduction will be considered for acquisition of housing.

Source: JICA Study Team, 2005

## 4.8 PUBLIC, SOCIAL AND ECONOMIC FACILITIES

### 4.8.1 Damages on Social, Public and Economy Facilities

Major damages on public services are summarized below.

- (1) Education : Casualties of around 1,883 teachers, 230 administrative staffs, more than 250 faculty members, and 40,900 students were identified. As of 2 February 2005, 1,586 units including general schools, Islamic schools, and higher education institutions were totally and partially damaged. It corresponds to 23.5 % of a total number of education institutions before the disaster.  
  
In addition, 2,197 non-formal education institutions were destroyed including early age children education institution (PAUD), community learning center (PKBM), training or course institution, Islamic boarding school, Islamic primary school, and reading Al Qur'an institution (TPA).
- (2) Medical Care : About 20 % of staff in city health office and health centers was lost in BAC, In Meuraxa area, only 65 % of pre-disaster staff is remaining. Two out of 7 major hospitals in BAC were not functioning.
- (3) Public Market : Eleven public markets were maintained. Of the 11 markets, 5 markets are destroyed and 6 are partially collapsed.
- (4) Mass Media : Main building of TV station (TVRI) was damaged by the earthquake. A temporary studio was settled next to main building for broadcasting, while the radio station (RRI) was heavily damaged because the broadcasting equipment was submerged into tsunami inundation

### 4.8.2 Facilities Requirement

Table 4.8.1 Education and Health Facility Requirement 2015

Type	Standard Needs			Population 2015	Existing Amount	Facility Require- ment	Space and Facilities Needs Estimation		
	Supporting Population	Land Area	Building Area				Unit	Land Area	Building Area
	(people)	(m <sup>2</sup> )	(m <sup>2</sup> )				(unit)	(m <sup>2</sup> )	(m <sup>2</sup> )
<b>EDUCATION FACILITIES</b>									
Kindergarten	750	1,200	500		0	546	546	655,200	273,000
Elementary	1,500	8,000	2,000	409,143	132	273	141	1,128,000	282,000
Junior High	5,000	6,000	3,000		30	82	52	312,000	156,000
Senior High	5,000	10,000	3,000		35	82	47	470,000	141,000
<b>Sub Total</b>								<b>2,565,200</b>	<b>2,852,000</b>
<b>HEALTH FACILITIES</b>									
Sub-district Puskesmas	25,000	2,000	1,200		50	(16)	0	0	0
District Puskesmas	120,000	4,000	2,000	409,143	21	(3)	0	0	0
Maternity Clinic	10,000	1,500	1,200		12	41	29	43,500	34,800
Hospital	500,000	50,000	30,000		6	(1)	0	0	0
<b>Sub Total</b>								<b>43,500</b>	<b>34,800</b>

Source: Additional Study Team, 2006

**(a) Preliminary Project Cost Estimate**

The extension and new construction cost is roughly estimated as shown in Table 4.8.2, on the basis of experiences of the similar works.

Table 4.8.2 Preliminary Cost Estimate

<b>Proposed Project/Program</b>	<b>Works</b>	<b>Amount (billion rupiahs)</b>
A. Projects	A. Development of Education Facilities:	
	(1) New Kindergarten Development ( 546 units)	336.34
	(2) New Elementary Development ( 141 units)	347.42
	(3) New Junior High School Development (52 units)	192.19
	(4) New High School Development (47 units)	173.71
	B. Development of Health Facilities:	
(1) New Maternity Clinic Development ( 29 units)	42.87	
	<b>Total</b>	1,092.54

Source: Additional Study Team, 2006

**(d) Tentative Implementation Plan**

The implementation schedule of Air Transport plan.

Figure 4.8.3 Tentative Implementation Schedule for Public and Social facilities Development

<b>Description</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
A. Development of Education Facilities:						
(1) New Kindergarten Development ( 546 units)						
(2) New Elementary Development ( 141 units)						
(3) New Junior High School Development (52 units)						
(4) New High School Development (47 units)						
B. Development of Health Facilities:						
(1) New Maternity Clinic Development ( 29 units)						
<b>Total</b>						

Source: Additional Study Team, 2006

## **4.9 DISASTER WARNING AND EVACUATION AND RELIEF SERVICE FACILITIES**

### **4.9.1 Warning System**

#### **(1) Mini Earthquake Detector**

It is easy to find in any electronic stores. The tool is useful for detecting earthquake and recording its power in Richter scale. Household members can immediately know about what really happen.

#### **(2) Central Earthquake Detector**

The mini detector can fail reporting the excessive impact when the power scale of earthquake is huge. So the central detector can provide more accurate information about the earthquake power as recorded and informed. The central detector commonly uses the sophisticated technology so some trained people will be needed to operate the equipment

#### **(3) Tsunami Detector**

A tsunami detector is situated in the off shore and functioned to fast and immediate detect to tsunami potential. The recorded potential will be informed directly via information system network.

#### **(4) Alarm System**

An alarm system is easy to use tool but well accepted by people. Alarm can reach wide area in a few second since it switches on. The tool should apply in central control or in special agency office and always ready in use.

#### **(5) Loud Speaker**

It is a classic tool to spread information by voice, but it has proven effective since widely used in many villages in Indonesia. The loud speaker should be installed in all villages and placed at the strategic location or building such as the mosque or church.

### **4.9.2 Evacuation and Relief Facilities**

#### **(1) Ambulance**

Ambulances transport community from temporary accommodation in escape building to the emergency bases. Number of ambulances required in such an emergency will vary and depends on number of people served.

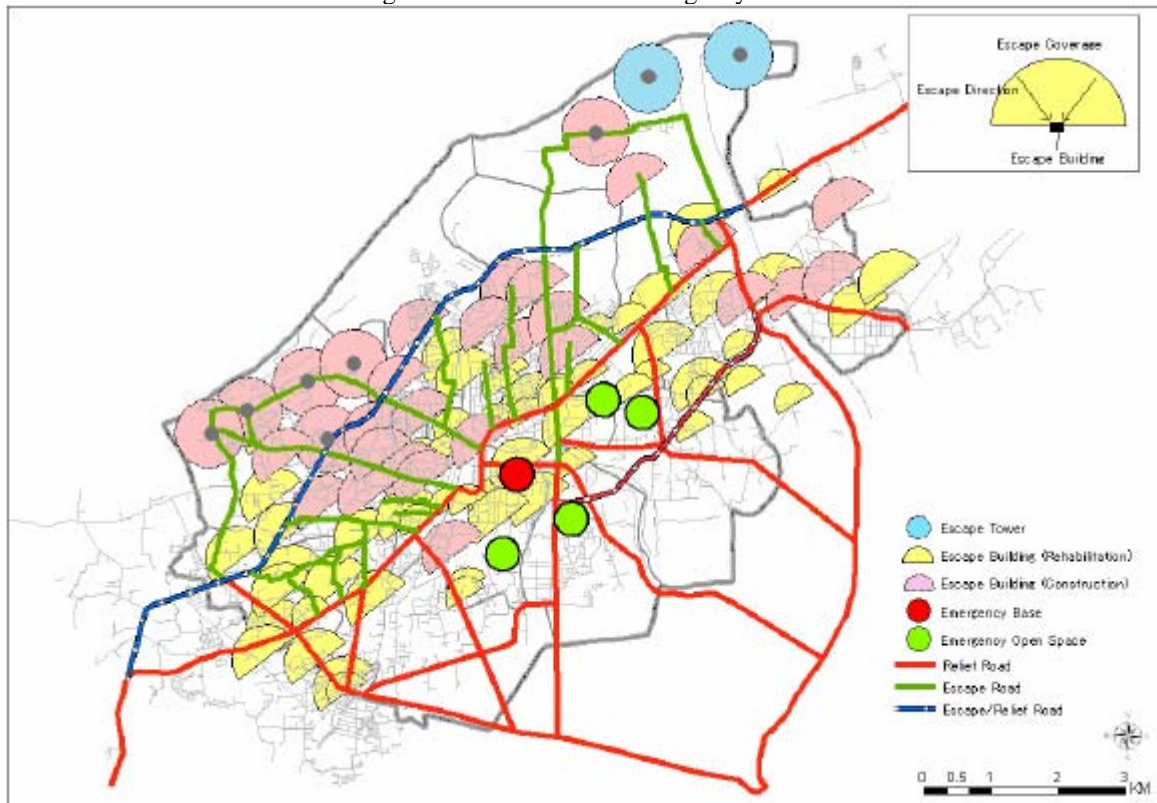
#### **(2) First Aid Tools**

In rush time, first aid tools act a vital equipment to provide people with urgent and fast medical treatment. The government or special agency should provide the FAT in a sufficient capacity. The real capacity will vary and depend on the number of people served.

#### **(3) Emergency bases**

Emergency bases collect people and then provide them with some treatment they need. Some treatment include medical treatment, psychological assists, and basic need provision.

Figure 4.9.1 Location of Emergency bases



Source: URRP Study Team, 2005

#### (4) Escape and relief roads

The tsunami run-up on 26 December 2004 ceased along this arterial national road although the road was impassable for all the type of vehicles due to floating logs and debris. The alignment of the road is regarded as the fringe of historic tsunami hazard.

Most serious concerns for the purpose of disaster mitigation are how to lead the citizens lived hazard area to the southward; namely safer side. Several existing south-north roads are proposed as possible escape roads for the citizens. Signboards and lights are provided in case of tsunami in the night time.

Time required for escape is quite limited when the tsunami generated by earthquake at the nearest fault. Thus, the place having higher elevation, such as tower, building with public stairs and bridges, are provided along the escape road.

Locations and the number of escape tower, building and bridges are examined taking into account the population distribution, escape road network and distance from the houses. The possible distance for escape on foot is estimated at the radius of 900 m (15 minutes at a walking speed of 1.0 m/sec on the average among the aged, handicapped and children).

Banda Aceh City has been developed as a business district of NAD along the arterial national road connecting the eastern side along the Strait of Malacca and the western side along the Indian Ocean. However, the alignment of the road is not in a straight and the traffic congestion used to occur at the center of the city.

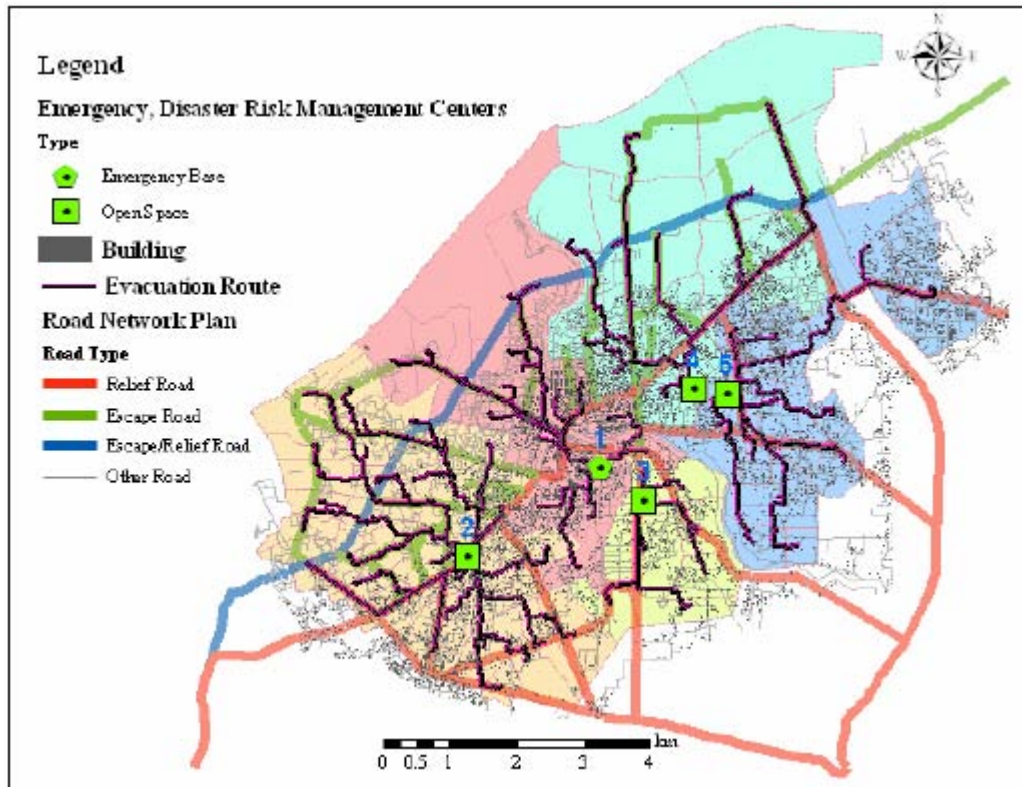
Relief road is delineated to ensure the immediate response to stricken area from both directions with the concept of “fail-safe”; namely, access from the eastern side (Syiah Kuala) and the western side (Jaya Baru). The road also provides the linkage with city center, sub-centre and major public

facilities (emergency bases). Especially, the relief road is regarded as a belt line connecting with city center and the sub-center as satellite districts.

Along the relief road, emergency bases having relatively wider area are provided for temporary settlement (a shelter tent) of dislocated families and for various relief activities. City parks, plaza in the mosques and schoolyard might be the site of proposed emergency bases. Whilst the low-lying areas extend southward crossing the proposed alignment of relief road, the area by filling up is available for emergency purposes.

The schematic longitudinal profile of coastal area to relief road is shown in Figure.

Figure 4.9.2 Escape roads by Desa



Source: URRP Study Team, 2005

## (6) Escape Building

In an emergency, some citizens failed to get out in time rush into the flat roof with external stairs of escape buildings located along escape roads. The height of flat roof is higher than the tsunami inundation depth on 26 December 2004; namely, it varies for the range from 10-m high near shoreline to at least 2-m high around national road.

The building is tsunami and earthquake proofed. Schools, mosques, markets, rental flats and building of ferry terminal could be good alternatives for the building. Also, the existing private buildings could be utilized as escape building. Escape towers are one of alternatives for fishermen and tourists since there is none of the houses and building with 10-m high in the coastal area.

Administrative guidance by the government agencies are necessary to make the existing buildings with flat roof, such as mosques, schools, public buildings and shopping centers.



## CHAPTER 5 PLANNING ON THREE MODEL RECONSTRUCTION AREAS

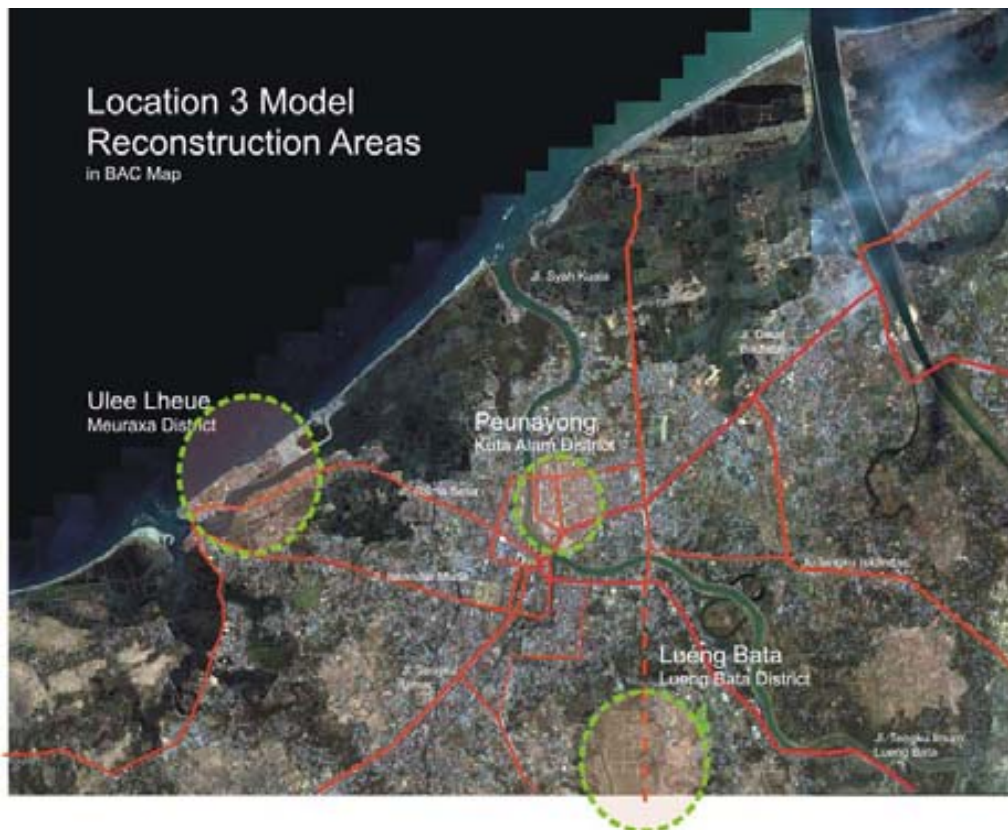
### 5.1 SELECTION OF MODEL AREAS

Three (3) reconstruction model areas have not defined yet, though TOR suggests that they would be Ulee Lheue, Peunayong and Lueng Bata in due consideration of the present development situation within BAC. It is therefore necessary to define the location and area in order to prepare a reconstruction model development pattern.

The selection of model areas are based on four criterias: (1) Does it fulfill the basic need of reconstruction and development?; (2) Is conceivable reconstruction and development feasible?; (3) No social, politically and environmentally issues/problems? (4) Is the conceivable reconstruction and development useful and adaptable to other parts of the city?

Three areas are selected based on the criterias: Ulee Lheue, Peunayong and Lueng Bata as reconstruction model areas. Figure 5.1.1 shows the location of the 3 model areas.

Figure 5.1.1 Location of Model Areas



Source: BAC Aerial Photography before tsunami

### 5.2 ULEE LHEUE MODEL AREA

#### 5.2.1 General Condition

Ulee Lheue is among the hardest hit areas by the 2004 disaster. Human casualties and material loss were extensive. An embankment in this area was destroyed in the 2004 disaster, causing high tide to enter far into the land, to fishpond and residential area. The disaster caused damages to residential area (100 %), fishpond (100 %), harbor (90 %), commercial (100 %), public & social facilities (90 %).

Figure 5.2.1 Ulee Lheue Area before tsunami  
Source: BAC Aerial Photography



Figure 5.2.2 Ulee Lheue Area after tsunami  
Source: BAC Aerial Photography





### (1) Location and Topography

The proposed Ulee Lheue area is located within Meuraxa District and encompasses four (4) villages which are Ulee Lheue, Deah Glumpang, Deah Baro, and Aloe Deah Tengoh. The boundaries of Ulee Lheue model area are as follows:

- North : Ocean/Malacca Strait.
- East : Peukan Bada District (ABR).
- South : Gampong Pie, Cot Lamkuweh, Blang Oi, Lampaseh Aceh.
- West : Lampaseh Aceh, Gampong Pande.

This model area covers 314 ha of land, ranging from 0 to 750 m from the shoreline. Its topography is relatively flat, with elevation of 0 – 2 m above sea level. There is a small island off the beach, connected to the mainland by Ulee Lheue Bridge and Bely Bridge. There are two river estuaries, namely Lamteh River and Krueng Cakra/Cangkui.

The disaster had caused significant topographic changes in this area. Parts of coastal area became submerged, shoreline retreated landward, and there are occurrences of high-tide inundation in previously flood-free residential area.

### (2) Land Use

There are five categories of existing land use in Ulee Lheue model area, consisting of residential area, fishponds, harbor, commercial area (local and city scale) and public & social facilities.

According to RTRW (Master Plan) of Banda Aceh 2002 – 2010, this area is designated as harbor area and residential area. Based on URRP Study by JICA Study Team, it is proposed to be very low density residential area.

### (3) Socio-economic Condition

From socio-economic aspects, Ulee Lheue may be described as an urban village. Its population is heterogeneous, many comes from outside BAC. Considering its dominantly Moslem population, it is understandable that there are many meunasah and mosques in the area.

#### (a) Population

Table 5.2.1 and 5.2.2 describe the present and projected population of Ulee Lheue Model Area, according to information from Meuraxa District & Head of Community by January, 2006 (the recorded population data has continually undergone revisions in this rehabilitation and reconstruction period).

Table 5.2.1 Population of Ulee Lheue Model Area

No	Village	Pre-disaster		Post-disaster *		Survival Rate
		person	household	person	household	
1	Ulee Lheue	4,154	839	784	157	18.9%
2	Deah Glumpang	1,172	294	332	67	28.3%
3	Deah Baro	1,010	256	202	40	20.0%
4	Aloe Deah Tengoh	1,492	349	201	40	13.5%
<b>TOTAL</b>		<b>7,828</b>	<b>1,738</b>	<b>1,519</b>	<b>304</b>	<b>19.4%</b>

Source: JICA Study Team, 2005 and Meuraxa District & Head of Community, January 2006

\*) note: post-disaster population excluding returnee

Projected population is shown in Table 5.2.2, based on annual growth rate according to JICA Study Team, 2005.

Table 5.2.2 Projected Population of Ulee Lheue Model Area

Village	Projected Population					
	2005	2006	2007	2008	2009	2015
Ulee Lheue	784	787	790	793	796	1129
Deah Glumpang	332	330	328	326	325	461
Deah Baro	202	202	203	203	203	288
Aloe Deah Tengoh	219	220	220	220	221	313
<b>TOTAL</b>	<b>1,537</b>	<b>1,539</b>	<b>1,541</b>	<b>1,542</b>	<b>1,545</b>	<b>2,191</b>

Source: JICA Study Team, 2005 and Additional Study Team, 2006

### (b) Economic activity

The majority of Ulee Lheue population works as fishermen, fish-farmers, traders, labors (fishing crews, construction workers, etc.), animal husbandry (tending cattle, goats or poultry) and entrepreneurs.

Unemployment level had soared high (70% - 100%) after the tsunami. Infrastructure & utilities such as roads and bridge are destroyed, power and telephone lines disconnected, while water supply provision becomes disrupted.

### 5.2.2 Rehabilitation and Reconstruction Program and Ongoing Works

There are a number of rehabilitation and reconstruction programs in Ulee Lheue area, as shown in Table 5.2.3 and Table 5.2.4.

Table 5.2.3 Rehabilitation and Reconstruction Programs

No	Programs	Funding	Executor	Progress
I	Housing reconstruction program	NGOs, donors, P2KP	NGOs, donors P2KP & community	<ul style="list-style-type: none"> <li>Committed</li> <li>Construction in progress</li> </ul>
II	Road network expansion and road elevating program			
	Rama Setia Street	BRR through APBN-P 2005	City Government	Construction in progress
	Iskandar Muda Street Ulee Lheue Port Access Road	ADB 2005	NAD Province Local Government	Land acquisition in progress
	Ulee Lheue Port Access Road (rebuild destroyed part)	UNDP 2005	City Government	Construction in progress
III	Ulee Lheue Port and Supporting Facilities Rehabilitation Program	AUSTRALIA	City Government	Construction in progress
IV	Dike Development Program			
	Sea wall/Breakwater	BRR	BRR and BAC local government	Planning & construction in progress
	Water tide dike	BRR	BRR and BAC local government	Construction in progress
V	Redevelop Medan-Banda Aceh railway Program	France Government (SCNF)	Indonesia -France	Commitment (Pre-Feasibility Study)

No	Programs	Funding	Executor	Progress
VI	Mass Grave Development Program	UNDP, Islamic Relief	Islamic Relief	Construction in progress
VII	Fish Auction Center Construction Program	Norway and BRR	Norway and BRR	Construction in progress
VIII	Planning and Reconstruction Program for four villages	NGOs/Donors, BRR	NGOs/Donors, BRR	<ul style="list-style-type: none"> <li>• Committed</li> <li>• Construction in progress</li> </ul>
IX	Rehabilitation of fishpond and other economic entities	NGOs/Donors	NGOs/Donors	Construction in progress
X	Water supply	Kuwait	Kuwait	Construction in progress

Source: Additional Study Team, 2006

Table 5.2.4 Sector and Executing Body

No	Village	EXECUTING BODIES					
		Village Planning	Land Tenure	Housing	Infrastructure & Utilities	Public Facilities	Economic Sector
1	ULEE LHEUE 1,129 persons 526 households	UPLINK	BPN	UPLINK	<ul style="list-style-type: none"> <li>• UPLINK</li> <li>• KUWAIT</li> </ul>	UPLINK	UPLINK
2	DEAH GLUMPANG 370 persons 174 household	UN-HABITAT	BPN	<ul style="list-style-type: none"> <li>• OXFAM</li> <li>• WVI</li> <li>• UN-HABITAT</li> </ul>	<ul style="list-style-type: none"> <li>• P2KP</li> <li>• UN-HABITAT</li> <li>• CARE</li> <li>• WVI</li> <li>• KUWAIT</li> <li>• PU</li> </ul>	<ul style="list-style-type: none"> <li>• WVI</li> </ul>	<ul style="list-style-type: none"> <li>• NORWAY</li> <li>• ELSAKA</li> </ul>
3	DEAH BARO 312 persons 172 household	UN-HABITAT	BPN	<ul style="list-style-type: none"> <li>• OXFAM</li> <li>• YBI</li> </ul>	<ul style="list-style-type: none"> <li>• P2KP</li> <li>• OXFAM</li> </ul>	<ul style="list-style-type: none"> <li>• P2KP</li> </ul>	<ul style="list-style-type: none"> <li>• P2KP</li> <li>• ELSAKA</li> </ul>
4	ALOE DEAH TENGOH 375 persons 207 household	----	BPN	<ul style="list-style-type: none"> <li>• OXFAM</li> <li>• YBI</li> </ul>	<ul style="list-style-type: none"> <li>• CARE</li> <li>• WVI</li> <li>• OXFAM</li> <li>• P2KP</li> </ul>	<ul style="list-style-type: none"> <li>• P2KP</li> </ul>	<ul style="list-style-type: none"> <li>• OXFAM</li> <li>• IRD</li> <li>• BPMD</li> <li>• ELSAKA</li> </ul>

Source: Meuraxa District & Head of Community, January 2006

### 5.2.3 Development Need and Constraint

The enormous devastation of Ulee Lheue area warrants a thorough reconstruction and rehabilitation of housing, infrastructure and utilities, social and public facilities. It is also imperative to promote local economic development and integrate mitigation aspect into the re-development of this model area. The following are the list of required development efforts:

- Housing** as basic need, an urgent program for all villages. Although there are on-going permanent and semi-permanent housing assistances from government, NGOs and donors, but overall progress has been slow. Several identifiable constraints are: problems in program execution; limited funding from NGOs and government; lack of village planning that may guide the rehabilitation and reconstruction process; questionable commitment on the part of NGOs and donors.
- Infrastructure and utilities** needs to be entirely rehabilitated and reconstructed. Several constraints that may hinder it are: slow execution of construction program; lack of village

planning as a guide for infrastructure rehabilitation and reconstruction process; most city scale infrastructure network is still inoperative.

3. Destroyed as well as new **Social and Public Utilities** need to be constructed. The constraints are slow program execution and limited funding.
4. **Local Economic Development** is crucial to restore the livelihood of local people, in order to make the area self-sufficient. It consists of capital, work equipments and workplace rehabilitation (harbor, fishpond, etc), as well as vocational training. The constraints are slow program execution and limited funding.
5. **Mitigation Aspect**, the designation and construction of (i) Escape Routes; (ii) Escape Building; (iii) Early Warning System. The major constraint is land acquisition for escape routes and escape building.

#### 5.2.4 Preliminary Development Concept

The development concept for Ulee Lheue model area is as waterfront area rich with historical value. This area is proposed to be developed as low density mixed use function, with better protection against future potential disaster by providing mitigation facilities.

There are several development themes proposed for this model area:

- (1) Historic Tourism Theme, including: (i) Tsunami victim mass grave; (ii) Historical mosque; (iii) Tsunami museum area; (iv) Tsunami sculpture park.
- (2) Water Tourism Theme, including: (i) Fishing area /leisure fishing; (ii) Water tourism boat area; (iii) Floating restaurant.
- (3) Thematic Residential including: (i) Mix use of residential and commercial; (ii) Medium – high rise residential (Hotel).
- (4) Waterfront Green Theme including: (i) Waterfront park/forest; (ii) Waterfront plaza; (iii) Waterfront forest.
- (5) Harbor Theme including: (i) Fish auction wharf; (ii) Ulee Lheue domestic harbor.
- (6) Sport Theme including Indoor sport and Outdoor Sport Facilities.
- (7) Escape Areas that can be use as a Community Hall and waterfront tourism.

The above preliminary development plan is illustrated in Figure 5.2.3 and development plan in figure 5.2.4.

#### 5.2.5 Proposed Reconstruction Works

Proposed reconstruction works for this model area consists of:

- (1) Housing Reconstruction.
- (2) Infrastructure and utilities: (i) seawall/break water; (ii) water tide dike; (iii) infrastructure & utilities for city scale and neighborhood scale.
- (3) Public and Social Facilities for district scale and neighborhood scale.
- (4) Mitigation facilities: (i) Escape Routes; (ii) Escape Building (3 units).
- (5) Ulee Lheue Tsunami Waterfront Area: (i)Historic Tourism area; (ii) Water Tourism area; (iii) Infrastructure - city scale; (iv) Thematic Residential; (v) Waterfront Green area; (vi) Harbor area; (vii) Sport area.
- (6) Local economic development: fishpond, fish auction center.
- (7) Estimated Cost and Construction Period

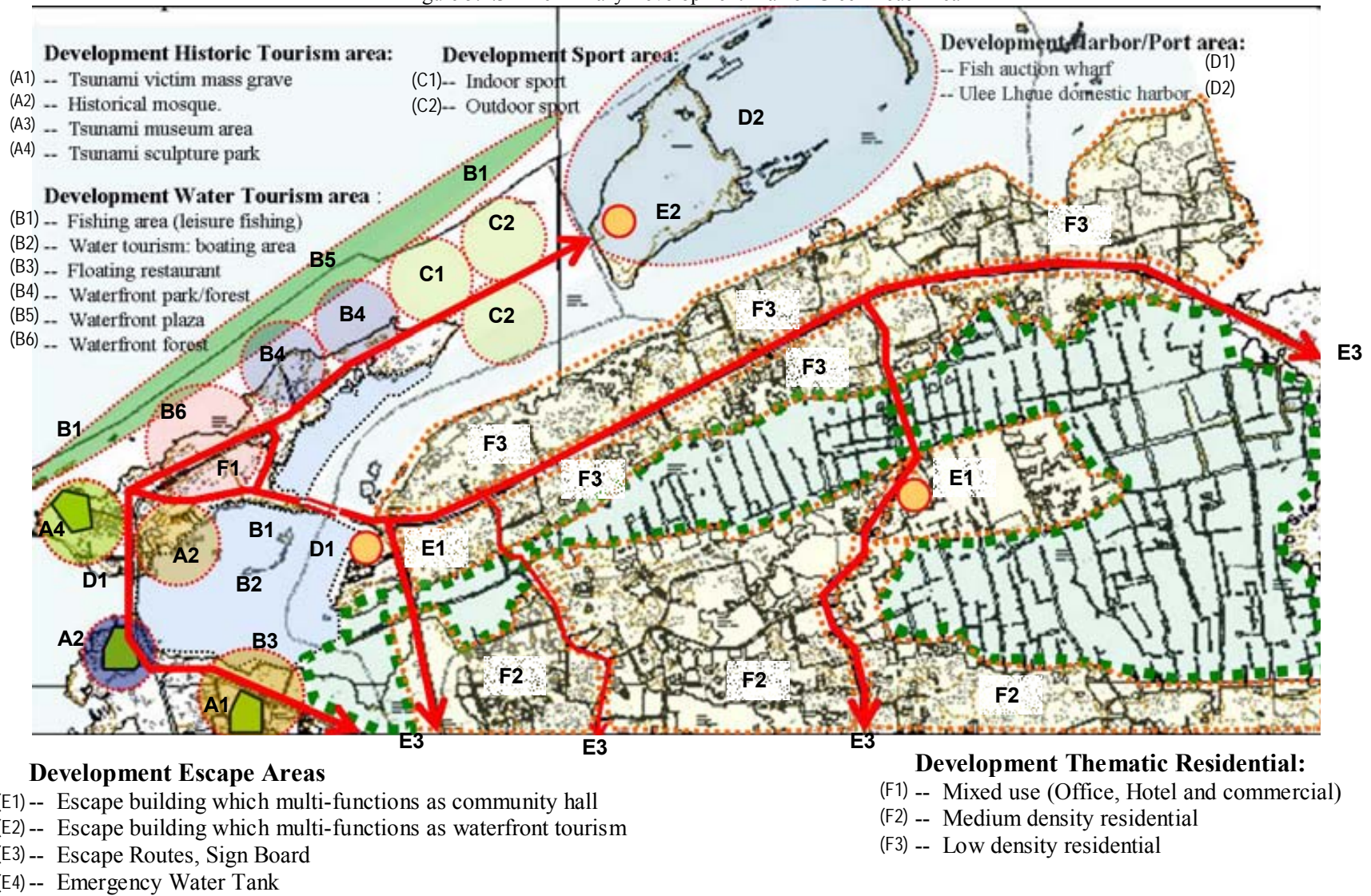
The estimated cost and construction period is shown in Table 5.2.5.

Table 5.2.5. Cost Estimation and Construction Period

No	Construction Programs	Volume	Cost Estimation (Rp billion)	Construction Period										
				2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
<b>I</b>	<b>Housing</b>	90 units	4.50	2.25	2.25									
<b>II</b>	<b>Infrastructure and Utilities:</b>													
	▪ Seawall	2,370 m	4.22	2.11	2.11									
	▪ Water tide dike	5,852 m	35.11	8.78	8.78	8.78	8.78							
	▪ Roads	7,205 m	23.15	3.86	3.86	3.86	3.86	3.86	3.86					
	▪ Drainage	13,304 m	19.29	3.86	3.86	3.86	3.86	3.86						
	▪ Bridges	226 m	24.03	6.01	6.01	6.01	6.01							
<b>III</b>	<b>Public and Social Facilities</b>	3,500 m <sup>2</sup>	4.31	0.62	0.62	0.62	0.62	0.62	0.62	0.62				
<b>IV</b>	<b>Escape Routes</b>	4,020 m	24	8	8	8								
<b>V</b>	<b>Escape Building (3 units)</b>	3 units	12.48	4.16	4.16	4.16								
<b>VI</b>	<b>Waterfront Area</b>	6.28 million m <sup>3</sup>	20	2	2	2	2	2	2	2	2	2	2	2

Source: Additional Study Team, 2006

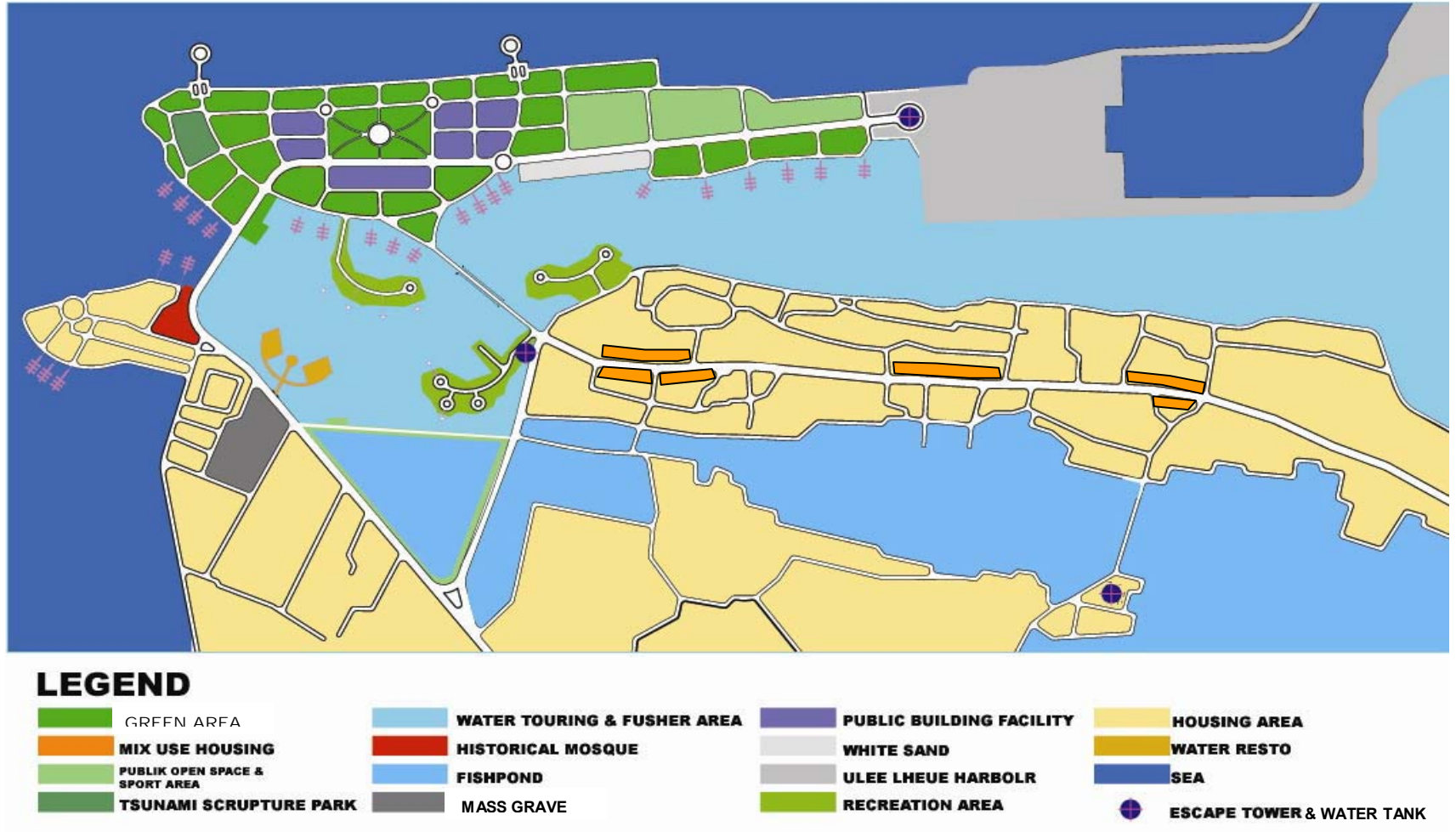
Figure 5.2.3 Preliminary Development Plan of Ulee Lheue Area



(Source : Additional Study Team, 2006)



Figure 5.2.4 Development Plan of Ulee-Lheue Area



Source: Additional Study Team, 2006

Figure 5.2.5 Bird Eye View (1) of Ulee Lheue Development Plan



Source: Additional Study Team, 2006

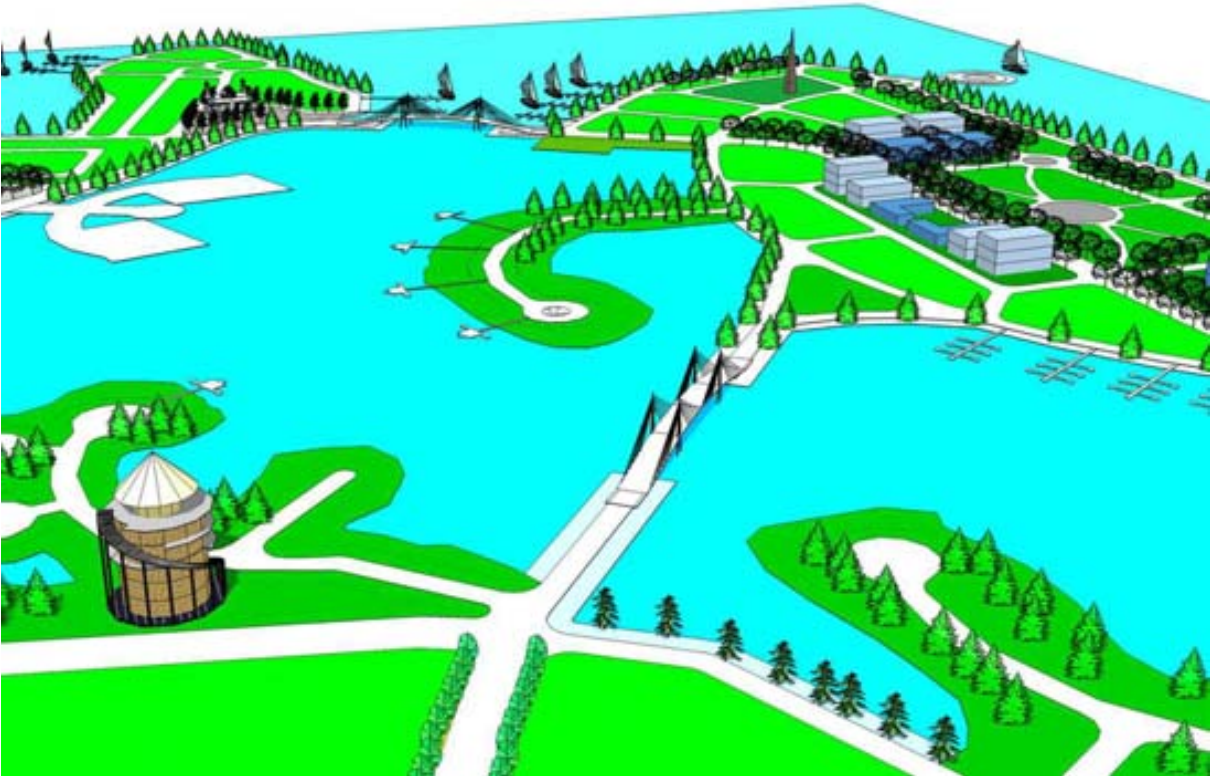
Figure 5.2.6 Bird Eye View (2) of Ulee Lheue Development Plan



Source: Additional Study Team, 2006

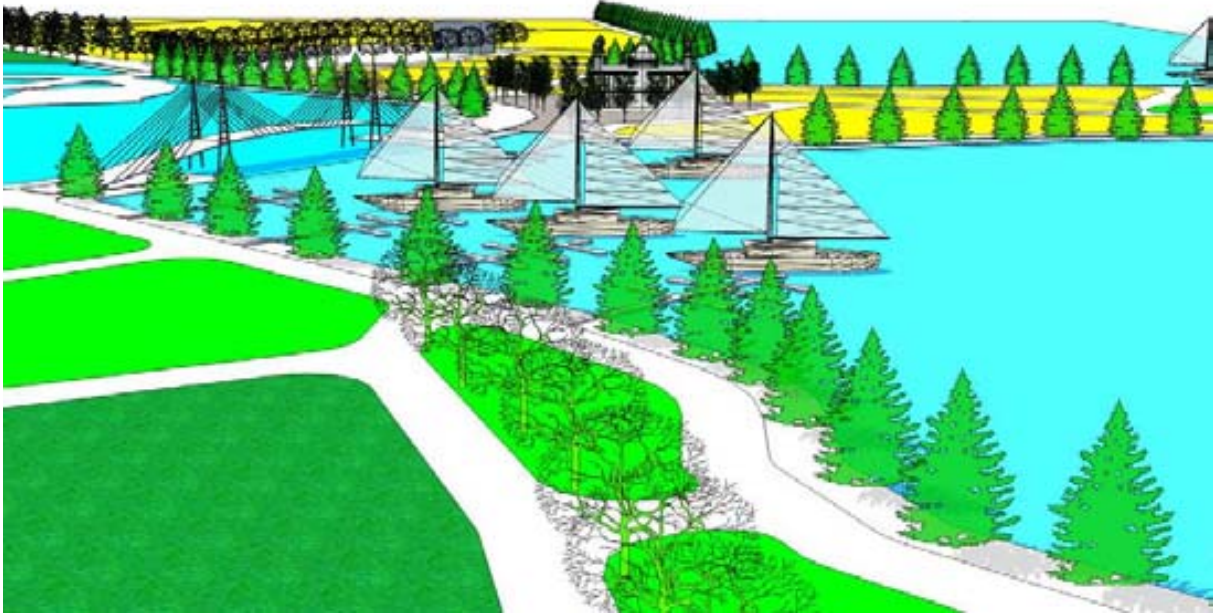


Figure 5.2.7 Bird Eye View (3) of Ulee Lheue Development Plan



Source: Additional Study Team, 2006

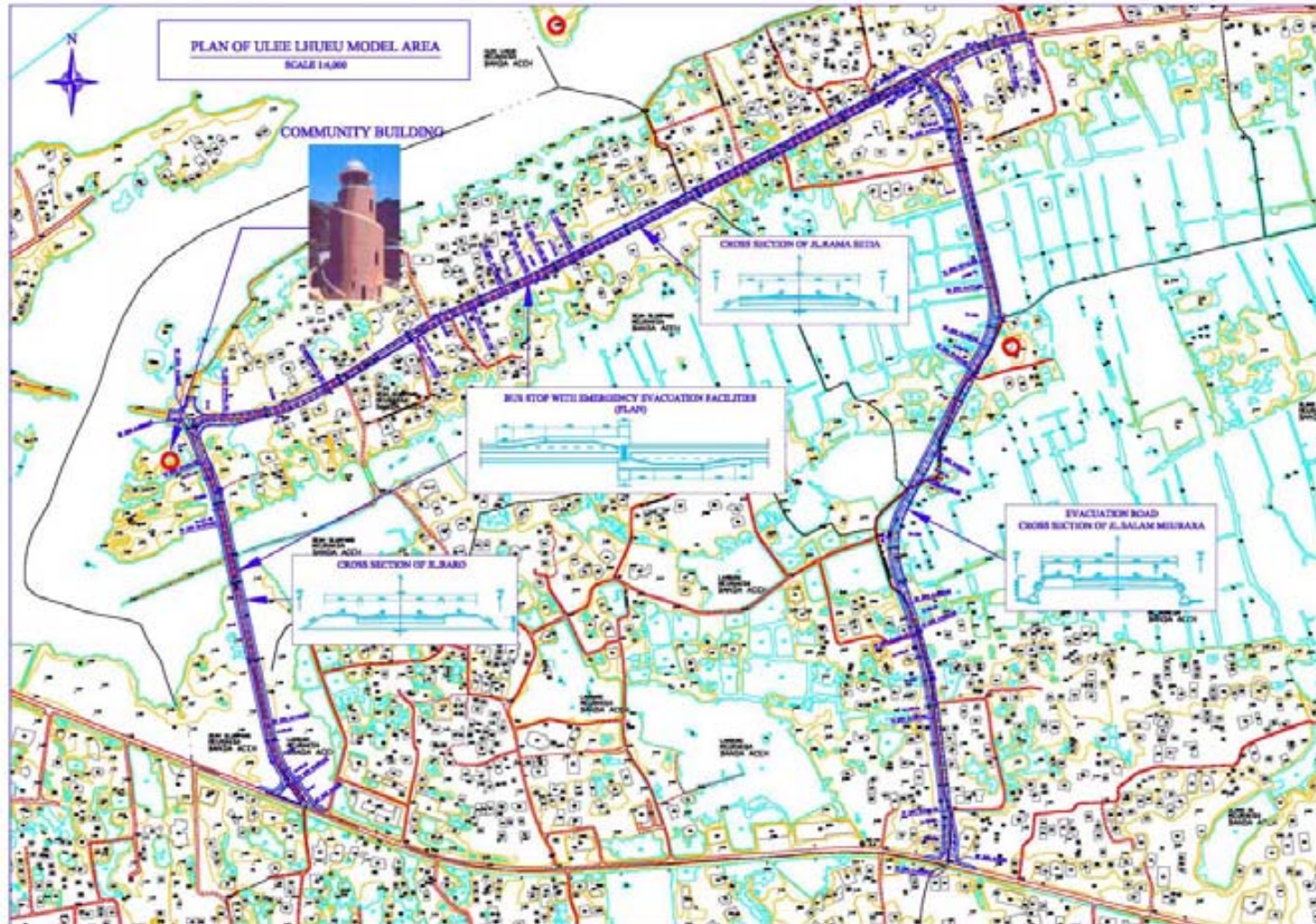
Figure 5.2.8 Bird Eye View (4) of Ulee Lheue Development Plan



Source: Additional Study Team, 2006



Figure 5.2.9 Short Term Program of Ulee Lhueu



Source: Additional study Team, 2006

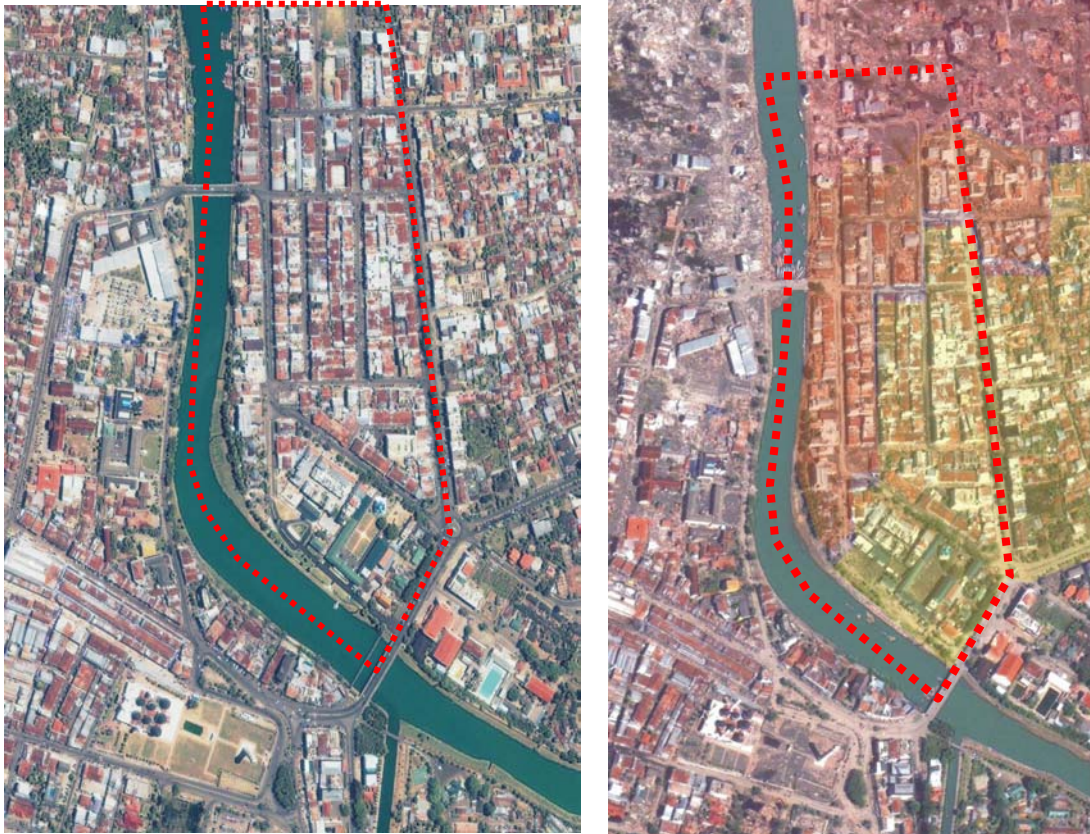


### 5.3 PEUNAYONG MODEL AREA

#### 5.3.1 General Condition

Peunayong has long been one of the most strategic areas in BAC and vicinity. It is a prominent Central Business District and also widely known as Old City of BAC.

Figure 5.3.1 Pre and Post-tsunami Aerial View of Peunayong



Source: BAC Aerial Photography (before and after tsunami)

#### (1) Location and Topography

Peunayong area lies in Banda Aceh city center, approximately 3,000 m from the shoreline. The area is 48.6 ha wide and is part of Kuta Alam District. It is also heavily damaged by the 2004 disaster. The boundaries of model area are as follows:

- North : Kampung Mulia
- East : Laksana Village and Keramat Village
- South : Kuta Alam
- West : Krueng Aceh

Peunayong model area covers 48.6 ha of mainly flat area, with elevation ranging from 2 – 4 m above sea level. Krueng Aceh, among the biggest rivers in BAC, flows through the city.

Although there had been no topographic change in this area, as an impact of the earthquake and tsunami there are now several inundated areas in this area.

## (2) Land use

Peunayong is almost entirely covered by built up area. Its existing land use is dominated by commercial area, consisting of shop-houses, fishing port, hotels, offices, markets (traditional and modern), as well as residential area and public and social facilities.

Along the riverfront there is also a military facility, a small pier near the bridge, and a fish market.

The disaster had caused damages to residential buildings (80%), commercial buildings (20%) and public and social facilities (50%). Damages to roads are moderate, while bridges only suffered minor damage.

Peunayong is proposed as commercial area by both RTRW (Master Plan) of Banda Aceh 2002 - 2010 and URRP Study.

## (3) Socio-economic Condition

### (a) Population

Based on data from Kuta Alam District (December, 2005), the pre-tsunami and post-tsunami population is described in Table 5.3.1. It should be noted that the recorded population data has continuously been revised in this rehabilitation and reconstruction period.

Table 5.3.1 Population of Peunayong Model Area

No	Village	Population		Survival Rate
		Pre-disaster	Post-disaster *	
1	Peunayong	4,382 persons	2,858 persons	65.23%

Source: JICA Study Team, 2005 and Peunayong District & Head of Community, December 2005

\*) note: post-disaster population excluding returnee

Table 5.3.2 shows the projected population calculated by annual growth rate based on URRP Study.

Table 5.3.2 Population of Peunayong Model Area

Village	Projected Population					
	2005	2006	2007	2008	2009	2015
Peunayong	2,858	2,872	2,887	2,903	2,919	4,141

Source: JICA Study Team, 2005 and Additional Study Team, 2006

### (b) Economic activity

Peunayong area may be described as an urban area with heterogeneous population. Originally they were merchants from outside Banda Aceh who finally settled down in this area.

At present their occupation are fishermen, traders, labors (fishing crew, construction worker, etc.), police/army, civil servant and entrepreneurs. The destruction caused by tsunami has gravely increased the unemployment rate to around 30% to 50%.

### 5.3.2 Rehabilitation and Reconstruction Program and Ongoing Works

In Peunayong area there are several planned, committed and on-going rehabilitation and reconstruction programs as listed in Table 5.3.3.

Table 5.3.3 Rehabilitation and Reconstruction Programs

No	Programs	Funding	Executing Body	Progress
1.	Housing reconstruction program	NGOs, BRR, P2KP	NGOs, BRR, P2KP & community	<ul style="list-style-type: none"> <li>• Committed</li> <li>• Construction in progress</li> </ul>
2.	Road rehabilitation program	BRR	City Government	Construction in progress
3.	Drainage rehabilitation program	People of China, BRR	City Government	Construction in progress
4.	Solid waste rehabilitation program	BRR	City Government	Construction in progress
5.	Water supply rehabilitation program	BRR, PDAM	PDAM	Construction in progress
6.	Utilities network rehabilitation program	BRR, PLN, TELKOM	PLN, TELKOM	Construction in progress
7.	Traditional market	Yokohama, USAID	City Government	Construction in progress

Source: Additional Study Team, 2006

### 5.3.3 Development Need and Constraint

As with Ulee Lheue, Peunayong area needs similar development efforts. Urgent development efforts for this area include rehabilitation of Peunayong market, assistance for operating capital, tools and equipment, and construction of houses.

The greatest constraint for development in this almost entirely built up area is non-availability of land for construction of mitigation facilities and basic infrastructures.

### 5.3.4 Preliminary Development Plan

The proposed concept for Peunayong development is as a commercial center of BAC. Such plan is compliant to the planning stated in RTRW and structure plan of URRP. The model area is proposed to be developed with the following themes:

- (1) Riverfront area
- (2) China town area (Old Town)
- (3) Military complex
- (4) City park (open air restaurant, plaza, etc)
- (5) Business district (hotel, office, retail and traditional market)
- (6) Residential area (including shop-houses)

Based on the above development concept, a schematic conceptual development is proposed in Figure 5.3.2, followed by a preliminary development plan as illustrated in Figure 5.3.3.

### 5.3.5 Proposed Reconstruction Works

According to the preliminary development plan, the proposed reconstruction works for Peunayong model area is as follows:

- (1) Housing Reconstruction Program

- (2) Road, piped water supply and storm water drainage rehabilitation program
- (3) Landscaping including city park, mitigation facility, early warning system
- (4) Development of riverfront area

### 5.3.6 Estimated Cost

The estimated construction cost is shown in Table 5.3.4.

Table 5.3.4 Cost Estimation and Construction Period

No	Construction Programs	Volume	Cost Estimation (Rp Billion)	Construction Period										
				2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
I	Housing	39 units	1.95	0.98	0.98									
II	Infrastructure and Utilities:													
	• Road	3,387 m	3.14	1.13	1.13	1.13								
	• Drainage	6,768 m	2.37	0.5	0.59	0.59	0.59							
III	Public and Social Facilities	6,500 m <sup>2</sup>	4.93	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49

Source: Additional Study team, 2006



Figure 5.3.2 Conceptual Development Concept of Peunayong



**Green Corridor Development :**

- Jl. Panglima Polim,
- Jl. Sri Ratu Safiatuddin

**Business District Development:**

- Hotel,
- Office
- Retail Market
- Restaurant
- Public & Social Facilities

**Green Park/plaza Development:**

- Rex Plaza
- Open resto
- Festival market place

**Military Complex Development:**

- Military function
- Escape Building
- Water Tank for emergency uses

**Traditional Market Rehabilitation :**

- Fish market
- Fishing port
- Service route

**China Town Conservation:**

- Jl. Tengku Hasan Krueng Kalee**
- Mixed Use (commercial-housing) old building
  - Arcade.
  - Specialty Shops

**Upgrade Infrastructure :**

- Road
- Drainage
- Water Supply
- Solid Waste & sanitation
- Electrical & Telephone

**Krueng Aceh Riverfront Development:**

- Green park.
- Port for fishery and tourism.
- Promenade (along the river)
- Building orientation to river

Source, JICA Study Team, 2005

Figure 5.3.3 Preliminary Development Plan of Peunayong Area



Source: Additional Study, 2006

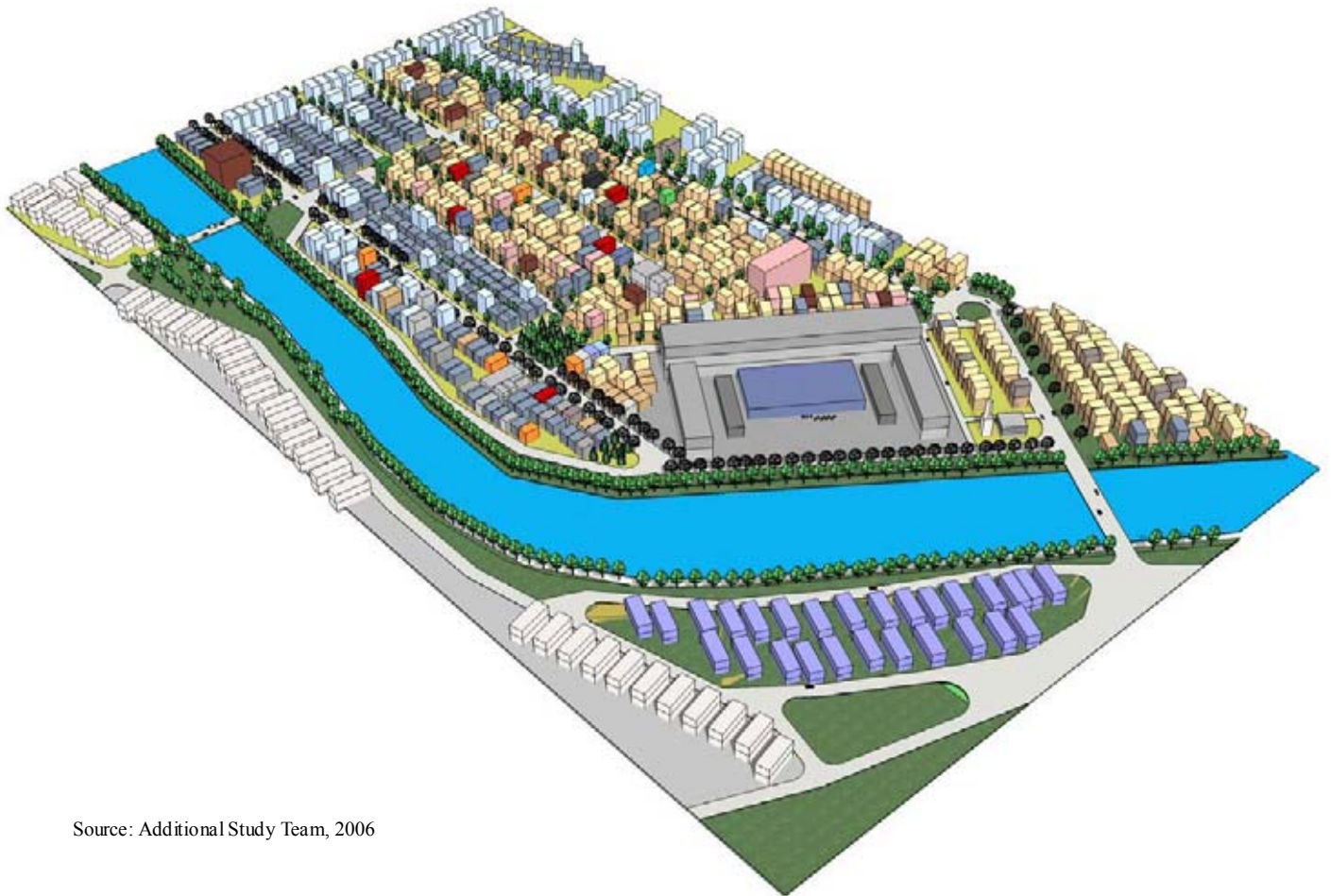


Figure 5.3.4. Bird Eye View (1) of Peunayong Area Development Plan



Figure 5.3.5. Bird Eye View (2) of Peunayong Area Development Plan

Source: Additional Study Team, 2006



Source: Additional Study Team, 2006



Figure 5.3.6 Bird Eye View (3) of Peunayong Area Development Plan



Source: Additional Study Team, 2006

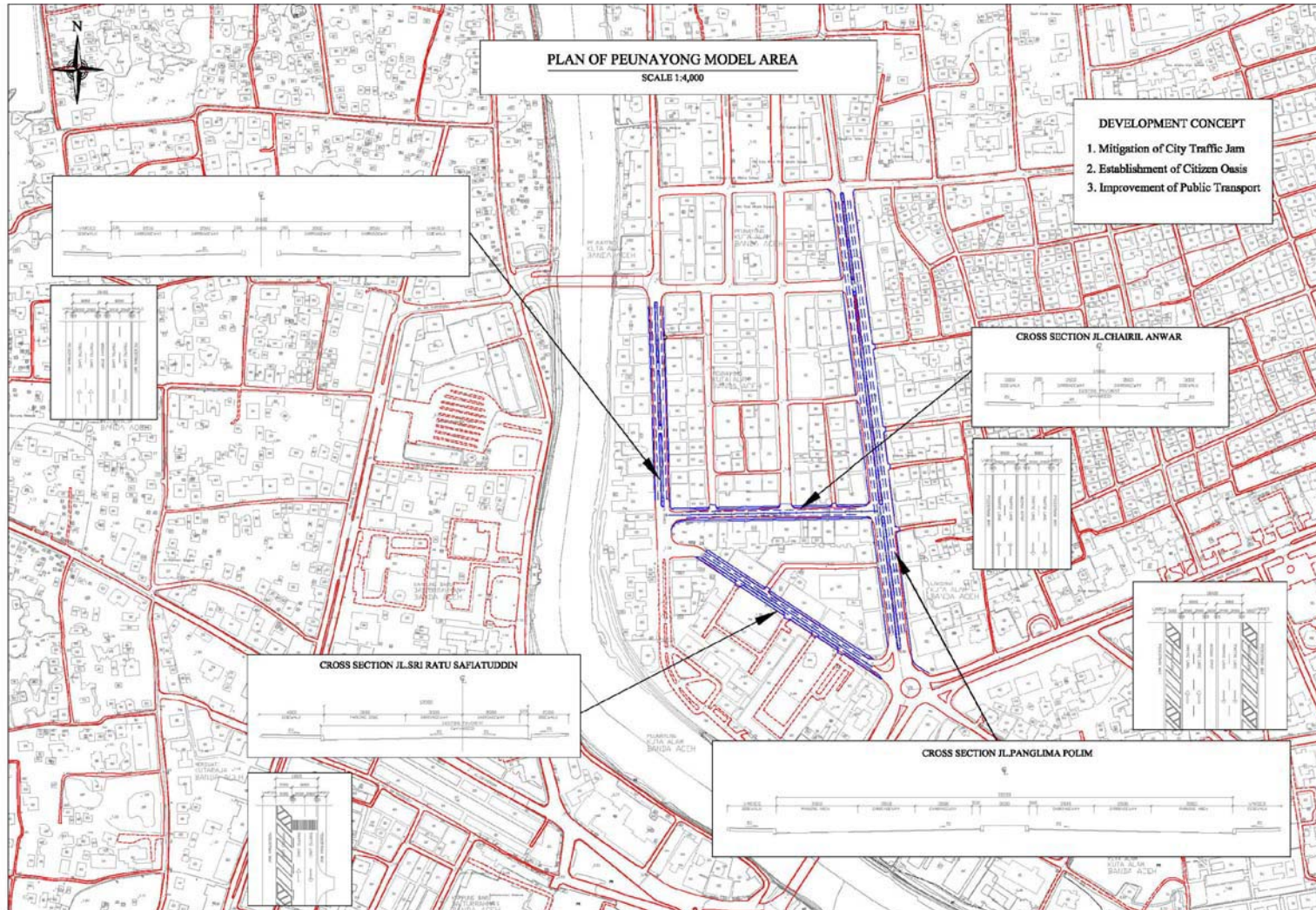
Figure 5.3.7 Bird Eye View (4) of Peunayong Area Development Plan



Source: Additional Study Team, 2006



Figure 5.3.8 Short Term Program Of Peunayong



Source: Additional study Team, 2006

## 5.4 LUENG BATA MODEL AREA

### 5.4.1 General Condition

There are several existing major roads that gives Lueng Bata model area good access, such as Sukarno Hatta primary arterial road; Tengku Imum primary road; Sultan Malikul Saleh collector road. A new primary road has also been planned to link Sukarno Hatta to Simpang Surabaya.

This area is suffered only minimum damage and.

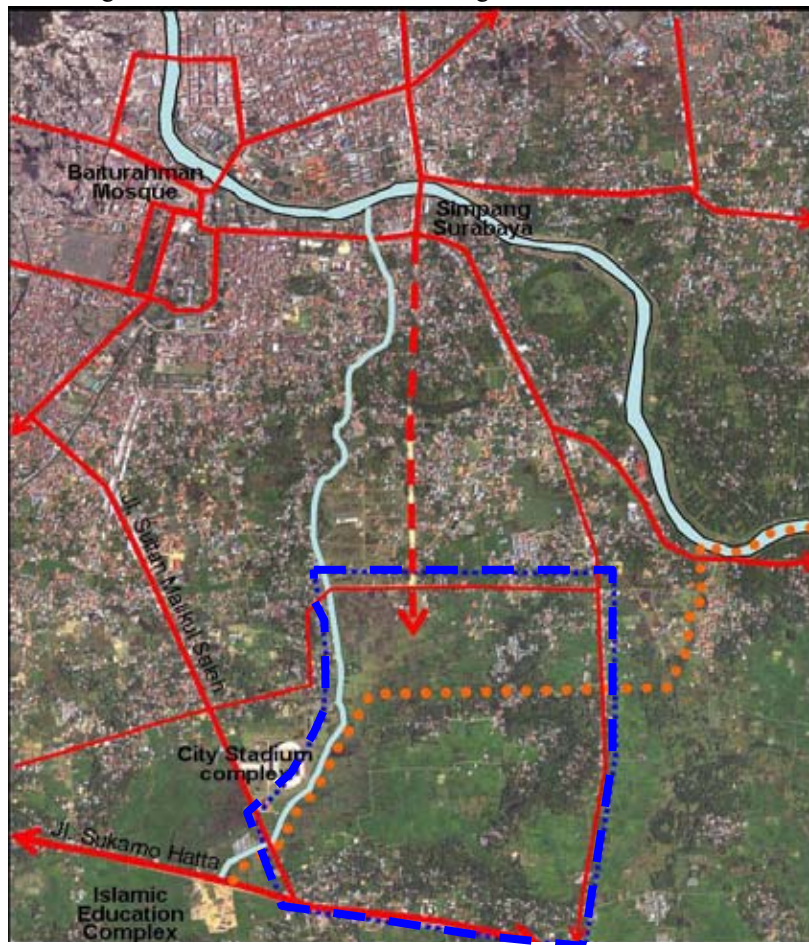
#### (1) Location and Topography

Lueng Bata model area lies across the border of BAC and consists of administrative areas of Batok and Lamdom Villages of Lueng Bata District in BAC and part of ABR. The model area covers an area of 338 ha, with the following boundaries:

- North : AMD Road
- East : Cot Mesjid Village
- South : Sukarno Hatta Arterial Ring Road
- West : River

The topography consists of relatively flat lowland. The border of BAC and ABR is marked by a river.

Figure 5.4.1 Aerial View of Lueng Bata Model Area



Source: BAC Aerial Photography (after Tsunami)

## (2) Land use

The present land use is dominated by agricultural area, some residential clusters, public and social facilities, commercial area and sport facilities.

According to URRP Study the area is allocated for new city development. Based on RTRW Banda Aceh 2002 – 2010, this area is designated as new residential area. In RTRW urban system, Lueng Bata is designated as a sub-center in order to foster southward growth of BAC.

## (3) Socio-economic Condition

### (a) Population

According to the officials of Lueng Bata District, the pre and post-disaster populations are as described in Table 5.4.1.

Table 5.4.1 Population of Lueng Bata Model Area

No	Village	Population		Number of Victims/IDP	Survival Rate
		Pre-disaster	Post-disaster*		
1	Landom Village	1,082	1,625	+543	-
2	Batok Village	3,792	3,769	-23	99.3%
<b>TOTAL</b>		<b>4,874</b>	<b>5,394</b>	<b>+520</b>	

Source: JICA Study Team, 2005 and Lueng Bata District Report, December 2005

Based on annual growth rate from URRP Study, Lueng Bata projected population is shown in Table 5.4.2.

Table 5.4.2 Projected Population of Lueng Bata Model Area

Village	Projected Population					
	2005	2006	2007	2008	2009	2015
Landom	1,625	2,415	3,240	4,093	5,058	7,174
Batok	4,521	5,640	6,863	8,212	9,830	13,944
<b>TOTAL</b>	<b>6,146</b>	<b>8,055</b>	<b>10,103</b>	<b>12,305</b>	<b>14,888</b>	<b>21,118</b>

Source: JICA Study Team, 2005 and Additional Study Team, 2006

### (b) Economic activity

Lueng Bata may be defined as a semi urban area. As with many areas in BAC, its population is also heterogeneous, coming from other areas in Aceh.

Lueng Bata residents work as farmers, traders, labors (construction workers, etc.), police/army, civil servant, entrepreneur and animal husbandry sector.



### 5.4.2 Rehabilitation and Reconstruction Program and Ongoing Works

The rehabilitation and reconstruction programs in Lueng Bata is listed in Table 5.4.3.

Table 5.4.3 Rehabilitation and Reconstruction Programs

No	Programs	Funding	Executing Body	Progress
I	Housing Reconstruction Program (Panterik village)	Budha Tzuchi	NGO & community	Completed
II	Construction of new road and drainage New Road (Simpang Surabaya)	APBN 2005	Provincial Government	Construction in progress
III	Road and Drainage Rehabilitation and Reconstruction Program	BRR, City Government	City Government	Construction in progress
IV	Construction of Islamic Boarding School (pesantren)	Turkey	Turkey	Construction in progress

Source: Additional Study Team, 2006

### 5.4.3 Development Need and Constraint

As the area suffering the least destruction among the three selected model areas, Lueng Bata needs a slightly different development. Shortly after the disaster the area had also become a destination for many refugees seeking safer place. Therefore the proposed development scheme for this model area is as follows:

1. Housing development for tsunami victims who are willing to be relocated
2. Development of Lueng Bata as New Town development center in Banda Aceh
3. Creation of employment opportunities
4. Economic enablement (operating capital, working tools, etc.)

Several things need to be considered in developing Lueng Bata, such as:

1. Inter governmental coordination will be vital in the development and management of this model area, because it lies across two different administrative areas (BAC and ABR).
2. This area is surrounded by vast vacant lands. Therefore it is necessary to build a “growth magnet” in order to increase attraction and accelerate growth.
3. Built environment (residential) around the area shows random pattern and tendency of unplanned growth. This may cause difficulties in integrating the spatial structure and hierarchy of existing built environment and proposed model area.

### 5.4.4 Preliminary Development Plan

Lueng Bata Model Area is proposed as a New Town in order to spread BAC urban activities, since existing urban activities are currently focused only in its northern part (such as in Kuta Raja District and Meuraxa District).

The proposed theme for Lueng Bata New Town is “an integrated administration center, residential and business center”. This theme is subsequently elaborated into five sub-themes:

- (1) Main green corridor, along the main north-south road.
- (2) Urban forests and city parks in several areas: in the central part of model area and within central business district.
- (3) Green belt, along the border of proposed model area with existing residential areas and also as buffer zone between different functions.



- (4) Low density residential area.
- (5) Green central business district.
- (6) Government office and public service

Figure 5.4.2 illustrates the above preliminary development concept.

**5.4.5 Proposed Reconstruction Works**

Based on the above preliminary development concept, the proposed reconstruction works for Lueng Bata model areas are as follows:

- (1) Development of new residential area
- (2) Road, water supply provision, electricity, storm water drainage, and other infrastructure construction
- (3) Solid waste management
- (4) Landscaping (parks and greenbelts)
- (7) Riverfront area development
- (8) Provision of public and social facilities
- (9) Provision of disaster mitigation and emergency facilities such as water supply tank and early warning system

**5.4.6 Estimated Cost**

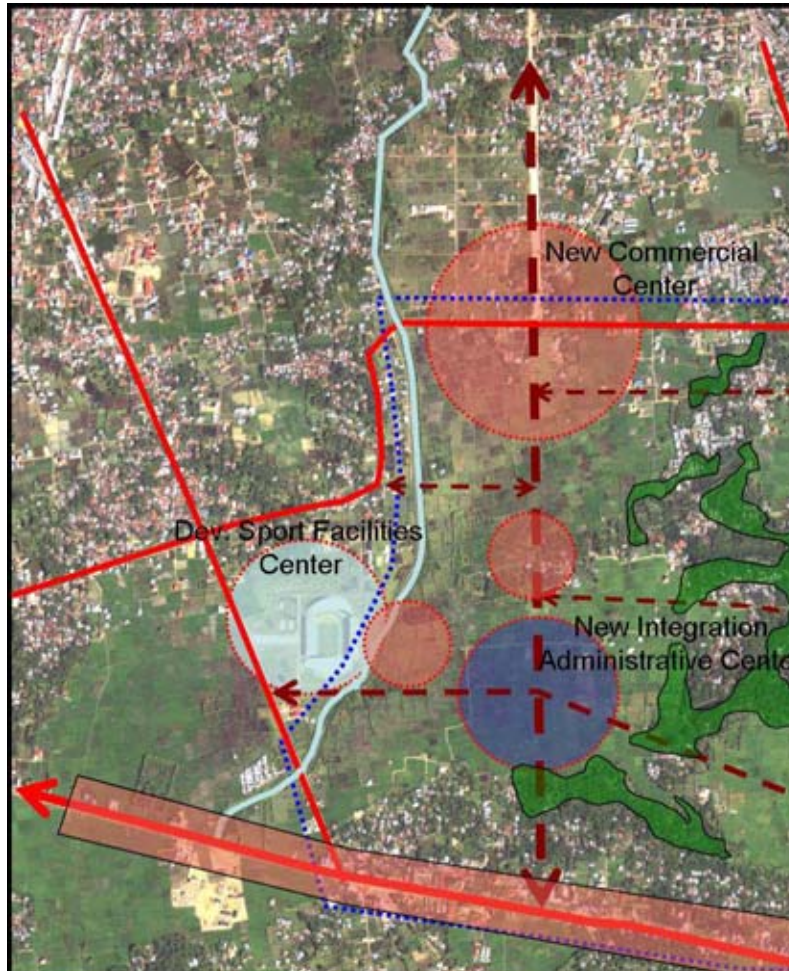
The estimated cost for Lueng Bata model area is shown in Table 5.4.4

Table 5.4.4 Cost Estimation and Construction Period

No	Construction Programs	Volume	Cost Estimation (Rp Billion)	Construction Period										
				2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
<b>I</b>	<b>Infrastructure and Utilities:</b>													
	• Road	12,229 m	59.98	9.99	9.99	9.99	9.99	9.99	9.99					
	• Drainage	24,454 m	35.46	5.07	5.07	5.07	5.07	5.07	5.07	5.07				
<b>II</b>	<b>Public and Social Facilities</b>	42,000 m2	51.74	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15

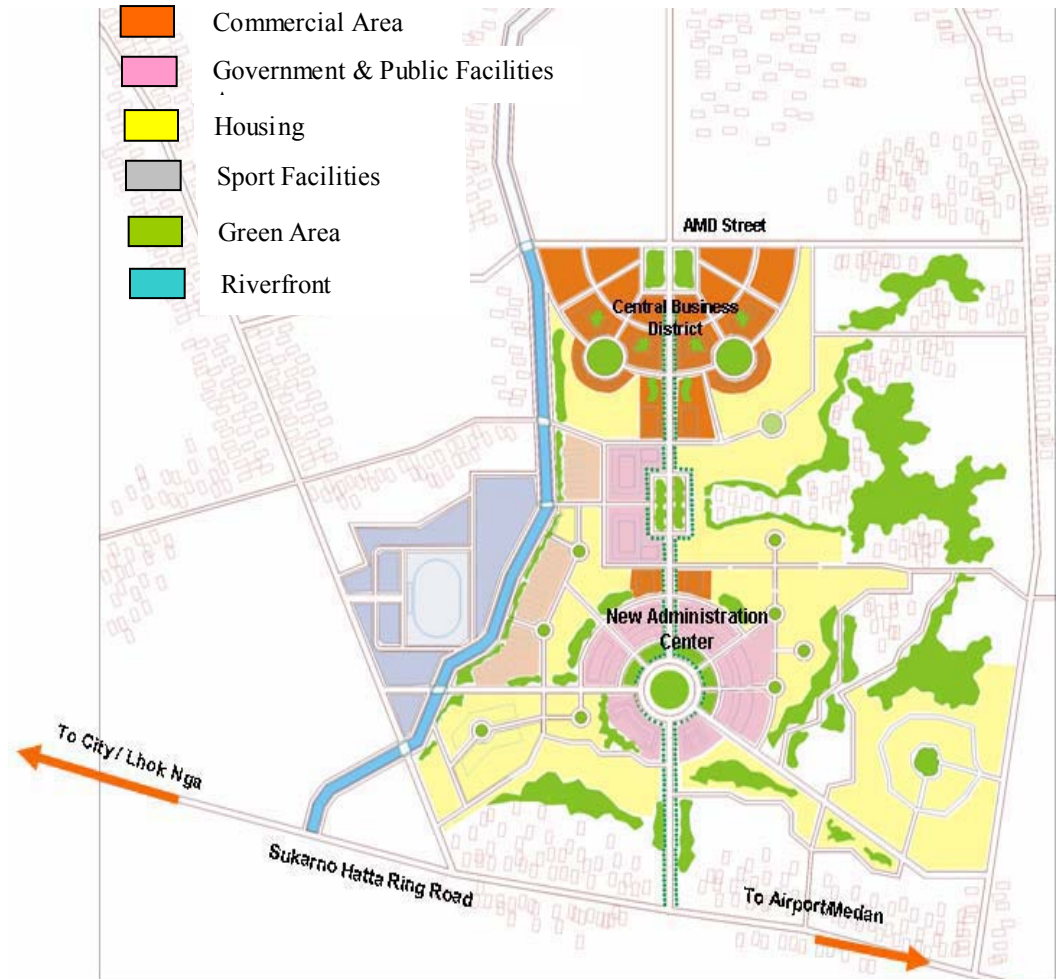
Source: Additional Study team, 2006

Figure 5.4.2 Development Concept for Lueng Bata



Source: Additional Study Team, 2006

Figure 5.4.3 Preliminary Development Plan of Lueng Bata



Source: Additional Study Team, 2006



Figure 5.4.4 Bird Eye View (1) of Lueng Bata Area Development Plan



Source : Additional Study Team 2006

Figure 5.4.5 Bird Eye View (2) of Lueng Bata Area



Source : Additional Study Team 2006

## CHAPTER 6 IMPLEMENTATION PLAN AND SCHEDULE

### 6.1 PROJECT LIST (2005-2015)

#### 6.1.1 Overall Program

The implementation schedule are mainly divided into three (3) phases; namely,

- (1) Rehabilitation phase (2005-2006)
- (2) Reconstruction phase (2007-2009)
- (3) Long-term phase (2010-2015)

The rehabilitation and reconstruction phases are presumed as the period for restoration of pre-disaster social and environmental conditions, while long-term phase is the development period to accomplish city planning with disaster preparedness.

#### 6.1.2 Preliminary Project Cost

Project cost is broken down according to implementation plan and schedule. Preliminary project cost and tentative implementation plan for rehabilitation and reconstruction are review subject for the to change by the related Indonesian authorities.

Preliminary project cost includes 10 % physical contingency, 10 % price escalation and 10 % engineering services fee of the direct cost, and Value Added Tax (VAT). Import duty, land acquisition cost and compensation fee are not included in the cost.

Total project cost estimation are 6,618 billion Rupiah for rehabilitation and reconstruction programs and 9,482.5 billion Rupiah for Long-term programs as summarized in Table 6.1.1 and details in Table 6.1.2.

Table 6.1.1 Summary of Project Cost

SECTOR	Rehabilitation (2005 – 2006)	Reconstruction (2007 – 2009)	Long-term (2010 – 2015)	Total (Rp. billion)
A. Housing	780	524.9	588.9	1,893.80
B. Electricity & Communication	651.3	1,281.20	780	2,712.50
C. Water Supply	115.9	8.2	21.7	145.8
D. Drainage and Sanitation	324.2	357.9	176.7	858.8
E. Road and Transport	619.2	154.9	761.2	1,535.30
F. Health	324.6	84.9	88.3	497.8
G. Education	621	323	25	969
H. Disaster Preparedness	25	172.9	321.8	519.7
J. Public Market etc.	112.1	136.5	78	326.6
<b>TOTAL</b>	<b>3,573.30</b>	<b>3,044.40</b>	<b>2,841.60</b>	<b>9,459.30</b>

Source: Additional Study Team, 2006



Table 6.1.2 Overall Program and Cost Estimate (Rp. billion)

ITEM	Short Term		Medium term			Long term						Total
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
<b>A. Housing</b>												
Sub-Total	28.00	87.88	9.64	7.76	8.76	3.67						145.71
<b>B. Electricity and Communication</b>												
Sub-Total	325.65	325.65	427.05	427.05	427.05	130.00	130.00	130.00	130.00	130.00	130.00	2,712.45
<b>C. Water Supply</b>												
<b>C.1. Programs</b>												
C1-1. Sanjak Ash Water Supply master plan 2007-2020		3.14										3.14
C1-2. PDAM Corporate Plan 2005-2009	0.33											0.33
C1-3. Capacity Building Program	1.23	1.93	0.92	0.76	0.76							5.70
<b>C.2. Construction Works</b>												
C2-1. PDAM Administrative Facilities	7.87	0.25	4.68									12.80
C2-2. Rehabilitation of Lambaro (4350) water Treatment Plant	4.15	10.27										14.42
C2-3. Rehabilitation of Water Distribution System	14.32	72.29	1.04									87.65
C2-4. Expansion of Lambaro Water Treatment Plant			3.00	7.00	8.00	3.67						21.67
Sub-Total	28.00	87.88	9.64	7.76	8.76	3.67	0.00	0.00	0.00	0.00	0.00	145.71
<b>D. Sanitation and Drainage</b>												
<b>D.1. Drainage</b>												
D1-1. Urgent Rehabilitation Works	32.57	65.14	32.57									130.28
D1-2. Rehabilitation Works		14.62	34.58									49.40
D1-3. Reconstruction Works			36.59	71.19	71.19							177.97
D1-4. Dikes and Floodwall	28.50	66.50										95.00
D1-5. Flood canalization in the south part of BAC						0.02	0.01	0.02	0.01	0.00	0.03	0.09
D1-6. River normalization						0.01	0.02	0.01				0.03
<b>D.2. Sanitation</b>												
D2-1. Recovery of existing septicage Plant (PLT)	7.98											7.98
D2-2. Additional Septage Treatment Plant		2.78	4.16									6.94
D2-3. Procurement of Vacuum cars	1.69	1.69	1.69	1.69								5.07
D2-4. Sewerage Development				6.74	15.00	20.00	20.00	25.00	30.00	30.00	30.00	176.74
<b>D.3. Solid Waste Management</b>												
D3-1. Construction of new Landfill Site (TPA)		103.26		103.26								206.52
D3-2. Packer and Dump Trucks		0.99		0.99	0.99		0.99					3.96
Sub-Total	69.05	255.18	108.59	183.87	87.18	20.03	21.02	25.03	30.01	30.00	30.03	859.98
<b>E. Road and Transport</b>												
<b>E.1. Road</b>												
E1-1. Rehabilitation of arterial roads and bridges	37.99	37.99										75.98
E1-2. Rehabilitation of Sub-arterial and other roads	271.61	271.61										543.22
E1-3. Construction of coastal road						120.90	120.90	120.90				362.70
E1-4. Extension of J. Syahid Kuala									21.93	21.94		43.87
E1-5. Improvement of existing road for escape road			19.74									19.74
E1-6. Construction of new arterial roads								66.74	66.74	66.74		200.22
<b>E.2. Traffic Management</b>												
E2-1. Reconstruction of traffic management systems				4.16								4.16
E2-2. Improvement of signals						9.20						9.20
<b>E.3. ROAD TRAFFIC FACILITIES</b>												
E3-1. Reconstruction of bus terminal			31.69	31.70								63.39
E3-2. Provisional of bus terminal, inspection center and truck terminal									46.61	46.60		93.21
<b>E.4. FERRY TERMINAL</b>												
E4-1. Reconstruction of ferry terminal			22.53	22.53	22.54							67.60
Sub-Total	309.60	309.60	72.96	63.28	22.54	130.10	120.90	120.90	66.74	135.28	135.28	1,483.28
<b>F. Health</b>												
<b>F.1. Improvement of environmental health</b>	5.30	10.50	10.50	10.50	10.50	2.10	1.80	1.80	1.80	1.80	1.80	58.40
<b>F.2. Basic health services / Referral services</b>	117.70	118.20	3.60	2.20	2.20	2.10	1.80	1.80	1.80	1.80	1.80	255.00
<b>F.3. Infectious diseases prevention and control</b>	2.30	6.90	4.00	0.70	0.50	0.49	0.48	0.47	0.46	0.45	0.45	17.80
<b>F.4. Preparation of medicines and medical supply</b>	0.40	0.60										1.00
<b>F.5. Dispatching health personnel and revitalization of education</b>	6.60	9.50	10.40	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	84.50
<b>F.6. Improving health Development policy and management</b>	2.90	4.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	19.90
<b>F.7. Revitalization of drug and food security function</b>	8.10	16.40	0.50	0.50	0.50							26.00
<b>F.8. Emergency Health and Medical Services</b>	6.10	8.40	6.10	0.50	0.50	0.90	0.90	0.50	0.50	0.50	0.50	25.40
Sub-Total	149.80	174.80	36.50	24.30	24.10	15.49	14.88	14.47	14.46	14.45	14.55	497.90
<b>G. Education</b>												
<b>G.1. School Building, Classroom, Furniture and Material</b>												
G1-1. Rehabilitation of damaged schools	153.00	207.00										460.00
G1-2. Providing emergency school classrooms	14.00	47.00										61.00
G1-3. Providing school furniture and materials	11.00	11.00										22.00
G1-4. Reconstruction of schools			116.00	91.00	34.00	5.00	4.00	4.00	4.00	4.00	4.00	265.00
<b>G.2. Employment of Teacher</b>												
G2-1. Recruiting temporary teachers	25.00	8.00										33.00
G2-2. Recruiting permanent teachers			2.00	2.00	2.00							6.00
<b>G.3. Scholarship</b>												
G3-1. Providing scholarship, consulting traumatized students	36.00	9.00										45.00
G3-2. Providing scholarship			6.00	4.00	4.00							14.00
<b>G.4. Capacity Building and Institutional Arrangement</b>												
G4-1. Developing teaching capacity			10.00	4.00	3.00							17.00
G4-2. Improving non-formal education			1.00	1.00	1.00							3.00
G4-3. Developing school management			14.00	14.00	14.00							42.00
Sub-Total	239.00	282.00	149.00	116.00	58.00	5.00	4.00	4.00	4.00	4.00	4.00	963.00
<b>H. Disaster Preparedness</b>												
<b>H.1. Structural Measures</b>												
H1-1. Detached Drainwater					46.69	43.27	43.27					133.13
H1-2. Sewerall			14.62	14.62	14.62	14.62	14.62					73.10
H1-3. Coastal Forest	2.97	2.97	2.97	2.97	2.97							14.86
H1-4. Total Gate						5.90	9.00	11.00	12.00	12.00	12.00	61.90
<b>H.2. Public Facility</b>												
H2-1. Escape Building	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58		25.80
H2-2. Escape Tower			0.62									0.62
H2-3. Emergency Base and Open Space			12.90	18.06	5.16	5.16	5.16					46.43
<b>H.3. Warning and Dissemination System</b>												
H3-1. Setcomtel/Alerting Siren/Mobile Phone System	3.10	3.10	6.19	6.19	2.06							20.63
H3-2. Trusmiat Watch					3.10							3.10
H3-3. GPS System/Disaster Mitigation Database						7.74	7.74					15.48
<b>H.4. Public Education and Disaster Awareness</b>												
H4-1. Mass Media	0.93	0.93	0.93	0.93	0.93	0.93	0.93					6.50
H4-2. GIS	2.10	2.10	2.10	2.10	2.10	2.10	2.11					14.73
H4-3. Public Facilities	0.62	0.62	0.62	0.62	0.62	0.62	2.38	3.00	5.00	5.00	5.87	24.97
H4-4. Monument including City Parks								16.00	16.00	16.00	16.23	64.23
H4-5. Drill for Escape	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.20				1.44
Total	12.60	12.50	43.74	43.27	30.94	32.92	33.00	32.78	35.58	35.58	34.10	596.32
<b>J. Public Market, Government Building, Religious Building</b>												
Sub-Total	52.26	59.80	45.50	45.50	45.50	25.00	25.00	26.00				326.56
<b>TOTAL</b>	1,213.86	1,695.29	903.62	918.83	762.83	416.88	404.80	353.18	280.79	349.31	347.96	7,647.40

     Cost and Schedule same as Original JICA URRP Study Report 2006  
     Review of a schedule, cost is same as Original JICA URRP Study f  
     Proposed of Additional study 2006

Source: Additional study team, 2006

### 6.1.3 Program Sector

#### (1) Housing Program

Housing program formulated in the Blueprint considering 16,000 unit houses in rehabilitation phase and 4,000 houses reconstruction phase. The construction total cost estimation 20,000 houses. Those numbers updating based on survey data prepared by this Study. The direct cost for housing rehabilitation/reconstruction was recalculated according to number of damaged house units as in the survey conducted by IOM on March 2005 as in following Table 6.1.3.

Table 6.1.3 Estimation of Rehabilitation/Reconstruction Cost for Housing (direct cost)

Degree of Damage	Minor	Medium	Destroyed	Total
Housing Unit	2924	3124	15583	21631
Unit cost for rehabilitation (million Rp.)	7	25	42	74
Estimated rehabilitation/reconstruction cost (million Rp.)	20468	76538	654486	751492

Source: Number of units: IOM; Estimated cost: JICA Study Team

However, many community Village Plans are being formulated with assistance of donors and NGOs and the concept on formulating Village Plan would be totally different from that in Blueprint because of the difference on land use in coastal area. In Blueprint, the coastal area was presumed as buffer zone with scattered houses for fishermen, while the Village Plan is being prepared under the concept that all dislocated families who lost their houses and want to return their homeland would re-build houses in coastal area.

Although the reconstruction of new houses is on-going in accordance with the Village Plan with funding of donors and NGOs, the number of reconstructed houses as of July 2005 is less than far behind the schedule from the proposed numbers in the Village Plan. The difficulties of reconstruction of houses by dislocated families are mainly insufficient fund; namely, the loss of opportunity of income generation, unemployment due to closed-down of private industries, and the loss of fishing boat and apparatus for fishermen.

The following countermeasures are considered for resolving the issue related housing program:

- 1) The preparation of the Micro Plan adjusting top-down approach with bottom-up approach for finalizing the preparation of Village Plan and the realization of the number of dislocated families who want to return their homeland.
- 2) Housing loan procedure with less interest or free-interest for dislocated families.
- 3) Employment of the dislocated families for the construction work of basic infrastructures including the coastal forest for the purpose of their income generation.

- 4) Loan procedure for re-establishment of private industries which collapsed due to tsunami disaster to get bigger opportunities of women employment.
- 5) Employment for dislocated people in small-scale industries organized by NGOs.

The number of IDP was estimated at 65,500 or about 13,100 household. The population increase in 2009 projection is 54,000 or about 10,800 household. Total 23,900 houses required to be constructed by 2009. Assuming the average cost per house is Rp.42 million, total construction direct cost estimate : Rp.1,003.8 billion.

(2) Electricity and Communication

Electricity and communication facilities are being rehabilitated by the electricity corporation and telecommunication company, respectively. The cost is based on their program.

(3) Water Supply System

Among basic infrastructures, water supply system is being rehabilitated urgently as part of Quick Impact Projects under Japanese aid program. After the implementation of the urgent rehabilitation of water supply system done, the capacity of water supply system covering the Banda Aceh City would be equivalent or slightly more than pre-disaster condition. The operation and maintenance of water supply system would be scheduled later.

(4) Necessity of Restoration of Road Network

The most serious concern of this Study is to restore the social and economical activities under pre-disaster condition. Among the proposed programs, the priority is given to the restoration of road construction, since the programs proposed in the other sectors depend largely on the access to the communities. The on-going village planning, which is people-centered attempt to restore pre-disaster condition and preparing village mapping by community, could not be completed successfully without the accurate information of the alignment of artery and sub-artery road network. It is noted that the alignment of the road is sometime different among village maps and it would be conflicts among villages. Thus the top priority is given to implementation of rehabilitation of devastated road network.

(5) Improvement of Drainage System

Land subsidence due to earthquake is the most serious issue to formulate community based housing plan, Village Plan, especially in the coastal area where many dislocated families want to return their homeland. Land area for their house lots was reduced and the land surface is frequently submerged into sea water during high tide. However, the dislocated

families have neither fund for housing nor technical knowledge. Most of them in the low-lying area are waiting for the urgent establishment of drainage system implemented by the local government unit.

(6) Health and Medical Cares

As well as the rehabilitation of basic infrastructures the priority programs for health and medical cares focus on the rehabilitation of damaged health care centers and to resume regular health services in rehabilitation stage by 2006. Revitalization and strengthen of the services including establishment of emergency health system to prepare against extreme cases are to be implemented in reconstruction stage. The routine maintenance of regular health services is required for successive years.

(7) Education

The education quality of the Aceh Province was reported as one of the 10th lowest in Indonesia. It has been degrading for the last six (6) years due to a political conflict. For those years, more than 1,000 schools have been burned, more than hundreds of teachers have been wounded, and about 100 teachers have been killed or missing.

Furthermore, the tsunami on 26 December 2004 caused casualties of 13,500 students and 820 teachers in Banda Aceh City. Although there were 66,000 students in an elementary and high school in 2004, the number of students has dropped suddenly by 55 %. Also, about 60 % of schools were damaged, in which a half of damaged schools was collapsed completely or washed away.

As remarkable population increase is projected at the growth rate of 6 % per annum by 2009, the rehabilitation and reconstruction of schools and the strengthening of education administration has to be commenced soon as the baby-boomers are expected to enter elementary schools after 2012. The reconstruction period is drawing to an end.

Among the education sector programs, the priority project is mainly divided into four (4) categories; namely, (i) restoration of school infrastructures, (ii) teacher production and training for in-service teachers, (iii) scholarship to orphans who lost parents by disaster, and (iv) upgrading the capacity of education administrators.

(8) Disaster Preparedness

The most effective method against a huge-scale natural disaster is to ensure escaping, evacuation and relief activities through well-arranged road network. Even the structural measures against the other small-scale and medium-scale natural disasters, such as flooding,



earthquake and fire spreading, require the ordinary operation and maintenance works passing through road network. The implementation of disaster mitigation plan depends largely on the accomplishment of rehabilitation of both damaged artery road network and improvement of sub-artery road network. Without the effective road network, the investment to public facilities as a shelter will be of no use since no one can access to those facilities immediately after the disaster. Thus, the implementation of disaster mitigation would be subsequent programs after the implementation of rehabilitation road network for the rehabilitation period.

However, public education and disaster awareness is regarded as one of the long-term efforts to achieve disaster preparedness and the people are able to understand well the importance of disaster preparedness immediately after the disaster. It might be high time to start public education and disaster awareness.

According to the interview survey to 1,000 citizens in the Banda Aceh City, almost all of the citizens felt the menace against disaster when the powerful aftershock occurred on 28 March 2005 and they ran away helter-skelter on foot or by motor car to the open place or building as a safer place which they could imagine promptly. This fact shows that the experiences of huge-scale disaster will be handed down from generation to generation by conducting continuous public education.

The early implementation of non-structural measure is favorable for disaster preparedness taking into account the lesser investment cost and long-range acquired of disaster mitigation effects, as well as administrative guidance for the installation of external stairs to existing buildings and newly-built public facilities as escape buildings.

Among the structural measures proposed in this Study, coastal forest utilizing natural force of vegetation would be raised with priority, while the reinforced-concreted structures such as seawall and detached breakwater would be part of reconstruction plan after the completion of effective road network.

(9) Public Market, etc.

The direct cost for rehabilitation/reconstruction of public markets, government buildings and religious buildings was calculated according to the number of damaged building units by the survey carried out by IOM on March 2005 as shown in the following table.

Table 6.1.4 Estimation of Direct Rehabilitation/Reconstruction cost for Public Markets, Government Buildings and Religious Buildings

<b>FACILITY/degree of damage</b>	<b>Unit</b>	<b>Minor</b>	<b>Medium</b>	<b>Destroyed</b>	<b>Total</b>
<b>Public market</b>	Unit	3	-	3	6
Unit cost for rehabilitation/reconstruction	Million Rp.	900	3,000	6,000	
Estimated rehabilitation/reconstruction cost	Million Rp.	2,700	-	18,000	20,700
<b>Government building</b>	Unit	3	2	28	33
Unit cost for rehabilitation/reconstruction	Million Rp.	800	1,680	2,560	
Estimated rehabilitation/reconstruction cost	Million Rp.	2,400	3,360	71,680	77,440
<b>Religious building</b>	Unit	29	12	31	72
Unit cost for rehabilitation/reconstruction	Million Rp.	420	1,320	2,100	
Estimated rehabilitation/reconstruction cost	Million Rp.	12,180	15,840	65,100	93,120
<b>Grand total</b>	Million Rp.	17,280	19,200	154,780	191,260

Source: Number of units: IOM; Estimated cost: JICA Study Team

#### (10) Airport and Maritime Transport Reconstruction and Development

Reconstruction is urgently required for ferry port in Ulee Lheue as it was totally collapsed after tsunami attack in December 2004. Meanwhile, minor reconstruction is needed for Malahayati and Sabang besides development for the future demand.

Airport development forwards to some programs such as runway lengthen to be 11,000 ft (3,355 m) for fitting the possibility of B-747SP plane for international service, international terminal building construction in order to provide international passengers with easy and comfortable services, and extension of cargo terminal for upcoming demand.

## 6.2 PRIORITY PROJECT (2005-2009)

A matrix for the relation of the sectors, their action, goal, outcome/benefit and the mission was summarized in Table 6.2.1. All projects were examined in environmental point of view and no serious negative impact was found. However as each design goes into detail and community consultation proceeds, the propriety shall be re-checked. Community's input such as preparation of minor access roads, micro drainage and recycling of solid waste is also considered.

The priority projects were selected basically from those in the rehabilitation and reconstruction stage (2005-2009). The projects cover all sectors. The implementation schedule was adjusted to average the total cost by year.

#### (1) Road and Transportation

Rehabilitation of the damaged road and bridges are selected. The rehabilitation of arterial roads will have more priority than other minor roads. Another priority is reconstruction of traffic management system and reconstruction of transport facilities including the bus (labi-labi) terminal and ferry terminal.

(2) Urban Sanitation and Drainage

Urban drainage rehabilitation in the devastated area and city center is prioritized including rehabilitation of pump facilities, primary channels and water gates, construction of retarding ponds and dredging of channels. Recovery and expansion of human excrement treatment plant (IPLT) is indispensable from environmental point of view. As the existing dumping site will be filled up in about two years, new site for sanitary landfill should be secured as soon as possible, and the construction should be expedited.

(3) Health and Medical Cares

Items of priority should be done in rehabilitation and reconstruction phase are classified into 8 categories. However, the implementation should be done as a package of the specific project which contains a few prioritized categories. Thus, the following 7 packages of specific projects are identified.

1. Rehabilitation/ Reconstruction of Damaged/ Destroyed Health Centers and Sub Health Centers
2. Rehabilitation/ Reconstruction of Damaged/ Destroyed Public Hospitals
3. Rehabilitation of Drug and Medical Supply System
4. Maternal and Child Health System Improvement Project
5. Mental Health Care System Improvement Project
6. Communicable Diseases Control Enhancement Project
7. Capacity Building for Drug and Food Control
8. Education

Rehabilitation of damaged schools is prioritized. Although it will be in reconstruction stage, reconstruction of school buildings in the coastal area as escape building should be important. As well as the specific projects introduced in Health and Medical Cares Sector, the implementation also should be done as a package of the specific project which contains a few prioritized categories. Thus, the following specific project package in the education sector is identified.

1. Reconstruction and improvement of nucleus school for upgrading science and mathematics education level
2. School Relocations in Coastal Areas Heavily Damaged by the Tsunami in disaster preparedness

3. REDIP (Regional Education Development and Improvement Program) in Banda Aceh
4. Improvement of Early Age Children Center
5. Reconstruction of a Senior Vocational High School
6. Reconstruction of In-Service Teacher Training Center
7. Reconstruction of Boarding Schools
8. Capacity Development of Education Administration

(5) Disaster Mitigation

Priority is given to the implementation of non-structural measure; especially warning system and disaster awareness, taking into account the lesser cost and long range acquired of disaster mitigation effects. Furthermore, the administrative guidance for the installation of external stairs to existing buildings and newly-built public facilities as escape building is necessary.

Coastal forest will be raised as part of structural measure, while the reinforced-concreted structures such as seawall and detached breakwater will be later part of reconstruction plan.



Table 6.2.1 Relation of Sectors, Missions, Goals and Outcomes

Mission	Sector	Action: Recover, Improve and Reconstruct:	Goal in 2009	Input of Community/NGO	Outcome/Benefit	Cross Sector
Livelihood of Acehnese will be recovered.  (Better living environment will be made and foundation for future growth will be secured.)	Water Supply	Water supply facilities	Water supply system is provided in all urban area.	Connection to each house level; Communal water supply until system	Service population for safe water access	Education, Cooperation and Capacity Development
	Sanitation and Drainage	Sanitation and Drainage facilities	Urban area is Flood free (return period 5 years); All solid waste and sludge will be managed.	Micro drainage, micro embankment, recycling of solid waste	Reduction of flood risk, Expected saved property, <u>Population in sanitary condition</u>	
	Road and Transport	Road and transport facilities	All arterial and sub-arterial roads will be recovered. Transport will be secured in all modes (land, sea,	Micro access road, community road	Smooth traffic flow, reduction of transport time and cost	
	Health	Health facilities, Capacity development	Health center and clinic will be accessible to all people.	Community health and sanitation activities	No. of healthy people, reduction of sick people	
	Education	Educational, cultural and vocational facilities, Capacity development	All school age children will have education in good environment. High education and training will be accessible.	Non-formal education and training, Cooperation with school	No. of students in decent educational environment	
	Disaster Preparedness	Structural and Non-structural measures	Victim will be minimum in calamity. Assets will be saved from minor disaster.	Education, Conversion to escape building	Expected saved life and property, Increased preparedness and sense of relief	
	Housing	Houses	All citizens will live in decent houses. Building material will be supplied. Low interest rate loan will be provided.	Construction of private houses	No. of houses, No. of people in decent houses	
	Other Public Facilities	Market, park, etc.	Necessary facilities for economic and cultural activities will be prepared.		Service population	
Disaster risk will be reduced to the level of people's relief.	Water Supply	Strong structure, Redundancy	Victims will be minimum in calamity. Assets will be saved from minor disaster.	Provision of emergency water	Expected saved life and property, Increased preparedness and sense of relief	
	Sanitation and Drainage	Strong structure, Redundancy (multi-access)		Maintenance of micro drainage		
	Road and Transport	Escape road, Relief road		Maintenance of escape road		
	Health	Escape building, First aid training		Individual health care		
	Education	Escape building, Disaster awareness education		Disaster awareness education		
	Disaster Preparedness	Coastal Disaster Risk Mitigation Facilities, Warning system, Education		Community efforts		
	Housing	Strong structure		Construction of strong house		
	Other Public Facilities	Emergency bases, Parks on disaster preparedness, Strong structure		Construction of strong structure against disaster		

Source: JICA Study Team, 2005

### 6.3 ORGANIZATION

Banda Aceh City and NAD Province are the implementing bodies for the rehabilitation and reconstruction projects for the city, while BRR plays an important role as a coordinating agency to ensure transparency, accountability and speed in the reconstruction of Aceh and Nias.

BRR was set up for a four-year period by the President on April 16, 2005 through Regulation in Lieu of a Law (*Perpu*) No. 2/2005. As part of the BRR's commitment to abide by stringent guidelines and the highest professional standards, the *Perpu* specifies that rehabilitation and reconstruction activities will be implemented based on the principles of transparency, accountability, participation and responsibility by prioritizing public interest and remaining free of corruption, collusion, and nepotism.

BRR has been granted an unprecedented level of authority and responsibility to enable it to rapidly address the needs of the affected regions. The establishment of two (2) independent oversight boards, made up of a number of national and regional officials, civil society representatives, and reconstruction and technical experts, have been providing the highest level of civilian supervision and accountability in order to ensure full transparency and oversee governance, operations and fund disbursement.

Dr. Kuntoro Mangkusubroto was appointed on April 29, 2005 as a Director of the Rehabilitation and Reconstruction Executing Agency (*Badan Pelaksana Rehabilitasi dan Rekonstruksi*) for Aceh and Nias. He is a man of high integrity with a proven track record of effective management.

There are eight (8) departments in the BRR. They are; (i) Planning and Programming, (ii) Institutional Development & Empowerment, (iii) Housing, Infrastructure & Land Use, (iv) Economic & Business Development, (v) Religion, Social & Culture, (vi) Education & Health, (vii) Finance & Funding, and (viii) Communications, Information & Inst. Relation.

Operation principles and roles of the BRR are:

- 1) To act as a "market place", bringing together project proposals that address important needs with available funds,
- 2) To facilitate local government and civil society bodies in implementation of projects, capacity building where needed,
- 3) To lever stakeholders resources (e.g., donors), external agencies and existing mechanism wherever possible,

- 4) To monitor progress of on-budget and off-budget projects, conducting spot-checks and full audits where necessary, and
- 5) To focus on agency capacity-building, and fast tracking suitable projects.

## CHAPTER 7 CONSULTATION AND ASSISTANCE TO BAC GOVERNMENT

One of the important objectives of the Additional Study is to provide the Banda Aceh City government with consultation and assistance to expedite the process of the rehabilitation and reconstruction program which will include the structure plan with a long term vision. In compliance with this objective a team of the Additional Study has organized a meeting with the city government and the other government offices concerned over 6 times in the course of the study. The outlines of these meetings are summarized in Table 7.1.

Table 7.1 Outlines of Meeting with the City Government

No	Date	Venue	Counterpart	Main Subjects
1	Nov. 7, 2005	Bappeda, Province	BRR, PU Jakarta and Dinas, Mayor of BAC, Bappeda Province, Dinas Tata Kota	➤ Presentation of Inception Report for Additional Study
2	Nov. 9, 2005	Bappeda, City	PU Jakarta and Dinas, Bappeda city, Dinas tata Kota	➤ Spatial plan ➤ Integration of Additional Study with micro plan being prepared by PU Jakarta
3	Dec. 20, 2005	Governor's Office	BRR, JICA Indonesia, Embassy of Japan, JICS, Mayor of BAC, City Bappeda, Dinas staff of city govn., Other organizations	➤ Presentation of progress of and interim results of the Additional Study
4	Jan. 18, 2006	Mayor's Office	BRR, Bappeda City, PU dinas, Dinas Tata Kota, Mayor of BAC, JICA Study Team	➤ BAC metropolitan concept ➤ BAC development concept and structure plan ➤ Concept on 3 reconstruction model
5	Jan. 20, 2006	Bappeda Province	MOE, BRR, BAC Parliament, Bappeda Province, Mayor of BAC, PU Dinas, Bappeda City, Dinas Tata Kota	➤ 3 reconstruction model planning ➤ Structure plan and development concept
6	Feb. 9, 2006	Bappeda City	PU Jakarta and Dinas, Bappeda City, Dinas tata Kota,	➤ Outlines of draft final report ➤ Spatial plan in context of national standard ➤ Legal aspect of BAC master plan being assisted by PU Jakarta
6	Feb. 16, 2006	Pendopo	BRR, DPR, DPRD, governor	➤ Tourism development of Ulee Lheue

Source: Additional Study Team, 2006