

CHAPTER 3 WATER SUPPLY

3.1 BAC

Water supply of BAC is served by PDAM (Water Supply Authority) Tirta Daroy Banda Aceh. PDAM Banda Aceh has two water treatment plants (WTP), Lambaro and Siron with each capacity reaching 37.584 and 1.728 m³/day. Total number of house connections is 14,656.

Planning and design criteria by URRP are realistic, including forecast of water demand. Preliminary design that planned with urgent rehabilitation of Lambaro WTP was done. Water supply distribution network rehabilitation is important to provision of potable water for the community with a quality, quantity, and continuity that conforms to prevailing requirements. Mission, strategy, and goals must be planned to make a good perform of water supply system.

The principal goal of water supply system is as follows:

- Provision of potable water for the community with a quality, quantity, and continuity that conforms to prevailing requirements.
- The fulfillment of a steady water supply system, with operation and maintenance conforming to proper procedure.
- Urban water supply system that can fulfill water demand according to the growth of the city.
- Reducing Unaccounted for water.
- Institutional and financial empowerment of PDAM
- The delivery of first quality service

The analysis is conducted to project water demand until the year 2015, based on the following design criteria:

Table 3.1.1 Design Criteria for Water Supply System

Description		Unit	2005	2006	2007	2008	2009	PU Guideline
Connection	Served population	%	58	60	65	70	80	
	Average family size		1;5					1:(5-6)
Unit Consumption	House connection	%	90					80-90
	Public tap	%	10					10..20
	Non-domestic	%	20					15-30
UFW	House connection	lpcd	150					150
	Public tap	lpcd	40					30-50
Maximum Daily Demand Factor	House connection	%	50	45	40	35	30	30-50
	Public tap	%	1.1					1.1-1.5
Peak Hourly Demand Factor			1.5					1.5-2.0

Based on the design criteria, the predicted water demand is as follows:

Table 3.1.2 Forecast of Water Demand

Description		unit	2005	2006	2007	2008	2009	2015
Population		person	200,843	212,893	225,767	239,206	254,000	360,304
Served Population	Total	person	116,489	127,736	146,749	167,444	203,200	288,243
	House Connection	person	104,840	114,962	132,074	150,700	182,880	259,419
	Public Tap	person	11,649	12,774	14,675	16,744	20,320	28,824
Net Demand	House Connection	m ³ /day	15,726	17,244	19,811	22,605	27,432	38,913
	Public Tap	m ³ /day	466	511	587	670	813	1,153
	Non-Domestic	m ³ /day	3,238	3,551	4,080	4,655	5,649	8,013
	Total	m ³ /day	19,430	21,306	24,478	27,930	33,894	48,079
UFW	Rate	%	50	45	40	35	30	30
	Amount	m ³ /day	9,175	9,588	9,791	9,775	10,168	14,424
Gross Demand		m ³ /day	29,146	30,894	34,269	37,705	44,062	62,503
Supply Capacity	Lambaro	m ³ /day	37,584	37,584	37,584	37,584	37,584	37,584
	Siron	m ³ /day	1,728	1,728	1,728	1,728	1,728	1,728
	Total	m ³ /day	39,312	39,312	39,312	39,312	39,312	39,312
Balance		m ³ /day	10,166	8,418	5,043	1,607	-4,750	-23,191

Source: Additional Study Team, 2006

Water demand for 2006 is 30,894 m³/day, water supplied by Lambaro WTP is 37,584 m³/day and Siron WTP 1,728 m³/day. Total demand is 39,312 m³/day.

Starting from 2009, with a water demand level reaching at 44,062 m³/day, there will be a water supply deficit at 4,750 m³/day. This deficit will increase on 2015 to 23,191 m³/day.

An implemented realistic program will involve:

- Water resources and water treatment
 - Rehabilitation and reconstruction (include up-rating)
 - Exploration of new sources.
- Rehabilitation and development of distribution system
- Management and human resources aspects

The Development Plan of Water Supply System in BAC is as follows:

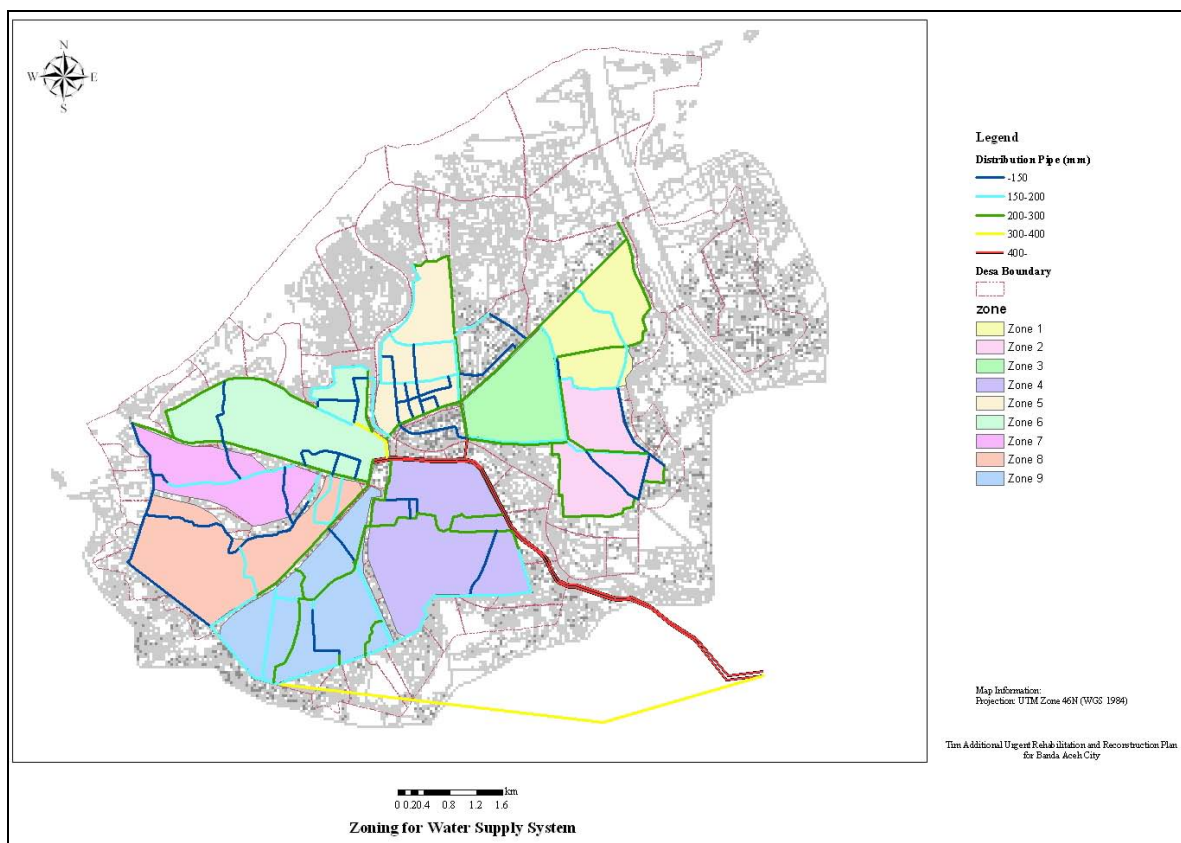
- 1) Rehabilitation and reconstruction of Lambaro and Siron WTP.

The Swiss Government is financing the rehabilitation of main Lambaro WTP. GTZ and UNICEF are financing the works conducted at Siron WTP.

- 2) Rehabilitation and reconstruction of Piped Transmission and Distribution System and its supporting facilities, including city reservoir, both from Lambaro system as well as Siron system with support from JICS.
- 3) Water supply zoning system, to facilitate the operation and maintenance, including the handling of Unaccounted for Water, by forming a special task force.

In detail, the proposed plan is to create a Zoning System to prepare the distribution network for future implementation of District Meter Area approach. The approach is beneficial for network operation and maintenance (and also for reducing Unaccounted For Water). Project description, program and construction work with preliminary project cost estimate and tentative implementation schedule shall be prepared. PDAM is proposed to establish a Special Team for Reduction of Unaccounted for Water (UFW).

Figure 3.1.1 Zoning of BAC Water Supply System



Source: Additional study team, 2006

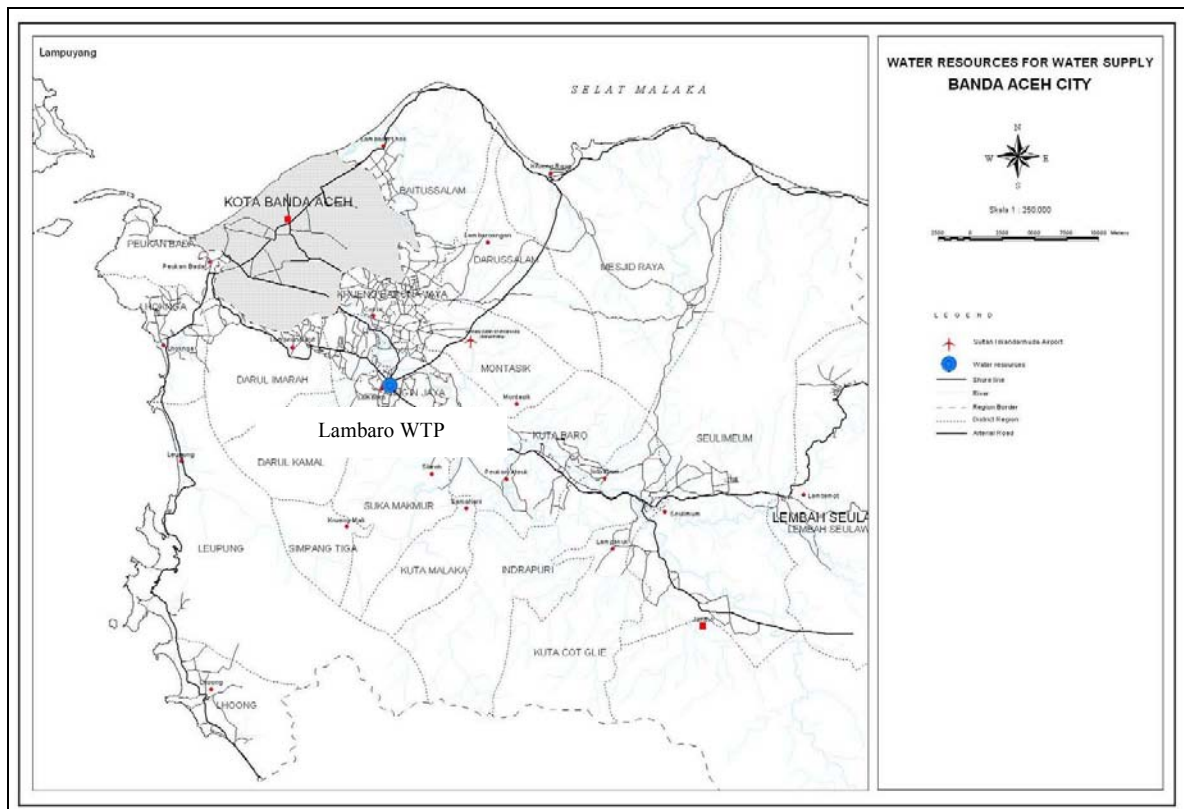
- 4) The Up-Rating of Lambaro WTP or construction of a new WTP

It is imperative to conduct an n order to cover the increasing number of house connections, it is crucial to do an up-rating of Lambaro WTP.

- 5) Water source protection. Water source for Lambaro Water Treatment (as the main provider of potable water for Banda Aceh population) comes from Aceh River. Therefore river protection will be prioritized. Initial protection is by delineating a clear and well-designed River Boundary Line. As an (positive) impact, water quality and quantity will be maintained.
- 6) Develop Institutions. Future efforts should focus on the operations, management, efficiency and financial sustainability of PDAM.

Training for PDAM personnel has been initiated by UNICEF, USAID-ESP, IRD, Switzerland and SAB-SAS (Netherlands).

Figure 3.1.2 Location of Lambaro WTP



Source: Additional Study Team, 2006

3.2 SURROUNDING AREA

The outline plan for water supply system in surrounding area is as follows:

- 1) Glietaron system
 - Repair and expand transmission and distribution system
- 2) Jantho system
 - DED pipeline to Seulimeun and Indrapuri and construct new transmission pipeline
- 3) Siron2 system

To involve DED and construction of intake and expansion of transmission to serve TLC in Ingin Jaya, Baitussalam and Darussalam Districts.

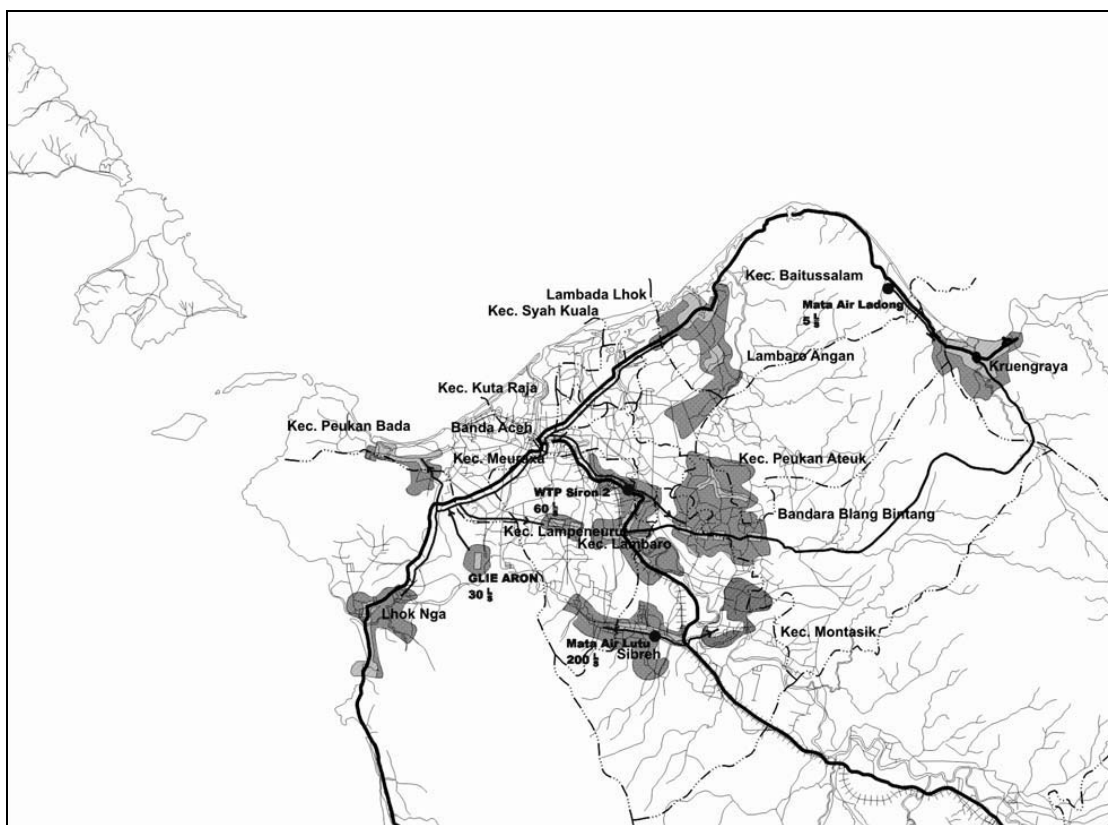
- 4) Montasik system
- 5) Hydraulic study and DED for transmission pipeline

The concept of water supply provision in surrounding area is as follows:

- For immediate term, expand the distribution system in order to deliver piped water to Temporary Living Center (TLC) and short and long term for new housing
- Rehabilitate water supply system
- Expand the distribution network of existing water system in order to serve new development areas

Total served on 2005 is 66,000 people, and it is forecasted to be 101,000 people in 2008 and 143,000 people in 2010. A water supply network in surrounding area is illustrated in figure 3.2.2

Figure 3.2.2 Water Supply for Surrounding Area



Source: Additional Study Team, 2006

CHAPTER 4 WASTE WATER TREATMENT (SEPTAGE TREATMENT PLANT)

4.1. BAC

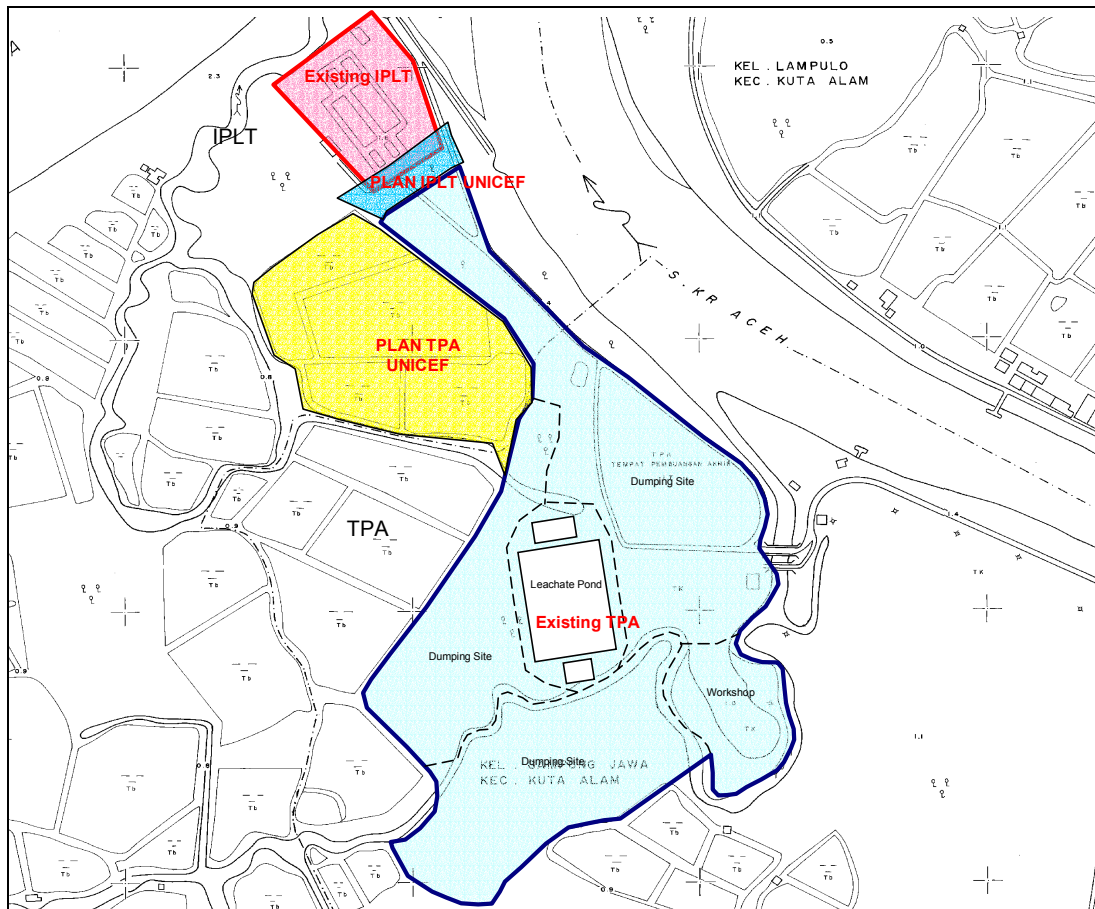
Waste water treatment plant and sewerage is not deemed suitable for BAC. General planning criteria for STP are very suitable with BAC condition. But the existing capacity cannot cope with effluent generation.

The planned treatment is on-site sanitation, with once a year desludging schedule by a pumping truck to be transported and treated in Septage Treatment Plant. The capacity of existing STP is 56 m³ a day (rehabilitated by the help of JICA), while predicted waste volume in 2005 is 114 m³ a day. It can be concluded that the capacity of Septage Treatment Plant must be increased by 58 m³ a day, and additional transporting tanks must also be procured.

4.1.1. Phase 1

Construct a new STP with a capacity 60 m³/day near the existing STP. This STP will be built by UNICEF on 2006 (Figure 4.6.1). At present the STP is in the construction preparation stage.

Figure 4.1.1 STP and Landfill, Existing and Planned



Source: Additional Study Team, 2006

4.1.2. Phase 2

The total capacity of existing and planned STP (UNICEF) is 116 m³ a day. In the year 2015 total solid waste generation will reach at 204 m³ a day. Therefore BAC must build an STP with minimum capacity of 88 m³ a day. There are two site alternatives of the new STP. First, it can be constructed as an exclusive site for Septage Treatment Plant (STP), or second, as a combined STP and sanitary landfill site.

4.2 SURROUNDING AREA

The concept of waste water management sets forth below:

- In urbanized surrounding area, septage will be collected by a pump truck to be treated at STP
- One STP serves more than one satellite cities
- STP can be combined with Landfill

Table 4.2.1 Septage Generation in Surrounding Area

No.	Description	Unit	2005	2009	2015
	Population				
1.	Lhoong	person	8,027	8,749	9,537
2.	Lhoknga	person	13,238	14,429	15,728
3.	Indrapuri	person	17,160	18,704	20,388
4.	Mesjid Raya	person	11,884	12,954	14,119
5.	Darussalam	person	16,848	18,364	20,017
6.	Baitussalam	person	10,736	11,702	12,755
7.	Suka Makmur	person	12,504	13,629	14,856
8.	Darul Imarah	person	59,300	64,637	70,454
	Total	person	149,697	163,170	177,855
	<i>Assumed number of households</i>	<i>houses</i>	<i>29,939</i>	<i>32,634</i>	<i>35,571</i>
	<i>Volume of septage</i>	<i>m³/year</i>	<i>0.9</i>	<i>0.9</i>	<i>0.9</i>
	<i>Septage generation from household</i>	<i>m³</i>	<i>26,945</i>	<i>29,371</i>	<i>32,014</i>
	<i>Septage from industry and other</i>	<i>m³</i>	<i>4,042</i>	<i>4,406</i>	<i>4,802</i>
	<i>Total septage per year</i>	<i>m³/year</i>	<i>30,987</i>	<i>33,776</i>	<i>36,816</i>
	<i>Total septage per day</i>	<i>m³/day</i>	<i>85</i>	<i>93</i>	<i>101</i>

Source: Additional Study Team, 2006

The outline plan for sanitation is as follows:

- Organize a community education campaign about the importance of sanitation, disposal and guideline for septic tank construction
- Locate suitable sites for STP (special or combined with disposal)
- Procure septic tank pump trucks and equipments
- Design, construct, and put into operation STP in surrounding area

CHAPTER 5 SOLID WASTE MANAGEMENT

5.1 BAC

The predicted solid waste generation is as follows:

Table 5.1.1 Solid Waste Generation

Description	unit	2005	2006	2007	2008	2009	2010	2015
Population	Pers.	200,843	212,893	225,767	239,206	254,000	307,695	360,304
Solid Waste Generation	Ltr/pers / day	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total Solid	Ltr/day	100,422	106,447	112,884	119,603	127,000	153,848	180,152

Source: Additional Study Team, 2006

The projective value of domestic solid waste generation by the year 2010 is 153,847 liters/day. It is assumed that the per capita rate of solid waste generation is 0.5 liter/person/day, while total solid waste generation in BAC will increase to 180,152 liters/day in 2015.

With the remaining useful life of *Gampong Jawa* Landfill of 2 years, a new alternative site needs to be found.

Solid Waste Management Development consists of:

1) Solid waste containment

It is planned that each household be equipped with a capacity 40 liter bin.

2) Solid waste collection

Garbage will be collected twice a week from collecting station (packed in containers). The solid waste collection is divided into 5 following areas:

- T. Nyak Arief, Ulee Kareng, Kuta Alam, Kp Kramat, and Laksana
- Aceh market and vicinity
- Jl. Teuku Cik Ditiro, Kp. Ateuk, Neusu, and vicinity
- Jl. Teuku Umar, Ketapang, Lamteumon, and vicinity
- Taman kota

3) Landfill and solid waste processing

Stage1: Extending Landfill in *Gampong Jawa*

The landfill consists of sanitary landfill in *Gampong Jawa*. This facility can still accommodate solid waste disposal for the next two years.

The first alternative is to expand the existing landfill area by 3.2 Ha into neighboring area, with aid from UNICEF and BRR.

Stage 2: New sanitary landfill site

As an alternative, a new landfill location must be found within two years, not excluding locations outside Banda Aceh. These alternatives for landfill sites are in Koeta Teu, Kleumbang, Gapang, Talue Sueke.

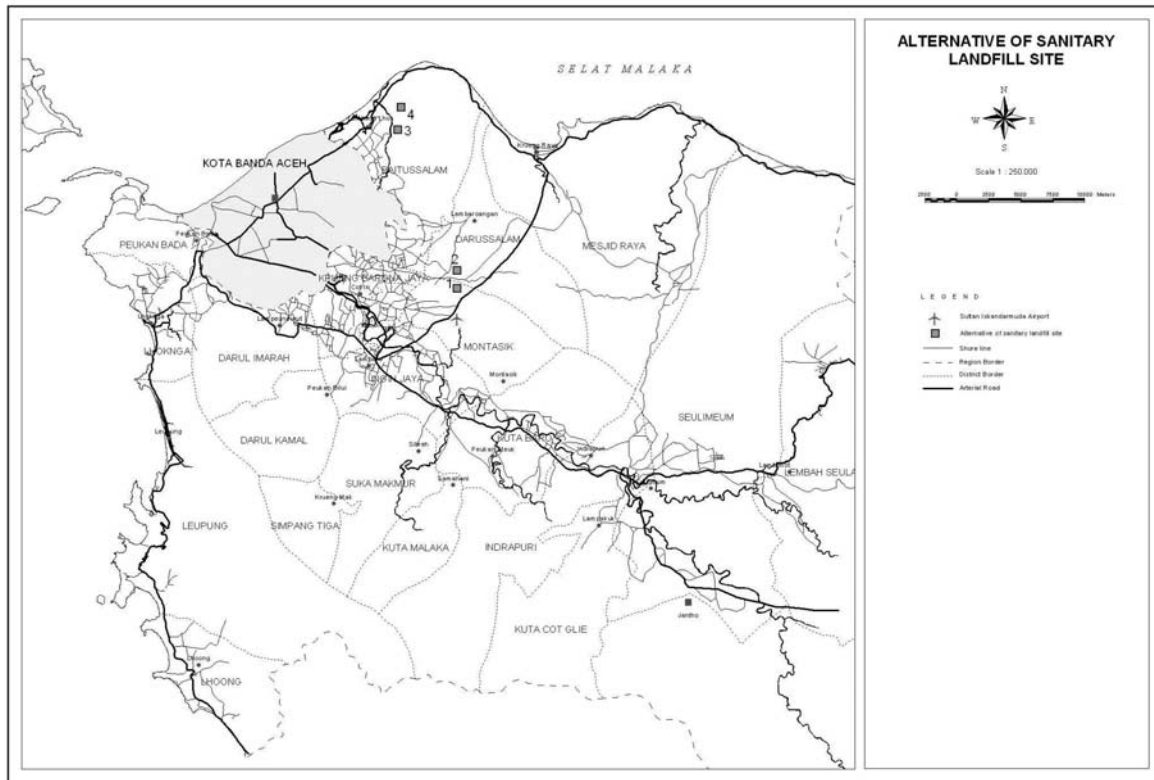
If located in Aceh Besar, the sanitary landfill may serve both BAC and Aceh Besar Regency as a regional sanitary landfill (Figure 5.1.1.).

Table 5.1.1 Alternatives of Sanitary Landfill Sites

No.	Location	Geographic Coordinate	Surface Area (ha)	Distance to Main Waste Source (km)
1	Koeta Teu (Montasik District)	772258 / 608169	15	21.5
2	Kleumbang (Darussalam District)	772258 / 609614	15	22.2
3	Gapang (Baitussalam District)	767636 / 620611	25	21.6
4	Taleue Seuke (Baitussalam District)	767873 / 622393	25	17.8

Source: Progress by GTZ, August 2005

Figure 5.1.1 Alternatives of Sanitary Landfill Site



Source: Additional Study Team, 2006

5.2 Surrounding Area

The predicted solid waste generation in surrounding area is illustrated in Table 5.1.2.

Table 5.2.1 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 ³ /year	7,714	8,458	9,212	9,978	10,127	10,836
Lhoknga	m ³ /year	12,262	13,022	13,792	14,574	14,793	15,829
Indrapuri	m ³ /year	15,150	15,377	15,608	15,842	16,080	17,206
Mesjid Raya	m ³ /year	11,123	11,921	12,731	13,553	13,756	14,719
Darussalam	m ³ /year	15,012	15,376	15,744	16,119	16,361	17,506
Baitussalam	m ³ /year	10,850	12,386	13,944	15,525	15,758	16,861
Suka makmur	m ³ /year	11,039	11,204	11,373	11,543	11,716	12,536
Darul Imarah	m ³ /year	48,287	44,946	41,554	38,112	38,683	41,391
Total	m ³ /year	131,437	132,690	133,958	135,246	137,274	146,883

Source: Additional Study Team, 2006

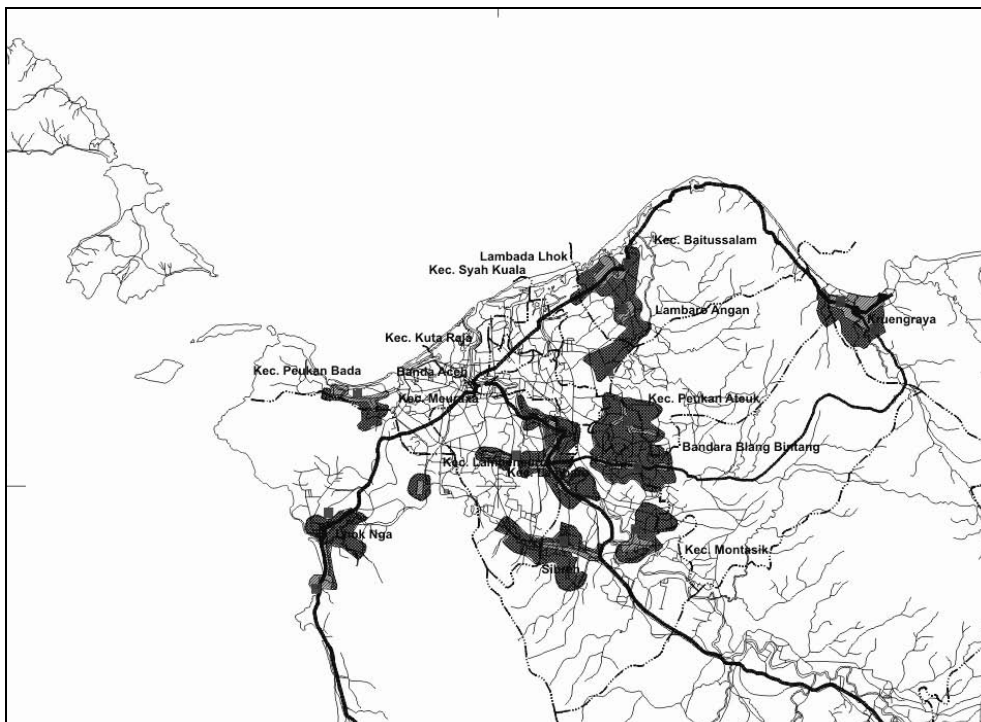
The plan for solid waste management in surrounding area is as follows:

- 1) Establish DKP (Sanitation and Park Department of Aceh Besar)
- 2) Collection by local neighborhood
- 3) Solid waste transportation and selection of TPS (temporary dumping site) 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 5.2.1.

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

Figure 5.2.1 Locations of TPS in Surrounding Areas



Source: Additional Study Team, 2006

CHAPTER 6 MARITIME TRANSPORT

6.1. Maritime Transport

6.1.1 Ferry Terminal Development

Ulee Lheue ferry port will need fast and entire reconstruction as the physical condition was totally collapsed while tsunami attacked in December 2004. The reconstruction includes wharf, passenger terminal building, parking area, etc.

6.1.2 Preliminary Project Cost

The preliminary project cost in Table is presented for the planning program of Ferry Terminal. The reconstruction cost is roughly estimated as shown in Table 4.6.1, on the basis of experiences of the similar works.

Table 6.1.8 Preliminary Cost Estimate

Port	Works	Amount (Billion Rupiahs)
Ulee Lheue Ferry	Reconstruction of all facilities	67.59

Source: JICA study team, 2005

6.1.3 Tentative Implementation Plan

The implementation schedule of air transport plan is set up as shown in Figure 4.6.2. On the figure, the reconstruction of Ferry Terminal port is started at 2007 and finish no later than 2009.

Figure 6.1.9 Tentative Implementation Schedule for Marine Transportation Plan

Proposed Project/Program	2006	2007	2008	2009	2010-2015
Ferry Terminal/Port					

Source: JICA study team, 2005

6.1.4 Annual Fund Requirement

The annual fund requirement is estimated based on the project cost estimate and implementation schedule as prior proposed.

Table 6.1.10 Annual Fund Requirement for Sea Transport Plan (Billion Rupiah)

Proposed Project/Program	2005	2006	2007	2008	2009	2010-2015	Total
Ferry Terminal			22.53	22.53	22.53	-	67.59

Source: JICA study team, 2005

CHAPTER 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.

7.1 Planning Criteria

i) General Criteria

- Target year : 2015
- Target area : BAC
- Population in 2015 : 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 : 30% of domestic power demand
- Load Factor : 80% of total power demand

7.2 Electric Power Supply Development Plan

The calculation of future power demand is based on prevailing standard, according to design criteria. Future power demand in BAC is described in Table 4.5.13.

Table 7.2.1 Future Electric Power Demand in BAC (2006 – 2015)

No	Description	Electric Power Demand (Watt)		
		2006	2010	2015
1	Population	267,441	420,823	741,634
2	Number of household	53,488	84,165	148,327
3	Power demand			
	- Domestic	69,534,660	109,413,980	192,824,840
	- Public facility	20,860,398	32,824,194	57,847,452
	- Street lighting	6,953,466	10,941,398	19,282,484
	- Total demand	97,348,524	153,179,572	269,954,776
	- Load factor	77,878,819	122,543,658	215,963,821

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.

CHAPTER 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.

8.1 Planning Criteria

i) General Criteria

- Target year : 2015
- Target area : BAC
- Population in 2015 : 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

8.2 Telecommunication network plan

The calculation of communication demand in BAC is based on prevailing standard according to the design criteria. The result is described in Table 8.2.1.

Table 8.2.1 Communication Demand in BAC (2006 – 2015)

No	Description	Service Connection (SST)		
		2006	2010	2015
1	Population	267,441	420,823	741,634
2	Number of household	53,488	84,165	148,327
3	Service connection demand			
	- Residential, commercial, services, government, public & social facilities	45,465	71,540	126,078
	- Industry, tourism, warehouse			
	- Telephone kiosk	53	84	148
	- Public telephone	267	421	742

Source: Additional Study Team, 2006

There has been a very significant growth of cellular customers (such as Telkom Flexi users) in Banda Aceh 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 Banda Aceh. 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.

APPENDIX E

PLANNING ON THREE MODEL RECONSTRUCTION AREAS

CHAPTER 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.

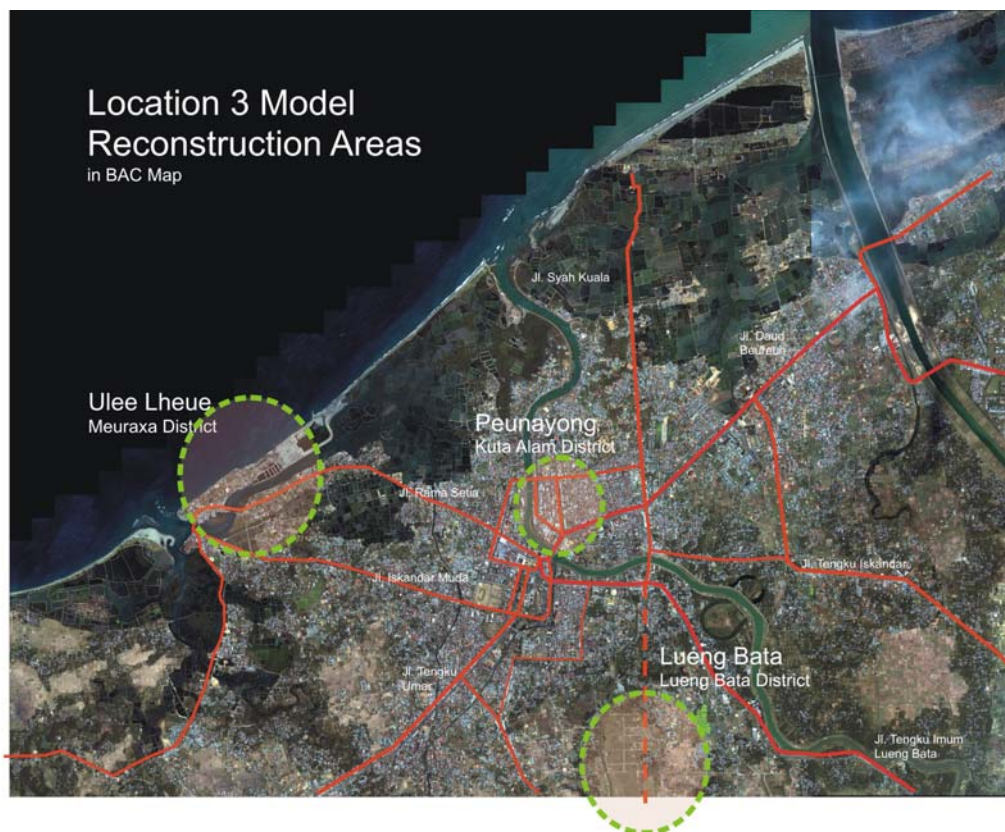
There are four (4) different evaluation items as described:

- (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?

As a result of the analysis, Ulee Lheue, Peunayong and Lueng Bata areas have finally selected for reconstruction model areas.

See Figure 1.1 Three Location Model Areas and Table 1.1 Selection Method for Three Model Areas

Figure 1.1 Three Location Model Areas



Source: BAC Aerial Photography before tsunami

Table 1.1 Selection Method for Three Model Areas

Criteria	Urban Category and Nominated Model Area								
	Affected Areas by Tsunami			Economic Generator			New Development Area		
	Ulee Lheue	Kuta Raja	Kuta Alam	Peunayong	Ulee Kareng	Setuy	Ketapang	Banda Raya	Lueng Bata
1 Basic Need of Development and Reconstruction	1 / 3	1 / 1	1 / 1	3 / 3	2 / 2	2 / 2	1 / 1	1 / 1	1 / 3
2 Feasibility of development and reconstruction	3	2	2	3	2	2	2	2	3
3 Social and environmental impact	1 / 3 / 3	2 / 1 / 1	2 / 1 / 1	3 / 3 / 3	3 / 1 / 2	3 / 1 / 2	1 / 1 / 2	1 / 1 / 2	3 / 3 / 2
4 Adaptability to other parts of the city	3	2	1	3	1	2	2	1	3
Score	17	10	9	21	13	14	10	9	18

Note: Weighted = 1 up to 3

Source: Additional Study Team, 2005

CHAPTER 2 ULEE LHEUE MODEL AREA

2.1 PROPOSED LOCATION AND AREA

(1) Location

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

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

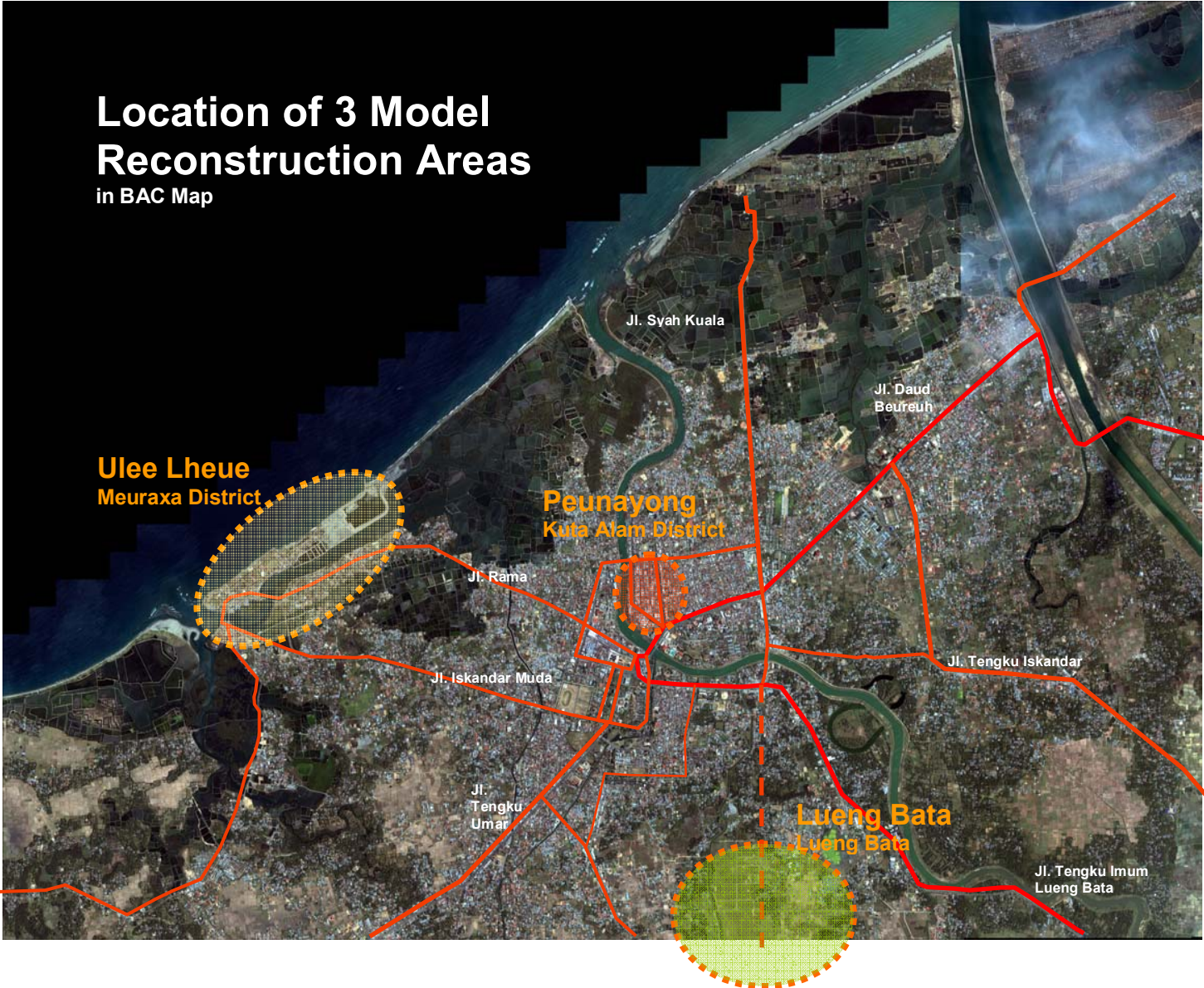
Ulee Lheue Area is a beachfront area, located between 0 – 750 m from the shoreline and ground elevation 0 – 1 m above sea level and is among the hardest hit areas by the 2004 disaster. Human casualties and material loss were extensive.

Ulee Lheue area is one of the most strategic area in BAC since BAC early formed until today, this happens because of:

Pre Tsunami Conditions

- Historically, represent the first landing place for Sultan Iskandar Muda wife, Princess Pahang.
- There is a railway station in 1874 (Holland colonization era) that became the old times Landmark for Aceh. But since 1976 until now are no longer functioning.
- Ulee Lheue Harbor is the BAC gateway through the sea that connects BAC to Pulau Nasi, Pulau Breueh, and Sabang in Pulau Weh.

Figure 2.1.1 Three Location Model Areas



- Biggest Fish market in BAC and becoming economic center for the fisherman in Ulee Lheue area and surroundings.
- Sea/Beach tourism for BAC community.

Post Tsunami Conditions

- Baiturrahim Mosque, are the historical mosque because it is the only building that survive from the tsunami disaster.
- Mass Grave that bury around 15.000 tsunami victims, and will be one of tsunami tourism object.

(2) Topographic Condition

- Relatively flat lowland
- Topographically, Ulee Lheue is a separate island profile between harbor area and main land and connecting by Ulee Lheue Bridge and Bely Bridge.
- Ulee Lheue area is the congregation between two rivers, that is, Lamteh River and Krueng Cakra/Cangkui River. The river acts as transportation for fishing boats. Krueng Cakra/Cangkui River located between two land (Ulee Lheue Harbor and main land) shaping smooth river path and the estuary form like a lake.
- Wave Embankments dike causing the tide sea water entry far to the land and to community housing area and also to fish pond area which is one of the primary pledges for the Ulee Lheue and surroundings society.
- Tsunami causing one of the villages in Ulee Lheue area that is Ulee Lheu village lost two orchards from four orchards which sink.

(3) Land Use

- Based on RTRW Banda Aceh 2002 – 2010, it is classified into harbor area and residential area.
- Based on URRP Study-JICA, it is proposed to be very low density residential area.
- Land Use and post tsunami conditions for each village as follows:

Table 2.1.1 Land Use and Physical Condition (post tsunami)

No	Name of Village	Land Use (pre tsunami)	Physical Condition (post tsunami)
1	Ulee Lheue	<ul style="list-style-type: none"> - High populated housing (most are fisherman housing) - Government and private office. - Environment and city scale for trade and services. - City scale facilities (Ulle Lheue Harbor, Baiturrahim Mosque, Fish Auction center/TPI, and sports hall) - Fishpond - Beach tourism area 	<ul style="list-style-type: none"> - All housing area are damage (house floor and foundation left) - All office are damage (pillar and foundation left) - All trade and services area are damage (floor and foundation left) - All city building facilities are damage except Mosque (minor damage) - Fishpond area are damage - beach tourism are damage and some of them are sink
2	Deah Glumpang	<ul style="list-style-type: none"> - Average-high density housing (most are the fisherman housing). - Environment and district scale for trade and services. - Village public social facilities - Fishpond Area 	<ul style="list-style-type: none"> - All area surfaces are damage (house floor and foundation left) - Trade and services area are damage (building floor and foundation left) - All public and social facilities building are damage - All Fishpond are damage
3	Deah Baro	<ul style="list-style-type: none"> - Average-high density housing (most are fisherman housing). 	<ul style="list-style-type: none"> - All housing area are damage (house floor and foundation left)

No	Name of Village	Land Use (pre tsunami)	Physical Condition (post tsunami)
		<ul style="list-style-type: none"> - Environment and district scale for trade and services. - Village public and social facilities - Fishpond Area 	<ul style="list-style-type: none"> - All trade and services area are damage (building floor and foundation left) - All public and social facilities are damage - All Fishpond are damage
4	Aloe Deah Tengoh	<ul style="list-style-type: none"> - Average-high density housing (most are fisherman housing). - Environment and district scale for trade and services. - Village public and social facilities. - Fishpond Area 	<ul style="list-style-type: none"> - All housing area are damage (house floor and foundation left) - All trade and services area are damage (building floor and foundation left) - All public and social facilities are damage - All Fishpond area are damage

Source: Additional Study Team, 2006

2.2 POPULATION

Before tsunami, Ulee Lheue area is including the most populous area in Meuraxa district. The population in five safe villages from the disaster is about 27-31% from total amount of previous community or about 29-68% from previous household. Ulee Lheue area was one of the areas that fall into total damage and gulping very big victims among areas in BAC. Present Population and Projected Population of Ulee Lheue Model Area is shown in table 6.3. and 6.4. based on Meuraxa District & Head of Community- January 2006

Table 2.2.1 Present 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%
TOTAL		7,828	1,738	1,519	304	19.4%

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

*) note: post-disaster population excluding returnee

The projected population is shown in Table 2.2.2 based on URRP.

Table 2.2.2 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
TOTAL	1,537	1,539	1,541	1,542	1,545	2,191

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

2.3 PRESENT SOCIO-ECONOMIC CONDITIONS

Social economics description of Ulee Lheue district reflected the village living in city area, where the population composition is heterogenic because coming from other area outside Banda Aceh connected to their source of revenue as fisherman and trader.

Almost all village communities in Ulee Lheue area embracing Islam, therefore there are meunasah and mosque serving several villages in each village in Ulee Lheue area.

Community education levels are various started from the elementary school unfinished to university graduated, and generally the rising generation could finish their education until graduated from the senior high school.

Table 2.3.1 Source of Revenue

No	Name of Village	Community Source of Revenue		Description
		pre tsunami	post tsunami	
1	Ulee Lheue	<ul style="list-style-type: none"> - Sea Fisherman = 40 % - Coastal area Fisherman = 10 % - Fishpond worker = 3 persons - Trader = 30 % - Breeder = - - Entrepreneur = 15 persons - PNS/POLRI/ABRI = 25 persons 	<ul style="list-style-type: none"> - Sea Fisherman = 10 % - Coastal area Fisherman = 3 persons - Fishpond worker = - - Trader = 5 % - Breeder = 10 persons - Entrepreneur = 6 persons - PNS/POLRI/ABRI = 0 	<p>Field that can be operated this time :</p> <ul style="list-style-type: none"> - Sea Fisherman = 10 % - Coastal area Fisherman = 3 persons - Fishpond worker = 0% - Trader = 5% - Breeder = 0% (unemployed) - Entrepreneur = 0% - PNS/POLRI/ABRI = 0 <p>Other fields that require aid:</p> <ul style="list-style-type: none"> - Work Equipment: Boat, Machine pedicab, etc - Work place - Working capital
2	Deah			Field that can be operated this time :

		Community Source of Revenue		
	Glumpang	<ul style="list-style-type: none"> - Sea Fisherman = 40 persons - Coastal area Fisherman = 40 persons - Fishpond worker = 15 persons - Trader = 30 persons - Breeder = 10 persons - Entrepreneur = 52 persons - PNS/POLRI/ABRI = 0 	<ul style="list-style-type: none"> - Sea Fisherman = 20 persons - Coastal area Fisherman = 23 persons - Fishpond worker = 15 persons - Trader = 30 persons - Breeder = 2 persons - Entrepreneur = 27 persons - PNS/POLRI/ABRI = 43 persons 	<ul style="list-style-type: none"> - Sea Fisherman = 40 % - Coastal area Fisherman = 20 % - Fishpond worker = 0% (unemployed) - Trader = 0% (unemployed) - Breeder = 0% (unemployed) - Entrepreneur = 10 – 50% - PNS/POLRI/ABRI = 43 persons <p>Other fields that require aid:</p> <ul style="list-style-type: none"> - Work Equipment: Boat, Machine pedicab, etc - Work place - Working capital
3	Deah Baro	<ul style="list-style-type: none"> - Sea Fisherman = 30 % - Coastal area Fisherman = 10 % - Fishpond worker = 30 persons 	<ul style="list-style-type: none"> - Sea Fisherman = 10 % - Coastal area Fisherman = 10% - Fishpond worker = 0 % 	<p>Field that can be operated this time :</p> <ul style="list-style-type: none"> - Sea Fisherman = 10 % - Coastal area Fisherman = 10 % - Fishpond worker = 0%

		Community Source of Revenue		
		<ul style="list-style-type: none"> - Trader = 17 persons - Breeder = 0 - Entrepreneur = 52 persons 	<ul style="list-style-type: none"> - Trader = 11 persons - Breeder = 0 - Entrepreneur = 52 persons - PNS/POLRI/ABRI = 6 persons 	<ul style="list-style-type: none"> - Trader = 11 persons - Breeder = 0% - Entrepreneur = 10 – 50% - PNS/POLRI/ABRI = 6 persons <p>Other fields that require aid:</p> <ul style="list-style-type: none"> - Work Equipment: Boat, Machine pedicab, etc - Work place - Working capital
4	Aloe Deah Tengoh	<ul style="list-style-type: none"> - Sea Fisherman - Coastal area Fisherman - Fishpond worker - Trader - Entrepreneur 	<ul style="list-style-type: none"> - Sea Fisherman = 50 persons - Coastal area Fisherman = 40 persons - Fishpond worker = 15 persons - Trader = 120 persons - Entrepreneur = 6 persons 	<p>Field that can be operated this time is 10% and other field that require aid:</p> <ul style="list-style-type: none"> - Working Equipment: Boat, Machine pedicab, etc - Working place - Working capital

Data source: Head of Community- January 2006

2.4 PLANNING AND DEVELOPMENT PROGRAM FULFILL, IN PROGRESS, AND GOING TO BE WORKED

1. Road expansion and elevating program

- Rama Setia Street
 - Program : Road expansion and elevating from ROW width = 6-8 m to ROW = 12 and 25 meter.
 - Executor : BAC local government.
 - Funding : BRR through APBN-P 2005.
 - Progress : physical execution in process
- Iskandar Muda Street
 - Program : Road expansion and elevating from ROW width = 14 m to ROW = 25 - 30 meter.
 - Executor : NAD Province Local Government
 - Funding : ADB 2005.
 - Progress : Land acquisition is in process
- Pelabuhan Ulee Lheue Street
 - Program : Reconnect the broken road
 - Executor : BAC local government.
 - Funding : UNDP 2005.
 - Progress : Physical execution in process.

2. Rehabilitation Program For Ulee Lheue Harbor and Supporting Facilities

- Executor : BAC local government.
- Funding : AUSTRALIA (around Rp.80 Billion)
- Progress : Physical execution in process.

3. Dam Development Program

- Sea wall/Breakwater Dam
 - Executor : BRR and BAC local government.

- Funding : BRR.
- Area : from Peukan Bada, Ulee Lheue to Aloe Naga (length 20 Km)
- Progress :
 - o Aloe Naga Segment physical execution in progress
 - o Peukan Bada and Ulee Leheue Segment in planning
- water tide dike
 - Executor : BRR and BAC local government.
 - Funding : BRR.

4. Redevelop Medan-Banda Aceh railway Program

- Funding : Indonesia and France Government mutual aid, De Societe Nationale des Chemins de Fer Francies (SCNF) International.
- Fund range : Rp. 7 trillion
- Area/Route : Connecting North Sumatera – Banda Aceh that divided into 3 phase:
 - o Phase I : Langsa (Aceh Timur) to Langkat (Sumatera Utara)
 - o Phase II : Langsa ke Lhok Seumawe (Aceh Utara)
 - o Phase III : Lhok Seumawe to Banda Aceh

5. Mass Grave Development Program

- Executor : Islamic Relief.
- Funding : UNDP.
- Progress : Physical execution in process.

6. Fish Auction Center Development Program

- Executor : Norwegia and BRR
- Funding : Norwegia and BRR
- Progress : Physical execution in process

7. Planning and Physical Development Program in Five Villages

Planning and Physical Development Program in Five Villages as follows:

Table 2.4.1 Aid from Government and NGO's/Donors

No	Name of Villages	AID FROM GOVERNMENT AND NGO/DONORS					
		Village Planning	Land Tenure	Housing	Infrastructure	Public Facilities	Economic Sector
1	ULEE LHEUE 1.129 persons 526 household	UPLINK	BPN	UPLINK	UPLINK	UPLINK	UPLINK
2	DEAH GLUMPANG 370 persons 174 household	UN HABITAT	BPN	<ul style="list-style-type: none"> • OXFAM • WVI • UN HABITAT 	<ul style="list-style-type: none"> • P2KP • UN HABITAT • CARE • WVI • KUWAIT • PU 	<ul style="list-style-type: none"> • WVI 	<ul style="list-style-type: none"> • NORWEGIA • ELSAKA
3	DEAH BARO 312 persons 172 household	UN HABITAT	BPN	<ul style="list-style-type: none"> • OXFAM • YBI 	<ul style="list-style-type: none"> • P2KP • OXFAM 	<ul style="list-style-type: none"> • P2KP 	<ul style="list-style-type: none"> • P2KP • ELSAKA
4	ALOE DEAH TENGOH 375 persons 207 household	-	BPN	<ul style="list-style-type: none"> • OXFAM • YBI 	<ul style="list-style-type: none"> • CARE • WVI • OXFAM • P2KP 	<ul style="list-style-type: none"> • P2KP 	<ul style="list-style-type: none"> • OXFAM • IRD • BPMD • ELSAKA

Source: Additional Study Team, 2006

2.5 DEVELOPMENT NEED AND CONSTRAINT

Development Need and Constraint as follow:

Table 2.5.1 Development Need and Constraint

No	Development Need	Constraint
1	<p>Housing</p> <p>Housing is the basic need for community. Several villages in Ulee Lheue area have accepting permanent and semi permanent housie aid from government, NGO's, and donor country.</p>	<p>Obstacle:</p> <ul style="list-style-type: none"> • Permanent house needs has not been fulfill yet because of the program execution and fund limitation from NGO's and government • There is no village planning which is use for spatial planning guide for village rehabilitation and reconstruction.
2	<p>Infrastructure and Utilities</p> <p>Infrastructure and utilities rehabilitations need including the village and city scale, which is:</p> <ul style="list-style-type: none"> • Road • Drainage • Clean water • Sanitation • Waste Disposal • Electricity • Telephone 	<p>Some of infrastructure and utilities sectors have been rehabilitated and reconstructed by NGO's/donor and government. But there is still much area that has not been implemented by the physical execution.</p> <p>Obstacle:</p> <ul style="list-style-type: none"> • Clean water, Electricity, and Telephone, connected to the city network system that has not been cure yet (facilities and basic facilities) • There is no village planning documents that guide the village rehabilitation and reconstruction.
3	<p>Social and Public Utilities</p> <p>To restore the community activity and living, therefore the community activity could be work as previous, such as:</p> <ul style="list-style-type: none"> • The damage public and social facilities rehabilitation • Developing new facilities suited to the community needs 	<p>Nowadays, villages in Ulee Lhueue area have accepted village facilities rehabilitation aid from government, NGO's, and donor countries.</p> <p>Obstacle:</p> <ul style="list-style-type: none"> • Has not accepted all village facilities needs, because of the fund and program limitation.
4	<p>Local Economic Development</p> <p>Restore community activity and living, therefore the village will not depending on outside aid, requirement:</p> <ul style="list-style-type: none"> • Working capital aid • Working equipment aid (fisherman boat, workshop, etc) • Work place rehabilitation (harbor, fishpond, etc) 	<p>Nowadays, villages in Ulee Lheue area have accepted economic enable ness from government, NGO's, and donor countries.</p> <p>Obstacle:</p> <ul style="list-style-type: none"> • Community needs for the economic enable ness has not fulfilled yet because of the aid management, fund, and program limitation.

No	Development Need	Constraint
	<ul style="list-style-type: none"> • Community skillful training 	
5	<p>Mitigation Aspect</p> <ul style="list-style-type: none"> • Escape Routes Using the existing city road and village road • Escape Building Escape building location is suited to: <ul style="list-style-type: none"> – Services Area – Easy Accessibility 	<p>Mitigation Aspect</p> <ul style="list-style-type: none"> – Escape Routes Existing Road conditions: destruct, very small road width therefore land acquisitions are required. – Escape Building Escape building location plan located in government land and community land (land acquisition are required)

Source: Additional Study Team, 2006

2.6 DEVELOPMENT CONCEPT

The scenario of Ulee Lheue Area Development is as beachfront area laden with historical (disaster) value. This area is proposed to be developed as mix use function, with low density and better protection against (future potential disaster) by the provision of mitigation facilities.

The function of the development area consists of several themes as follows:

- (1) Historic Tourism Theme:
 - Tsunami victim mass grave
 - Historical mosque.
 - Tsunami museum area
 - Tsunami sculpture park
- (2) Water Tourism Theme, including:
 - Fishing area (leisure fishing)
 - Water tourism boat area
 - Floating restaurant
- (3) Thematic Residential:
 - Mix use of residential and commercial
 - Medium – high rise (Hotel) residential
- (4) Waterfront Tourism Theme:
 - Waterfront park/forest
 - Waterfront plaza
 - Waterfront forest

(5) Harbor Theme:

- Fish auction wharf
- Ulee Lheue domestic harbor

(6) Sport Theme:

- Indoor sport
- Out door sport

(7) Escape Areas

- Escape building which multi-functions as Community Hall
- Escape building which multi-functions as waterfront tourism

The above development concept is illustrated in Figure 1.2

2.7 PROPOSED RECONSTRUCTION WORKS

The scenario of Ulee Lheue Area Development is as beachfront area laden with historical (disaster) value. This area is proposed to be developed as mix use function, with low density and better protection against (future potential disaster) by the provision of mitigation facilities

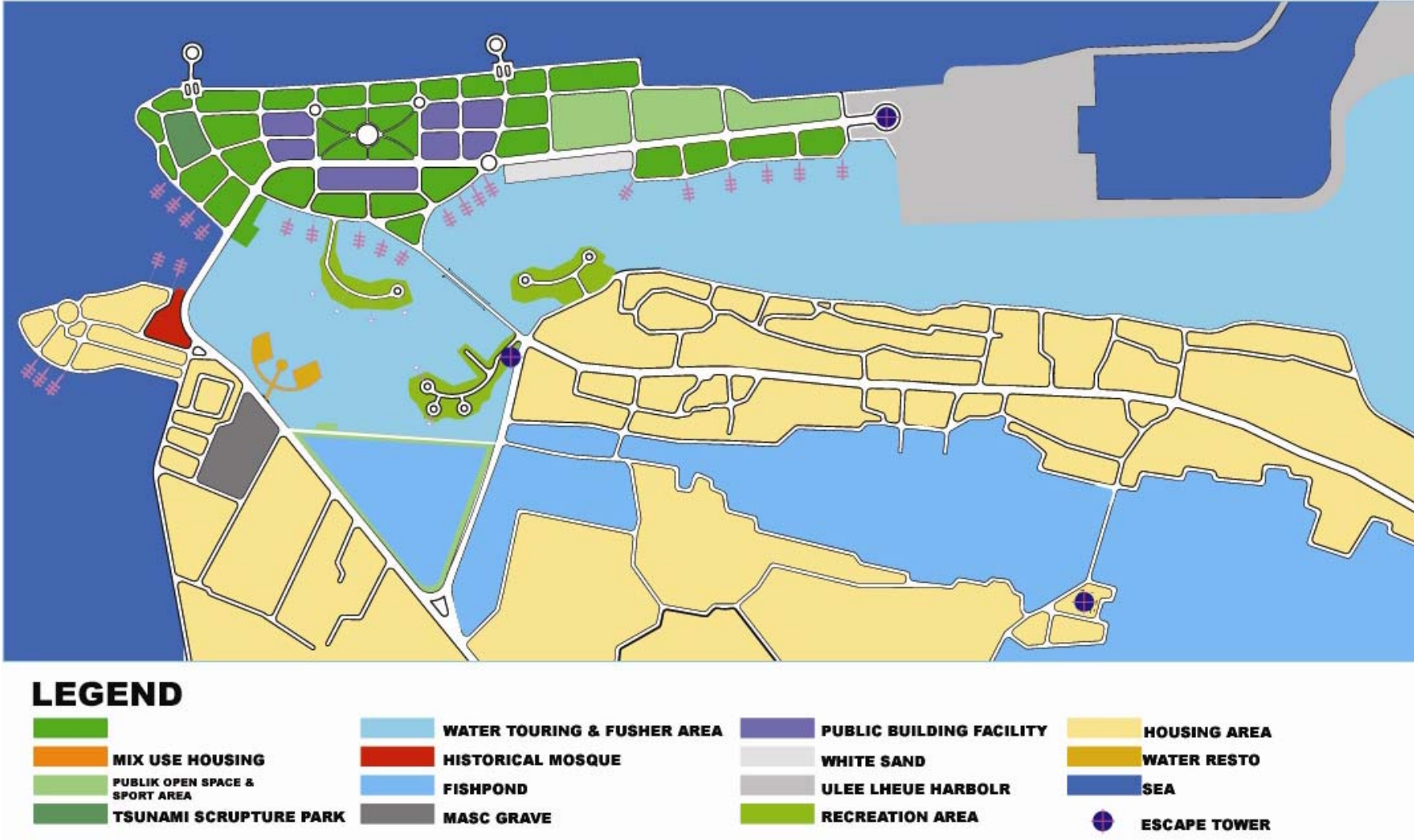
Proposed reconstruction works from this study are:

1. Escape Routes

Escape routes in Ulee Lheue area plan consist of:

- a) Rama Setia Road (still in progress through APBN cost 2005)
- b) Sultan Iskandar Muda Road, (still in progress through ADB fund 2005)
- c) Ulee Lheue Harbor Road,
 - Class of Road : Collector Road (ROW= 8 – 12 meters)
 - Functions : Links to Ulee Lheue harbor
 - Land Ownerships : city government and community of Ulee Lheue village
 - Programs planning :
 - Land Acquisition plan along the sidewalks.
 - Road Enlargement and expansion Planning to be ROW = 30 meters.
 - Fund Source by: has not been suggested.

Figure 2.7.1 Development Concept of Ulee-Lheue



Source: Additional Study Team, 2006

D. Baro Road

- Class of Road : Collector Road (ROW= 8 – 12 meters)
- Functions : Links from Rama Setia road to Sultan Iskandar Muda Road
- Land Ownerships : community of Deah Glumpang and Lambung
- Programs planning :
 - Land Acquisition plan along the sidewalks.
 - Road Enlargement and expansion Planning to be ROW = 25 meters.
 - Fund Source by: has not been suggested.

E. T.TH. Ares Road – TA.Salam Meuraxa Road

- Class of Road : Neighborhood Street (ROW= 2,5 – 4 meters)
- Functions : Links villages in Deah Baru to Blang Oi Villages
- Land Ownerships : community of Deah Baro and Blang Oi
- Programs planning :
 - Land Acquisition plan along the sidewalks.
 - Road Enlargement and expansion Planning to be ROW = 15 meters.
 - Fund Source by: JICA.

F. Pintu Air Road –Main Road of Lambung Village

- Class of Road : Neighborhood Street (ROW= 3 – 6 meters)
- Functions : Links villages in Deah Glumpang and Lambung
- Land Ownerships : community of Deah Glumpang and Lambung
- In Progress Program:
 - Village Planning by P2KP in Lambung Village and UN-Habitat ini Deah Glumpang
 - Functions : as a village main road and Escape Route
 - Road Enlargement and expansion Planning to be ROW = 8 - 12 meters.
 - Fund Source by : P2KP as stimulate fund

2. Escape Building

Escape building in Ulee Lheue area are planned to be evacuation area and also functioned as public facility that can be use as Community hall, Mercusuar, etc.

Escape Building location suggestions are in:

A. Ulee Lheue Harbor Area:

- Location : in the end of Ulee Lheue road (main entrance of Ulee Lheue harbor).
- Service area : around Ulee Lheue harbor and part of Ulee Lheue Village area
- Function : as an escape area and city tower (public water tourism)
- Land Ownerships : government of BAC – Harbor Department

B. Deah Glumpang Village Area

- Location : around TPI Norwegia.
- Service Area : Ulee Lheue Village and Deah Glumpang Village.
- Function : as an escape building, community hall and city park.
- Land Ownership : community of Deah Glumpang and Lambung Village.

C. Deah Baro Village

- Location : in Deah Baro Village, around fish pond area
- Function : as an escape building, community hall and city park.
- Land Ownership : community of Deah Baro
- Service Area : Village of Deah Baro and Aloe Deah Tengoh

3. Seawall (break water dike)

Seawall, break water or water tide dike development become one of the village priorities along the beach included Ulee Lheue surrounds to prevent the sea water entering the housing area and community fish pond.

4. Fishpond Area Rehabilitation

- Location : Village of Lampaseh Aceh, Aloe Deah Tengoh, Deah Baro, Deah Glumpang, Blang Oi and Lambung.
- Program :
 - Rehabilitation of surface of fish pond area

- Rehabilitation of embankment
 - Rehabilitation of irrigation canal
 - Fish Core
- Land Ownership : Community of Lampaseh Aceh, Aloe Deah Tengoh, Deah Baro, Deah Glumpang, Blang Oi and Lambung.
- Program donated by :
- Lampase Aceh Village donated by ELSAKA (2005 – 2006)
 - Village of Aloe Deah Tengoh, Deah Baro, Deah Glumpang, Blang Oi and Lambung, donated by JICS , Japan Red Cross (2006)

5. Ulee Lheue Tsunami Water front Area

- Location : Village of Ulee Lheue, Aloe Deah Tengoh, Deah Baro and Deah Glumpang.
- Program :
- (1) Historic Tourism Theme:
 - Tsunami victim mass grave
 - Historical mosque.
 - Tsunami museum area
 - Tsunami sculpture park
 - (2) Water Tourism Theme, including:
 - Fishing area (leisure fishing)
 - Water tourism boat area
 - Floating restaurant
 - (3) Thematic Residential:
 - Mix use of commercial
 - Medium – high rise (Hotel) residential
 - (4) Waterfront Tourism Theme:
 - Waterfront park/forest

- Waterfront plaza
- Waterfront forest

(5) Harbor Theme:

- Fish auction wharf
- Ulee Lheue domestic harbor

(6) Sport Theme:

- Indoor sport
- Out door sport

(7) Escape Areas

- Escape building which multi-functions as Community Hall
- Escape building which multi-functions as waterfront tourism

- Land Ownership : City government, community of Ulee Lheue, Aloe Deah Tengoh, Deah Baro and Deah Glumpang.
- Program donated by : has not been suggested

2.8 ESTIMATED COST AND CONSTRUCTION PERIOD

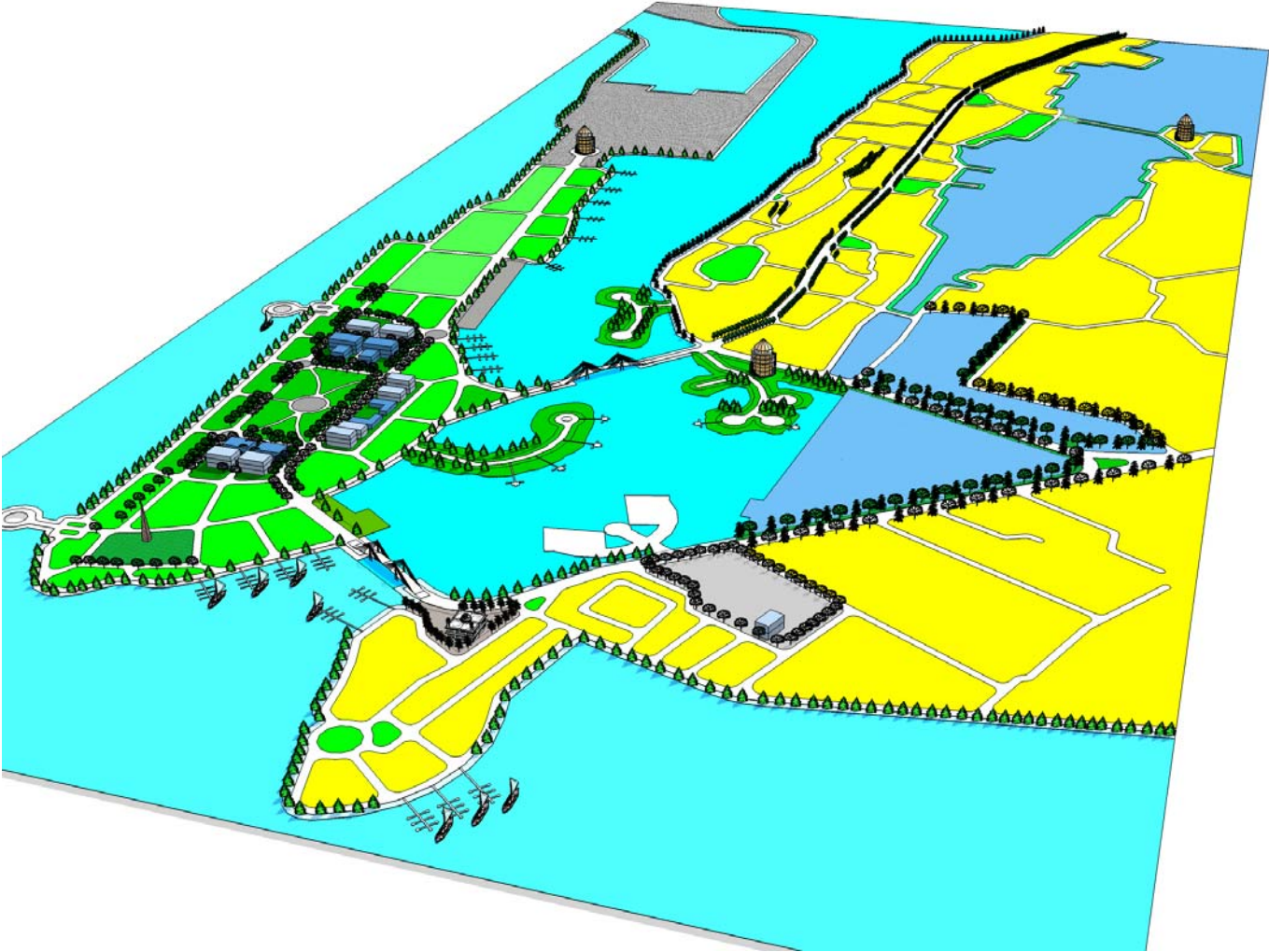
For the estimated cost and construction period is shown in Table 2.8.1.

Table 2.8.1 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	90 units	4.50	2.25	2.25									
II	Infrastructure and Utilities:													
	▪ 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							
III	Public and Social Facilities	3,500 m ²	4.31	0.62	0.62	0.62	0.62	0.62	0.62	0.62				
IV	Escape Routes	4,020 m	24	8	8	8								
V	Escape Building (3 units)	3 units	12.48	4.16	4.16	4.16								
VI	Waterfront Area	6.28 million m ³	20	2	2	2	2	2	2	2	2	2	2	2

Source: Additional Study Team, 2006

Figure 2.8.1 Model Concept of Ulee-Lheue



Source: Additional Study Team, 2006

CHAPTER 3 PEUNAYONG MODEL AREA

3.1 PROPOSED LOCATION AND AREA

(1) Location

Peunayong area is located in central BAC, in Kuta Alam District, Peunayong Village. It functions as commercial area. Being approximately 3,000 m from the shoreline, this area was also hardly 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

Before the 2004 disaster and until right now, Peunayong is one of the most strategic area in BAC and surrounding area, this happen because Peunayong as a Central Business District which located in the river front area and Peunayong as an old town of BAC.

Peunayong area consist of two villages:

- Peunayong Village
- Lampulo Village

(2) Topographic condition

- Relatively flat lowland
- Crossed by Krueng Aceh. It is one of the biggest rivers in BAC, and also functions as boat waterway.

(3) Land use

- Based on RTRW Banda Aceh 2002 – 2010, and URRP Study-JICA the proposed area is commercial area.

3.2 POPULATION

Based on the most up-to-date data from Kuta Alam District, the population before and after the 2004 disaster is reported as shown in Table 3.2.1 below, with the percentage of safe victims are 65%, as follows:

Table 3.2.1 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

Projected population for 2009 is 2,919 people based on URRP.

Table 3.2.2 Projected 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

3.3 PRESENT SOCIO-ECONOMIC CONDITIONS

Social economics description of Peunayong area reflected the urban area, where the population composition is heterogenic because coming from other area outside Banda Aceh connected to their source of revenue as trader.

Most the village communities in Peunayong area embracing Islam, but the religious facilities are various like church, Klenteng (Tionghoa).

Community education levels are various started from the elementary school unfinished to university graduated, and generally the rising generation could finish their education until graduated from the senior high school.

Table 3.3.1 Source of Revenue of Peunayong Model Area

No	Name of Village	Community Source of Revenue		Description
		Pre-disaster	Post-disaster	
1	Peunayong Village	<ul style="list-style-type: none"> • Trader • PNS • Police/army • Helper 	<ul style="list-style-type: none"> • Trader • PNS • Police/army • Helper 	

2	Lampulo Village	<ul style="list-style-type: none"> • Trader • PNS • Police/army • Helper 	<ul style="list-style-type: none"> • Trader • PNS • Police/army • Helper 	

Source: Kuta Alam District, Report December 2005

3.4 PLANNING AND DEVELOPMENT PROGRAM FULFILL, IN PROGRESS, AND GOING TO BE WORKED

After disaster of damaged most buildings and infrastructures have been rehabilitated by NGO's/Donors and local government and already functioning.

1. Housing Reconstruction Program

- Location : Peunayong and Lampulo Villages
- Funding : Aceh Relief = 90 units
Care = 700 units
BRR = 60 units
P2KP = 26 units
- Progress :

2. Road Rehabilitation Program

- Location :
- Funding : BRR, City Government
- Progress :

3. Drainage Rehabilitation Program

- Location :
- Funding : People of China
- Progress :

4. Solid Waste Rehabilitation Program

- Location : all Peunayong area

- Funding :

- Progress :

5. Water supply Rehabilitation Program

- Location : all Peunayong area

- Funding : PDAM

- Progress :

6. Utilities Network Rehabilitation Program

- Location : all Peunayong area

- Funding : PLN dan TELKOM

- Progress : have been done

7. Riverfront Traditional Market Rehabilitation Program

- Location : Peunayong Village

- Funding : YOKOHAMA

- Progress : Physical progress

8. Fishery Pier Rehabilitation Program

- Location : Lampulo Villages

- Funding : CHF

- Progress : Physical progress

9. Fish Auction Rehabilitation Program

- Location : Lampulo Villages

- Funding : CHF

- Progress : Physical progress

10. Water tide Reconstruction Program

- Location : Lampulo Village

- Funding : BRR.

– Progress : Physical progress

3.5 DEVELOPMENT NEED AND CONSTRAINT

Development Need and Constraint as follow:

Table 3.5.1 Development Need and Constraint

No	Development Need	Constraint
1	<p>Housing</p> <p>Housing is the basic need for community. Two villages in Peunayong area have accepting permanent and semi permanent housie aid from government, NGO's, and donor country.</p>	<p>Obstacle:</p> <ul style="list-style-type: none"> • Permanent house needs has not been fulfill yet because of the program execution and fund limitation from NGO's and government • There is no village planning which is use for spatial planning guide for village rehabilitation and reconstruction.
2	<p>Infrastructure and Utilities</p> <p>Infrastructure and utilities rehabilitations need including the village and city scale, which is:</p> <ul style="list-style-type: none"> • Road • Drainage • Clean water • Sanitation • Waste Disposal • Electricity • Telephone 	<p>Some of infrastructure and utilities sectors have been rehabilitated and reconstructed by NGO's/donor and government. But there is still much area that has not been implemented by the physical execution.</p> <p>Obstacle:</p> <ul style="list-style-type: none"> • There is no village planning documents that guide the village rehabilitation and reconstruction.
3	<p>Social and Public Utilities</p> <p>To restore the community activity and living, therefore the community activity could be work as previous, such as:</p> <ul style="list-style-type: none"> • The damage public and social facilities rehabilitation • Developing new facilities suited to the community needs 	<p>Nowadays, villages in Peunayong area have accepted village facilities rehabilitation aid from government, NGO's, and donor countries.</p> <p>Obstacle:</p> <ul style="list-style-type: none"> • Has not accepted all village facilities needs, because of the fund and program limitation.

No	Development Need	Constraint
4	<p>Local Economic Development</p> <p>Restore community activity and living, therefore the village will not depending on outside aid, requirement:</p> <ul style="list-style-type: none"> • Working capital aid • Working equipment aid (fisherman boat, workshop, etc) • Work place rehabilitation (harbor, fishpond, etc) • Community skillful training 	<p>Nowadays, villages in Peunayong area have accepted economic enable ness from government, NGO's, and donor countries.</p> <p>Obstacle:</p> <ul style="list-style-type: none"> • Community needs for the economic enable ness has not fulfilled yet because of the aid management, fund, and program limitation.
5	<p>Mitigation Aspect</p> <ul style="list-style-type: none"> • Escape Routes <p>Using the existing city road and village road</p> <ul style="list-style-type: none"> • Escape Building <p>Escape building location is suited to:</p> <ul style="list-style-type: none"> - Services Area - Easy Accessibility 	<p>Mitigation Aspect</p> <ul style="list-style-type: none"> - Escape Routes <p>Existing Road conditions: destruct, very small road width therefore land acquisitions are required.</p> <ul style="list-style-type: none"> - Escape Building <p>Escape building location plan located in government land and community land (land acquisition are required)</p>

Source: Additional Study Team, 2006

3.6 DEVELOPMENT CONCEPT

Development scenario for Peunayong Area will still be concurrent with the planning stated by RTRW and URRP studies. Such studies and plan envisage the area to be main commercial area.

This model area will be developed with several themes as follows:

- (1) Riverfront area
- (2) China town area
- (3) Military complex
- (4) Hotel area
- (5) Business district (including retail and traditional commercial area)
- (6) City park

The above development concept is illustrated in Figure 6.4.

3.7 PROPOSED RECONSTRUCTION WORKS

The scenario of Peunayong Area Development is as beachfront area laden with historical (disaster) value. This area is proposed to be developed as mix use function, with low density and better protection against (future potential disaster) by the provision of mitigation facilities

Proposed reconstruction works from this study are:

1. Housing Reconstruction Program
2. Road Rehabilitation Program
3. Drainage Rehabilitation Program
4. Solid Waste Rehabilitation Program
5. Water supply Rehabilitation Program
6. Landscape

Figure 3.7.1 Development Concept of Peunayong



Source: Additional Study Team, 2006

3.8 ESTIMATED COST AND CONSTRUCTION PERIOD

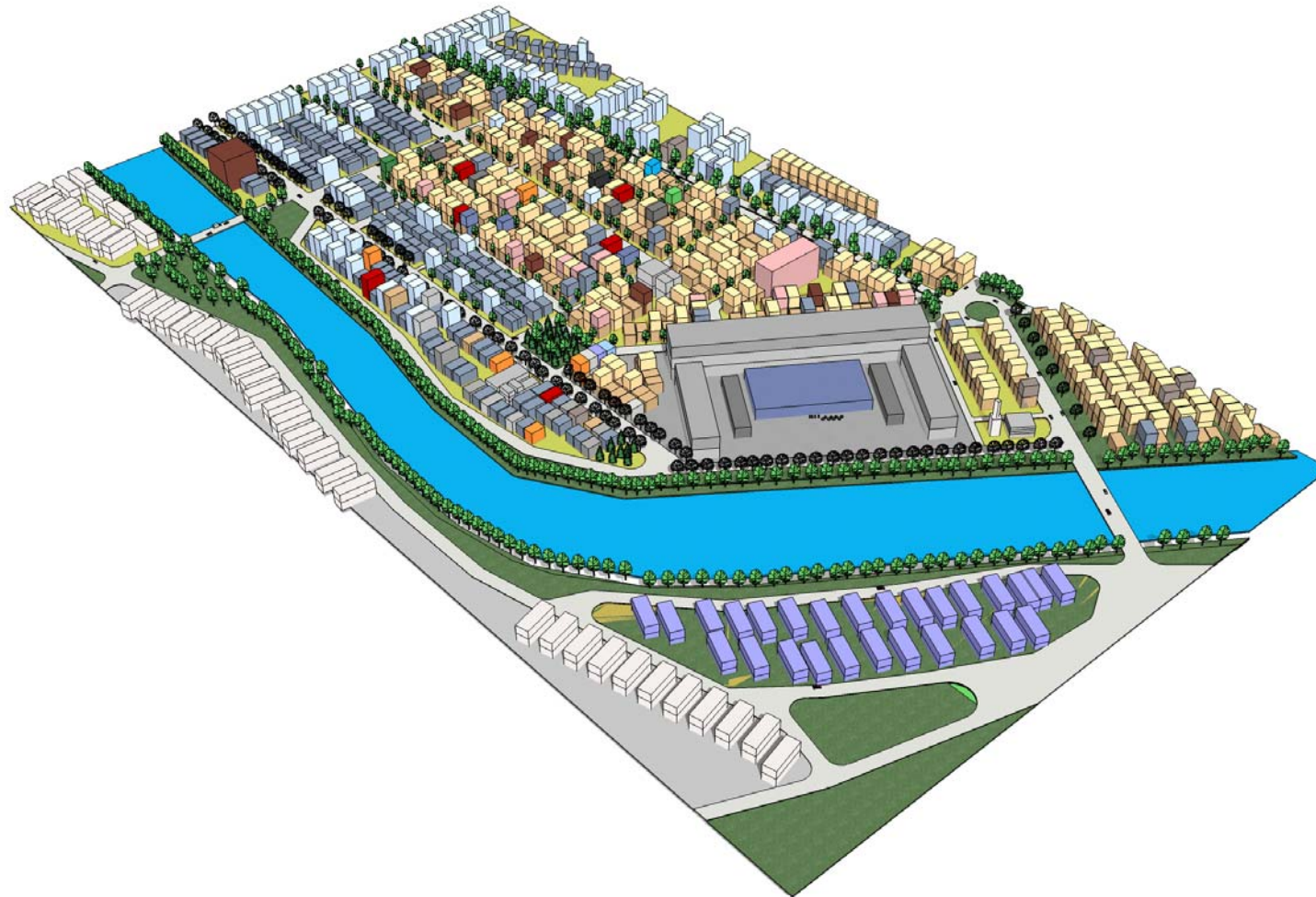
For the Estimated Cost and Construction Period is shown in Table 3.8.1.

Table 3.8.1 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 ²	4.93	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 3.8.1 Model Concept of Peunayong



Source: Additional Study Team, 2006

CHAPTER 4 LUENG BATA MODEL AREA

4.1 PROPOSED LOCATION AND AREA

(1) Location

This model area lies across the southern border of BAC and consists of administrative areas of

Penjeurat Village and Lamdom Village in Lueng Bata District, BAC and a part of Aceh Besar Regency.

Boundaries of model area are as follows:

- North : AMD Road
- East : Cot Mesjid Village
- South : Sukarno Hatta Artery Road (ring road)
- West : River

The area is provided with good access such as:

- Sukarno Hatta Road, primary arterial road
- Tengku Imum Road, primary road of Lueng Bata City
- Sultan Malice Sale Road, urban collector road
- Planned new road (from Simpang Surabaya)

In present urban system, this area was planned as a sub-center in order to foster southward growth of BAC. The present physical condition of model area is as follows:

- Dominated by agricultural area
- There are some residential clusters
- Relatively good natural condition with many separate clusters of trees

(2) Topographic condition

- Relatively flat lowland
- A river flowing from the south to the north marks the border of BAC and Aceh Besar Regency.

(3) Land use

- Based on RTRW Banda Aceh 2002 – 2010, the area is designated as new residential area.

- Based on URRP Study-JICA, the area is allocated for development of new city area.

4.2 POPULATION

According to the officials of Lueng Bata District, the pre- and post-disaster populations are as follows:

Table 4.2.1 Population of Lueng Bata Model Area

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

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

Predicted population is as follows (Based on URRP):

Table 4.2.2 Projected Population of Lueng Bata Model Area

Village	Projected Population					
	2005	2006	2007	2008	2009	2015
Lamdom	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
TOTAL	6,146	8,055	10,103	12,305	14,888	21,118

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

4.3 PRESENT SOCIO-ECONOMIC CONDITIONS

Social economics description of Lueng Bata area reflected the semi urban area, where the population composition is heterogenic because coming from other area of Banda Aceh.

Most the village communities in Lueng Bata area embracing Islam, therefore there are meunasah and mosque serving several villages in each village in Lueng Bata area.

Community education levels are various started from the elementary school unfinished to university graduated, and generally the rising generation could finish their education until graduated from the senior high school.

Table 4.3.1 Source of Revenue of Lueng Bata Model Area

No	Name of Village	Community Source of Revenue		Description
		Pre-disaster	Post-disaster	
1	Lueng Bata Village	<ul style="list-style-type: none"> • Trader • PNS • Police/army • Helper • Farmer • Ternak 	<ul style="list-style-type: none"> • Trader • PNS • Police/army • Helper • Farmer • Ternak 	
2	Lampulo Village	<ul style="list-style-type: none"> • Trader • PNS • Police/army • Helper • Farmer • Ternak 	<ul style="list-style-type: none"> • Trader • PNS • Police/army • Helper • Farmer • Ternak 	

Source: Lueng Bata District & Head of Community- Desember 2005

4.4 PLANNING AND DEVELOPMENT PROGRAM FULFILL, IN PROGRESS, AND GOING TO BE WORKED

After disaster of damaged most buildings and infrastructures have been rehabilitated by NGO's/Donors and local government and already functioning.

1. Housing Reconstruction Program

- Location : Panterik Village
- Funding : Budha Tzuchi = 500 units
- Progress : have been done

2. Construction of new road and drainage

- Location : from Simpang Surabaya to Sukarno-Hatta Arterial Road (lies across the southern part of model area)
- Funding : APBN 2005
- Progress : physical progress

3. Road and Drainage Rehabilitation and Reconstruction Program

- Location : Lueng Bata Lam Dhom
- Funding : City Government
- Progress : physical progress

4. Construction of Islamic Model Facility (pesantren)

- Location : in Sukarno-Hatta Arterial Road
- Funding : Turkey

4.5 DEVELOPMENT NEED AND CONSTRAINT

(1). Development Need:

- Pembangunan Rumah untuk area relokasi warga korban tsunami, yang mau direlokasi
- Pengembangan Lueng Bata sebagai Pusat Pertumbuhan Kota baru di area Banda Aceh
- Penciptaan lapangan pekerjaan baru di area pengembangan baru
- Pemberdayaan ekonomi (bantuan modal, alat kerja, pelatihan dll)

(2). Constraint

- Interregional coordination will be vital in the development and management of this model area, because it lies across two different administrative areas (BAC and Aceh Besar Regency).
- This model area lies surrounded by vast vacant lands. Therefore it is necessary to build a “growth magnet” in order to increase attraction and accelerate growth.
- 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

4.6 DEVELOPMENT CONCEPT

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 of the New Town is “an integration of administration center, residential and business center”.

There are several sub-themes as follow:

- Main green corridor, as the main north-south road in the area
- Forest and city park in several areas: in the central part of model area and within central business district
- Green belt, along the border of model area with existing residential areas and also as buffer zone between different neighboring functions.
- Low density residential area
- Green central business district
- Green government office and public services,
- Hotel and accommodation
- Sport center
- Riverfront area

The above development concept is illustrated in Figure 4.7.1.

4.7 PROPOSED RECONSTRUCTION WORKS

The scenario of Lueng Bata Area Development is as beachfront area laden with historical (disaster) value. This area is proposed to be developed as mix use function, with low density and better protection against (future potential disaster) by the provision of mitigation facilities

Proposed reconstruction works from this study are:

1. Housing Reconstruction Program
2. Road Rehabilitation and Reconstruction Program
3. Drainage Rehabilitation Program
4. Solid Waste Rehabilitation and Reconstruction Program
5. Water supply Rehabilitation Program
6. Utilities (electrical and telephone network)

7. Landscape (as a new green town)
8. Government Office.
9. Public and Social Facilities

Figure 4.7.1 Development Concept of Lueng Bata



Source: Additional Study Team, 2006

4.8 ESTIMATED COST AND CONSTRUCTION PERIOD

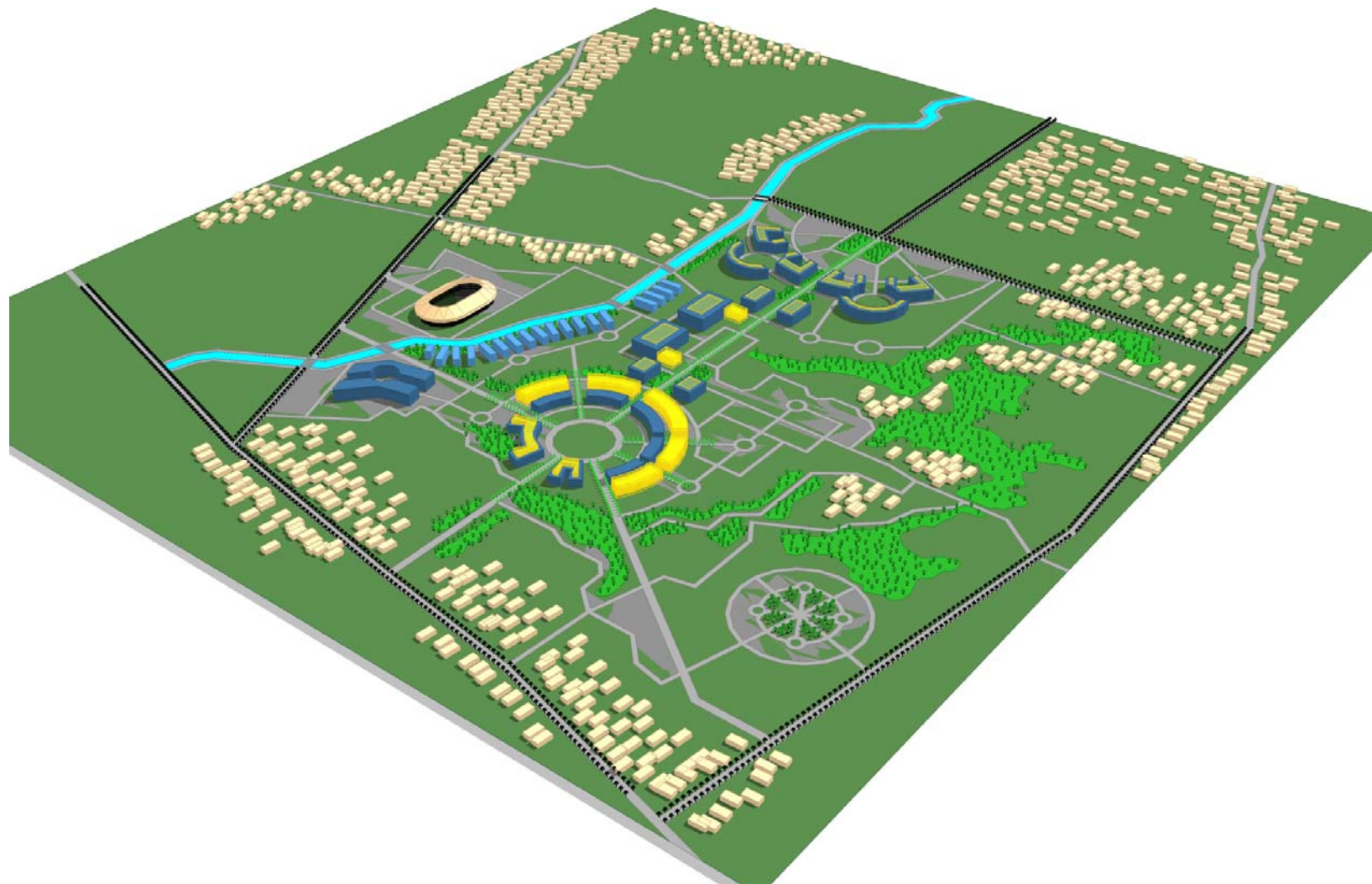
For the Estimated Cost and Construction Period is shown in Table 4.8.1.

Table 4.8.1 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	Infrastructure and Utilities:													
	• 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				
II	Public and Social Facilities	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 4.8.1 Model Concept of Lueng Bata



Source: Additional Study Team, 2006