

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
PROVINCIAL GOVERNMENT OF NANGGROE ACEH DARUSSALAM
BANDA ACEH CITY
REHABILITATION AND RECONSTRUCTION AGENCY (BRR)

THE STUDY
ON
THE URGENT REHABILITATION AND RECONSTRUCTION
SUPPORT PROGRAM
FOR
ACEH PROVINCE AND AFFECTED AREAS
IN NORTH SUMATRA

(URGENT REHABILITATION AND RECONSTRUCTION PLAN
FOR BANDA ACEH CITY)

IN THE REPUBLIC OF INDONESIA

ADDITIONAL STUDY ON URRP
VOLUME II : MAIN REPORT

MARCH 2006

NIPPON KOEI CO., LTD.
YACHIYO ENGINEERING CO., LTD.
PASCO CORPORATION

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LIST OF REPORTS

VOLUME I : EXECUTIVE SUMMARY
VOLUME II : MAIN REPORT
VOLUME III : ANNEX

PREFACE

In response to a request from the Government of Indonesia, the Government of Japan decided to conduct a “Study on the Urgent Rehabilitation and Reconstruction Plan (URRP) for Banda Aceh City in the Republic of Indonesia” and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Akira Takahashi of Nippon Koei Co., Ltd. in association with Yachiyo Engineering Co., Ltd., and Pasco Corporation, to Indonesia from March 2005 to March 2006.

In August 2005, presentation meeting on Draft Final Report (1) for the URRP was held and all outputs of the study were favorably agreed by agencies concerned of the Government of Indonesia. In September, Final Report (1) for the URRP was submitted to the Government of Indonesia. During the above presentation meeting in August 2005, Banda Aceh City and BRR (Rehabilitation and Reconstruction Agency) requested JICA to continue further technical assistance. In response to the request, JICA decided to conduct this Additional Study on URRP from October 2005 to February 2006.

The team held discussions with the officials concerned of the Government of Indonesia and conducted field surveys at the study area. Upon returning to Japan, the team prepared this final report.

I hope this report will contribute to the reconstruction and development of Banda Aceh City and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Indonesia for their close cooperation extended to the study.

March 2006

Kazuhisa Matsuoka
Vice President
Japan International Cooperation Agency

Mr. Kazuhisa Matsuoka
Vice President
Japan International Cooperation Agency
Tokyo, Japan

Subject: Letter of Transmittal

Dear Sir,

We are pleased to submit herewith the Final Report for the “Additional Study on URRP for Banda Aceh City in the Republic of Indonesia”. This Study was conducted by Nippon Koei Co., Ltd., in association with Yachiyo Engineering Co., Ltd., and Pasco Corporation, under a contract to JICA, during the period from October 2005 to March 2006. The report consists of Executive Summary, Main Report and Annex.

The report presents outputs and recommendations for Banda Aceh metropolitan concept, Banda Aceh City structural plan with target year 2015, three model areas reconstruction plan, and rehabilitation and reconstruction program.

We would like to take this opportunity to express our sincere gratitude to your Agency, and the Ministry of Foreign Affairs. We are also most grateful for the cooperation and assistance from the officials concerned in the Republic of Indonesia, the JICA Indonesia office, and the Embassy of Japan in Jakarta. The Final Report is a fruit of excellent collaboration of all participants in this Study.

Yours Faithfully

Akira Takahashi
Team Leader, JICA Study Team
The Study on the Urgent Rehabilitation and Reconstruction Plan
for Banda Aceh City
in the Republic of Indonesia



Location Map of Banda Aceh City – Aceh Besar - Sabang

CONCLUSIONS AND RECOMMENDATIONS

BACKGROUND

- (1) This Additional Study was conducted in response to the request made by the Mayor of Banda Aceh City and the BRR on August 13, 2005.
- (2) The Additional Study was actually undertaken by the Indonesian consultant, PT. Wiswakharman, which was awarded through a competitive bidding conducted by the JICA Study Team on October 15, 2005. The study period extended over four and a half (4.5) months from middle of October 2005 to end of February 2006.
- (3) This Report is prepared on the basis of the outputs of the above mentioned consultant.

OBJECTIVES OF THE ADDITIONAL STUDY

- (4) The objectives of the Additional Study are (a) establish a long term vision for development of Banda Aceh City (hereinafter referred to as “BAC) and its surroundings, (b) provide a detailed BAC structure plan, (c) formulate immediate and short term program for rehabilitation and reconstruction works in BAC, and (d) formulate and prepare a layout plan for three (3) reconstruction model areas.

THE STUDY AREA

- (5) The Study Area practically covers three (3) administrative areas, Sabang City, BAC and Aceh Besar Regency (hereinafter referred to as “ABR”), with a gross area of 2,886km². It is seen in the location map in frontispiece.
- (6) Both Sabang City and BAC were severely devastated by the 2004 disaster because of their geographic location. Population in the Study Area was approximately 544,300 in 2003 and was reduced by more than 70,000 by the disaster.
- (7) BAC is a capital of the Nanggroe Aceh Darussalam Province (hereinafter referred to as “NAD”) and is the center of administration, economy, culture and education in NAD as well as hub of transportation and logistics in the northern Sumatra. Its population accounts for approximately 40 % of total population in the Study Area, though its administrative area shares only 2.1% of the whole Study Area.
- (8) Gross Regional Domestic Product (GRDP) without oil and gas was Rp. 993 billion in BAC, Rp. 142 billion in Sabang City and Rp. 1,510 billion in ABR at current rate in 2002. The average GRDP per capita is Rp. 4.88 million, far below the national average. Per capita income is Rp. 3,585 million on the average in 2002, being about a half of the national average.
- (9) It is concluded that there is serious need in enhancement and promotion of economic development to minimize an economic disparity with the other part of the country, to

bottom up level of livelihood and to create a stable and peace society. It is also concluded that integrated development with a concept of Banda Aceh metropolis would be rational and efficient.

FORMULATION OF BANDA ACEH METROPLOITAN CONCEPT

- (10) The formulation of metropolitan concept was achieved through five (5) steps: (a) establishment of long term vision, (b) identification of regional centers to be prospective to form part of metropolis, (c) analyses of interaction and interdependency between BAC and regional centers, (d) formulation of urban system concept, and (e) formulation of metropolitan macro spatial structure plan, in order of process.
- (11) The long term vision is set forth paying attention to the preservation of the tradition, culture, and Islamic principle, and comprises four (4) sub-visions as follows:
 - In accordance with the national and provincial policies, development of BAC will be directed to be core of economy, social, culture and religion in the Northern Sumatra
 - BAC will be motivated to be the northern international gateway of the country taking its geographic advantage. Given rich human and natural resources industrial development will be promoted along with this vision.
 - People shall be protected from possible future disaster
 - The Study Area will continuously co-exist with the precious natural environment.
- (12) Through the preliminary screening it is concluded that BAC would have stronger linkage with the Aceh Besar Regency (ABR) than other regencies in NAD. Within ABR, there are 22 regional centers within ABR, and interaction of BAC to the respective center was analyzed. As a result it is found that 13 centers in ABR have very to strong linkage with BAC.
- (13) It is confirmed through interdependency analysis that those 13 centers are located within a distance of influence of BAC. It is therefore concluded that the Banda Aceh metropolis will be composed of BAC, Sabang City and 13 regional centers within ABR. The contemplated metropolitan area extends over 800 km².
- (14) The metropolitan urban system is studied and in view of population, distance between BAC and the centers concerned and present economic activities. BAC, Sabang City and 13 nominated regional centers are classified into core city, satellite city and growth center as follows, subject to further study in future. Within integrated urban system, each city and center bears various functions as also noted below.

Category of Urban System	City/Center	Main Function
Core city	BAC	<ul style="list-style-type: none"> ➤ Center of government services ➤ Center of commercial, education, culture and religion ➤ Hub of transport and logistics
Satellite city	Sabang City, Lahokonga, Lambaro, Krueng Raya	<ul style="list-style-type: none"> ➤ District service center ➤ Supporting function of BAC ➤ Agro-industry and industry
Growth center	Peukan Bada, Cot Iri, Lambaro Angan, Peukan Biliu, Lambada Lhok, Montasik, Peukan Ateuk, Sibreh, Blang Bintang, Peukan Bada	<ul style="list-style-type: none"> ➤ Residential area ➤ Agricultural center ➤ Tourism development

- (15) Macro-spatial structure is worked out preliminarily. The core and satellite cities and growth centers are even at present connected each other by existing road network. The entire metropolitan area is broadly divided into two categories: (a) zone of non-built up area with the area of 36km² and (b) zone of development with the area of 44 km².
- (16) The metropolitan development would contribute to minimize existing economic disparity with the other region of the country and to create a peaceful society of the area involved. It is however recommended that a further deep study be conducted to materialize the proposed development concept.

BANDA ACEH CITY STRUCTURE PLAN IN 2015

- (17) In the context of the long term vision, five (5) different themes are set forth in formulation of the BAC 2015 structure plan. Those are (i) green city concept, (ii) cyber city concept, (iii) promotion of tourism development, (iv) promotion of industrial development, and (v) non-polluted mass transport system. They are studied at preliminary level and the outputs are incorporated into the formulation of the structure plan.
- (18) BAC has its administrative area of 61km² and its population is forecast at approximately 360,300 in the year 2015, meaning population density of approximately 5,900 per km² which is equivalent to a half of that Jakarta in 2000.
- (19) It is foreseen that increasing population creates a serious burden on land resources, infrastructure, employment and social aspects so that it is important to formulate the 2015 structure plan to absorb and minimize such burdens.

- (20) It is proposed that BAC will broadly be divided into a city center and three (3) urban planning units (Ulee Kareng, Ulee Lheue and Lueng Bata) in term of urban system planning unit. The city center and urban planning units are graded into Urban Hierarchy 1 and 2 respectively. The city center and urban units hold a couple of sub-urban planning units with Urban Hierarchy-3 grade: three (3) in the city center area (City Center A, B and C), two (2) Ulee Kareng Unit (Ulee Kareng A and B), and in Ulee Lheue Unit. In addition there are three (3) sub-sub urban units with Urban Hierarchy-4 grade: one (1) in Lueng Bata Unit and two (2) in Ulee Kareng Unit. The city center unit and each planning unit have their definitive function and role, and sub and sub-sub units act as supporting the city center and main unit.
- (21) The urban skeleton in 2015 is established taking into account the ones elaborated by URRP. It is concluded that the URRP plan could be followed in principle with a slight modification in alignment of the coastal road, Syiah Kuala road and Baru Street on account of land appropriation issue.
- (22) The spatial structure and land use plan are worked out taking into consideration of the special themes studied beforehand. The whole area of BAC will be broadly classified into (i) Preservation and conservation area and (ii) Development area. The development area covers the area of 50 km², corresponding to 82 % of the entire area. Housing area is the predominant among the other, covering the area of 31.9 km², being about 52% of the whole BAC area. It is recommended to conduct a comprehensive study to materialize more detailed structure plan in a period shortest as possible as it is foreseeable that increase of population result in adverse effect on land resources, natural environment and social aspect.
- (23) The infrastructure development plan is deliberated on a basis of the URRP Plan. It is concluded that there is no requirement in change in water supply, flood control, health, education, disaster preparedness and maritime sectors. It is however made a supplementary report on urban sanitation sector, a slight modification on road and urban drainage, and additional plan on electric power supply and telecommunication. It is recommended to conduct deep study for implementation of the respective infrastructure as earlier as possible, since it is forecast that many of existing infrastructure are unable to afford to meet the demand.
- (24) The cost estimate presented in the URRP Plan is updated on a basis of the infrastructure development plan worked out as above. The updated cost is slightly reduced mainly owing to change in housing sector.

	Sector	Estimated Cost (Rp., billion)
1	Housing	863.46
2	Electric power supply and communication	2,712.45
3	Water supply	145.71
4	Sanitation and drainage	859.98
5	Road transport	1,367.58
6	Health	497.80
7	Education	969.00
8	Disaster preparedness	506.92
9	Public facilities	326.56
	Total	8,249.45

RECONSTRUCTION MODEL PLANNING

- (25) Three (3) areas are selected for planning of reconstruction model. They are Ulee Lheue, Peunayong, and Lueng Bata. The first area with 4 villages is one of the most heavily devastated areas by the 2004 disaster and is susceptible to be hit by the high tide and potential tsunami in future owing to its geographic conditions. The second area is located almost in the central part of BAC and was also affected by the same disaster. The third area lies deep inland and is expected to be a receptacle of influx of increasing population in future.
- (26) For each area, need of development and constraint is identified, and then reconstruction concept and plan are prepared at preliminary level and construction cost is estimated only for the works to be executed under the public investment.

Site	Area (ha)	Present land use	Reconstruction Concept	Estimated cost (Rp., billion)
Ulee Lheue	314	Flattened by tsunami	<ul style="list-style-type: none"> ➤ Promotion of tourism with tsunami memorial and historic religious facilities ➤ Residential development ➤ Water front green concept ➤ Disaster preparedness with evacuation and community hall ➤ Evacuation road ➤ Fish ponds 	171.09
Punayong	48.6	Built-up area	<ul style="list-style-type: none"> ➤ Military complex, residential ➤ River front ➤ City park to be used as emergency relief ➤ Re-vitalization of old town ➤ Evacuation road 	12.39
Lueng Bata	338	Mostly cultivation with some residential area	<ul style="list-style-type: none"> ➤ Green belt, forest, city park ➤ Residential area ➤ Business district ➤ Government and public services 	147.18

IMPLEMENTATION PROGRAM

(27) The implementation program and annual fund requirement presented in the Final Report (1) of URRP are updated with modification of the infrastructure development and in the light of the ongoing rehabilitation and reconstruction program. The implementation program is divided into short (2005-2006), medium (2007-2009) and long term programs (2010-2015).

The annual fund requirement for the respective sector is worked out in accordance with the tentative construction schedule.

(Unit: Rp., billion)

Sector		Short Term		Medium Term			Long Term						Total
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
1	Housing	124.90	223.49	223.49	145.79	145.79	0.00	0.00	0.00	0.00	0.00	0.00	863.46
2	Electricity and Communication	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
3	Water Supply	28.00	87.88	9.64	7.76	8.76	3.67	0.00	0.00	0.00	0.00	0.00	145.71
4	Sanitation and Drainage	69.05	255.18	108.59	183.87	87.18	20.03	21.02	25.03	30.01	30.00	30.03	859.98
5	Road and Transport	309.60	309.60	73.96	58.38	22.54	91.20	82.00	83.00	66.74	135.28	135.28	1,367.58
6	Health	149.80	174.80	36.50	24.30	24.10	15.49	14.88	14.47	14.46	14.45	14.55	497.80
7	Education	239.00	382.00	149.00	116.00	58.00	5.00	4.00	4.00	4.00	4.00	4.00	969.00
8	Disaster Preparedness	12.50	12.50	43.74	48.27	80.94	82.92	88.00	32.78	35.58	35.58	34.10	506.92
9	Government and Public Offices	52.26	59.80	45.50	45.50	45.50	26.00	26.00	26.00	0.00	0.00	0.00	326.56
Total		1,310.76	1,830.90	1,117.47	1,056.92	899.86	374.31	365.90	315.28	280.79	349.31	446.11	8,249.45

CONSULTATION AND ASSISTANCE TO BAC GOVERNMENT

(28) The annual fund requirement for the respective sector is worked out in accordance with the During the course of the Additional Study, the team of the local consultant had a meeting with the Banda City government office, the representatives of the city parliament, BRR, BAPPEDA and the organizations concerned over 6 times. In the meeting various subjects were discussed in order to carry out the Additional Study smoothly and to incorporate the opinions of the city government, BRR and other organizations into various plans and concepts. The study team provided technical advices to the city government to facilitate the rehabilitation and reconstruction activities.

**FINAL REPORT
FOR
THE ADDITIONAL STUDY
ON
THE URGENT REHABILITATION AND RECONSTRUCTION PLAN (URRP)**

PREFACE

LETTER OF TRANSMITTAL

LOCATION MAP OF BANDA ACEH CITY-ACEH BESAR-SABANG

CONCLUSIONS AND RECOMMENDATIONS

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Final Report for the Additional Study on URRP prepared by PT. WISWAKHARMAN

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ABBREVIATIONS

ADB	Asian Development Bank
AIPRD	Australia-Indonesia Partnership for Reconstruction and Development
AMDAL	Environmental Impact Assessment <i>Analisis Mengenai Dampak Lingkungan</i>
ANDAL	Environmental Impact Statement <i>Dokumen Analisis Dampak Lingkungan</i>
ARF	Aceh Recovery Forum
ARI	Acute Respiratory Infection
ARRIS	Aceh Rehabilitation and Reconstruction Information System
AusAID	The Australian Agency for International Development
BAC	Banda Aceh City
BAPEL	Rehabilitation and Reconstruction Executing Agency <i>Badan Pelaksana Rehabilitasi dan Rekonstruksi</i>
BAPPENAS	National Development Planning Agency <i>Badan Perencanaan dan Pembangunan Nasional</i>
BAPPEDA	Regional Development Planning Agency <i>Badan Perencanaan Pembangunan Daerah</i>
BAPEDALDA	Regional Environmental Impact Management Agency <i>Badan Pengendalian Dampak Lingkungan Daerah</i>
BPOM	Drug and Food Control Center <i>Badan Pengawasan Obat dan Makanan</i>
BCPR	Bureau for Crisis Prevention and Recovery
BPN	National Land Agency <i>Badan Pertanahan Nasional</i>
BPS	National Statistics Bureau <i>Badan Pusat Statistik</i>
BRR	Rehabilitation and Reconstruction Agency for Aceh and Nias <i>Badan Rehabilitasi dan Rekonstruksi NAD-Nias</i>
CBD	Central Business District
CEIC	Center for the Study of Education in an International Context
CEP	Community Empowerment Program
CHO	City Health Office
CGI	Consultative Group on Indonesia
Desa	Village
DFID	The United Kingdom Department for International Development
DKP	Department of Sanitary and Park <i>Dinas Kebersihan dan Pertamanan</i>
DOTS	Direct Observation and Treatment, Short Term
DPU	Department of Public Works <i>Dinas Pekerjaan Umum</i>
DTM	Digital Topographic Map
EDB	Education Department of Banda Aceh City
EDNP	Education Department of NAD Province
EIA	Environmental Impact Assessment (AMDAL)
EIS	Environmental Impact Statement (ANDAL)

EOJ	Embassy of Japan
EPI	Expanded Immunization Program
ERTR	Emergency Response and Transitional Recovery
ETESP	Earthquake and Tsunami Emergency Support Project
GIS	Geographical Information System
GNI	Gross National Income
GOI	Government of Indonesia
GOJ	Government of Japan
GTZ	German Technical Cooperation Agency <i>Deutsche Gesellschaft für Technische Zusammenarbeit</i>
GRDP	Gross Regional Domestic Product
HIC	UN Human Information Centre
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
IATPI	Indonesian Society of Sanitary and Environmental Engineers <i>Ikatan Ahli Teknik Penyehatan dan Teknik Lingkungan Indonesia</i>
IDPs	Internal Displaced Peoples
IDPC	Internal Displaced Peoples' Camps
IFRC	International Federation of Red Cross and Red Crescent Societies
INGO	International Non Governmental Organization
ILO	International Labor Organization
IMR	Infant Mortality Rate
IPLT	Human Excrement Treatment Plant
IOM	International Organization for Migration
IRD	International Relief and Development
JICA	Japan International Cooperation Agency
JICS	Japan International Cooperation System
Kabupaten	District
Kecamatan	Sub-district
Kota	City/ Municipality
LGSP	Local Government Support Project
LGU	Local Government Unit
LPMP	Quality Assurance in Education Institution <i>Lembaga Penjamin Mutu Pendidikan</i>
LSM	Non Governmental Organization <i>Lembaga Swadaya Masyarakat</i>
MA	Islamic Senior High School <i>Madrasah Aliyah</i>
MOC	Ministry of Communication
MCK	Communal toilet/ bath facility <i>Mandi Cuci Kakus</i>
MDGs	Millennium Development Goals
MI	Islamic elementary school <i>Madrasah Ibtidaiyah</i>
MMR	Maternal Mortality Rate
MOH	Ministry of Health
MONE	Ministry of National Education
MORA	Ministry of Religion Affairs

MOU	Memorandum of Understanding
MPU	Muslim Leader Consultative Council <i>Majelis Permusyawaratan Ulama</i>
MT	Islamic Junior High School <i>Madrasah Tsanawiyah</i>
NAD	Nanggroe Aceh Darussalam
NGO	Non Governmental Organizations (LSM)
O&M	Operation and Maintenance
PALYJA	Water Company of Jakarta City <i>PT PAM Lyonnaise Jaya</i>
PAUD	Early Age Children Education Institution <i>Pendidikan Anak Usia Dini</i>
PDAM	Water Supply Authority <i>Perusahaan Daerah Air Minum</i>
PEQIP	Primary Education Quality Improvement Project
PHO	Provincial Health Office
PKBI	Indonesia Planned Parenthood Association (NGO) <i>Perkumpulan Keluarga Berencana Indonesia</i>
PKBM	Community Learning Center <i>Pusat Kegiatan Belajar Masyarakat</i>
PMI	Red Cross Indonesia <i>Palang Merah Indonesia</i>
Propinsi	Province
Posyandu	Integrated Health Service Post <i>Pos Pelayanan Terpadu</i>
PSDAK	Road and Water Resources Department, Banda Aceh City <i>Dinas Prasarana Jalan dan Sumber Daya Air Kota Banda Aceh</i>
PTSD	Post Traumatic Stress Disorder
PU	Ministry of Public Works <i>Departemen Pekerjaan Umum</i>
PVC	Polyvinyl chloride
QIP	Quick Impact Project
RA	Islamic kindergarten <i>Raudatul Athfal</i>
RDB	Religion Department of Banda Aceh City
RDNP	Religion Department of NAD Province
REDIP	Regional Education Development and Improvement Program
RRI	The State Radio of Indonesia <i>Radio Republik Indonesia</i>
RTRW	Revised Plan of Regional Space Layout <i>Rencana Tata Ruang dan Wilayah</i>
R3MAS	Rehabilitation and Reconstruction Plan for the People of Aceh & North Sumatra <i>Rencana Rehabilitasi dan Rekonstruksi Masyarakat Aceh & Sumatra Utara</i>
SD	Elementary school <i>Sekolah Menengah</i>
SDC	Swiss Agency for Development and Cooperation
SETNEG	National Secretariat <i>Sekretariat Negara</i>

SMA	Senior High School <i>Sekolah Menengah Atas</i>
SMK	Senior Vocational High School <i>Sekolah Menengah Kejuruan</i>
SMP	Junior High School <i>Sekolah Menengah Pertama</i>
SPK	District Nursing School <i>Sekolah Perawat Kesehatan</i>
STI	Sexually Transmitted Infections
THW	German Federal Agency for Technical Relief <i>Technisches Hilfswerk</i>
TK	Kindergarten <i>Taman Kanak-kanak</i>
TLC	Temporary Location Center
TOR	Terms of Reference
TOT	Training of Trainers
TPA	Reading Al Qur'an Institution <i>Taman Pengaiaan Al-Qur'an</i>
TVRI	National Broadcast of Indonesia <i>Televisi Republik Indonesia</i>
UFW	Unaccounted for Water
UKL	Environmental Management Plan <i>Upaya Pengelolaan Lingkungan</i>
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UPL	Environmental Monitoring Plan <i>Upaya Pemantauan Lingkungan</i>
USACE	The United States Army Corps of Engineers
USAID	The US Agency for International Development
URRP	Urgent Rehabilitation and Reconstruction Plan
VCT	Volunteer Testing and Counseling
WB	World Bank
WHO	World Health Organization
WTP	Water Treatment Plant
YAB	(Acehnese NGO) <i>Yayasan Anak Bangsa</i>
YADESA	(NGO) <i>Yayasan Desa</i>
YASINDO	(NGO) <i>Yayasan Sinar Desa Indonesia</i>
YCDI	(Acehnese NGO) <i>Yayasan Citra Desa Indonesia</i>
YIPD	(Acehnese NGO) <i>Yayasan Inovasi Pemerintahan Daerah</i>
YNDN	(Acehnese NGO) <i>Yayasan Nandra Dian Nusantara</i>

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND OF ADDITIONAL STUDY ON URRP

On August 13, 2005, there was a meeting in Banda Aceh City (BAC) to discuss about Final Report (Draft) on URRP among the representatives from BAPPENAS, PU Jakarta and Dinas, BRR, BAPPEDA province and City Government, Dinas Tata Kota, JICA Indonesia Office and other agencies concerned and Mayor of Banda Aceh City. On the same day the Mayor and the representative of BRR requested to the JICA Indonesia office to continue technical assistance to elaborate (1) a long term vision, (2) a definite structure plan for BAC and (3) sector development program of BAC in addition to URRP (hereinafter referred to as “the Additional Study”).

In response to this request JICA decided to continue to extend its assistance to conduct the Additional Study and “Minutes of Meeting on Amendment of Scope of Work for the Urgent Rehabilitation and Reconstruction Support Program for Affected Areas in North Sumatra” was signed among the representatives of BRR, BAPPENAS, Provincial Government, JICA Indonesia Office and Banda Aceh City.

As one of the arrangements for the Additional Study, Indonesian consultant do hired as main actor to work in accordance within the scope of work for the Additional Study.

This Report on the Additional Study is prepared by the JICA Study Team on the basis of the report prepared and submitted by the Indonesian consultant.

1.2 OBJECTIVES AND SCOPE OF THE ADDITIONAL STUDY

1.2.1 Objectives

The objectives of the Additional Study are set forth as follows:

- (1) Establish a long term vision for development of Banda Aceh City and its surrounding
- (2) Provide a detailed Banda Aceh City structure plan
- (3) Formulate immediate and short-term program for rehabilitation and reconstruction works in Banda Aceh City including cost estimate and annual fund requirement
- (4) Formulate and prepare layout plan for three (3) reconstruction model areas for future implementation

1.2.2 Outlines of Scope of Work

Details of the scope of work are presented in ANNEX and their outlines are summarized herein below:

The structure plan shall include, but not limited to the following:

- (1) Define the concept of BAC Metropolitan Area

- (2) Create BAC as green city in conjunction with provision of more detailed mitigation plan against incoming Tsunami
- (3) Develop the concept of BAC as a cyber city
- (4) Develop conceptual structure of non-polluted and energy saving mass transit system
- (5) Create BAC free from flooding
- (6) Develop BAC for regional tourism
- (7) Designate a new land use for industrial zone
- (8) Formulate more detailed structure plan at the sea front area for tourism development and centers for fishery and agriculture industry, with due attention to conservation of aqua-ecology and disaster warning and mitigation aspects
- (9) Formulate and prepare outline plan and indicative cost estimate for three (3) reconstruction model areas

The Additional Study will produce the following outputs:

- (1) BAC and its surrounding urban development vision
- (2) BAC metropolitan area conceptual structure
- (3) BAC structure plan
- (4) Formulation of and layout planning for three (3) reconstruction model areas
- (5) Setting up of immediate and short program for rehabilitation and reconstruction works in BAC
- (6) Regular consultation and assistance to the BAC government

1.3 IMPLEMENTATION OF ADDITIONAL STUDY

1.3.1 Employment of Indonesian Consultant

The Additional Study was actually conducted by the Indonesian consultant, PT. Wiswakharman, which was procured through a local competitive bidding by the JICA Study Team. The contract was awarded to the said consultant in the day of 15th October, 2005. The Additional Study was then commenced from the same day and was completed by end of February, 2006 upon submission of its Final Report.

The JICA Study Team supervised the progress of the works and provided a technical advice from time to time to the Indonesian consultant. In the course of the Additional Study the Indonesian consultant prepared and submitted Inception Report, Interim Report and Draft Final Report as well as Monthly Progress Report. Draft Final Report was circulated to BRR and BAC government for their comment.

1.3.2 Indonesian Expertise Mobilized

For the performance of the Additional Study, the Indonesian consultant organized a project team which was composed of the following staff:

Table 1.3.1 Composition of Indonesian Consultant Team

	Position	Name
1	Technical Advisor	Dr. Ir. Andi Siswanto
2	Team Leader/Urban Planner	Ir. Sudarnoto
3	Urban Designer	Ir. Endah Meigawati
4	Land Management Specialist	Amri Amno
5	Road and Transport Engineer	Suprasiknyo Aji
6	GIS Specialist	Suwanaito
7	Drainage/Water Engineer	Yenny Endang Sulistyowati
8	Municipal Engineer/Budgeting Programming	Susilo
9	Tourism Specialist	Ir. Wirjani Rahardjo

1.3.3 Final Product submitted by Indonesian Consultant

The local consultant has prepared their final report incorporating the comments on the draft final report. The said final report comprises two (2) volumes as follows:

- Volume 1 Main Report
- Volume 2 Appendix
 - Appendix A Present Condition of the Study Area
 - Appendix B Formulation of Banda Aceh Metropolitan Development Concept
 - Appendix C Proposed Banda Aceh City Structure Plan
 - Appendix D Infrastructure Development
 - Appendix E Planning on Three Model Reconstruction Areas

The above Volumes 1 and 2 are attached herewith as ANNEX.

1.3.4 JICA Study Team for Supervision

For the purpose of progress control of and technical advices to the Indonesian consultant, the JICA Study Team was reinforced and in particular Supervisor and Road Engineer were assigned with the schedule shown in Figure 1.3.1. They have kept the Team Leader and Deputy Team Leader of the JICA Study Team of the progress, activities and quality of the product by the Indonesian consultant during their absence.

Position	Name	2005			2006		
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Overall Management, URRP							
Team Leader	A. Takahashi			-		-	
Deputy Team Leader	Y. Shimano		—————			—————	
Specific to Additional Study							
Coordinator	Y. Shimano	—————					
Supervisor	K. Endo	—————		—————	—————	—————	
Road Planning and Design	I. Inuzuka		—————		—————	—————	

Figure 1.3.1. Assignment of JICA Study Team Members for Additional Study

CHAPTER 2 PRESENT CONDITION OF THE STUDY AREA

2.1 LOCATION AND TOPOGRAPHY

The Study Area covers 2,866 km² over three (3) administrative areas: Sabang City, Banda Aceh City, and Aceh Besar Regency (ABR). Their areas are 119 km², 61 km² and 2,686 km² respectively. BAC is the capital of Nanggroe Aceh Darussalam Province (NAD Province). ABR is divided into 22 districts and has its capital at Jantho about 60 km to southeast from BAC on beeline. Map of the Study Area is as presented in Figure 2.1.1. It is noteworthy that Sabang City is designated as “Economic Development Area” by Presidential Policy Letters No. 89 of Year 1996 and No. 9 of 1998, and further it is designated as “Free Trade and Port Area” in 2000.



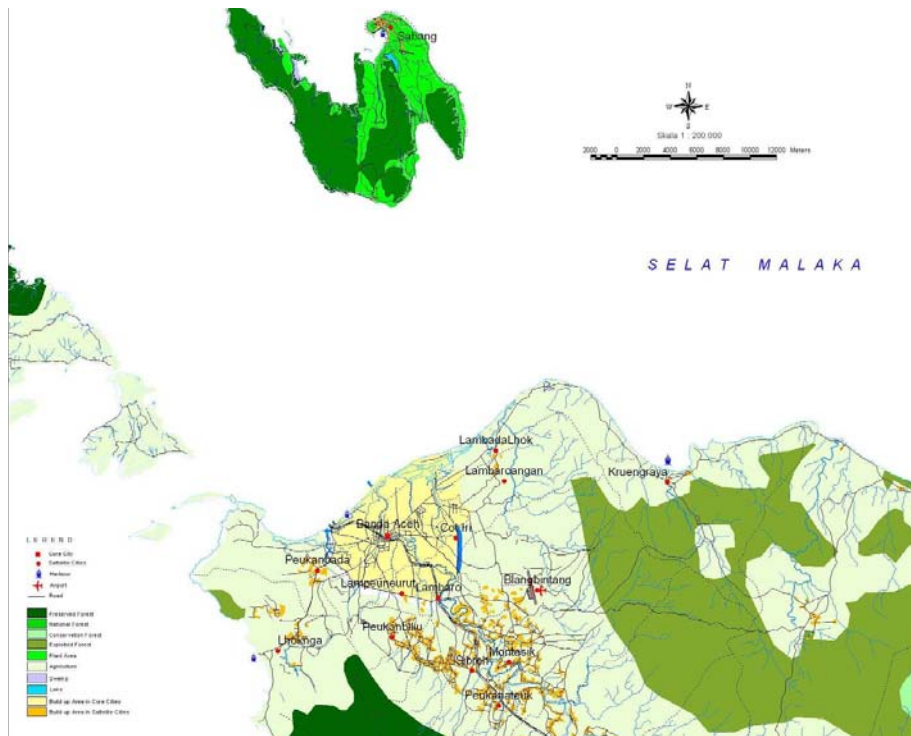
Source: BAKOSURTANAL, Map

Figure 2.1.1 General Topography of the Study Area

The Sabang City is located in the Weh Island, approximately 25 km off the coast of BAC. The Weh Island is characterized by steep topography with highest elevation of 100 m. BAC is located at the northern tip of the Sumatra Islands and is adjacent to ABR. It is relatively flat along the coast and tends to increase its altitude towards the south. It is facing to the Strait of Malacca on its north and bounds with ABR on the rest of direction. ABR is bounded by mountain ranges on its east and south, and by the Strait of Malacca on the west and north. There is a vast flat plain extending along the Aceh River. The highest elevation is 2,140 m above sea level on the southern mountain range.

2.2 LAND USE

Plantation and forest is predominant in the Weh Island, accounting for 70 percent. In ABR, forest occupies approximately 49.5 percent, followed by grass land (19.1 percent) and cultivation area (8.6 percent).



Source: BAKOSURTANAL, Map

Figure 2.2.1 Present Land Use of the Study Area

BAC was severely devastated by the disaster, causing great change in geography along the coast with a radius of one to 2 km. Such damage by the disaster is reported in detail in Final Report (1). A small island near Ulee Lheue has lost almost a half of its land, residential areas along the coast were flattened, fish ponds and mangrove forest totally disappeared. Even as of February 2006, there are many submerged areas within the city as shown in Figure 1.3.3 of Volume 1 Executive Summary of Final Report (1).

2.3 RIVERS AND DRAINAGE

There is no major river in the Weh Island. BAC and ABR are drained by the Aceh River with a catchment area of 1,650 km². It flows down almost the center of ABR and BAC and debouches into the Strait of Malacca. It is the source of irrigation supply within its drainage area and also the source of pipe water supply for BAC and major centers in ABR.

The Aceh River was improved to secure BAC from flooding in 1980th with financial assistance of the Overseas Cooperation Fund of Japan (now JBIC). However part of BAC is still prone to inundation mainly owing to storm water. Because of topographic condition there was a number of drainage pumping stations, which were linked to urban drainage network, to drain the storm water into the Aceh River and its tributaries.

BAC is now encountered with a serious drainage problem, resulted from the 2004 disaster, which caused breaking/corruption of flood dykes along the Aceh River at many sections, complete washing out of seawall along the shoreline, and washing out/corruption of all drainage pumping

station excepting one at Peuniti, and flood gates at many locations. It is a matter of importance to urgently restore storm water drainage system, otherwise BAC will be subjected to inundation when occurring heavy storm rainfall and high tide.

2.4 SOCIO-ECONOMIC CONDITIONS

2.4.1 Population and Employment

Population in the Study Area was 595,364 in 2003 before the disaster and their aerial distribution and growth rate are as shown in Table 2.4.1.

Table 2.4.1 Population in the Study Area during the Period from 1999 to 2003

Area	Population					Average Growth Rate (percent/year)	Density in 2004 (person/km ²)
	1999	2000	2001	2002	2003		
BAC	217,397	220,864	224,766	226,050	235,523	1.47	3,669
ABR	287,876	285,925	285,498	290,582	301,746	0.31	110
Sabang	22,879	23,654	24,376	25,262	26,505	3.8	206
Total	528,152	530,443	534,640	541,894	563,774		

Source: (1) Aceh Dalam Angka 2004, (2) Aceh Besar Dalam Angka 2003, (3) Sabang Dalam Angka 2003

As reported in Final Report (1), population in BAC was reduced to approximately 190,000 owing to the 2004 disaster, and there are still more than 60,000 internally displaced people. It is a matter of urgent to provide housing facilities with basic lifeline to the people who wish to return to their original land. There were also casualties in Sabang City and ABR.

There are a large number of labors in the Study Area but unfortunately such labor has remained untapped because of less job opportunity. Potential labor and rate of unemployment are as shown in Table 2.4.2

Table 2.4.2 Labor and Unemployment in 2004

Area	Labor	Unemployment	Unemployment Ration (%)
BAC	86,110	11,772	13.7
ABR	114,669	18,084	15.8
Sabang	12,579	1,517	12.1

Source: Aceh Dalam Angka, 2004

It is estimated that a large portion of labor force, especially in ABR is absorbed by agriculture and its related activities. In parallel with implementation of rehabilitation and reconstruction program, it is important to promote and enhance economic activities in the Study Area, especially aiming at increasing job opportunity, GRDP and per capita income.

2.4.2 Regional Economy

Gross Regional Domestic Products (GRDP) of BAC, ARB and Sabang City and their characteristics are as presented in Table 2.4.3.

Table 2.4.3 GRDP and Per Capita Income in 2002 in Study Area

Area	GRDP (without oil and gas) (Rp., billion)	Main Sectors and their Share in GRDP (%)		Per Capita Income (without oil and gas) (Rp., million)
		Most predominant	Second predominant	
BAC	992.66	Transportation: 33.21	Commercial and hotel: 21.85	3,325
ABR	1,509.98	Agriculture: 52.74	Manufacturing: 18.95	2,776
Sabang	142.63	Construction: 22.22	Commercial and hotel: 22.16	4,654

Source: BAC Dalam Angka, ABR Dalam Angka, Sabang Dalam Angka, 2003

The per capita income of BAC is almost a half of the national average, indicating that the Study Area requires acceleration of its economic development for upgrading the level of living standard of the inhabitants.

2.5 EXISTING INFRASTRUCRE

There are Sultan Iskandar Muda airport at approximately 15 km from center of BAC, ferry terminal at Ulee Lheue, Malahayati port at approximately 33 km from BAC, and Sabang port in the Weh Island. The airport is currently serving only domestic flight and ferry service is available between BAC and Sabang City. Sabang and Malahayati ports are international gate way of NAD province.

Within the Study Area, road network are well developed. BAC, Sabang City and most of towns in ABR are provided with basic infrastructure such as pipe water supply, septage and solid waste collection and disposal, and electric power supply.

The 2004 disaster had however caused corruption and/or severe damage on infrastructure especially in BAC as reported in detail in Final Report (1). Prior to the disaster, existing infrastructure was supposed to be appropriate in general under the present population and economic activities. It is however necessary to rehabilitate/restore damaged and corrupted infrastructure urgently as possible and to expand them thereafter to cope with increasing demand well in advance of occurrence of shortfall.

2.6 REHABILITATION AND RECONSTRUCTION WORKS IN PROGRESS

In April 2005, BRR was organized aiming at coordinating and controlling all rehabilitation and reconstruction activities being helped and assisted by many donors, NGOs and GOI. As of October 2005 there are more than 100 numbers of projects/activities in progress. Such projects/activities

are listed up in Chapter 2 of Main Report in ANNEX. As far as infrastructure is concerned, major activities are as summarized below:

(1) Pipe water supply

BAC and part of ABR are supplied by Lambaro and Siron Waterworks respectively. In BAC distribution network had suffered from severe damage and there is no pipe water service in the area along the coast even at present. Lambaro waterworks was damaged slightly and Siron waterworks has lost its production.

The pipe water distribution network is determined to be restored as one of Non-Grant Aid Type Projects of GOJ and the design and preparation of draft tender documents were conducted as one of tasks of the JICA Study Team for URRP. The restoration works has been designed so as to be capable of distributing the forecast water demand in the year 2009. The contract for restoration works has already awarded in the date of Dec. 23, 2005 and it is scheduled to complete by Dec. 18, 2006.

(2) Septage treatment in BAC

There is no centralized sewage treatment system in the Study Area. Septic tank is the most common means of sewage treatment in the Study Area. In BAC, septic tanks are to be regularly emptied and septage collected is being treated at septage treatment plant with estimated treatment capacity of 50m³/day, which is located in the vicinity of Gampong Jaya. It was completely destroyed by the 2004 disaster, but has already rehabilitated under JICA assistance in December 2005. Its expansion is determined to be implemented by assistance of UNICEF and it is reported that construction will take place from March 2006.

(3) Flood Control of Aceh River and its tributaries

GOJ also extended assistance for restoration of damaged/collapsed dykes as one of Non-Grant Aid Type Projects. The works are divided into 5 separate contracts and the construction was already started. All the works are scheduled to complete by December 2006.

(4) Storm water drainage in BAC

It is anticipated that GOJ will implement urgent rehabilitation works in some drainage facilities as one of Non-Grant Type Projects in response to the request made by BRR in November 2005. The GOJ assistance covers priority areas in BAC where inundation occurs frequently.

(5) Housing

As of December 2005, it is reported that there are more than 60,000 internally dislocated people in BAC, who strongly wish to return to their original locations. Provision of adequate houses is a matter of urgency and importance for such people and there is a number of NGOs in helping construction of housing facilities. According to BRR, total demand in house is 17,269, out of which

2,498 houses completed to date and 3,383 houses are under construction.

(6) Ulee Lheue ferrey terminal

This ferry terminal was due to complete by the time of the 2004 disaster. Unfortunately it was completely destroyed and geography in their vicinity was changed to great extent. By December 2005, the terminal was rehabilitated by assistance of Australian government but far smaller scale than the original.

(7) Seawall

The construction of seawall is in progress with GOI's own funding in Meuraxa, Kuta Raja, Kuta Alam and Syiah Kuala districts.

CHAPTER 3 FORMULATION OF BANDA ACEH METROPOLITAN CONCEPT

3.1 METHODOLOGY OF FORMULATION OF METROPOLITAN CONCEPT

Rehabilitation and reconstruction activities are being carried out in full swing with assistance and support of many donors, NGOs and government organizations under overall coordination of BRR. The BAC government and BRR are in opinion that in order to reduce economic disparity between the BAC and its surrounding area and the other part of the country it is vital to place emphasis on various development activities. Having such principle in mind the BAC government and BRR strongly wish to establish a long term vision for development of BAC and its surrounding area and a conceptual plan for Banda Aceh Metropolis.

The formulation of the metropolitan development concept comprises five steps as shown in Figure 3.1.1.

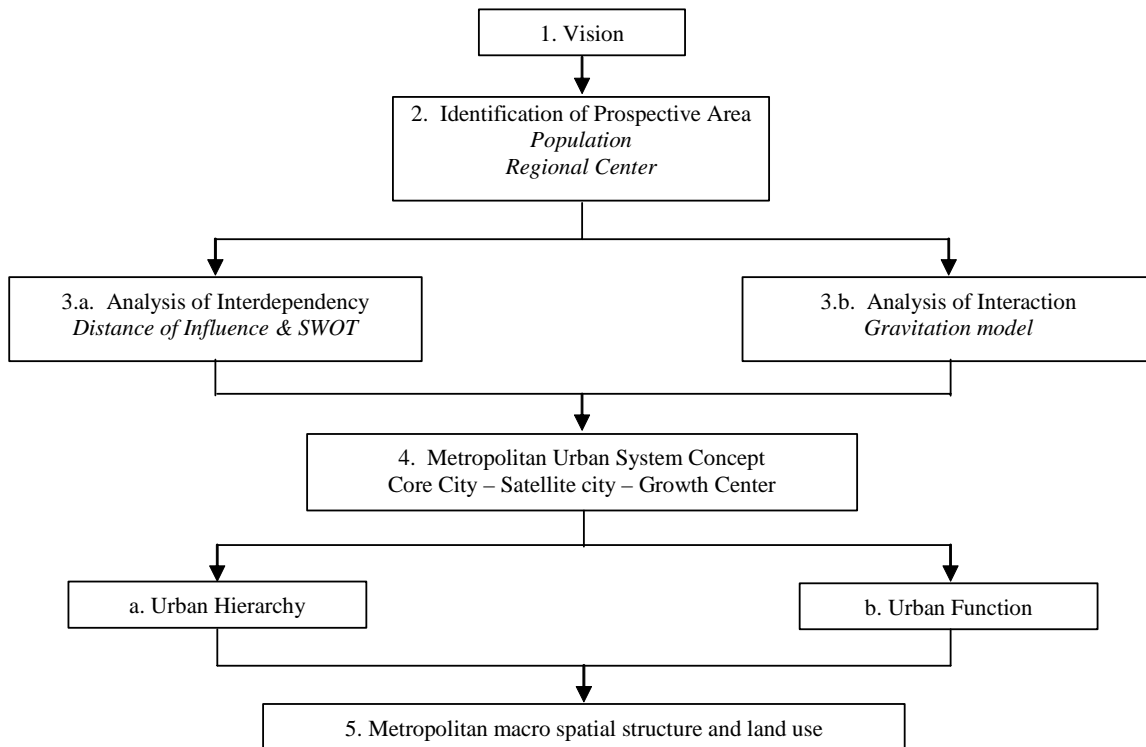


Figure 3.1.1 Procedures for Formulation of Metropolitan Concept

3.2 LONG TERM VISION

URRP has established a BAC spatial structure plan with a target year 2009 as reported in detail in Final Report (1). Under the Additional Study a planning horizon is extended up to 2015 and a long term vision for development is set forth as summarized below, paying attention to preservation of the prevailing tradition, culture and Islamic principle.

- (1) In accordance with the national and provincial policies, development of BAC will be

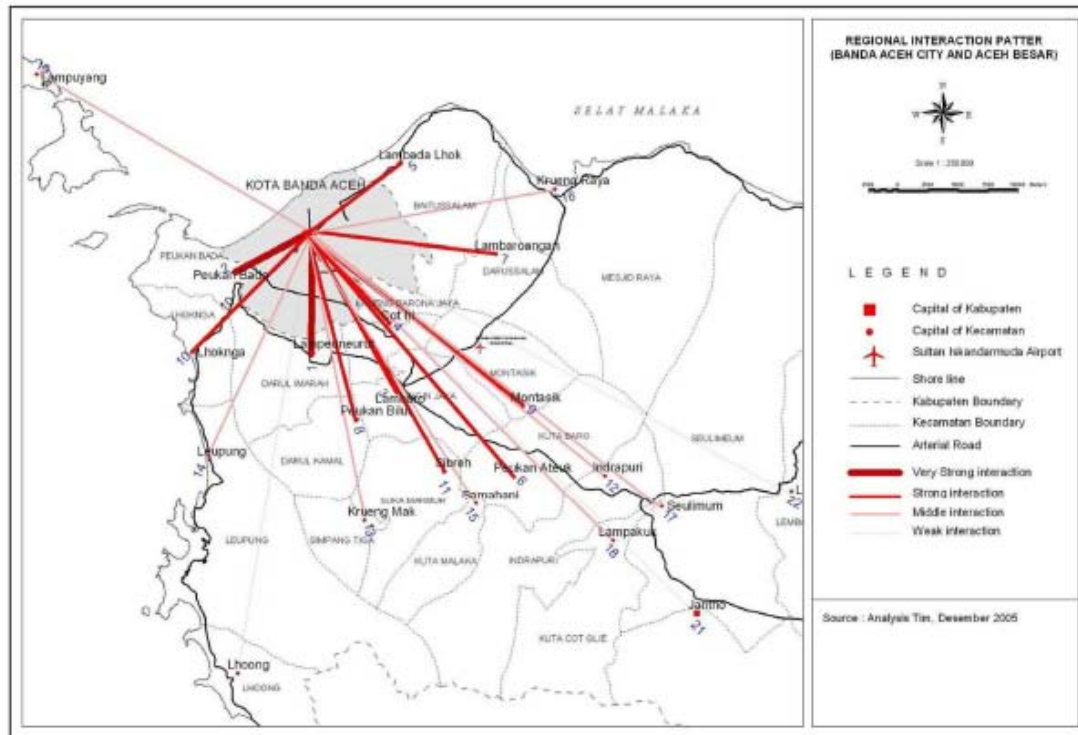
directed to be economic, social, cultural and religious core in the North Sumatra and aims at creating various benefits and social and economic impacts to the surrounding areas of BAC.

- (2) BAC will be motivated to be northern international gateway of the country taking its geographical advantage to the Middle East and South Asian countries. Along with this policies and making avail of rich human and natural resources, industrial development will be promoted, most prospectively such type of industry as labor intensive, and forestry and natural gas oriented.
- (3) People shall be mitigated from possible future disaster and eventually they secure their dignity that they are successfully recovered from the 2004 disaster.
- (4) The Study Area will continuously co-exist with the precious natural environment.

3.3 IDENTIFICATION OF REGIONAL CENTERS

3.3.1 Regional Centers around BAC

It is expected that the Government provides various policies and economic development measures in order to create equilibrium economic status of NAD Province with other part of the country and secure a peaceful society in NAD Province. Enhanced with such measures, it is considered that BAC would be highlighted as a center of development in the area. In a long run, BAC would then gradually influence to other parts of the Study Area especially to ease its burden on administrative area, population, and economic activities, and integrate such regional centers to be integral part of BAC. BAC Metropolis would accordingly be a consolidation of BAC and regional centers. There are a number of regional centers in ABR, main of which is as shown in Figure 3.3.1, and they are supposed to be closely linked to BAC or otherwise BAC would interact to them.



Source: Additional Study Team

Figure 3.3.1 Regional Centers and Interaction to BAC

3.3.2 Population Forecast

For the purpose of facilitating a formulation of Banda Aceh Metropolitan concept, population forecast is attempted for BAC, ABR and Sabang City and for main regional center in ABR prospective to be part of metropolitan area.

BAC population forecast has already been worked out under URRP up to 2009. It is reported that population in BAC in 2004 were 263,668 and 192,194 before and after the disaster respectively. URRP forecasts that population would grow at a rate of 6 percent per annum during the period from 2005 to 2009, resulting in total population 254,000 in 2009, which was accepted by various organization concerned in rehabilitation and reconstruction program. For the purpose of the Additional Study population growth rate after 2009 is presumed to maintain the same figure until the year 2015, and estimated population in 2009 is 360,304.

In the vicinity of BAC there identified 22 regional centers in ABR, which are candidate to form part of metropolis in a long run, subject to distance to BAC, population and other elements. In addition there is Sabang City, most prospective to form part of the metropolis. In order to facilitate the interaction and interdependency analyses population of those regional centers and Sabang City are also forecast as given in Table 3.3.1.

Table 3.3.1 Projected Populations in the Study Area

Areas	City, District, Center	2003	2009	2015	Annual Growth Rate (Percent)	Distance from BAC (km)
Study Area	BAC	223,829	254,000	360,304	6.0	0
	Sabang City	24,498	33,056	41,227	3.89	37
	ABR	295,957	327,415	355,268	1.4	-
	Total	544,284	614,471	756,799	-	-
Regional Centers	Lambada Ihok	18,177	19,723	21,401	1.4	11
	Krueng Raya	12,277	13,321	14,455	1.4	31
	Lambaro Angan	16,355	17,746	19,256	1.4	13
	Cot Iri	10,338	11,217	12,172	1.4	6
	Montasik	19,997	21,698	23,544	1.4	16
	Indrapuri	16,658	18,075	19,693	1.4	25
	Seulimeum	18,944	20,556	22,304	1.4	42
	Lamtamot	7,184	7,705	8,458	1.4	77
	Jantho	5,736	6,224	6,753	1.4	52
	Lampakuk	10,756	11,671	12,664	1.4	32
	Paukan Ateuk	20,107	21,817	23,673	1.4	12
	Samahani	4,768	5,174	5,614	1.4	19
	Sibreh	12,137	13,169	14,290	1.4	15
	Lambaro	21,466	23,292	25,273	1.4	8
	Peukan Bada	19,457	21,112	22,908	1.4	6
	Krueng Mak	5,009	5,435	5,897	1.4	18
	Lhoong	11,592	12,578	13,648	1.4	54
	Leupung	7,878	8,548	9,275	1.4	24
	Lhoknga	16,556	17,984	19,473	1.4	14
	Peukan Bilui	5,932	6,448	7,009	1.4	8
	Lampayong	6,002	6,524	7,091	1.4	30
	Lampeneureut	34,420	37,490	40,751	1.4	5

Source: (1) The Additional Study Team, (2) Aceh Besar Dalam Angka 2003, (3) URRP, (4) Additional Study Team

3.3.3 Present Function of Regional Centers

Based on the statistics and filed survey, it is envisaged that 22 regional centers in ABR have been playing the following functions:

Table 3.3.2 Function of Regional Centers and Sabang City under Present Conditions

Regional Centers	Present Function
Montasik, Peukan Bada, Seulimeun, Lambada Lhok, Indrapuri, Lhoknga, Lambaro Angan, Krueng Raya, Sibreh, Lhoong, Lampakuk, Cot Iri, Leupung, Lamtamot, Lampayong, Peukan Bilui, Jantho, , Krueng Mak, Samahani	<ul style="list-style-type: none"> ➤ Agricultural activities ➤ Social/public service center within the district ➤ Rural commercial center
Lambaro	<ul style="list-style-type: none"> ➤ Receptacle of new residential area from BAC ➤ Source of staple food (paddy) to BAC ➤ Small industry
Peukan Ateuk	<ul style="list-style-type: none"> ➤ Source of staple food (paddy) to BAC ➤ Receptacle of new residential area from BAC ➤ Cattle raising
Lampeneurut	<ul style="list-style-type: none"> ➤ Receptacle of new residential area from BAC ➤ Small industry ➤ Hot spring tourism
Sabang City	<ul style="list-style-type: none"> ➤ Tourism ➤ Port facilities ➤ Fishery and plantation ➤ Small industry

Source: The Additional Study Team

3.4 INTERDEPENDENCY AND INTERDEPENDENCY ANALYSES

3.4.1 Interaction Analysis

As an initial step, interaction of BAC to all regencies of NAD was analyzed and as a result it is found that BAC has a strongest linkage with ABR and to less extent to Aceh Utara Regency and Bireuen Regency. In view of geographic condition, it is concluded that metropolis in question would extend over part of ABR.

The interaction of BAC to the 22 regional centers in ABR and Sabang City was then analyzed. Interaction index is calculated by using the following mathematic equation, which is derived from “Geografi Wilayah, Geography UGM, 1997”:

$$\text{Interaction} = \frac{P_1 \times P_2}{J^2}$$

- I = Interaction between cities 1 and 2
- P1.2 = Populations of city 1 and 2
- J = Distance between cities 1 and 2

The results of calculation are given in Figure 3.3.1. Details are reported in ANNEX.

Of 22 pre-selected regional centers in ABR, 13 centers are identified having very to high interaction with BAC. They are Lampeneurut, Lambaro, Peukan Ateuk, Montasik, Peukan Bada, Lambada Lhok, Lambaro Angan, Sibreh, Peukan Bilui, Cot Iri, Blang Bintang, Krueng Raya and Lhoknga.

3.4.2 Interdependency Analysis

On a regional basis, BAC, the nominated 13 regional centers and Sabang City would rely on each other for their economic activities i.e., supply of food and labor force, public services, etc., and each of those would be assigned to play a certain role and function within integrated metropolitan structure. The interdependency between BAC and the pre-nominated regional center is therefore analyzed also by using a mathematical equation given here below and is expressed in terms of a distance of influence:

Distance of influence from BAC =

$$\frac{\text{Distance of } 2-1}{1 + \sqrt{\frac{\text{Pop. } 2}{\text{Pop. } 1}}}$$

Pop1.2 = Populations of city 1 and 2

The distance of influence is expressed by means of a relative distance between one point to another and in this particular case it means the distance between BAC and the pre-nominated regional center. According to the result of the calculation all the 13 pre-nominated regional centers in ABR are located within a distance of BAC influence.

Sabang City has already been designated to be Economic Development Area and Free Trade and Port Area as noted in Section 2.1 of this report. It is therefore considered to be appropriate to integrate the Sabang City as part of the metropolis.

It is therefore concluded that metropolis in question encompasses BAC, Sabang City and 13 regional centers in ABR, and it covers the gross area of approximately 80 km².

The interdependency between BAC and the regional centers and between the regional centers are also studied taking into account the present land use, economic activities, existing services, etc. and they are presented in detail in ANNEX.

3.5 METROPOLITAN URBAN SYSTEM

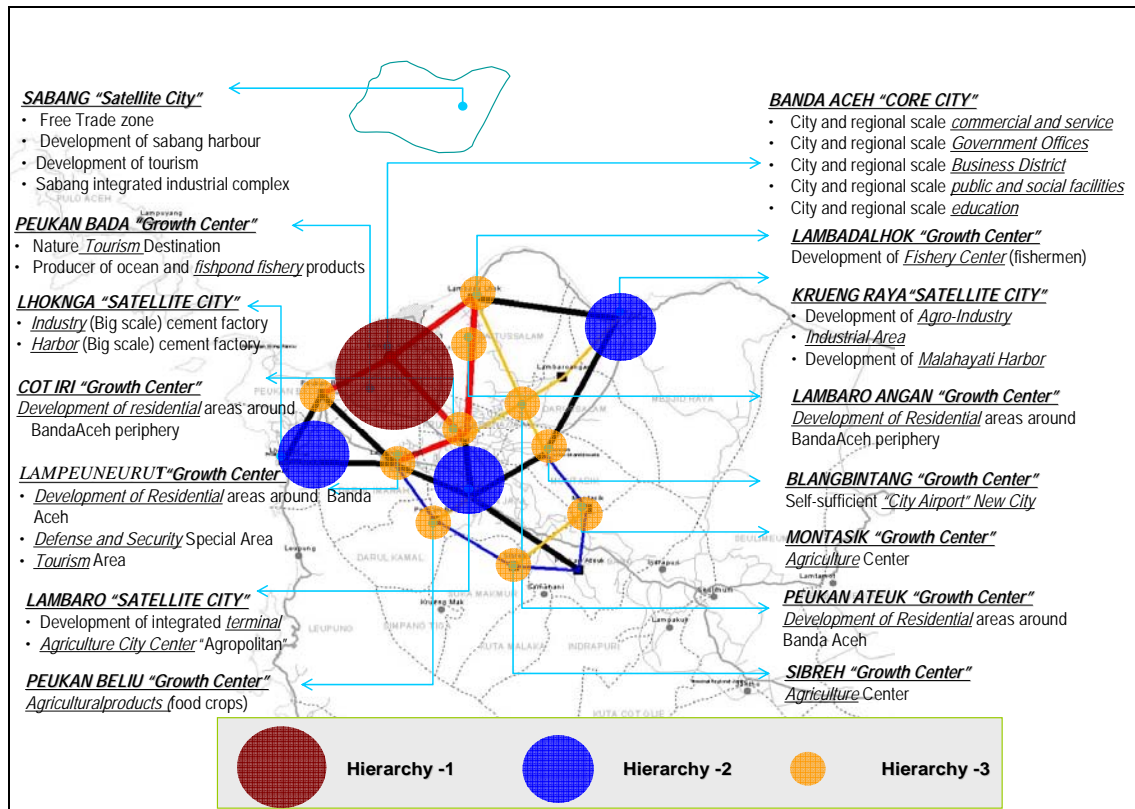
The Banda Aceh Metropolis comprises BAC, Sabang City and 13 regional centers in ABR, and each of them plays various functions and roles in an integrated system. In view of their function and role, they are classified into a core city, satellite city and growth center as described below:

- Core city BAC will continuously act as a center of the government and other public services, commercial, education, culture in the region and also will be a hub of transportation and logistics.
- Satellite city Sabang City, Lhokonga, Lambaro, and Krueng Raya will be designated as satellite city. They are even at present provided with strategic infrastructure such as airport and sea port and expected to play an important role in

industrial and agro-industrial development in the metropolis.

Growth centers Peukan Bada, Cot Iri, Lambaro Angan, Peukan Bilui, Lambada Lhok, Lambaro Angan, Montasik, Peukan Ateuk, Blang Bintang and Sibreh are designated to be growth center. They will act as receptacle of residential area with expansion of BAC, source of food supply for people and source of materials for agro-industry, supply of labors, etc.

The conceivable metropolitan system is as illustrated in Figure 3.5.1.



Source: The Additional Study Team

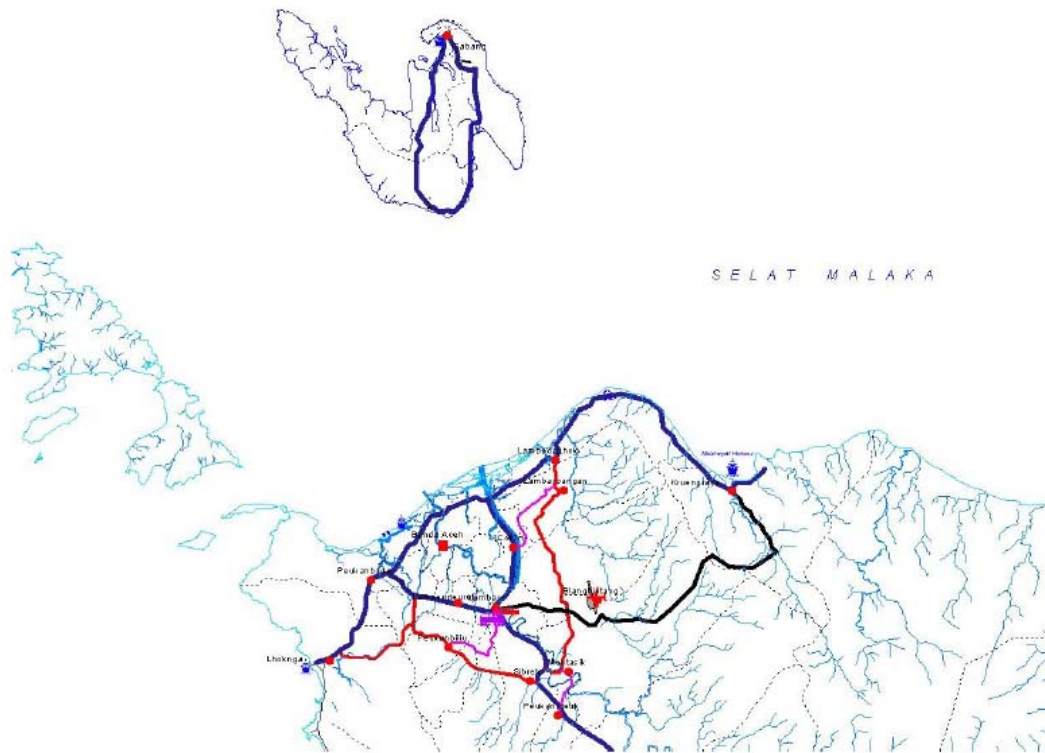
Figure 3.5.1 Conceivable Metropolitan Urban System

In term of urban hierarchy, the core city, satellite city and growth center are classified into Hierarchy -1, -2 and -3 respectively.

The metropolis urban concept presented in this report is of conceptual nature. It is therefore recommended that more detailed study be conducted to materialize the metropolitan development plan.

3.6 MACRO SPATIAL STRUCTURE AND LAND USE

The core city, satellite cities and growth centers will be required to be linked with well planned transportation network including roads, ferry and harbor. The roads play important role among the others and would be classified into four (4) categories depending on volume of traffic as shown in Figure 3.6.1.

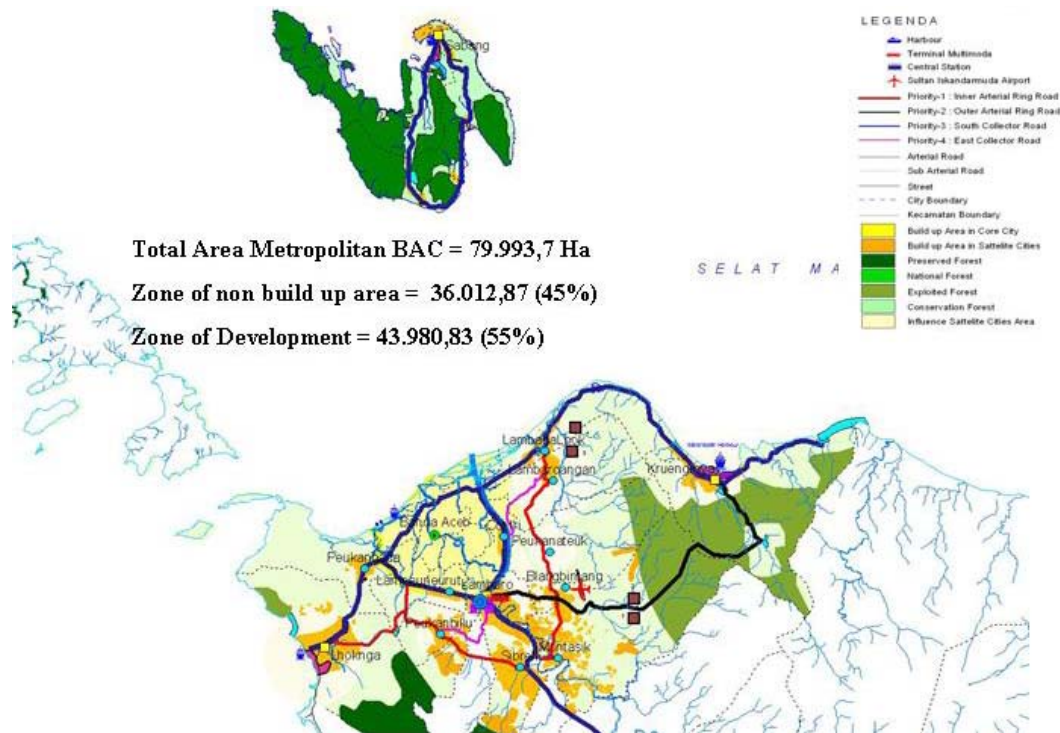


Source: The Additional Study Team

Figure 3.6.1 Conceptual Road Network over Metropolitan Area

Existing road network is presumed to be capable of handling the present daily traffic volumes, but traffic volume always tends to increase with expansion of economic development and growth of population. It is therefore necessary to conduct more detailed study as to traffic volume and road system development in the context of metropolitan development study.

Metropolitan development would span over many years and it is hardly possible at this stage to predict how the development would progress and how the area would be transformed. It is however considered important to lay down a conceptual spatial structure and land use plan so that development activities would be implemented and adjusted as required in the context of such plan. A tentative macro spatial plan is as shown in Figure 3.6.2.



Source: The Additional Study Team

Figure 3.6.2 Tentative Metropolitan Macro Spatial Structure

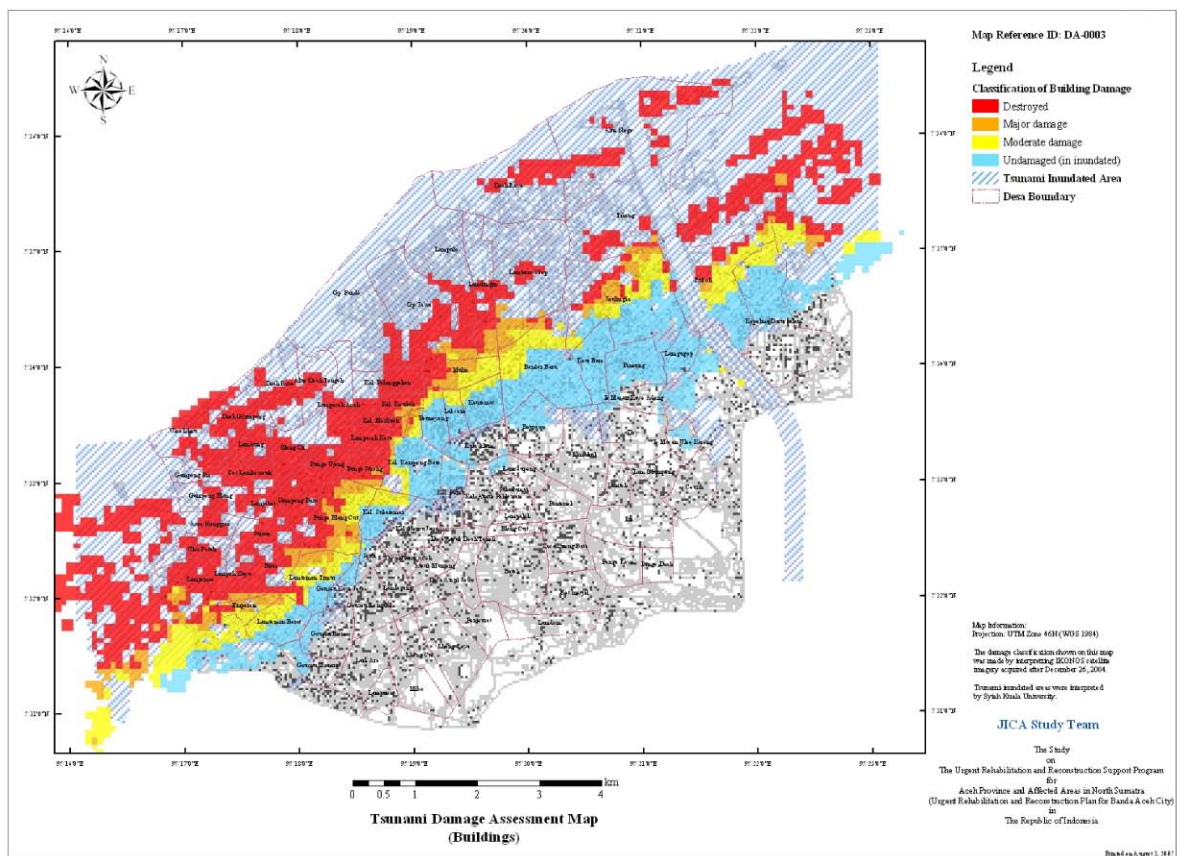
The gross area of the metropolis covers a vast area, approximately 800 km², subject to further study in context of detailed development planning. Out of the whole area, 45% would be allocated to non-built-up area and the rest for development.

The metropolitan development concept presented herein is of conceptual nature, subject to further elaboration. The contemplated area is revealed to be economically behind the national average and unfortunately had devastated in 2004 by the tremendous disaster. Though the rehabilitation and reconstruction works have been taking place in full swing under cooperation of the government, donors and NGOs, it is important to continue various development efforts to minimize economic disparity with the other part of the country and to create a peaceful and stable society. In this context, it is recommended to conduct more comprehensive study for development of Banda Aceh Metropolis, aiming not only physical development but also in due consideration of upgrading the livelihood of inhabitants, securing peace in the area, safe against future potential disaster, and transforming the area as one of representative economic zone in the country.

CHAPTER 4 BANDA ACEH CITY STRUCTURE PLAN WITH TARGET YEAR 2015

4.1 BASIC APPROACH

The 2004 disaster had caused various and serious destruction on human lives, properties, land resources, aqua-ecology, economic activities, etc. There is valuable data available from URRP, namely Tsunami Damage Assessment Map shown in Figure 4.1.1. This is one of benchmarks in formulation of rehabilitation and reconstruction program and a long term structure plan of BAC.



Source: URRP

Figure 4.1.1 Tsunami Damage Assessment Map

For the purpose of the structure planning, the JICA Study Team has also made population forecast for every year during the period from 2005 to 2009 and the year 2015. Population immediately after the disaster is said to be approximately 190,000, and according to the forecast it would grow at the average annual rate of 6 %, resulting in total population approximately 254,000 in 2009 and 360,304 in 2015. This population forecast has been already authorized by the Indonesian authorities concerned including BAC government subsequent to approval of Final Report (1) of URRP. In this Additional Study this population forecast is therefore also adopted.

URRP has worked out a city development concept and a spatial structure plan for the target year 2009, detail of which is explained in Final Report (1) of URRP. URRP has also elaborated infrastructure development program up to the year 2009 in principle in conjunction with the urban system, structure plan and disaster preparedness. In compliance to the request of BRR and BAC government, the Additional Study aims at establishing the structure plan with extended target year, namely, 2015.

Along with extension of planning horizon, there are special themes to be taken into consideration in formulating the 2015 structure plan. They are (i) green city concept, (ii) promotion of urban tourism, (iii) cyber city concept, (iv) promotion of industrial development and (v) mass transport system (light railway transit, LRT). Prior to formulating the structure plan, a preliminary survey was conducted to assess available resources and development potentials and then the results were incorporated into formulation of the concerned concept. The 2009 structure plan by URRP is verified in the light of the latest situation and circumstances. As a result, it is concluded that there is no need of changes in development concept and plan in substance.

The infrastructure development plan of URRP is also reviewed in the light of the latest structure plan and confirmed, excepting minor modification in alignment of a couple of roads. And also infrastructure development plan is extended to the year 2015 based on the proposed 2015 structure plan.

4.2 POPULATION

Population in BAC was already forecast by URRP in detail up to the year 2009. Under this Additional Study it is extended until the target year 2015 and is summarized in Table 4.2.1.

Table 4.2.1 Forecast Population in BAC

District	2005	2009	2015
Meuraxa	5,661	5,683	8,061
Baitur-rahman	36,894	37,480	53,167
Kuta Alam	43,507	45,484	64,520
Ulee Kareng	20,196	37,658	53,418
Jaya Baru	11,362	11,417	16,195
Banda Raya	21,225	34,784	49,342
Lueng Bata	20,637	36,144	51,271
Syah Kuala	35,985	38,559	54,696
Kuta Raja	5,376	6,791	9,634
Total	200,843	254,000	360,304

Source: URRP and Additional Study Team

Out of 9 districts in BAC, three (3) districts, Meuraxa, Jaya Baru and Kuta Raja were most

devastated area, resulting in reducing total population less than half, and the rest of population is relocated to temporary camps in and around BAC. It is foreseen that majority of such people would return to their original lands upon completion of housing scheme in progress. Accordingly population in those three areas tends to increase gradually.

4.3 SPECIAL THEMES

4.3.1 Green City Concept

One of a long term vision is that BAC lives in harmony with the natural environment and this concept is introduced to achieve this mission.

Before the 2004 disaster there were the beautiful mangrove forest over the wide area in coastal area but was unfortunately completely destroyed by the Tsunami. It was the precious resources for aqua-ecology and fishery activities of many inhabitants and acted to absorb the power of tsunami to some extent. Most of roads within the city are planted with side trees and many of them are Tamarisk which has been attracting not only BAC citizens but also people from the outside. On the southern part of the city there remains abundant vegetation area.

In association with promotion of urban tourism, securing the amenity of people, and facilitating evacuation and relief activities in case of potential disaster, it is considered necessary to preserve existing side trees along the roads and undeveloped natural lands and to develop more park areas than the present. It is also recommended to revive mangrove forest in the coastal area by means of planting of nursery so that this green belt is expected to contribute to mitigation of power of potential Tsunami in future.

The green city concept is therefore emphasized in the process of formulating structure plan and land use plan, and is as shown in Figure 4.3.1.



Source: The Additional Study Team

Figure 4.3.1 Green City Concept

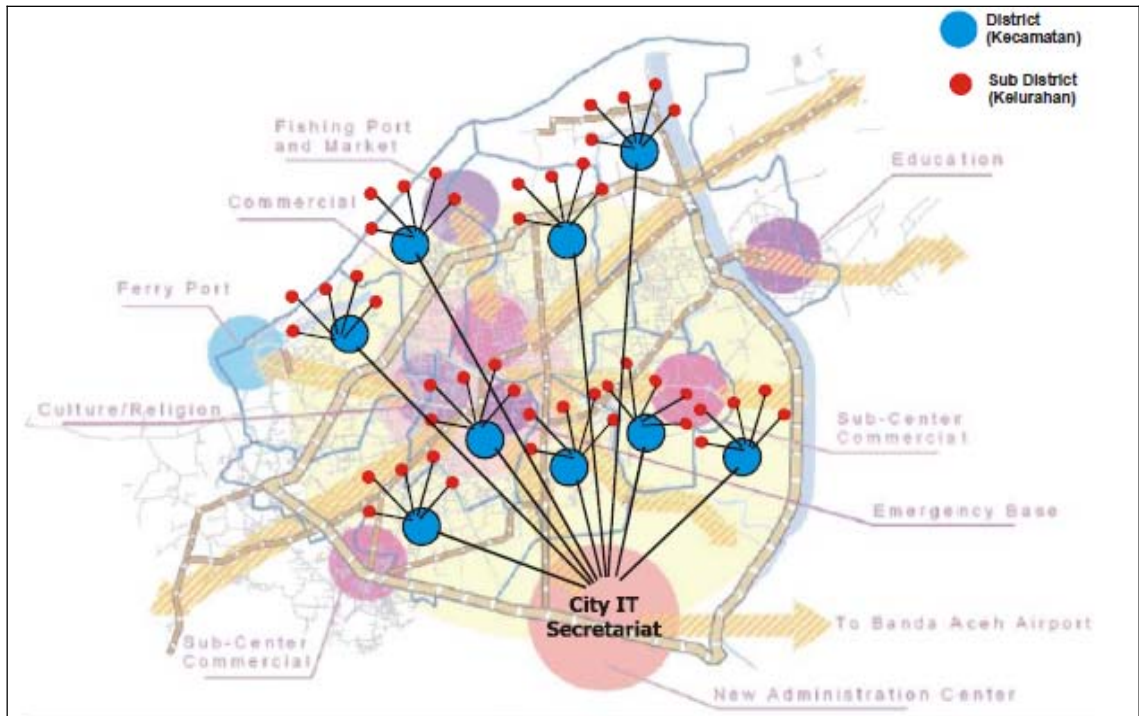
There are four major elements in promoting the green city concept: they are (1) conservation, rehabilitation and revitalization of existing and damaged resources, (2) implementation of public hygienic facilities such as proper solid waste and waste water management, (3) legislative matter such as establishment and enforcement of regulations for organized and controlled land use, town development, building code, etc., and (4) emphasis on public awareness against conservation and preservation of natural and urban environment. More detailed explanation is given in ANNEX.

4.3.2 Cyber City Concept

This concept intends to transform BAC into an IT driven government service, education and economy. This concept is considered to be vital to upgrade the quality and rationalization of the government services, to allow the every citizen to access various information through global internet, and to create high technology industry and its related activities in order to accelerate economic development of BAC. These are as summarized below:

- ✓ Universal citizen access
- ✓ Cooperative sharing of network facilities among the public service entities (Government office, schools, libraries, hospitals, etc.)
- ✓ Improved government management, administration and service through improvement of skill and knowledge of the civil servants
- ✓ Increasing education level of potential labors to be ready to introduce high tech-industry
- ✓ Create more closer communication system among the government, the community and the private sector through online system
- ✓ Improved quality of life of the residents through provision of easily accessible disaster forecasting and warning system, and global data and information system

There would be two categories in introducing such high technology into BAC. One is to be implemented with the government initiatives such as public service related approach which contemplates to upgrade the quality and rationalization of public administration (e-government), and the other is to be realized by the private finance initiatives such as investment in high tech industry, soft ware development, etc. As a typical example a conceptual schematic network over BAC is presented in Figure 4.3.2.



Source: The Additional Study Team

Figure 4.3.2 Conceptual Scheme of BAC Area Network

It is expected that the BAC government takes initiative for realization of portion of the cyber city concept, so that the private sector would be accelerated. In order to enhance this concept it is also important to provide back support for various aspects such as reinforcement of curriculum at university/collage for development of human resources, provision of incentive for education and investment, etc. Accordingly it is required to conduct more comprehensive study for promotion of the cyber city concept and assess development potential of high-tech industry in BAC.

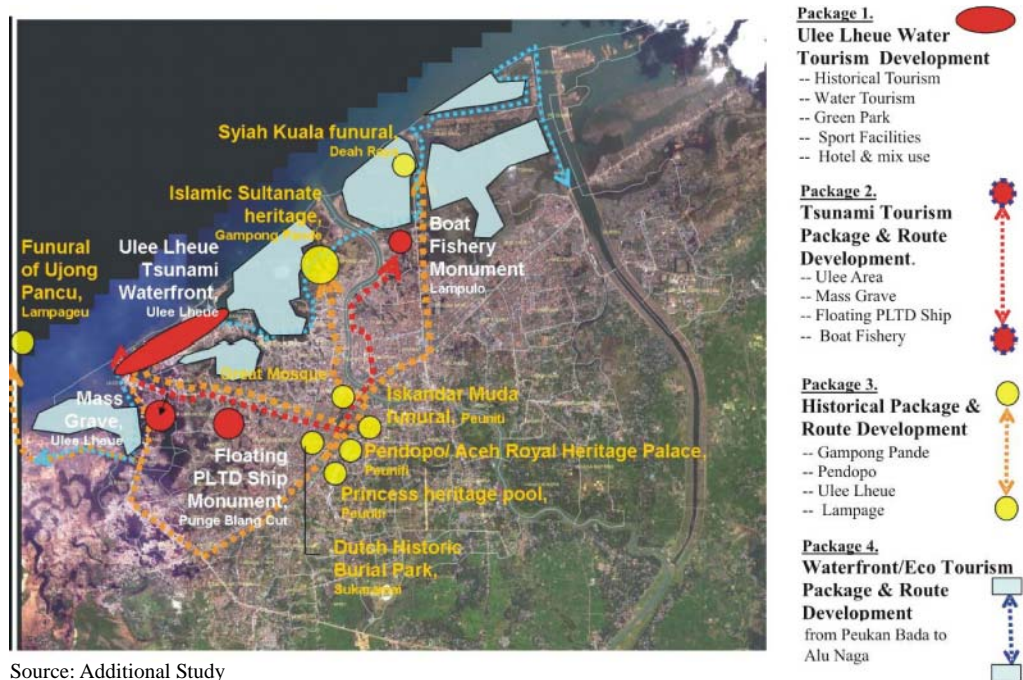
4.3.3 Tourism Development

It is expected that tourism industry would contribute to economy and employment in BAC. So far this sector has remained untapped and no tourism resources have so far reckoned qualitatively. Under the Additional Study preliminary investigation was conducted to identify potential tourism resources/spots in BAC.

There are a number of potential tourism resources/spots in BAC, which are originated from spiritual, natural environment, tsunami memorial, historical sources. Such resources/spots are supposed to be attractive mainly for the domestic market. However BAC is one of the worldwide attention areas because of the 2004 disaster, which is supposed to remain for many years in the mind of people of Indonesia and world. It is already in progress to establish a number of memorial facilities including mass grave, memorial park, etc. In addition the Weh Island has been attractive marine tourism site internationally. It is therefore concluded that the tourism development be planned integrating all such resources/spots including the Weh

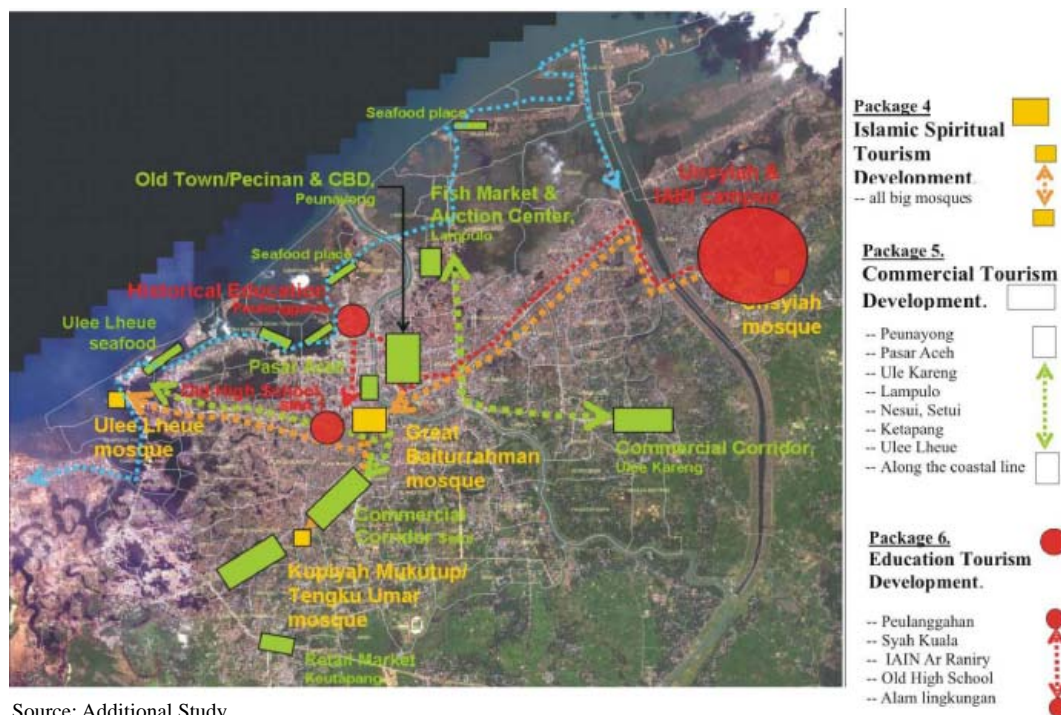
Island.

Under the Additional Study, 6 package programs are preliminarily laid out as shown in Figure 4.3.3. It is recommended to conduct more deep study including assessment of potential tourists, provision of accommodation, provision of infrastructure including access to the spots, marketing etc.



Source: Additional Study

Figure 4.3.3 (1/2) Tourism Development Plan



Source: Additional Study

Figure 4.3.3 (2/2) Tourism Development Plan

4.3.4 Industrial Development

There is unfortunately no major industry in BAC and its vicinity to date, excepting cement factory, though there are a large number of potential labors and sea ports at Sabang and Malahayati. It is supposed that lack of strategic resources and materials has hampered the development of industry in the area.

In order to catch up the level of livelihood and income in the region, the industrial development is one of conceivable measures. The Sabang City has already designated as one of free ports in the country, and Malahayati port is capable of handling not only domestic cargo but also international. It is considered to be appropriate to concentrate industrial activities in Sabang and Malahayati, aiming at maximum use of existing infrastructure and incentive.

It is hardly possible to properly address to industrial development plan in a limited time, since it requires a comprehensive study including the overall industrial development policy and measure of the government as well as assessment of available resources. In order to materialize an industrial development plan, it is recommended to conduct such study and its results be included into the Banda Aceh Metropolis development plan.

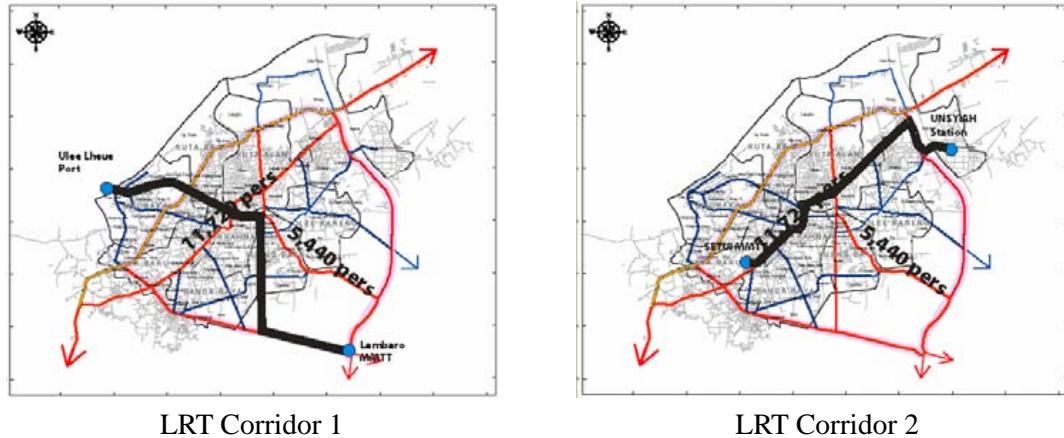
4.3.5 Non Polluted Mass Transport

Under the present condition, BAC is an important transport and logistic hub in the Northern Sumatra.

Within BAC, the public transport service is not well developed and people get used to motorbike for their daily transport. Although there is no data available as to trip per day in BAC, it is assumed that there would be 120,000 trips per day when population reach to 272,098 in 2010, on the basis of the national average. Further it is roughly estimated that incoming volume would be at approximately 90,000 trips per day, resulting in total trip number more than 210,000 per day. It is foreseeable that such increased number of trips would cause heavy burden on the road network.

An idea of mass and non-polluted transport is to cope with increasing traffic volume safely and efficiently and to preserve BAC free from pollution. Especially one of the visions of BAC development is co-existence with the natural environment, which is represented by Green City Concept.

Apart from issue of economic feasibility of mass transport system, light railway transit is tentatively studied in this Additional Study. More details of the study is presented in ANNEX. For the purpose of the structure planning, only route of LRT is presented in this report. The preliminary study proposes two (2) routes as shown in Figure 4.3.4, which takes into account alignment of existing roads.



Source: The Additional Study Team

Figure 4.3.4 Proposed LRT Routes

As to type of LRT, Type 1 is considered to be applicable to BAC, which opens the right of way to road traffic intervention, though its transport capacity is less than Type 2.

It is reported that a pre-feasibility study will be conducted under assistance of the Chinese Government in 2007. More definite plan will be revealed after completion of this study.

4.3.6 Disaster Preparedness

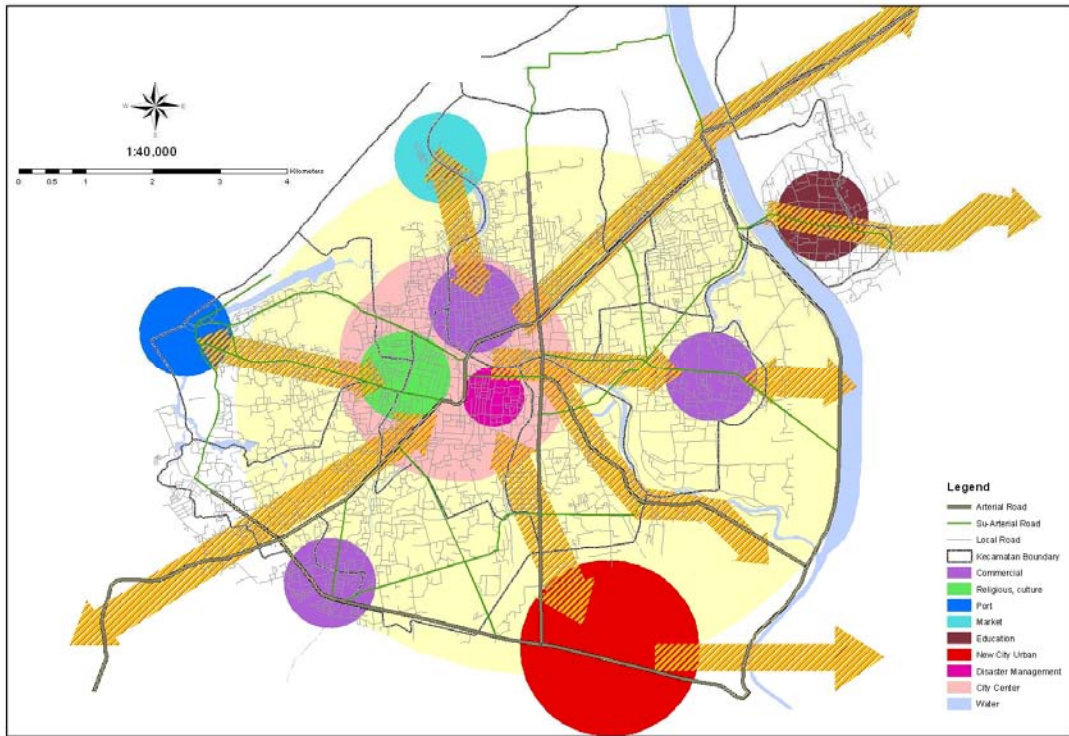
URRP has provided a comprehensive plan for disaster preparedness, comprising BAC disaster mitigation plan, hazard map, disaster mitigation structure at shoreline, emergency facility plan, warning and dissemination system, public education of disaster awareness. Such proposed plans are very valuable and considered requisite to fight with potential disaster. Part of the proposed plan has been in place and/or in progress.

Unfortunately, there has been delay and/or lack of effort in some aspects. Those are (1) establishment of disaster management organization, (2) provision of disaster forecasting and warning system, (3) public education on disaster awareness including drill. It is strongly recommended the BAC government with assistance of BRR launches a special program covering those three (3) elements in its annual program and budget. In some cases it may be possible to look for assistance from donors.

4.4 PROPOSED URBAN SYSTEM, HIERARCHY AND FUNCTION

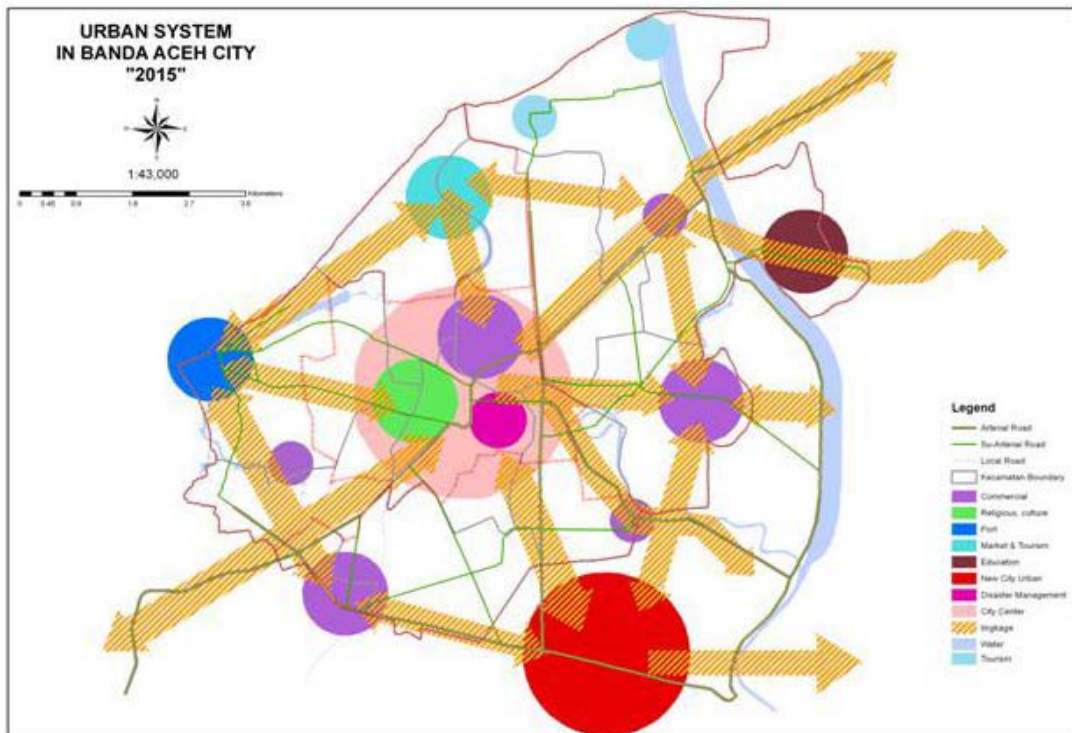
As aforesaid, the structure plan of BAC is to be extended up to the year 2015, while the same has been worked out by URRP up to the year 2009. URRP has proposed “Linked Multi Center with Multi Residential Area” as model of spatial development. Even the planning horizon is extended it is judged that this model is adaptable to BAC continuously.

The urban system in 2015 remains almost the same as that proposed for the year 2009. However there are addition of 5 small centers in the 2015 plan. The urban system concepts in 2009 and 2015 are as shown in Figures 4.4.1 and 4.4.2.



Source: URRP

Figure 4.4.1 BAC Urban System and Function for 2009



Source: The Additional Study Team

Figure 4.4.2 BAC Urban System and Function for 2015

In the year 2015 plan, BAC urban system comprises (a) a city center planning unit and (b) three (3) urban planning units (Ulee Lheue, Lueng Bata and Ulee Kareng). There are three (3) sub-units (City Center A, B and C) in the City Center Unit, one (1) sub-unit (Ulee Lheue A) in the Ulee Lheue unit, one (1) sub-unit (Lueng Bata A) in Lueng Bata Unit, and two (2) sub-units (Ulee Kareng A and B) in the Ulee Kareng Unit. There are also four (4) sub-sub urban planning unit in total as shown in Figure 4.4.2. The above urban system is delineated on the map as shown in Figure 4.4.3 and shown in Table 4.4.1

Table 4.4.1 BAC Urban System Hierarchy and Function

System/Hierarchy	Area	Function
City Center Planning Unit (Hierarchy 1)	Kuta Alam, Kuta Raja, Baiturahman	<ul style="list-style-type: none"> ➤ Regional scale services, trade ➤ Regional scale government services
Urban Planning Unit (Hierarchy 2)	Ulee Lheue, Muraxa dist.	<ul style="list-style-type: none"> ➤ Passenger and cargo port ➤ Tsunami memorial and historical tourism ➤ Production of fishery product ➤ Trading services
	Lueng Bata Dist.	<ul style="list-style-type: none"> ➤ Sport center ➤ Residential ➤ Trade and services (new town) ➤ Government services (new town) ➤ Warehouses
	Ulee Kareng, Ulee Jareng dist.	<ul style="list-style-type: none"> ➤ Services and trade ➤ Social services and facilities (education and health)
Sub-Urban Planning Unit (Hierarchy 3)	Lueng Bata A, Ulee Lheue A, Ulee Kareng A and B, Center City A, B and C	<ul style="list-style-type: none"> ➤ Supporting main urban unit
Sub-sub Urban Planning Unit (Hierarchy 4)	Alue Naga, Deah Raya, Surien, Lueng Bata	<ul style="list-style-type: none"> ➤ Supporting sub-unit

Source: The Additional Study Team

According to the national and NAD provincial spatial policies, NAD Province is categorized in Development Area –A jointly with the North Sumatra, West Sumatra, and Riau Provinces. BAC is designated to be Order –II which acts as counter magnet to Medan City (Order-I). Within NAD, BAC is ranked at Hierarchy-1. BAC’s roles are assigned to be government center and office, social activity center, transportation and logistics hub and religious center.

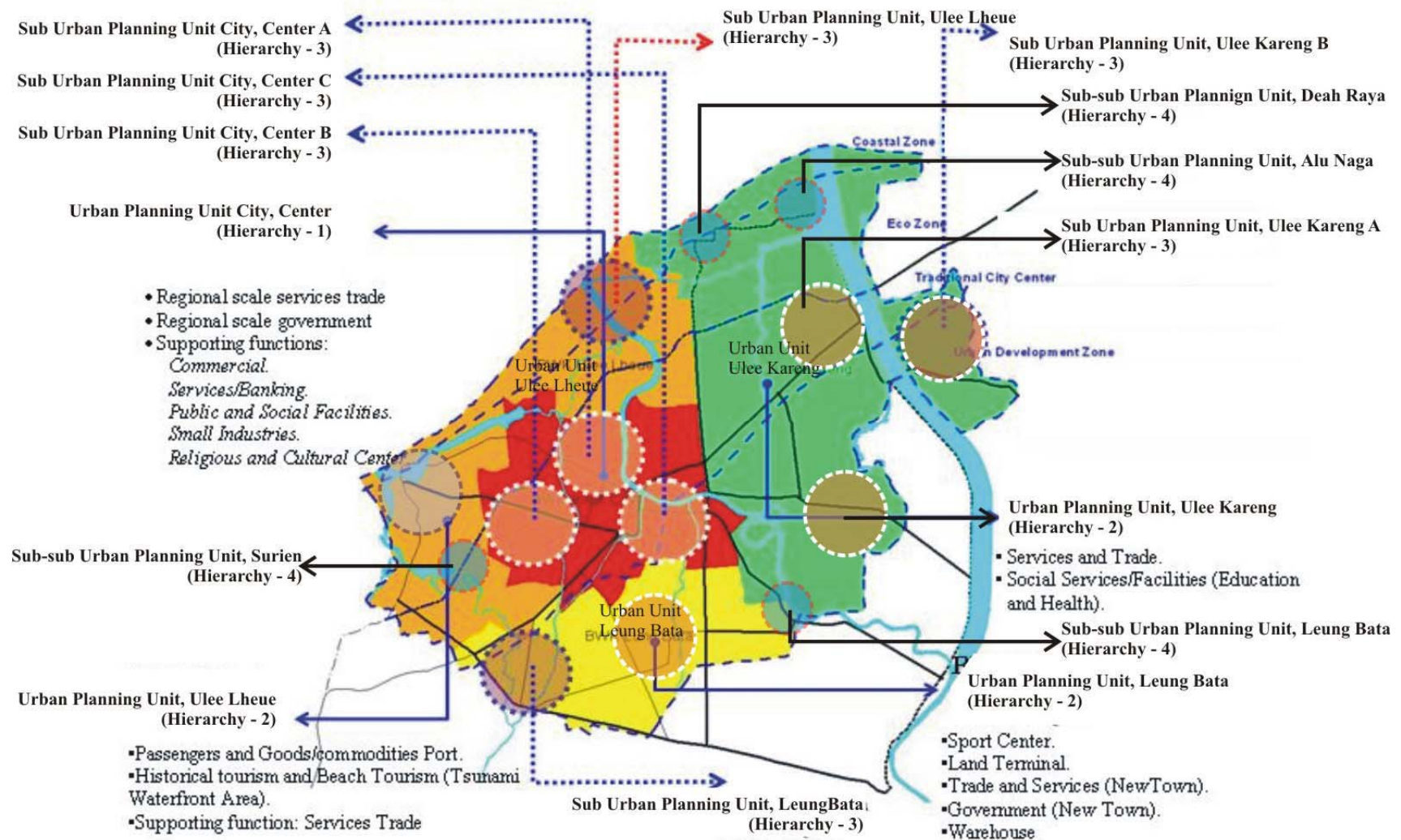
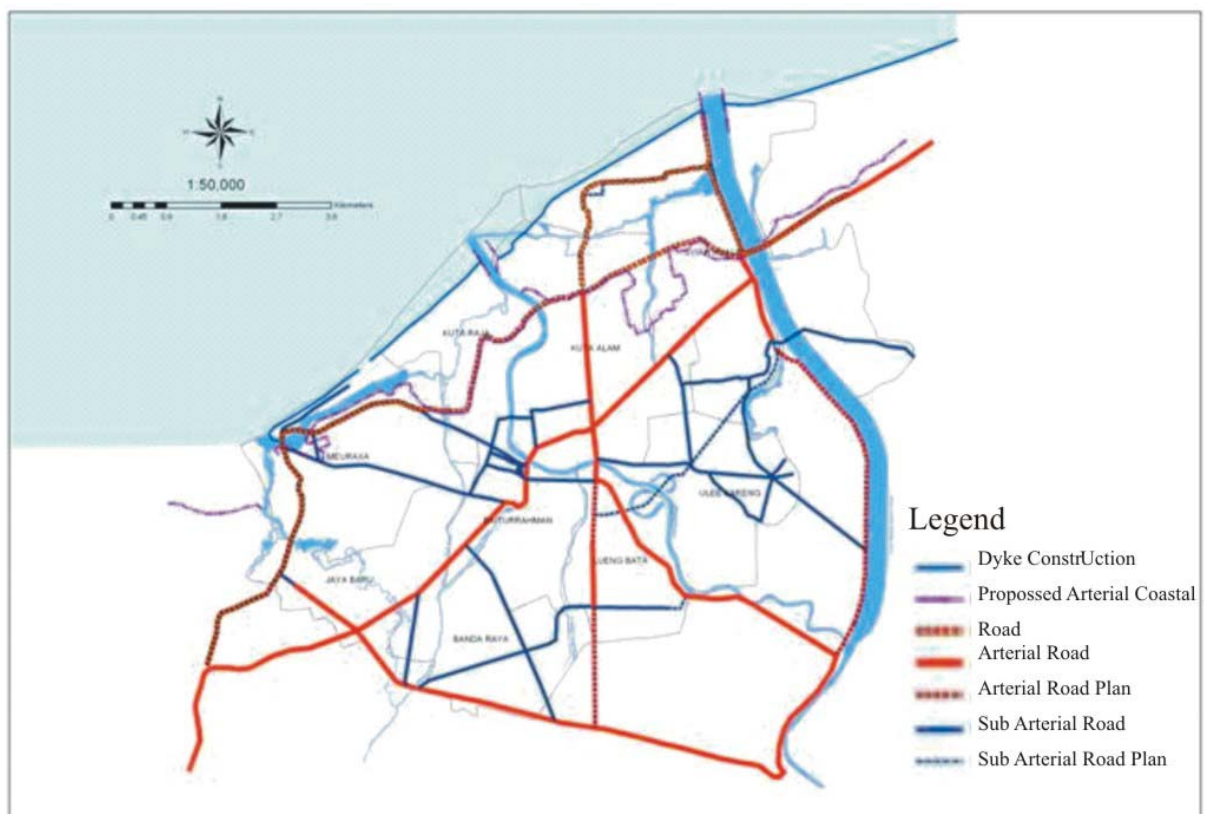


Figure 4.4.3 Urban Function and Urban Hierarchy of BAC, 2015

4.5 PROPOSED SPATIAL STRUCTURE PLAN

4.5.1 Proposed Urban Skelton

The urban skeleton in the year 2015 also remains almost the same as that of 2009 which was worked out by URRP. There are however a couple of minor modifications which are considered necessary mainly on account of land appropriation issue. The proposed minor modifications are alignment of route of (1) coastal road, (2) Baru Street, and (3) Syiah Kuala Street. Figure 4.5.1 presents the proposed urban skeleton in 2015.



Source: The Additional Stud Team

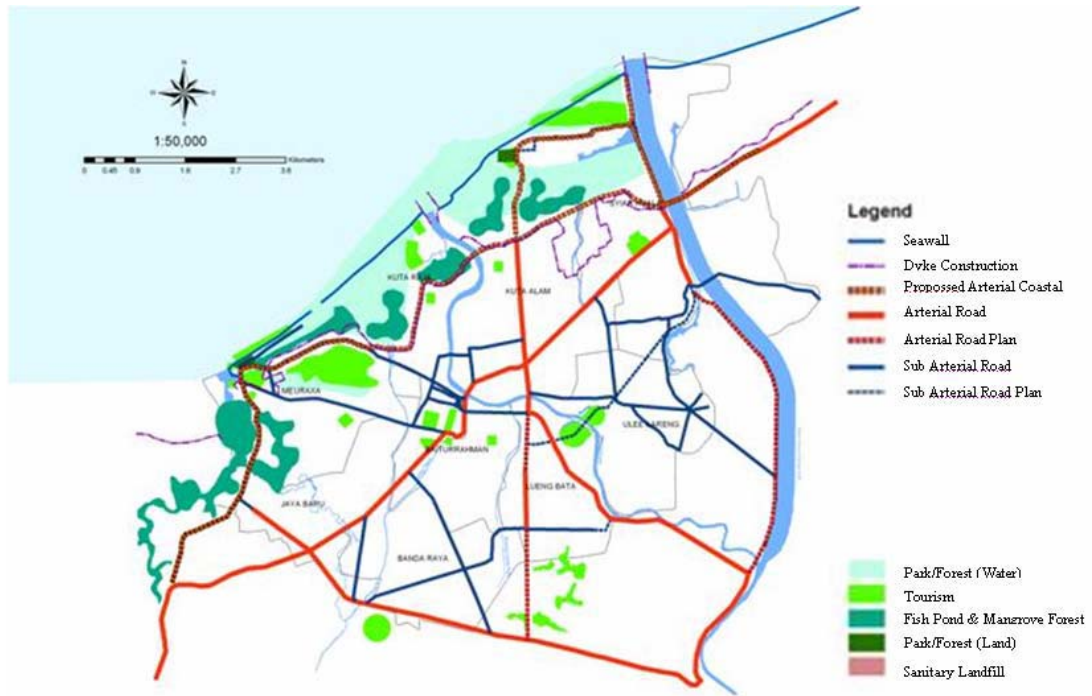
Figure 4.5.1 Proposed Urban Skelton in 2015

4.5.2 Specific Spatial Structure Plan

A spatial structure plan is to be established in order to meet a long term vision and development concept. BAC is broadly planned to be divided into two (2) zones, Zone of Preservation and Conservation and Zone of Development.

(1) Zone of Preservation and Conservation

This zone mainly consists of park, forest, fish ponds and mangrove forest taking into consideration of the concept of Green City, promotion of tourism development present geographic and natural environment. It covers the area of about 11 km². The location of these spatial structure is shown in Figure 4.5.2.



Source: The Additional Study Team

Figure 4.5.2 Zone of Preservation and Conservation

The green area extends mainly over Meuraxa, Kuta Raja, Kuta Alam, Baiturahman, Syah Kuala, Ulee Kareng, Lueng Bata and Banda Raja. It includes public open spaces including parks, side trees along the roads, riparian lands along the rivers. Re-plantation of mangrove is proposed in the areas such as Kuta Raja, Kuta Alam, Jaya Baru. This will contribute to revival of aqua ecology and mitigation of potential tsunami in future as barrier.

The rivers and drainages are proposed to be protected to secure proper drainage and flood control. Coastal area will mainly be developed for fish ponds, which is one of major economic activities in BAC, keeping harmony with conservation of vegetation and other natural environmental aspects.

(2) Zone of Development

Zone of development comprises commercial, government office, sport center, harbor, bus station, education, tourism, and solid waste landfill sub-zones as shown in Figure 4.5.3.



Source: The Additional Study Team

Figure 4.5.3 Specific Spatial Structure Plan

All sub-zones are almost the same as the present condition and location, excepting tourism sub-zone in Ulee Lheue, where various tourism and the 2004 disaster memorial facilities including parks are to be proposed.

4.5.3 Primary Land Use Plan

Based on the specific spatial structure plan, pre-studied development concepts and pre-and post disaster land use conditions, a primary land use plan in 2015 is worked out as given in Figure 4.5.4. The land use is basically divided into 10 categories as given in Table 4.5.1.



Source: The Additional Study Team

Figure 4.5.4 Primary Land Use Plan

Table 4.5.1 Primary Land Use Plan

Zone	Land Use	Area (ha)	Proportion (%)
Preservation and conservation	(1) Park and forest	740	12.1
	(2) Fishpond and mangrove	352	5.8
	Sub-total	1,092	17.9
Development	(1) Commercial and industry	1,038	17.0
	(2) Education and culture	153	2.5
	(3) Sport center	23	0.4
	(4) Tourism	300	4.9
	(5) Residential	3,190	52.3
	(6) Government offices	275	4.5
	(7) Solid waste landfill	10	0.2
	(8) Harbor	19	0.3
	Sub-total	5,008	82.1
Total		6,100	100

Source: The Additional Study Team