PEMERINTAH PROVINSI NANGGROE ACEH DARUSSALAM
BADAN PENGENDALIAN DAMPAK LINGKUNGAN DAERAH
(BAPEDALDA)
PROVINSI NANGGROE ACEH DARUSSALAM
Jalan Tgk. Malem No. 2 Telp. (0651) 635721, 635722 Fax (0651) 32456
BANDA ACEH, 23121

KEPUTUSAN
KEPALA BADAN PENGENDALIAN DAMPAK LINGKUNGAN DAERAH
PROVINSI NANGGROE ACEH DARUSSALAM
NOMOR : 660-27/IX/AMDAL/2005

TENTANG

KESEPAKATAN KERANGKA ACUAN ANALISIS DAMPAK LINGKUNGAN HIDUP (KA – ANDAL)
KEGIATAN PERBAIKAN DAN REKONSTRUKSI JALAN DARI
BANDA ACEH SAMPAI MEULABOH
PROVINSI NANGGROE ACEH DARUSSALAM

KEPALA BADAN PENGENDALIAN DAMPAK LINGKUNGAN DAERAH
PROVINSI NANGGROE ACEH DARUSSALAM,

Menimbang :

a. bahwa usaha dan/atau kegiatan Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, Provinsi Nanggroe Aceh Darussalam** merupakan usaha dan/atau kegiatan yang wajib dilengkapi dengan Studi Analisis Mengenai Dampak Lingkungan Hidup;

b. bahwa Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA – ANDAL) Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh,, Provinsi Nanggroe Aceh Darussalam** merupakan bagian dari Studi Analisis Mengenai Dampak Lingkungan Hidup yang wajib mendapatkan Keputusan Kesepakatan berdasarkan hasil penilaian Komisi Penilai AMDALDA Provinsi Nanggroe Aceh Darussalam;

c. bahwa untuk hal tersebut di atas, perlu ditetapkan dalam suatu keputusan tentang Kesepakatan Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA–ANDAL) Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, oleh Departemen Pekerjaan Umum , Dirjen Bina Marga, Direktorat Jalan dan Jembatan, Satuan Kerja Sementara Perencanaan Jalan dan Jembatan (P2JJ) Provinsi Nanggroe Aceh Darussalam dengan Konsultan Penyusun PT. ERM INDONESIA.**

Mengingat :

1. Undang – undang Nomor 24 Tahun 1992 tentang Penataan Ruang (Lembaran Negara Republik Indonesia Tahun 1992 Nomor 115, Tambahan Lembaran Negara Republik Indonesia Nomor 3501);
2. Undang – undang Nomor 23 Tahun 1997 tentang Pengelolaan Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 1997 Nomor 68, Tambahan Lembaran Negara Republik Indonesia Nomor 3699);
3. Undang-undang Republik Indonesia Nomor 22 Tahun 1999 Tentang Pemerintah Daerah (Lembaran Negara Republik Indonesia Tahun 1999 Nomor 60, Tambahan Lembaran Negara Nomor 3699);
4. Undang-undang Republik Indonesia Nomor 18 Tahun 2001 Tentang Otonomi Khusus bagi Propinsi Daerah Istimewa Aceh sebagai Provinsi Nanggroe Aceh Darussalam;
5. Peraturan Pemerintah Nomor 27 Tahun 1999 tentang Analisis Mengenai Dampak Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 1999 Nomor 59, Tambahan Lembaran Negara Republik Indonesia Nomor 3838);
6. Peraturan Pemerintah Republik Indonesia Nomor 25 Tahun 2000 Tentang Kewenangan Pemerintah dan Kewenangan Provinsi sebagai Daerah Otonom;

7. Keputusan Menteri Negara Lingkungan Hidup Republik Indonesia Nomor 40 Tahun 2000 Tentang Pedoman Tata Kerja Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup;
8. Keputusan Kepala Badan Pengendalian Dampak Lingkungan Hidup Nomor 08 Tahun 2000 tentang Keterlibatan Masyarakat dan Keterbukaan Informasi dalam Proses Analisis Mengenai Dampak Lingkungan Hidup;
9. Keputusan Kepala Badan Pengendalian Dampak Lingkungan Hidup Nomor 09 Tahun 2000 tentang Pedoman Penyusunan Analisis Mengenai Dampak Lingkungan Hidup;
10. Keputusan Menteri Negara Lingkungan Hidup Nomor 17 Tahun 2001 tentang Jenis Rencana Usaha dan/atau Kegiatan yang Wajib Dilengkapi dengan Analisis Mengenai Dampak Lingkungan Hidup.
11. Peraturan Daerah Propinsi Daerah Istimewa Aceh Nomor 09 Tahun 1995 tentang Rencana Tata Ruang Wilayah Provinsi (RTRWP) Daerah Istimewa Aceh.
12. Peraturan Daerah Propinsi Daerah Istimewa Aceh Nomor 6 Tahun 2001 Tentang Susunan Organisasi dan Tata Kerja Badan Pengendalian Dampak Lingkungan Daerah Propinsi Daerah Istimewa Aceh;
13. Keputusan Gubernur Provinsi Nanggroe Aceh Darussalam Nomor 660/047/2002 Tentang Pembentukan Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup Daerah (AMDALDA) Provinsi Nanggroe Aceh Darussalam.
14. Keputusan Gubernur Provinsi Nanggroe Aceh Darussalam Nomor 14 Tahun 2002 Tentang Pedoman Tata Kerja Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup Daerah Provinsi Nanggroe Aceh Darussalam;

Memperhatikan : 1. Hasil rapat Komisi Penilai AMDALDA Provinsi Nanggroe Aceh Darussalam di **Banda Aceh** pada tanggal **28 Juli 2005** Mengenai Penilaian Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA – ANDAL) Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, Provinsi Nanggroe Aceh Darussalam,** oleh **Departemen Pekerjaan Umum , Dirjen Bina Marga, Direktorat Jalan dan Jembatan Satuan Kerja Sementara Perencanaan Jalan dan Jembatan (P2JJ) Provinsi Nanggroe Aceh Darussalam** dan hasil perbaikan dokumen sesuai surat Nomor .PR.03.02/P2JJ/379/2005 tanggal 13 Agustus 2005.

MEMUTUSKAN :

Menetapkan :

PERTAMA : **KEPUTUSAN KESEPAKATAN KERANGKA ACUAN ANALISIS DAMPAK LINGKUNGAN HIDUP (KA – ANDAL) RENCANA KEGIATAN PERBAIKAN DAN REKONSTRUKSI JALAN DARI BANDA ACEH SAMPAI MEULABOH, PROVINSI NANGGROE ACEH DARUSSALAM "*DAPAT DISETUJUI DAN DITERIMA*".**

KEDUA : Kesepakatan Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA – ANDAL) Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, Provinsi Nanggroe Aceh Darussalam,** sebagaimana dimaksud dalam diktum PERTAMA, mengandung arti bahwa ruang lingkup dan kedalamam Studi Analisis Mengenai Dampak Lingkungan Hidup (AMDAL) bagi kegiatan Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, Provinsi Nanggroe Aceh Darussalam** adalah sebagaimana tercantum dalam dokumen Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL).

KETIGA : Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA – ANDAL) tersebut wajib digunakan sebagai acuan dalam pelaksanaan Studi Analisis Dampak Lingkungan Hidup (ANDAL) selanjutnya.

KEEMPAT : Kegiatan **Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh,** tidak boleh dilaksanakan/dikerjakan sebelum diterbitkan keputusan Gubernur Provinsi Nanggroe Aceh Darussalam tentang Kelayakan Lingkungan Hidup berdasarkan hasil Analisis Dampak Lingkungan Hidup (ANDAL), Rencana Pengelolaan Lingkungan Hidup (RKL) dan Rencana Pemantauan Lingkungan Hidup (RPL).

KELIMA : Dokumen Kelayakan Lingkungan Hidup merupakan bagian yang tidak terpisahkan dari kontrak kerja yang dilaksanakan oleh kontraktor yang terpilih

KEENAM : Setiap kelalaian dan / atau penyimpangan yang dilakukan di luar "**Keputusan Kesepakatan**" ini dapat dikenakan sanksi sesuai peraturan yang berlaku.

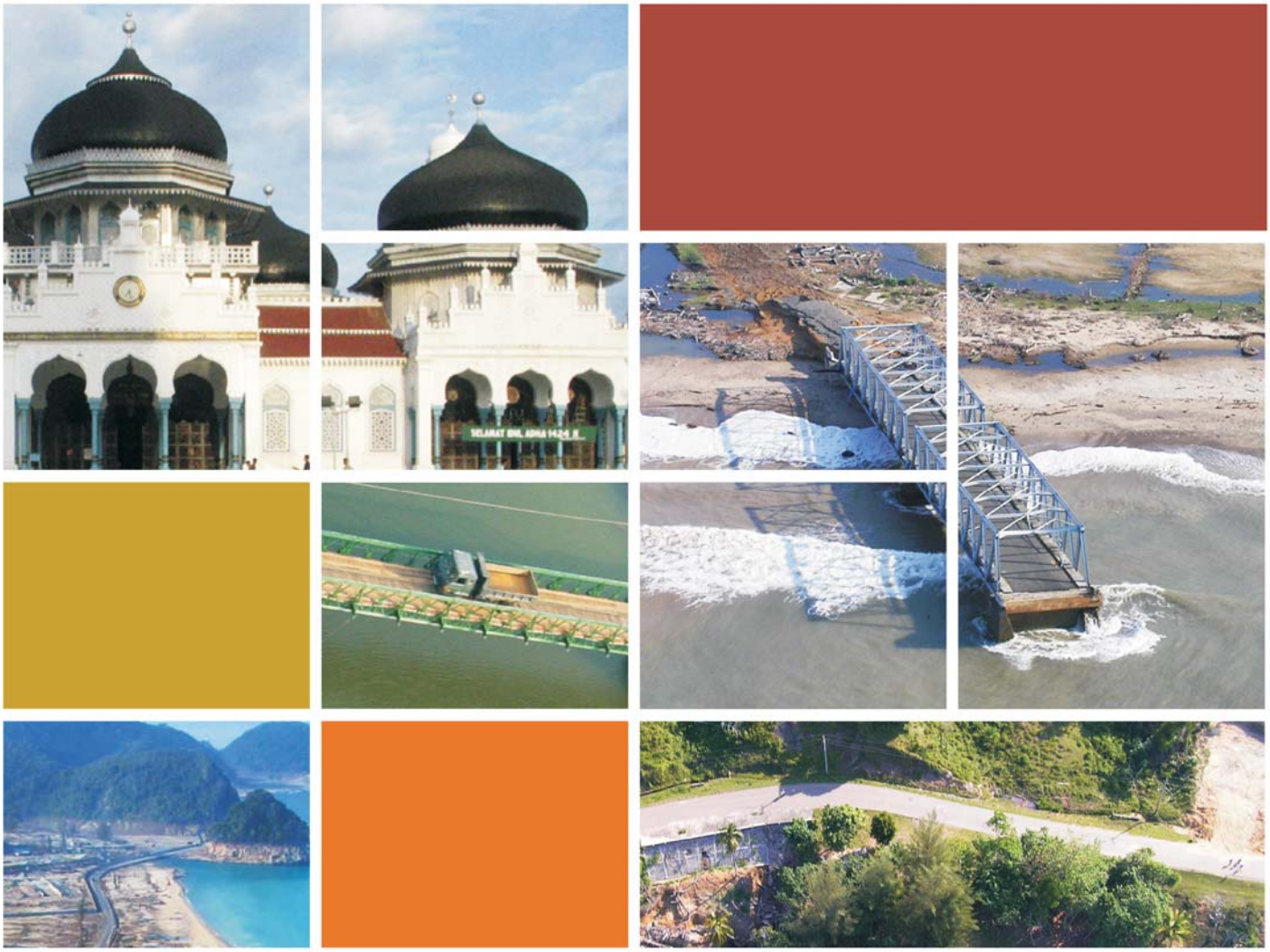
Ditetapkan di : **Banda Aceh**
Pada Tanggal : 7 September 2005

KEPALA BADAN PENGENDALIAN DAMPAK LINGKUNGAN DAERAH PROVINSI NANGGROE ACEH DARUSSALAM

IR. ARSYIAH ARSYAD, MM
NIP. 010 087 342

Keputusan ini disampaikan kepada Yth :

1. Gubernur Provinsi Nanggroe Aceh Darussalam;
2. Menteri Negara Lingkungan Hidup RI di Jakarta;
3. Menteri Pekerjaan Umum di Jakarta;
4. Walikota Banda Aceh;
5. Bupati Kabupaten Aceh Besar di Jantho;
6. Bupati Kabupaten Aceh Jaya di Calang;
7. Bupati Kabupaten Aceh Barat di Meulaboh;
8. Kepala BAPPEDA Provinsi Nanggroe Aceh Darussalam;
9. Kepala Dinas PRASWIL Prov. NAD;
10. Kepala Kantor Wilayah Badan Pertanahan Nasional Provinsi Nanggroe Aceh Darussalam;
11. PT. ERM INDONESIA (Konsultan Penyusun) di Jakarta----------



Banda Aceh to Meulaboh
Rehabilitation and Reconstruction Road Project

Terms of Reference

September 2005

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FROM THE AMERICAN PEOPLE

DEPARTEMEN PEKERJAAN UMUM
DIREKTORAT JENDRAL BINA MARGA
DIREKTORAT JALAN DAN JEMBATAN
SATUAN KERJA SEMENTARA PERENCANAAN DAN PENGAWASAN JALAN DAN JEMBATAN PROV.NAD
JALAN JENDRAL SUDIRMAN NO.1 BANDA ACEH - KODE POS 23239 TELP/FAX (0651)47150

DEPARTEMEN PEKERJAAN UMUM
DIREKTORAT JENDERAL BINA MARGA
DIREKTORAT JALAN DAN JEMBATAN WILAYAH BARAT
SATUAN KERJA SEMENTARA PERENCANAAN DAN PENGAWASAN JALAN DAN JEMBATAN PROV. NAD
JALAN JENDERAL SUDIRMAN NO. 1 BANDA ACEH – KODE POS 23239 TELP/FAX (0651)47150

FOREWORD

The Department of Public Works of the Republic of Indonesia, supported by the fund and technical assistance of the United Stated Agency of International Development (USAID), plans to conduct the reconstruction and rehabilitation of the road along the west coast of the Nangroe Aceh Darusalam, which was damaged by earthquake and Tsunami in December 2004.

In accordance with the provision of the existing laws, in particular the Ministerial Decree No.17 of 2001 for the Living Environment, the project sponsor is required to conduct an Environmental Impact Analysis (AMDAL). To initiate the process it is required to develop a Framework of a Reference Document which provides direction and baseline reference for the Environmental Assessment (ANDAL) including an Environmental Management Plan (RPL) and Environmental Monitoring Plan (RPL). This is the required Reference Document for Environmental Assessment (ANDAL) for the reconstruction and rehabilitation of the 245 km road from Banda Aceh- to Meulaboh in the province of Nanggroe Aceh Darussalam(NAD).

We wish to acknowledge and express our appreciation and gratitude to all those who assisted in the preparation of this Reference Document (KA ANDAL) .

Banda Aceh, September 2005

Project Proponent,

IR KHALIDIN, MT
Head of Temporary Working Unit for the construction and rehabilitation of roads and bridges
Department of Public Works Province of Nanggroe Aceh Darussalam (NAD)

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GLOSSARY

A-E	Architect-Engineer
AMDAL	Environmental Impact Assessment
ANDAL	Environmental Assessment Process
AASHTO	Association of American State Highway Officials
BAKOSURTANAL	Badan Koordinasi Survey dan Pemetaan Nasional (Coordinating National Agency for Survey and Mapping)
BANGDES	Badan Pembangunan Desa (Village Development Agency)
Bapedalda	Badan Pengendalian Dampak Lingkungan (Agency of Environmental Impact Management)
BAPPEDA	Badan Perencanaan Pembangunan Daerah (*Regional Development Planning Program*)
BNA-MBO	Banda Aceh - Meulaboh
BOD	Biological Oxygen Demand
BPS	Badan Pusat Statistik (*Central Agency of Statistics*)
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
dB (A)	Decibel
GIS	Geographic Information System
GR	Government Regulation
GRDP	Gross Regional Domestic Product
INP	Important Index Value
IMR	Infant Mortality Rate
IOM	International Organization for Migration
IMC	International Medical Corps
IPA	Index Point of Abundance
ISPA	Infeksi Saluran Pernapasan Atas (Upper Respiration Canal Infection Disease)
Hi-Vol	High Volume Air Sampler
KA	Kerangka Acuan (Term of Reference)
Km	Kilometers
Kg	Kilograms
m	Meters
m/dt	Meter per detik (*meters per second*)
NAD	Nanggroe Aceh Darussalam (Province)
ND	Not Detected

NO	Nitrogen Oxide
NS	Not Significant
O3	Ozone
PAD	Pendapatan Asli Daerah (*Original Local Revenue)*
P2JJ	The Planning And Supervision of Roads and Bridges Division
PUSKESMAS	Pusat Kesehatan Masyarakat (*Public Health Center*)
SO2	Sulfur Dioxide
SPL	Sound Pressure Level
Susenas	Survey Sensus Nasional (National Census Survey)
t/ha/th	ton/hectar/year
USAID	United States Agency for International Development
***u*g/m³**	Microgram per cubic meter

CHAPTER 1. INTRODUCTION

1.1. BACKGROUND

The earthquake and tsunami that affected Aceh so tragically at the end of December 2004 also caused major damage to a large part of the road network in the same region. According to information from the International Organization for Migration (2005:1), the disaster damaged over 654 kilometers of arterial roads, 136 kilometers of village roads, 603 kilometers of provincial roads, 2,267 bridges and 9,122 drainage systems. Of the damaged facilities, some 27.5% of arterial roads, 33.7% of village roads, 38% of provincial roads, 66.7% of bridges and 83% of drainage systems have already been restored. The financial loss of damaged infrastructure including roads, sanitary facilities and drainage systems totals approximately US$877 million dollars. The estimated loss in the transportation sector alone is approximately Rp. 7 trillion (US$ 700 million) consisting of Rp. 4.8 trillion (US$ 480 million) for damaged roads and Rp. 2.0 trillion (US$ 200 million) for damaged harbors (ISEI 2005:4).

One of the worst impacts of the tsunami disaster in Aceh is the destruction of transportation and related infrastructure creating inaccessibility throughout the western coast of Aceh province including amongst the more prominent villages and towns in the area. A significant portion of the roadway between Lhonga and Meulaboh fell into the sea and is no longer functioning to facilitate transportation. The seaports of Lhok Nga, Calang and Meulaboh are also not operational. The only transportation facility that is practically functioning at the moment is the airport at Cut Nyak Dhien situated in the Western Aceh regency. The disconnection and inaccessibility of the west coast area of Aceh to surrounding areas has paralyzed most of the social and economic activities of the people living along the road between Banda Aceh and Meulaboh. This was particularly so in the first several months after the earthquake and tsunami when the people in the region could not realize basic needs.

The reopening and accessibility to the western coast of Aceh is imperative, not merely for the sake of the socio-economic needs of the community living in the area, but also in the interests of other humanitarian, defense, security and Government activities.

The total rehabilitation and reconstruction of the damaged road network spanning up to 240 kilometers between Meulaboh and Banda Aceh is to be financed with grant support from the Government of the United States through USAID (United States Agency for International Development). The MOU for the work between the Government of the United States, represented by USAID, and the Government of Indonesia, represented by the Department of Public Works, was signed on the bridge over Krueng Raba (Raba River) in Lhonga, the regency of Aceh Besar. The bridge is one of the many devastated structures affected by the tsunami.

According to Government Regulation No. 27 of 1999 on the process of analyzing potential environmental impacts (AMDAL) and Decree No. 17 of 2001 from the Junior Minister of Environment related to work plans and activities subject to AMDAL supplementation, the reconstruction and rehabilitation of up to 240 kilometers of road linking Banda Aceh and Meulaboh is categorized as work requiring an Environmental Impact Assessment (ANDAL), Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL). This requirement becomes a commitment on the part of the project planner in order to comply with project development guidelines and prevailing environmental mandates. The AMDAL process related to the reconstruction and rehabilitation of the Banda Aceh - Meulaboh road is being carried out on the basis of the decision from the head of Bapedal (Supervisory Agency on Environment) and in accordance with Regulation No. 9 of 2000 on AMDAL terms and conditions.

The project development plan will emphasize priority on the reconstruction and rehabilitation of the road network linking Banda Aceh and Lamno. These locations are situated in the northern part of the province and had reasonable road infrastructure prior to the tsunami. The construction of new roads is planned to begin from Lamno to Meulaboh and aims to avoid low lying areas near the coast that are of similar altitude to sea level and hence exposed to storms and severe weather conditions.

Construction of some sections of the new road in the southern portion of the project area may require excavation and relocation of soil and coral as part of the modification process in working with the natural resource conditions and land vegetation. During the project pre-construction, construction and operation phases, it is anticipated that the work will result in potential impacts on physical properties associated with soil chemistry, low lying land, surrounding water and air, transportation modes, biology (terrestrial and

water biota), socio-economic (employment, local economy and social processes) and the health of the community (sanitation, nutrition, accidents, etc.). However, the overall socio-economic benefits upon project completion are anticipated to be significant as compared to the temporary effects sustained during the pre-construction and construction phases. The road will be a key element of support in the ongoing rehabilitation effort by creating work, channelling materials and products and generating funds to support economic development in many nearby areas.

The project is intended to provide viable alternatives to minimize any negative effects on economic livelihoods and environmental quality. As such, the anticipated benefits to be enjoyed from the project development are significantly greater compared to the impacts and permanent effects on the natural resources and environment that might otherwise be left alone.

1.2. PURPOSES AND ADVANTAGES OF THE PROJECT

1.2.1. Objective of the project

The main objective of this project is to quickly restore and improve land transportation and socio-economic conditions along the west coast of the Nanggroe Aceh Darussalam Province between Banda Aceh and Meulaboh as well as to ensure that all stakeholders utilize any disrupted natural resources in a sustainable manner.

1.2.2. The benefits of the project

The Banda Aceh to Meulaboh Road Rehabilitation and Reconstruction Project will play a vital part in the regional recovery. The Project will have numerous benefits, including the following:

a. Allow efficient access for reconstruction efforts along the west coast of Nangrroe Aceh Darussalam as part of the reconstruction of tsunami-affected areas.
b. Reduce travel times along the west coast that have been significantly increased due to damage from the earthquake and tsunami.
c. Enable local people to travel easily along the west coast both during and after reconstruction efforts have finished.
d. Re-establish the regional economy by developing existing natural resources and potential markets.

1.3. PREVAILING LAWS AND REGULATIONS

The AMDAL study for this project is based upon the following existing Laws, Regulations Decrees etc of the Republic of Indonesia.

a. Law

1. Law of the Rep of Indonesia No. 5, year 1960 regarding basic regulation on agrarian affairs
2. Law No. 5, year 1990 regarding the Conservation of natural biological resources and their ecosystem
3. Law No 4, year 1992 regarding housing and living area
4. Law No. 14, year 1992 regarding traffic and land transportation.
5. Law No. 23, year 1992 regarding health.
6. Law No. 24, year 1992 regarding spatial management
7. Law No. 5, year 1994 regarding the ratification of UN Convention on Biological Diversity)
8. Law No. 23, year 1997 regarding the processing of the living environment.
9. Law No. 41, year 1999 regarding forestry
10. Law No. 18, year 2001 regarding special autonomy for the special territory of Aceh as the province of Naggroe Aceh Darussalam.
11. Law No. 32, year 2004 regarding regional government
12. Law No. 38, year 2004 regarding road.

b. Government Regulations

1) Government Regulation No. 26 year 19856 regarding road
2) Government Regulation No. 27, year 1991 regarding marsh
3) Government Regulation No. 35, year 1991 regarding rivers
4) Government Regulation No. 7, year 1998 regarding the preservation of certain kinds of plants and animals.
5) Government Regulation No. 8, year 1998 regarding the profiting of certain kinds of plants and animals.
6) Government Regulation No. 27, year 1999 concerning analysis of impact of living environment.
7) Government Regulation No. 41, year 1999 regarding the control on the air pollution
8) The Government Regulation No. 43, year 1999 regarding norms and road traffic
9) Government Regulation No. 25 year 2000 regarding authorization of the Government and the authorization of the province as autonomous region

10) Government Regulation No. 82, year 2001 regarding the processing of water quality and water pollution control
11) Government Regulation No. 34 regarding forestry system, the planning of forestry processing, forestry profiting and the profiting of forests.
12) Government Regulation No. 45 year 2004 regarding forest preservation.

c. Presidential decrees and Presidential regulations

1) Decree of the President of the Rep. of Indonesia No.32, year 1990 Regarding the processing of the preserved area.
2) Decree of the President of the Rep. of Indonesia No. 55 year 1994 Regarding the system of lending forest area.
3) Decree of the President of the Rep. of Indonesia No. 36 year 2005 regarding the allocation of land for the realization of development for public interests.

d. Ministerial decrees

1) Decree of the Minister of Civic Affairs and Living Environment No. Kep 02/MENLH/6/1988 regarding the direction on stating the quality of the environment.
2) Decree of the Minister Living Environment No. 13/MENLH/94 regarding the standard for the quality of emission of the unmovable sources.
3) Decree of the Minister for Agrarian Affairs/Head of BPN (National Land Use Agency) No 1 year 1994 regarding the application of the Presidential Decree No. 55 year 1993 regarding the allocation of land for use for the development for public interests.
4) Decree of the Minister of Forestry No. 55/KPTS-II/94 regarding the direction on the lending and use of forest area.
5) Decree of the Minister of Public Works No. 58/KPTS/1995 regarding the direction on making the analysis on the environment impact, Department of Public Works
6) Decree of the Minister of Public Work No. 69/PRT/1995 regarding the making of the analysis on the environment impact at the Department of public works.
7) The Decree of the Minister Public Work No. 148/KPTS/1995 regarding the planning for the processing the environment and the planning for monitoring the environment within the sector of Public Works.

8) The decree of the Minister of Living Environment No 48/MNLH/96 regarding the standardization of the degree of noise.
9) Decree of the Minister of Living Environment No. 49/MENLH/96 regarding the standardization of the level of vibration.
10) Decree of the Minister of Public Works No. Kep-40/KPTS/1996 regarding the technical direction for the arrangement of Analysis of the environment impact of road project.
11) Decree of the Minister of Public Works No. 40/KPTS/1997 regarding the technical direction on making the analysis of the environment impact of road project.
12) Decree of the Minister of Living Environment No. 45/MENLH/97 regarding standard index of Air Pollution.
13) The Decree of the Minister Home Affairs No 620-306 dated 4 November 1998 regarding the consideration on the status of road as the provincial road.
14) The decision of the Minister of Living Environment No. 05/MENLH/2000 regarding the way on making AMDAL of the development activity in the wetland area.
15) Decree of the Minister of Forestry No. Kep.170/KPTS/11/2000 regarding the allocation of the areas of forestry and waters in the province/special territory of Aceh.
16) Decree of the Minister of Forestry No. 17/MENLH/2001 regarding the types of business and activities, which are to be provided with analysis on the impact of living environment.
17) Decree of the Minister of Forestry No Kep-70/KPTS-II/2001 regarding the allocated areas, changes of status and function of forest areas.
18) Decision of Minister of Health of the Republic of Indonesia No. 876/Menkes/SK/VIII/2001 regarding the technical direction of analysis of impact of the health of environment.
19) Decision of the Minister of Public Works No. 375/KPTS/M/2004 regarding parts of roads based on each status as national roads.

e. Decisions of Head of Bapedal (Supervisory Agency for Environment)

1) Decision of Head of Bapedal No. Kep-056/1994 regarding the direction on the size of significant impact.
2) Decision of Head of Bapedal No. 299/11/1996 regarding the technical direction for the study of social aspects in the preparing an AMDAL.

3) Decision of the Head of Bapedal No. 105 year 1997 regarding the Direction for the realization of the processing of the environment and the planning for monitoring of the environment.
4) Decision of the head of Bapedal No. 107/Ka Bapedal/1997 regarding the technical direction for calculating and reporting and the information standard index of air pollution.
5) Decision of Head of Bapedal No Kep-124/12/1997 regarding the Direction on studying the community health aspect in preparing of AMDAL.
6) Decision of head of Bapedal No. 08 year 2000 regarding the Involvement of the community and open information in the processing of AMDAL.
7) The decision of head of Bapedal No. 09 year 2000 regarding the processing of AMDAL.

f. Regional Regulation (by law)

1) The regulation (by law) of the Province/ Special Territory of Aceh No. 3 Year 1992 regarding the mining of the deposit of type C.
2) The regulation of the Province/Special District of Aceh No. 9 year 1995 regarding spatial management plan for the province/special territorial of Aceh.
3) Qanun (Arabic term for regulation) of Province Nanggroe Aceh Darussalam No. 14 year 2002 regarding the forestry of Province Nanggroe Aceh Darussalam.
4) Qanun of Province Nanggroe Aceh Darussalam No 15 year 2002 regarding forestry permit.
5) Qanun of Province Nanggroe Aceh Darussalam No.02 year 2002 regarding the development program of Province Nanggroe Aceh Darussalam.
6) Qanun of Province Nanggroe Aceh Darussalam No 02 year 2002 regarding the master plan 2001-2005 of province NAD.
7) Qanun of Province NAD No. 20 year 2002 regarding the conservation of natural resources.
8) Qanun of province NAD No.21 year 2002 regarding the management of natural resources.
9) Qanun of Province NAD No. 1 Year 2003 regarding references for the development of Banda Aceh City year 2001-2005.
10) Qanun of the Province NAD No. 3 year 2003 regarding the plan of spatial management of the Province NAD years 2002-2010.

g. Governor Decisions

1) The decision of Governor NAD No. 08 Year 1993 regarding classification and standardization of water quality in the special territory of Aceh.
2) The decision of Governor NAD No. 17 Year 1991 regarding the direction of the function of forest within the spatial management of the province of NAD.
3) The decision of the Governor of the Province of NAD No. 19 year 1999 re adjustment of the direction of the function of forest within the spatial management of the province of NAD.

1.4. BASIC PROVISIONS OF THE ENVIRONMENTAL MANAGEMENT POLICY

The project to restore and reconstruct the Banda Aceh to Meulaboh road will be developed by the office-in-charge of the planning and supervision of roads and bridges (P2JJ), under the auspices of the United States Agency for International Development (USAID). Since USAID provides the grant and technical assistance for the project there is a dual requirement that this project shall also comply with all of the related policies of the authorities of both the province of NAD and the US Government authorities (where applicable). The key underlying guidelines are as follows:

- The highest priority is given to the improvement of the welfare of the community of the province of NAD, especially those who are living in and around the project location.
- The conservation and sustainable use of all related physical, biological and human resources as one of the major components of the development program.
- Stability and continuity of inter environmental components

1.5. OBJECTIVES AND BENEFITS OF ANDAL STUDY

1.5.1. Objective of ANDAL study

a. To identify the plan of business and the activities to be completed, particularly those which are expected to have a significant impact on the living environment from the pre-construction stage through the post-construction and operation stage.

b. To identify the existing conditions of the living environment, particularly those resources which are expected to undergo significant impacts.
c. To assess and evaluate the significant impacts on physical, chemical, biological, socio-economic, socio-cultural and public health aspects as a result of the proposed road project using appropriate formal and informal methodologies.

1.5.2. Benefits of ANDAL Study

a. Improved evaluation and decision-making to select appropriate development alternatives as viewed from the perspectives of the living environment, appropriate technology, and application of key socio-economic factors.
b. Integration of a full and balanced consideration of the environmental components in all phases of detailed planning and implementation of the project and related activities.
c. Preparation of a guideline document with direction and purpose to effectively manage and supervise all project activities that could affect the living environment.

CHAPTER 2. SCOPE OF STUDY

2.1. SCOPE OF PLANNED ACTIVITIES

2.1.1. Impacts due to Generating Planned Activities

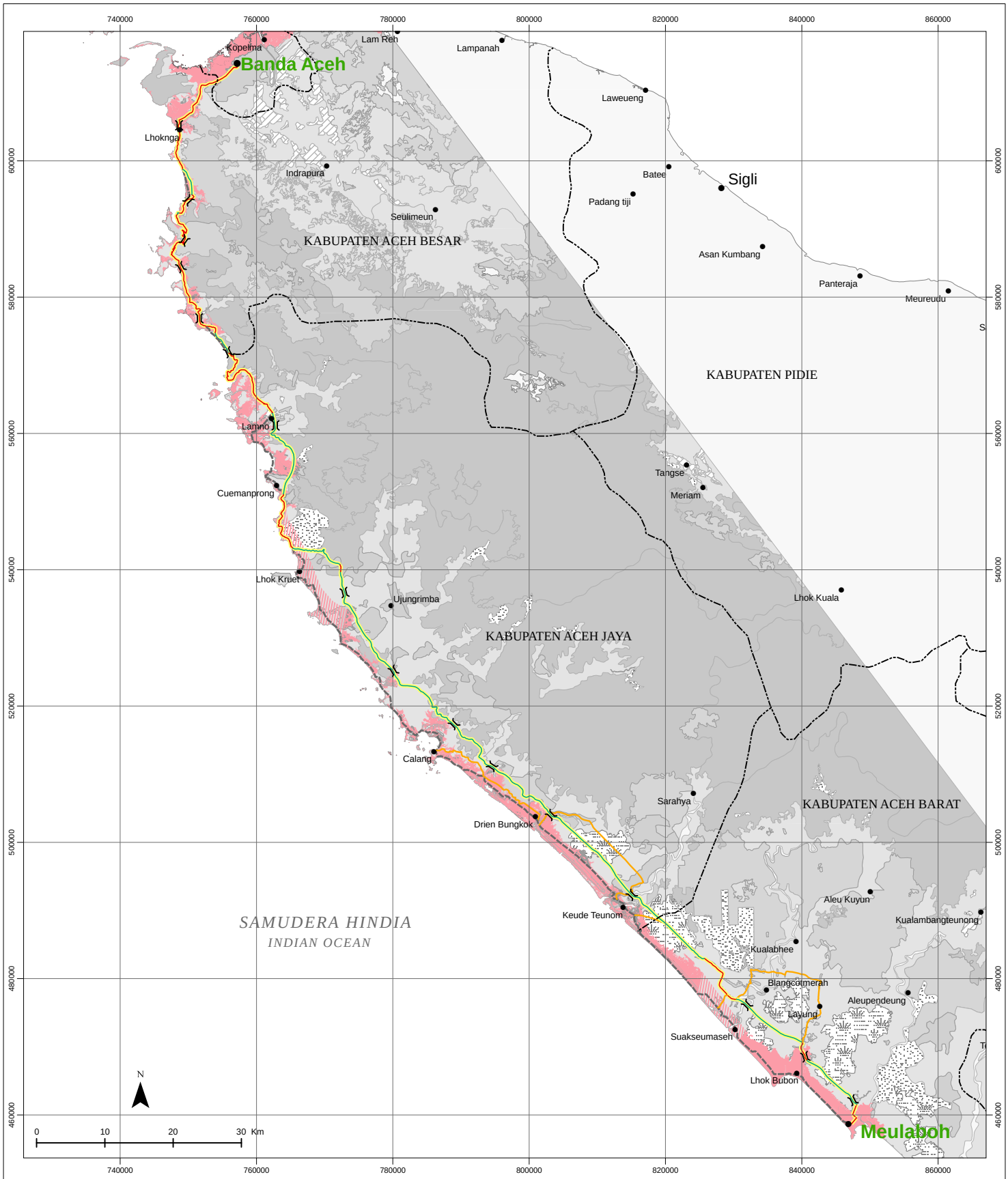
The planned development of roads in the province of Aceh is aimed at constructing of road stretching from Banda Aceh to Meulaboh. The roads will be constructed at Banda Aceh city, Aceh Besar Regency, Aceh Jaya Regency, and Aceh Barat Regency (See Caption 2-1). These roads are categorized national roads. The construction will be started from point zero (O) in Banda Aceh city (Pante Pirak) up to monument site on traffic circle at Meulaboh. The construction work include the widening, the enhancement of the existing roads, and to build new roads replacing the dilapidated roads which are no longer safe from the threat tsunami. Caption 2-1 shows the existing dilapidated roads to be reconstructed and the location of the new pad for the roads to be constructed.

The roads are designed in accordance with the suitable standard being developed by the Association of American State Highway Officials (AASHTO) and the Association of Southeast Asian Nations (ASEAN), but it is not limited to the road geometry, road pavements, soil works, sewerages, road equipments, traffic signs and the makings of asphalt, bridges and other structures, foundation structures, road blocks, the structure for protecting the shore alignment, control of erosion, sedimentation, protection of the environment, the weighing and deciding the limit of the roads right (ROW), bus stops and traffic signs. The road consists of two ways, one of them is a paved way of 7 meters wide the unpaved side way 2.5 meters wide (2 meters wide for the high land). The total width of the right of way is 30 meters (including the sewerages of drainages of the road.) The total length of the road is 240 meters. Its pavement will be provided with bitumen and hot mix asphalt. Some 110 units of the constructions for waterways will be repaired and reconstructed including the bridges, sewerages, drainages structures and so forth (**Table 2.1**). The bridges, sewerages and drainages to be built are of concrete construction. The design models of roads, bridges and Box Culvert are figured in **2.2, 2.3 and 2.4**.

Table 2.1 Proposed Volume of Work Road Rehabilitation and Reconstruction from Banda Aceh to Meulaboh

Description	Nos of Unit	Unit
Mobilization and De- Mobilization Total Mobilization and Demolization	1	LS
Urban Area Asphalt clearing Asphalting	 14,0 9.800	 Km Cubic mt
Swamp Filling Geo textile Asphalt 5 cm Base course 15 cm Sub base 10cm Culvert Circulation/Sewerages	 44,0 1.538.000 286.000 15.400 46.200 77.000	 Km Cubic mt Square mt Cubic mt Cubic mt Cubic mt
Flat area Filling Asphalting 5 cm Base course 15 cm Sub base 20 to 25 cm	 140,0 1.129,375 48.800 146.420	 Km Cubic mt Cubic mt Cubic mt
Mountainous Areas Coral excavation Coral digging Slope protection Protecting road Asphalting 5 cm Base course 15 cm Sub base 10 cm Swales concrete Sewerages	 33,5 609.400 914.100 10.050 25.125 11.700 35.120 23.410 11.055	 Km Cu mt Cu mt Sq mt Cu mt m Cu mt Cu mt m
Lain-lain Clearing and dredging Stripping Road limit marking Beacons /Traffic signs Grass planting Unlined Swales	 463 71.765 1 4.825 727.620 210.000	 Ha Sq mt LS Ea Sq mt Sq mt
Bridges and drainages Old structure clearing Long bridges Short bridges Culvert box Culvert pipe	 2.290 1 4 34 42	 m LS ea ea ea

Source: US Army Corp of Engineers (2005)



KERANGKA ACUAN

TERMS OF REFERENCE

LOKASI PERBAIKAN DAN REKONSTRUKSI JALAN DARI BANDA ACEH SAMPAI MEULABOH

BANDA ACEH TO MEULABOH REHABILITATION AND RECONSTRUCTION ROAD PROJECT

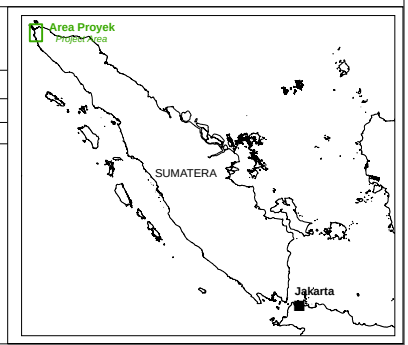
ROAD ALIGNMENT

Sumber :
Source :
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

Gambar	2 - 1	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Legenda
Legend

- Ibu Kota Propinsi — *Provincial Capital*
- Ibu Kota Kabupaten/Kotamadya — *Regency Capital/Municipality*
- Ibu Kota Kecamatan — *District Capital*
- Batas Kabupaten — *Regency Boundary*
- Jalur Lama Tetap Dipakai — *Proposed Route (Existing)*
- Jalur Baru — *Proposed Route (New)*
- Jalur Lama (tidak dipakai) — *Abandoned Route*
- Jalur Sementara (Jepang) — *Japan Temporary Alignment*
- Jembatan (hanya contoh, jumlah total lebih dari 100) — *Water Crossing (examples only, more than 100 in total)*
- Area Dampak Tsunami — *Tsunami Affected Area*
- Area Dampak Tsunami (perkiraan) — *Tsunami Affected Area (estimated)*



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JALAN JENDRAL SUDIRMAN NO.1 BANDA ACEH - KODE POS 23239 TELP/FAX (0651)47150

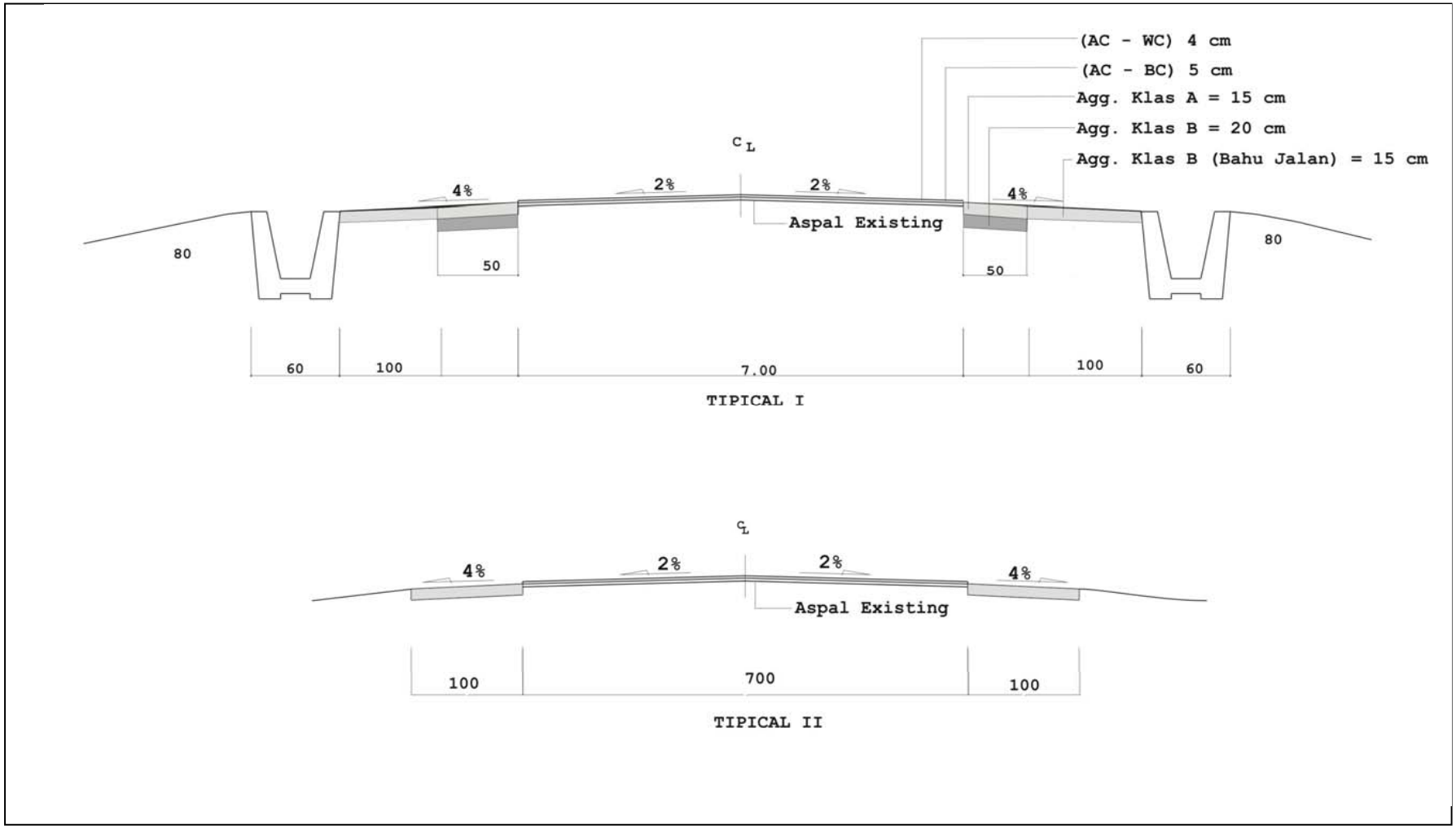


Figure 2.2 Example of Road Design

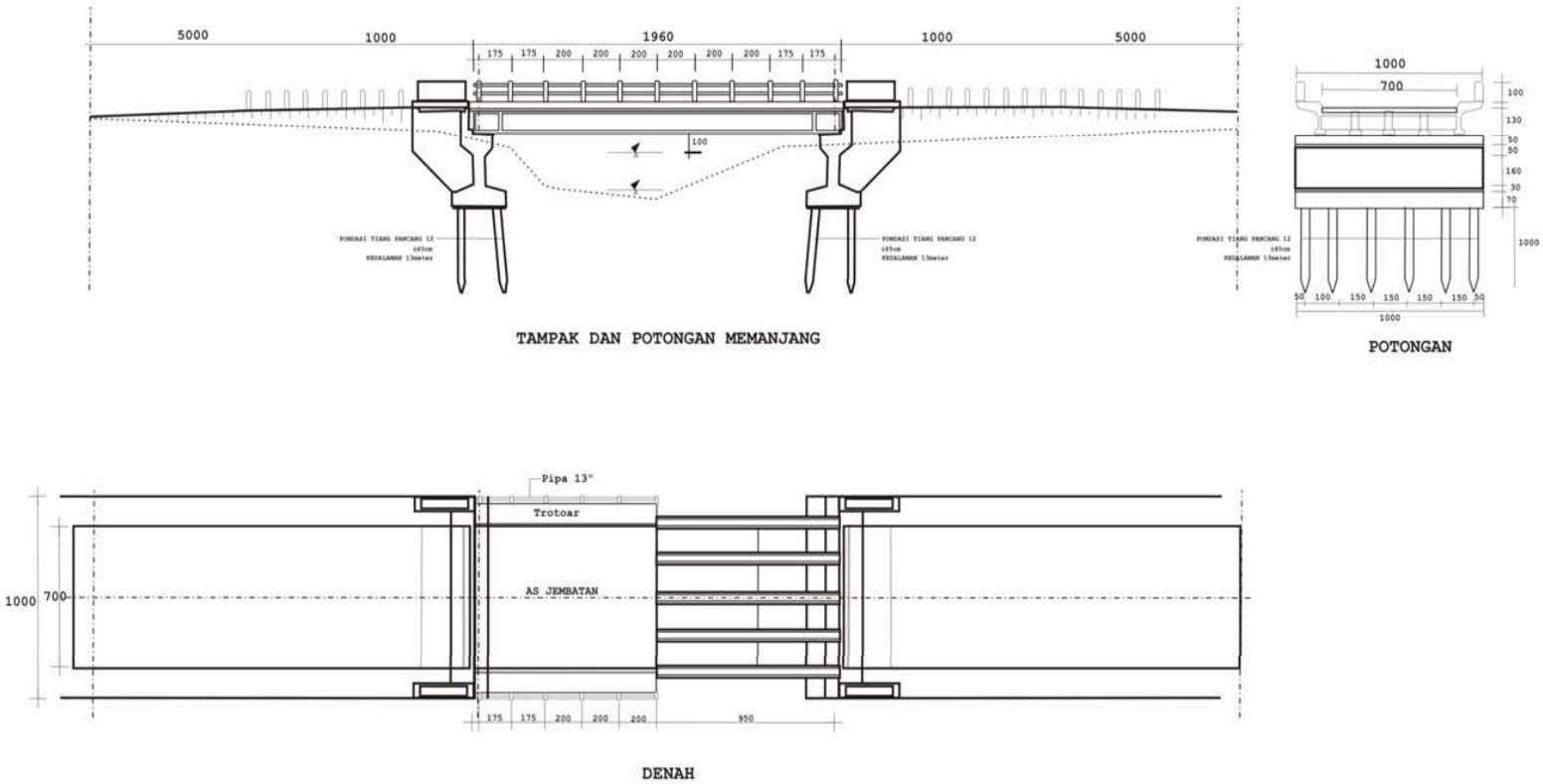


Figure 2.3 Example of Bridge Design

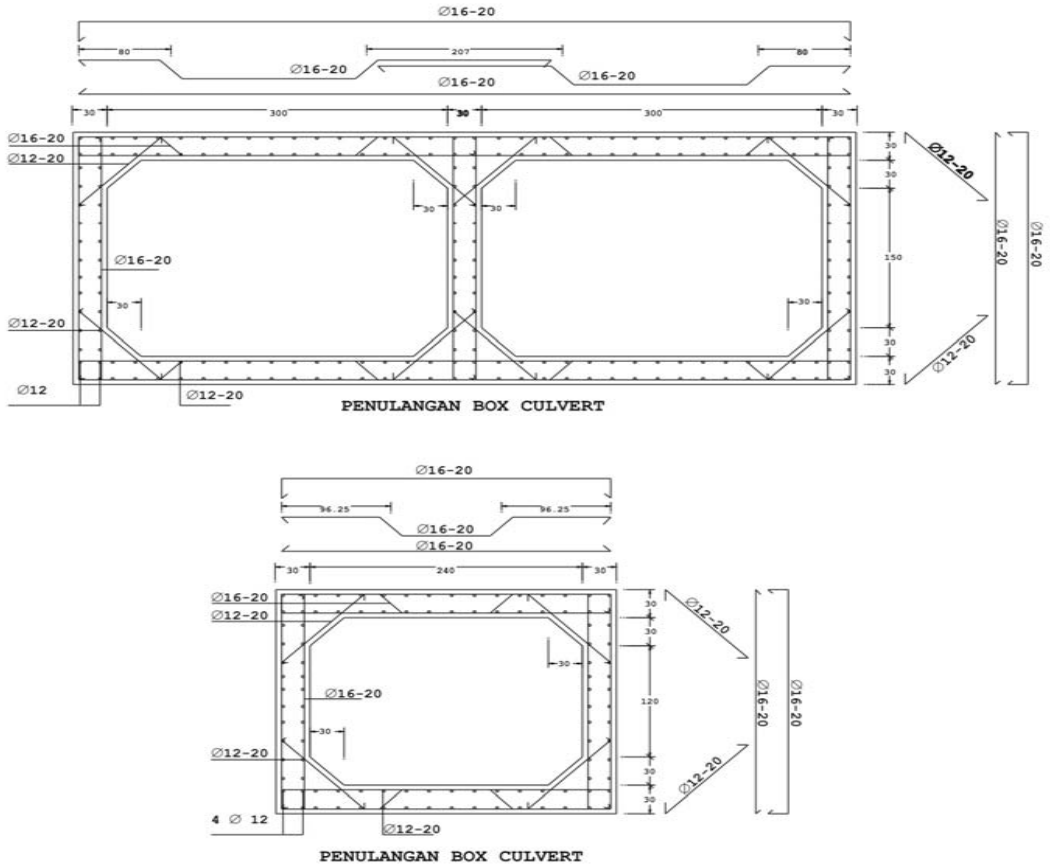


Figure 2.4 Example of Culvert Box Design

2.1.2. *Project Components to be Studied*

Project components that could potentially cause impacts are differentiated according to three distinct project stages; pre-construction, construction and operation.

2.1.2.1 *Pre construction Stage*

Pre-construction activities that could potentially cause impacts are limited to site survey and marking as well as land acquisition:

Site Survey and Measurement

When the road design has been completed and the road alignment determined, the alignment is to be surveyed and marked. This marking process will be visible to the public and therefore will be one of the first opportunities for all people to comprehend exactly where the road will be placed. Site survey and marking affects a limited area and is therefore relatively non-obtrusive.

Land Acquisition

Where the proposed new road alignment differs from the original (pre-tsunami) network, acquisition of the land for the road may be necessary. The land acquisition process will involve identification of land to be acquired and corresponding land owners and/or valid squatters, valuation of land, consultation with owners and/or squatters and payment of compensation for all land acquired.

2.1.2.2 *Construction Stage*

Mobilization of Work Force

The construction crew will be selected and mobilized by the appointed contractor(s). The workforce will include a range of professions including transport engineers, structural engineers, construction managers, foremen, heavy equipment operators and a range of semi-skilled and unskilled laborers.
The contractor(s) will be instructed to select workers from the local area wherever and whenever possible. It is estimated that several hundred workers are expected to be employed for construction. As such, construction activities will provide work opportunities and secondary business opportunities for the affected region.
The contractor (s) will be instructed to source workers from the local area where possible (i.e. where the appropriate skills are available).

Mobilization of Materials and Equipment

Project material and equipment specifications will be based upon the final road design and budget for selection and mobilization by the appointed contractor(s). The contractor(s) will be instructed to select materials and equipment from the local area whenever and wherever specifications and budget are compatible.

Establishment of Supporting Infrastructure

Base camps will be constructed as temporary office and accommodation facilities for workers during the construction phase. The base camps will also be used for equipment maintenance and warehouses. There will be also the need for temporary roads and structures.

Development of Borrow Pits and Quarries

The development of borrow pits and quarry locations for raw material supplies is synonymous with the establishment of a network of small-scale mining operations. The range of activity and components includes; identifying supply areas, establishing access roads, selecting work pits, providing temporary housing, arranging machinery, fuel and explosives, managing crushing operations, co-ordinating loading/delivery logistics, etc. (**See Table 2-2**)

Table 2.2 Location of Soil and Coral Rock Material for the Construction of Banda Aceh to Meulaboh Road

No.	Quarry Villages	Coordinate	Description
1.	Simpang Rima (Keude Bieng) (Kec/Sub Regency. Peukan Bada)	05°31′28,0″N 95°16′23,1″E	Filling coral
2.	Pudeng (Kec/Sub Regency. Lhoong)	05°11′52,2″N 95°17′47,9″E	Filling soil
3.	Lam Asan (Kec/S Regency. Lammo)	05°06′35″N 95°22′50″E	Coral and sand
4.	Gle Mehla (Kec./S Regency Lammo)	0°′″N°″E	Filling soil
5.	Krueng No (Kec. Sampoiniet)	05°55′14″N 95°23′20″E	Filling soil Coral and sand
6.	Desa sarah Peureulak (Kec. Teunom)	04°31′31″N 96°07′00″E	Filling soil Coral and sound
7.	Desa Pasi Timon (Kec. Teunom)	04°31″1″N 96°07′09″E	Filling soil , Coral and sand

No.	Quarry Villages	Coordinate	Description
8.	Pasi Teube (Kec. Teunom)		Coral and sand
9.	Pasi Geulima (Kec. Teunom)		Filling soil Coral and sand
10.	Desa Lamcong (Kec. Sungai Mas)	04°31′32″N 96°07′64″E	Filling soil, Coral and sand
11.	Desa Sawang Teube (Kec. Kaway XVI)	04°18′27″N 96°12′64″E	Filling soil
12.	Desa Meuteulang (Kec. Johan Pahlawan)	04°25′37″N 9611′50″E	Filling soil, Coral and sand
13.	Desa Keuramat Raya (Kec. Pantai Ceuremen)		Filling soil Coral and sand
14.	Desa Preumeu (Kec Woyla)		Filling soil Coral and sand
15.	Desa seumara (Kec. Pantai Cermin)		Filling soil Coral and sand
16.	Desa Sayeng (Kec. Setia Bakti)		Filling soil, Coral and sand
17.	Desa Babah Awe (Kec. Sampoiniet)		Filling soil

Several of the quarries mentioned in the aforesaid Table 2-2 have already been operated by local businessmen, but several have not. Nevertheless, businessmen have not yet obtained UKL and UPL documents. The would be quarries which are not operated by local businessmen, if their soil and coral to be taken, the contractors whose business is supplying soil and coral, before doing it so, should first request excavation permit from the Province Mining Agency.

Land Clearing

Prior to actual construction of the road, any surface structures, vegetation or tsunami debris along the designated road alignment and supply areas will need to be cleared. Selective cutting of tall trees adjacent to the actual road corridor will be necessary to reduce potential hazards

Earthworks

As feasible, the road will be aligned along topography to minimize cutting and filling. Cut and fill activities, however, are still necessary to ensure that road gradients meet the applicable standards. Earthworks will also include compacting and levelling activities. The earthworks will result in localized

changes to topography and water drainage patters. During site preparation topsoil will be removed and temporarily stored for future reclamation activities. The temporary topsoil storage period will be minimized to maintain top soil quality. Reclamation activities will occur in parallel to construction.

Construction of road and bridges.

This road construction project consists of the following: construction of 110 units of water channels, bridges, land filling, procurement of building materials, tarring, fitting of traffic signs, building parking lots, water channel structures, connecting ways, shore protecting and so forth. During the reconstruction of the unchanged old roads, a turning is needed. This will cause a reverse of direction of the traffic on the alternative road until the new road is operational.

The road construction work consists of several sub works, among other things:

- Stripping
- Sub-grade
- Sub-base coarse
- Base coarse
- Pavement of road
- Side ditch

Use of Fuels And Oils

Earth works and road construction requires the operation of a large fleet of heavy equipment. Temporary fuel stations will be installed and equipped with fuel storage facilities. Equipment usage will result in significant amounts of waste oil. Other chemicals such as petroleum or thinners will be utilized during construction

Demobilization of Work Force

The construction crew will primarily be sourced from the local affected area. However, the road operation will require a relatively small amount of labor and most of the construction personnel will be demobilized upon completion of the construction work.

2.1.2.3 *Post Construction Stage (Operation Stage)*

Activities during road operation fall into road usage and road maintenance:

Road Usage

It is expected that the road will provide safer and more efficient transport for vehicles along the west coast of Aceh. The road will initially provide easier access for reconstruction activities and later as efficient transport for local people, products and services to the surrounding communities.

Road Maintenance

Maintenance activities are best carried out in a cost effective manner using a long-term asset management approach that includes a road and bridge inventory, condition surveys and evaluation tools to update, prioritize and schedule periodic maintenance.

2.1.3. *Activities Surrounding TheProject Area*

The location of the road construction stretching up from Banda Aceh to Meulaboh through the shore and hilly and mountainous areas. Because of tsunami, several villages have disappeared, but other villages, which are safe, still have the roads to be constructed. The activities of the people living in the villages situated along the would be constructed road area as follows:

a. Land fisheries. For this business, there will be a need for water with a quality suitable for land fisheries.
b. Rice farming. This sector also require water though irrigation system.
c. The farming of yearly harvest crops as coconut plantation and others will give a benefit to the farmers in the areas beside the farming of other vegetations which are suitable habitat of several kinds of fauna in the areas.
d. Activities of village settlements and housings and the refugee settlement and refugee barrack which found along the road. However their impact of these activities are not significant.
e. The activity of cement plant Pabrik Semen Andalas Indonesia at Lhok Nga.
f. The activities of the tourism objects at Lhok Nga , water fall at Lhoong, an Mount Geurutee and at Lhok Kruet resort.

2.1.4. Schedule of Activities of The Project

The schedule of the activities starting from the stage of pre construction up to the stage of construction and on to the stage of operation of roads and bridges will be commenced in January 2006 for pre construction, April 2006 for construction and May 2009 for operation.

Table 2.3 Schedule of the Road Rehabilitation and Reconstruction Banda Aceh-Meulaboh

Project Activity	2005				2006				2007				2008				2009				2010			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Pre Construction Phase																								
Survey and measuring																								
Land acquisition																								
Construction Phase																								
Employment of workforce																								
Mobilization and demobilization of materials and equipments																								
Development and operation of supporting facilities																								
Pointing out location of borrow area and excavation																								
Clearing of field																								
Land work																								
Construction of road and bridges.																								
Consumption of fuel and oil																								
Termination of workforce																								
Post Construction Phase																								
Operating the road																								
Maintenance and Repair of roads and bridges																								

2.2. ENVIRONMENTAL BASELINE CONDITIONS

2.2.1. *Physical and Chemical Components*

2.2.1.1 *Type of climate, rainfall and rainy days*

Aceh Besar Area

According to the classification of climate by Schmidt-Ferguson, the study area has predominantly a tropical climate. The ratio of the wet and dry months for 10 years recorded consecutively (1995 up to inclusive 2004) has a value of Q=45.31%. It is concluded that the Aceh Besar area has a climate of type C (rather wet) (BMG Station Iskandar Muda, 2004) with a value range from 33.3 to 60%. The difference between wet and dry seasons is very significant.

The highest monthly rainfall is 639 mm in November 2000 and the lowest one is 0.6 mm in March 1998. The data shows that the monthly average of the highest rainfall is 226 mm in the month of November and the average of the lowest rainfall is 57.4 mm in the month of June (**Table 2-4**).

Table 2.4 Average Monthly Rainfall (mm) for 10-Year Period in Aceh Besar Regency

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Av
Jan	155	87	65	128	104	130	232	227	168	112	140
Feb	199	349	70	172	186	101	66	21	207	380	175
Mar	202	48	268	0,6	55	46	42	60	131	262	111
Apr	135	85	100	76	59	44	47	105	96	135	88
May	126	81	105	88	70	119	69	138	122	99	101
Jun	41	119	78	63	3	136	43	7	45	39	57
Jul	55	285	17	45	21	65	22	91	64	30	69
August	80	111	77	167	245	34	19	13	112	82	94
Sept	73	56	128	54	116	105	104	91	57	46	83
October	186	184	256	95	73	69	453	229	291	234	207
Nov	165	261	258	120	160	639	103	162	126	267	226
Des	132	241	170	75	185	178	171	165	120	23	146
Total	1549	1907	1592	1083,6	1247	1666	1371	1309	1539	1709	
Average	129,1	158,9	132,7	90,3	103,9	138,8	114,3	109,1	128,3	142,4	

Source : Sta. BMG. Iskandar Muda

The average rainfall in the Aceh Besar Regency is shown on **Table 2-5**

Table 2.5 Average Monthly Rainy Days for 10-Year Period in Aceh Besar Regency

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	16	8	8	8	16	15	18	16	19	17
Feb	7	18	11	7	13	9	8	4	9	18
Mar	15	10	14	2	11	14	12	11	11	19
Apr	13	12	12	9	11	16	14	15	12	15
May	12	15	11	13	15	13	11	8	15	9
Jun	9	13	7	12	4	17	8	5	12	8
Jul	13	15	6	14	12	11	9	12	9	8
August	20	15	10	21	11	11	10	8	11	10
Sept	12	11	17	17	14	16	13	17	13	10
October	16	16	26	18	15	16	17	19	16	24
Nov	16	17	20	29	11	16	19	17	12	16
Des	12	14	15	18	21	11	8	18	19	5
Total	161	164	157	168	154	165	147	150	158	159
Average	13,4	13,7	13,1	14	12,8	13,8	12,3	12,5	13,2	13,3

Source: Sta. BMG. Iskandar Muda

The highest number of the rainy days in a month was 29 days in the month of November 1998, and the lowest number of rainy days in a month was 4 days in the month of June 1999. The average rainy days for the same period were 18.3 days in October and 9.5 days in the month of June.

Areas of Aceh Barat and Aceh Jaya

Climates of the areas of Aceh Barat and Aceh Jaya, according to the classification of Schmidt-Ferguson, are classified as climate type A (Station BMG Cut Nyak Dhien, 2004). The ratio of average total of wet months and dry months according to the data recorded for 10 years (1995 up to inclsv 2004) Table 2-6 has a value of Q=0.0% meaning that the regency of Aceh Barat and the surrounding area has no significant difference between wet season and dry season. The type of climate of Aceh Jaya Regency has not yet been classified by the region itself, but it is still covered by the BMG station at Cut Nyak Dhien which used to monitor it for Aceh Jaya when it was still part of the regency of Aceh Barat.

The highest annual rainfall recorded was 3941 mm and the highest monthly rainfall was 816 mm during May 1995. The lowest rainfall was 121 mm in January 1997. According to data recorded in recent 10 years (1995-2004) there was no dry month during the ten-year period.

Table 2.6 Monthly Average Rainfall (mm) for 10-Year Period in Aceh Barat Regency

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Av
Jan	124,4	124,4	120,6	470,8	325,6	515,2	176,8	288,2	179,6	453,8	278
Feb	439,2	342,7	214,2	175,5	116,9	161,6	169,3	293,6	380,5	207,5	250
Mar	321,3	277,3	199,9	165,9	412,4	200,8	306,5	175,2	187,0	315,2	256
Apr	285,8	380,9	403,4	334,5	211,7	516,6	407,5	422,0	356,4	518,8	384
May	815,8	175,9	319,9	458,3	363,8	492,1	144,5	257,6	147,1	491,8	367
Jun	250,4	240,6	135,6	142,5	206,7	186,5	454,1	454,1	258,9	305,9	264
Jul	226,6	217,9	235,4	450,1	254,8	458,6	378,4	228,7	104,5	309,7	286
August	302,2	332,8	130,1	759,5	218,1	247,1	144,1	149,5	368,4	244,2	290
Sept	356,9	169,6	623,3	502,4	385,8	426,7	219,6	367,1	262,8	645,0	396
October	311,4	382,4	689,9	210,7	332,7	467,7	524,2	476,4	338,5	388,2	412
Nov	441,2	352,9	600,5	547,2	343,9	704,5	291,3	322,1	539,8	389,2	453
Des	153,3	150,6	650,4	377,2	192,4	410,3	350,6	316,3	283,4	166,1	305
Total	4029	3148	4323	4595	3365	4788	3567	3751	3407	4435	
Average	335,7	262,3	360,3	382,9	280,4	399	297,2	312,6	283,9	369,6	

Source : Sta. Klimatologi Cut Nyak Dhien

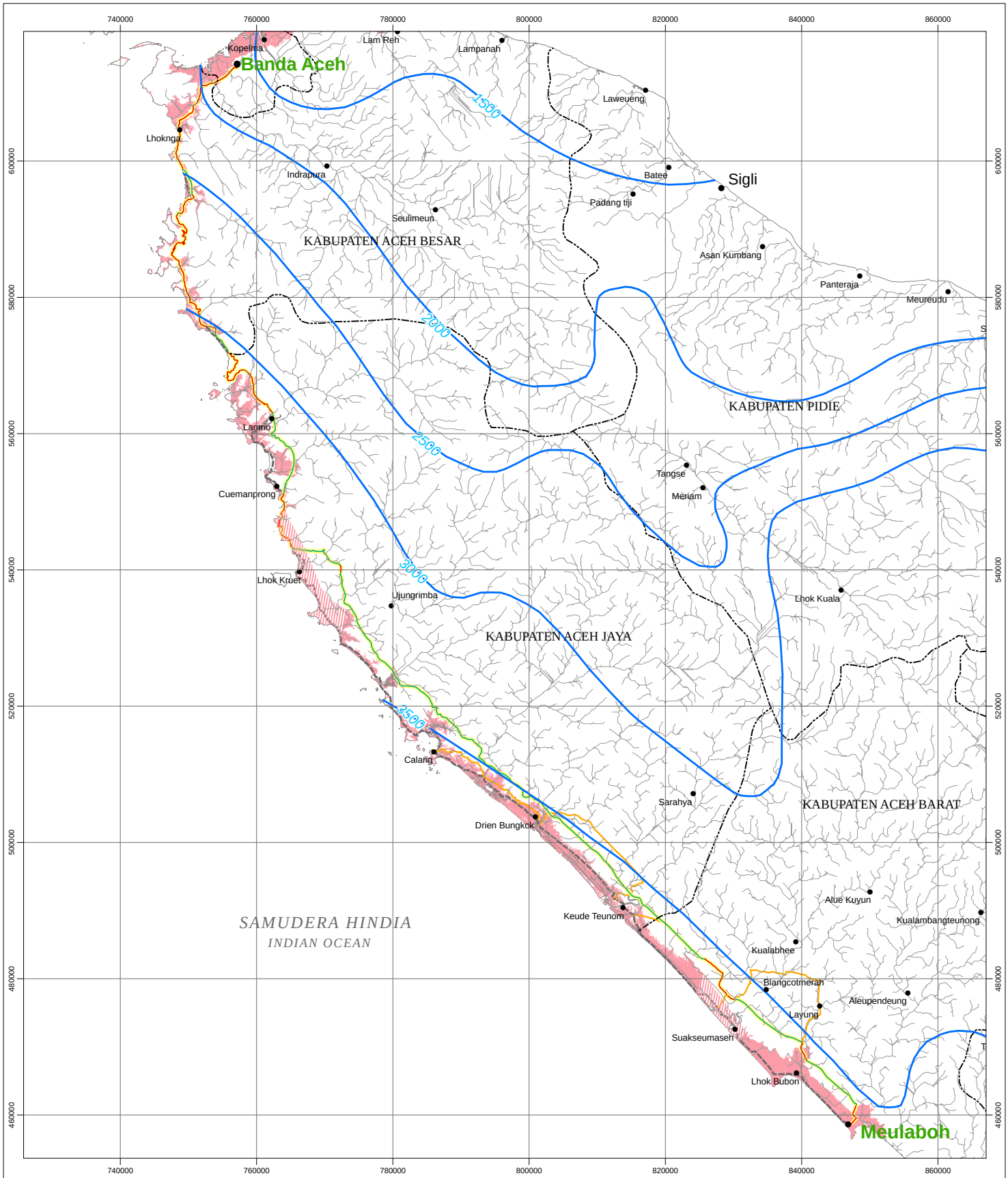
Average total rainfall in the regency of Aceh Barat shown on **Table 2-7**

Table 2.7 Total Average Monthly Rainy Days for 10 Year Period in Aceh Barat Regency

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	13	13	11	22	19	21	17	19	17	19
Feb	17	20	16	18	17	14	11	15	17	16
Mar	22	17	20	15	24	15	14	22	19	19
Apr	19	22	18	27	17	22	22	24	21	20
May	17	16	17	18	17	12	10	14	16	17
Jun	13	12	13	16	6	19	16	17	8	10
Jul	16	18	13	22	22	22	15	13	11	22
August	22	20	16	24	15	17	13	14	19	16
Sept	10	16	25	23	22	16	21	22	16	22
October	24	25	27	18	7	26	23	26	21	16
Nov	22	20	26	29	23	23	20	20	27	23
Des	15	12	27	16	18	27	19	19	21	20
Total	210	211	229	248	207	234	201	225	213	220
Average	17,5	17,6	19	21	17	20	17	19	18	18

Source : Sta. Klimatologi Cut Nyak Dhien

The highest average monthly rainy days in a ten year period is 23.3 days in the month of November. Aceh average isohyets rain map yearly is shown in **figure 2.5**.



KERANGKA ACUAN

TERMS OF REFERENCE

PETA ISOHIT HUJAN RERATA DAERAH TAHUNAN WILAYAH ACEH

ACEH AVERAGE ISOHIET RAIN MAP YEARLY

Sumber :
Source :

Data Departemen Pekerjaan Umum Tahun 1997
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

Gambar	**2 - 5**	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Legenda
Legend

Sungai
River

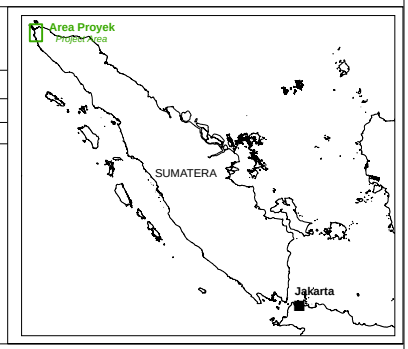
Garis Kontur Isohit (mm)
Isohiet Contour Line (mm)

Area Dampak Tsunami
Tsunami Affected Area

Area Dampak Tsunami (perkiraan)
Tsunami Affected Area (estimated)

N

0 10 20 30 Km



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2.2.1.2 *Wind Direction and Velocity*

Aceh Besar Area

Data of dominant wind direction and the maximum wind velocity is shown in **Table 2-8**.

Table 2.8 Average Wind Speed and Direction in Aceh Regency for 10-year period

Year	1995		1996		1997		1998		1999		2000		2001		2002		2003		2004	
	A	K	A	K	A	K	A	K	A	K	A	K	A	K	A	K	A	K	A	K
Jan	N	08	N	08	S	08	N	09	W	08	W	07	S	13	N	13	SW	10	N	13
Feb	W	08	S	09	W	09	W	09	E	08	W	08	S	12	W	11	SW	10	W	11
Mar	N	07	W	10	W	10	N	09	W	07	W	10	W	13	N	12	SW	11	N	12
Apr	W	11	W	11	W	11	W	08	W	11	W	08	SW	11	W	10	SW	11	W	10
May	E	09	W	10	W	10	E	09	E	09	W	08	W	13	E	11	SW	12	E	11
Jun	E	09	W	11	SW	11	E	11	NW	09	W	08	W	11	E	13	W	11	E	13
Jul	E	11	W	11	W	11	E	10	NW	11	W	09	W	13	E	10	W	12	E	10
August	N	08	W	10	W	10	N	11	W	08	W	12	W	11	N	12	W	13	N	12
Sept	N	10	W	10	W	10	N	09	N	10	W	13	W	12	N	12	W	14	N	12
Octor	N	10	W	11	W	11	N	08	N	10	W	10	W	14	N	12	W	16	N	12
Nov	N	08	W	10	W	10	N	10	W	08	W	12	S	12	N	13	S	17	N	13
Des	S	07	S	08	W	08	S	07	W	07	W	10	SW	11	S	13	SW	13	S	13

Source : Sta. Klimatologi Iskandar Muda
Note : A = wind direction K = wind speed (knot)

Aceh Barat and Aceh Jaya Area

Data of dominant wind direction and wind velocity is shown in **Table 2-9**

Table 2.9 Average Wind Direction and Speed in Aceh Barat Regency in 10 Year Period

Year	1995		1996		1997		1998		1999		2000		2001		2002		2003		2004	
	A	K	A	K	A	K	A	K	A	K	A	K	A	K	A	K	A	K	A	K
Jan	N	08	N	08	S	08	W	09	W	08	W	07	S	12	SW	13	SW	10	SW	13
Feb	W	09	S	08	W	08	W	09	E	08	W	08	S	11	W	11	SW	10	SW	12
Mar	N	10	W	08	W	09	W	09	W	07	W	10	W	12	SW	12	SW	11	SW	13
Apr	W	11	W	08	W	08	W	08	W	11	W	08	SW	12	W	10	SW	11	W	11
May	E	10	W	09	W	09	W	09	E	09	W	08	W	11	W	11	SW	12	W	13
Jun	E	11	W	07	SW	11	W	11	NW	09	W	08	W	13	W	13	W	11	W	11
Jul	E	11	W	07	W	09	W	10	NW	11	W	09	W	11	W	10	W	12	W	13
August	N	10	W	10	W	09	W	11	W	08	W	12	W	11	W	12	W	13	W	11
Sept	N	10	W	09	W	09	E	09	N	10	W	13	W	11	W	12	W	14	W	12
Octo	N	11	W	09	W	09	W	08	N	10	W	10	W	13	W	12	W	16	W	14
Nov	N	10	W	09	W	08	W	10	W	08	W	12	S	13	SW	13	S	17	SW	12
Des	S	08	S	09	W	08	W	07	W	07	W	10	SW	11	SW	13	SW	13	W	11

Sumber : Sta. Klimatologi Cut Nyak Dhien
Keterangan : A = Arah angin K = Kecepatan angin

2.2.1.3 *Temperature, Humidity, Air Pressure and Sunlight.*

Aceh Besar Area

Data on temperature, relative humidity, air pressure and solar radiation (sunlight) is shown in **Table 2-10**

Table 2.10 Average Temperature, Humidity, Air Pressure and Solar Radiation in Aceh Besar Regency

Year	Temperature (°C)			Relative Humidity (%)			Air Pressure ((mbar) Min	Sun Radiation (%) Av
	Max	Min	Av	Max	Min	Max		
January	30,2	22,2	25,8	92	68	80	1008,7	69
February	30,2	20,5	26,2	94	69	75	1008,9	69
March	30,4	20,6	26,4	94	71	83	1010,0	69
April	30,6	21,0	26,7	94	70	84	1009,7	69
May	30,4	20,7	26,4	93	72	77	1009,5	69
June	31,2	21,4	26,8	94	74	84	1012,3	69
July	30,1	20,0	26,0	94	71	83	1009,6	70
August	30,4	22,5	25,9	92	68	79	1010,8	70
September	30,1	22,7	25,9	94	74	84	1011,2	69
October	29,6	22,7	25,5	93	71	83	1011,7	69
November	29,6	22,6	25,5	94	74	84	1010,6	69
December	30,2	22,2	25,7	93	67	81	1010,2	69
Total	363	259,1	312,8	1121	846	976	12122,9	830
Average	30,3	21,6	26,1	93,4	70,5	81,3	1010,3	69

Source : Sta. Klimatologi Iskandar Muda

The average maximum and minimum temperature recorded at the BMG-Iskandar Muda station were 31.2^{0}C and 20.5^{0}C respectively with an average temperature of 26.1^{0}C.

The average maximum and minimum relative humidity recorded were 93% and 70% respectively with an average of 81.3%, average air pressure 1010.3 mbar and average sun radiation 69%.

Aceh Barat and Aceh Jaya Area

Data on maximum, minimum and average levels of temperature, and the maximum, minimum and average levels of humidity, and also the data on solar radiation are shown in the following **Table 2.11**.

Table 2.11 Average Temperature, Humidity, Air Pressure and Solar Radiation in Aceh Barat

Year	Temperature (°C)			Relative Humidity (%)			Air Pressure ((mbar)	Sun Radiation (%)
	Max	Min	Av	Max	Min	Av		
January	30,2	22,2	25,8	92	68	80	1008,7	69
February	30,2	20,5	26,2	94	69	75	1008,9	69
March	30,4	20,6	26,4	94	71	83	1010,0	69
April	30,6	21,0	26,7	94	70	84	1009,7	69
May	30,4	20,7	26,4	93	72	77	1009,5	69
June	30,6	20,7	26,5	92	69	81	1009,3	69
July	30,1	20,0	26,0	94	71	83	1009,6	69
August	30,4	22,5	25,9	92	68	79	1010,8	69
September	30,1	22,7	25,9	94	74	84	1011,2	69
October	29,6	22,7	25,5	93	71	83	1011,7	69
November	29,6	22,6	25,5	94	74	84	1010,6	69
December	30,2	22,2	25,7	93	67	81	1010,2	69
Total	362,4	258,4	312,5	1119	844	974	12120	828
Average	30,2	21,5	26,0	93	70	81	1010	69

Source : Sta. Klimatologi Cut Nyak Dhien

According to the data recorded at the BMG Cut Nyak Dhien station, the average maximum temperature is 30.2^{0}C and minimum 21.5^{0}C with an average of 26^{0}C degree. The average maximum relative humidity is 93% and minimum 70% with an average of 81%. The average air pressure is 1010 mbar and solar radiation is 69%.

2.2.1.4 *Geology*

Information on geology of the area covered by the BandaAceh-Meulaboh roads is the secondary data obtained from literature of Bennet, et. Al, (1981); Cameron, et.al, 1982. But the information will be provided with data generated from a field survey.

The road to be constructed stretches from Banda Aceh trough the formation of tertiary sediment and quarter alluvium (Qh), the areas of Gle Gajah and Gle Joning on to Ujung Labuhan where the road will cross over the fault at coordinate 5o28` N and 95o 15` E` The route continues passing tertiary sediment (Qh) again at Desa Layeun at coordinate 5o17` N and 95o14`E crossing another fault.From there it continues to pass Mount Bentaro (Muvb).

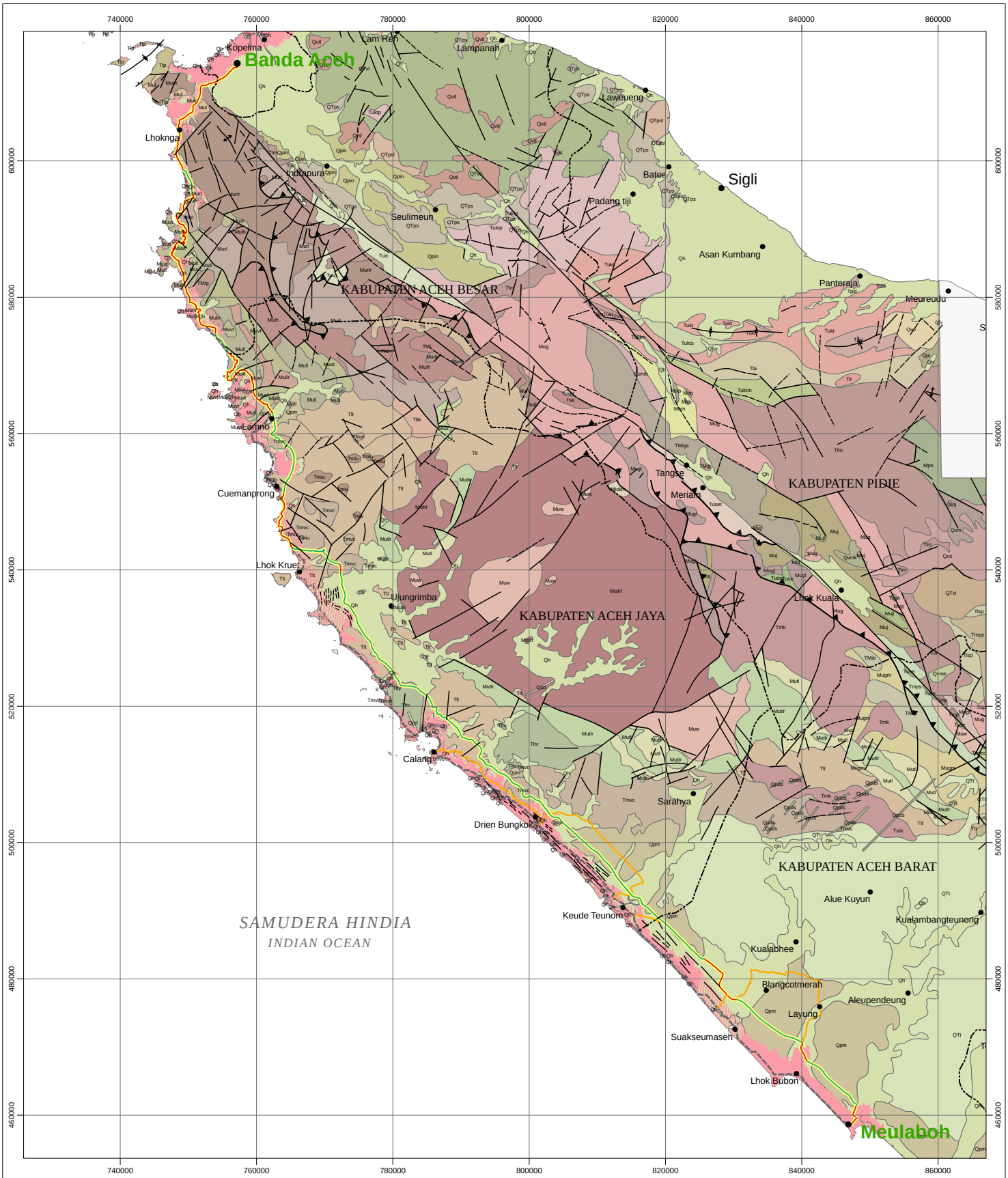
From the village of Ano, the road will pass through formasi Batu Gamping Lamno (Mull) up to Desa Meunasah Tengoh through tertiary sediment (Qh) again until Desa Pasi and further pass Formasi Batu Gamping Lamno and tertiary sediment (Qh) again until Bentaro Formation (Muvb) at Kraeng

Tanong. The road will find two faults at coordinate 5o 15` N and 95o 16` E, then to Meulaboh Formation (QPM) at Lamno, Tangla Formation (Tlt) and Mount Calang Formation (Tmvc), then the road will pass two villages (uncertain) at the coordinate 5o 03` N and 95o 23` E, and on to Formation Tangla Fasies Volkanic (Tltv) at the area of Ceumamprong, from on to a fault at coordinate 4o 53` N and 95o 24` E, and another fault at coordinate 5o 58` N and 95o 26` E near village Jumeut.

After passing uneven hilly land, the road will pass flat area and marsh of tertiary sediment (Qh) at Paqya Sialit, Paya Meurebo, Pungkis, on to Seunebok Langat, up to the foot of Gle Betong through to village Padang. From Village Padang it goes to Formation Tangla and Formation Tangla Fasies Volkanik and on to Village Lingkang. The new road will pass Formation Mount Calang (Tmvc) and then meet again with tertiary sediment (Qh), Formation Meulaboh (Qpm) and Formation Tutut (QTt). After passing the three geol;ogic formations, the road to Meulaboh will be no longer geologi brstruktur, such as sesar and faults, and they are only Formation Meulaboh (Qpm) and Tertiary Sediment. Geology map is shown by **Figure 2-6**.

2.2.1.5 Physiography

Description of the physiography and topography of this region is based on a Topographic Map with a scale of 1 : 50,000 issued by Bakosurtanal (National land survey Agency) in 1975. The road from Banda Aceh has a flat physiography of 0-3%. It also passes through an awkward physiography of the area of Mount Paroe; later it passes through the mountaineous areas (15 – 25 pct), on to the the hilly areas (8 – 15 pct) and uneven land (3 – 8 pct), and on to the flat land (0 – 3 pct) at the areas of Lhoong up to the foot of Mount Gerutee where the physiography changes from flat into mountaineous. The physiography of the area from Gerutee to Lamno varies from flat to mountaineous (0 – 8 pct). The construction of the new road is planned so as not to pass through the old routes where physiography is flat along the shore. The new route of the road passes through Lamno to Teunom where areas are hilly (5 – 15 pct), while the area from Teunom to Meulaboh is uneven ranging from high of 3-8pct up to the lowest of 0-3 pct (see **Figure 2-7**). Meanwhile the topographic map with scale 1: 50.000 will be appended as a Map Book.



KERANGKA ACUAN
TERMS OF REFERENCE

PETA GEOLOGI
GEOLOGY MAP

Sumber :
Source :
Pusat Penelitian dan Pengembangan Geologi
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

Gambar	**2 - 6**	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Legenda
Legend

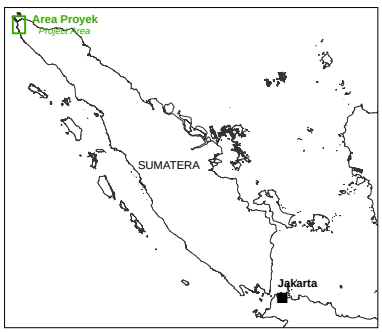
Area Dampak Tsunami
Tsunami Affected Area

Area Dampak Tsunami (perkiraan)
Tsunami Affected Area (estimated)

Lihat Halaman Selanjutnya
See Next Page

N

0 10 20 30 Km



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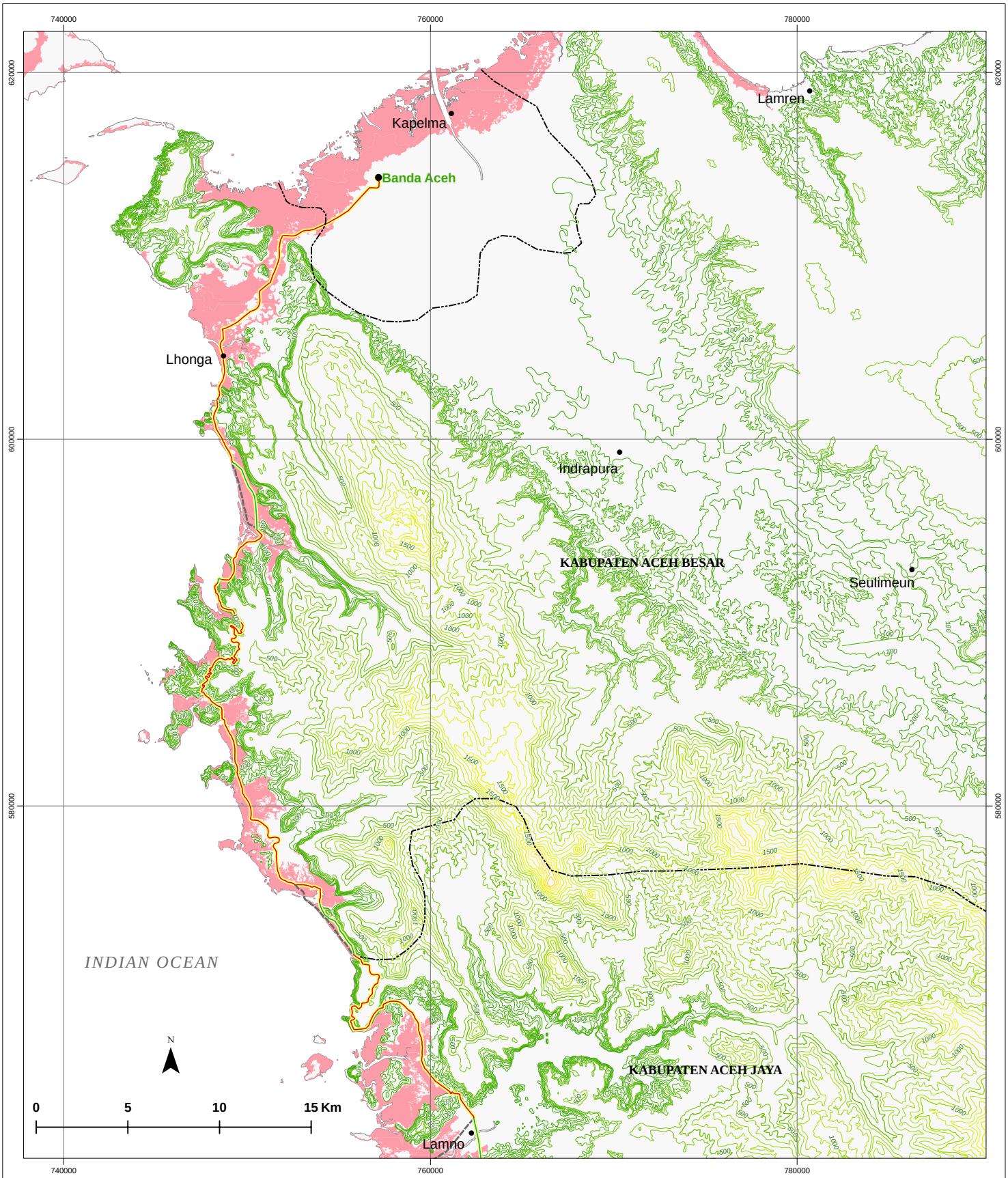
Legenda
Legend

Mirb	MIGROGABRO ROB ROB MICROGABBRO
Misk	BATOLIT SIKULEH : Miskf : granodiorite (Komplek Muda), Miski : dioritoid (Komplek Tua) SIKULEH BATHOLITH : Miskf : granodiorite (Younger Complex), Miski : dioritoids (Older Complex)
Miskf	Granodiorite Biotit-Hornblenda : granit biotit setempat bersifat migmatit atau genes Biotite-Hornblende Granodiorite; biotite granite locally migmatitic or gneissose
Miskm	Dioritoid terubah Alterred dioritoids
Mpn	SATUAN UNEUN : Sabak, batugamping malihan, batuan gunungapi malihan kurang. UNEUN UNIT : Slates, metalimestones, metavolcanics
Mugl	FORMASI GEUMPANG : Anggota Batugamping ; batugamping GEUMPANG FORMATION : Limestones member: metalimestones
Mug	FORMASI GEUMPANG : batuan gunungapi dan piroklastika menengah hingga mafik berubah dan termalihkan berbeda-beda, filit, sekilas hijau dan batugamping malihan kurang GEUMPANG FORMATION : variably altered and metamorphosed intermediate to mafic volcanics and pyroclasstic, minor phyllites, green schists and metalimestones
Mugm	FORMASI GUME GUME FORMATION
Mugr	FORMATION GEUMPANG, ANGGOTA BATUGAMPING GEUMPANG FORMATION, REUNGEUT LIMESTONE MEMBER
Muj	FORMATION JALEUEM JALEUEM FORMATION
Mujl	FORMATION JALEUEM, ANGGOTA BATUGAMPING JALEUEM FORMATION, LIMESTONE MEMBERS
Mul	FORMATION LHO'NGA :filit, serpih, sedimen gunungapi, dan turbidit, batugamping tipis LHO'NGA FORMATION : phyllites, slates, volcanic and turbiditic sediments, thin limestones
Mulh	FORMATION LHOONG : wake gunung api, sedikit batupasirdan batulanau, batuan gunungapi mafik dan batugamping LHOONG FORMATION : volcanic wackers, subordinates sandstones and siltstones, mafic, volcanics and limestones
Mull	FORMASI BATUGAMPING LAMNO : batugamping berwarna gelap dengan rombakan batuan gunung api LAMNO LIMESTONE FORMATION : dark limestones with volcanics debris
Mullr	Anggota Terumbu : batugampingbak terumbu, kelabu pejal Reef Member : massive grey reef-like facies
Mum	FORMASI LAM MINET : sebak dan rijang memita, berkandungan mangan berbeda-beda, berbesi, bergamping, berkarbon, batuan gunungapi, malihan mafik, basal terpengaruh tektonik, konglomerat, batugamping LAM MINET FORMATION : slates and banded cherts, variously manganiferous, ferruginpus, calcareous, carbonaceous, mavic metavolcanics, tectonised basalts, limestone conglomerates
Mumb	Anggota Batugamping Bengga : batugamping malihan bersifat turbidit konglomerat, sabak kurang, malih sentuhan Bengga LimestoneMember : conglomeratic turbiditic limestones, minor slates, locally contact metamorphosed
Murl	FORMASI BATUGAMPING RABA : batugamping lempungan dan silikaan berwarna gelap, berlapis tipis RABA LIMESTONE FORMATION : dark, thin bedded argillaceous and siliceous limestones
Murlr	Anggota Terumbu : batugamping bak terumbu, kelabu pejal Reef Member : massive grey reef-like facies
Mutl	Anggota Terumbu : batugamping bak terumbu, kelabu pejal Reef Member : massive grey reef-like facies
Mutlr	FORMASI BATUGAMPING TEUNOM TEUNOM LIMESTONE FORMATION
Muvt	FORMASI GUNUNGAPI TAPAKTUAN : basal dan andesit epidot, aglomerat, breksi, dan tufa, sedimen kurang penting TAPAKTUAN VOLCANIC FORMATION : epidotised andesites and basalts, agglomerates, breccias and tuffs, subordinate sediments
Muw	Kelompok Woyla tak terpisahkan (hanya pada penampang), lithologi tidak diketahui Undifferentiated Woyla Group (section only), lithologies unknown
QTps	FORMASI SEULIMEUM : batupasir tufaan dan gampingan, konglomerat, batulumpur kurang SEULIMEUM FORMATION : tuffaceous and calcareous sandstones, conglomerates, minor mudstones
QTpsl	Anggota Batugamping Lam kabeue : batugamping koral Lam Kabeue Limestone member : coralline limestone
QTt	FORMASI TUTUT : batupasir, konglomerat, batulumpur, batugamping minor TUTUT FORMATION : sandstones, conglomerates, mudstones, minor limestones
QTvl	SATUAN SAMALANGA LEUPING UNIT
QTvt	FORMASI TUTUT : batupasir, konglomerat, batulumpur, batugamping minor TUTUT FORMATION : sandstones, conglomerates, mudstones, minor limestones
QTvw	BATUAN GUNUNGAPI PULAU WEH : andesit, tufa, aglomerat PULAU WEH VOLCANICS : andesites, tuffs, aglomerates
Qh	ALLUVIUM (tak terbedakan) : kerikil, pasir, lumpur, dst ALLUVIUM : (undifferentiated) : gravels, sands, muds, etc
Qpd	Retas mikrogabroid Retas : microgabbro
Qpds	Retas : mikrogabro Retas : microgabbro
Qpi	FORMASI IDI : pasir dan kerikil berbongkahan setengah mengeras IDI FORMATION : semiconsolidated sands and bouldery gravels
Qpin	FORMASI INDRAPURI : endapan undak tua, sebagian kerikil dan pasir gunungapi INDRAPURI FORMATION : older terrace deposits, partly volcanic gravels and sands
Qpm	FORMATION MEULABOH MEULABOH FORMATION
Qvm	SATUAN MEUNTOL MEUNTOL UNIT
Qvme	BATUAN GUNUNGAPI MEUGEURINCENG MEUGEURINCENG VOLCANICS
Qvmk	SATUAN MEUKEUB MEUKEUB UNIT
Qvo	BATUAN GUNUNGAPI OLIM : breksi andesit, aglomerat, tufa, dan batupasir OLIM VOLCANICS : andesitic, breccias, agglomerates, tuffs, and sandstones
Qvs	SATUAN SAMALANGA SAMALANGA UNIT
Qvtl	Lahar dan piroklastika (bersifat) andesit sampai dasit Andesitic to dasitic pyroclastics & lahars
TMi	Aneka terobosan granodiorit dan intrusi diorit Miscellaneous granodiorite to diorite intrusives
TMib	GRANODIORIT BEURIEUNG BEURUEUNG GRANODIORITE
TMig	GRANODIORIT GEUNTEUT : granodiorit dan diorit tambahan GEUNTEUT GRANODIORITE : granodiorite and subsidiary diorite
TMigs	KOMPLEK GLE SEUKEUN : granodiorit, kurang penting, gabro, diorit, granit biotit, batuan retas GEU SEUKEUN COMPLEX : granodiorites, subordinate, gabbro, dioritebiotite, granite, dyke, rocks
Tibm	GRANODIORIT BALE MEUKO BALE MEUKO GRANODIORITE
Til	MIKRODIORIT INONG INONG MIKRODIORITE
Tir	DIORIT RAYA : diorit berpirit dengan meladiorit/facies piroksenit RAYA DIORITE : pyritic diorite with melanodiorite/pyroxenite facies
Tla	FORMASI AGAM : batulanau berari, batupasir, breksi, dalam formasi, batugamping, batupasir, berglaukonit AGAM FORMATION : laminated, siltstones, sandstones, intraformational, breccias, limestones, glauconitic, sandstones
Tlm	FORMASI MEUCAMPLI : batupasir mikaan, konglomerat aneka bahan, batupasir konglomerat, batulanou, batugamping, batuan gunungapi, mafik amigdaloid MEUCAMPLI FORMATION :micaceous sandstones, polymict conglomerates conglomeratic sandstones, limestonesm amygfaloidal mafic volcanics
Tlp	FORMASI PEUNASU : batupasir mikaan, konglomerat, serpih, batulumpur, batugamping, terumbu PEUNASU FORMATION : volcanogetic sandstone, conglomerates, snares, mudstones, reef limestones
Tlsp	FORMASI SIPOPOK SIPOPOK FORMATION
Tlt	FORMASI TANGLA : asal gunungapi, batupasir, konglomerat kerakal, arenit kuarsaan TANGLA FORMATION : volcanogenic sandstones, conglomerates, quartzose arenites
Tltk	Anggota Keubang : batugamping lempungan, sedikit batupasir gampingan dan batulanau, tipis batubara Keubang Member : argillaceous limestone, minor calcareoussandstones, and siltstones, thin coals
Tltv	FORMASI TANGLA : FASIES VOLKANIK : Batuan gunungapi menengah sampai mafik, terobosan gunungapi tanggung (dunaba terpisahkan) TANGLA FORMATION : VOLCANIC FACIES :Intermediate to mafic volcanics, subvolcanic intrusives (where differentiated)
Tlvb	FORMASI GUNUNGAPI BREUEH : basal amigdaloid, piroklastika bolus, rijang, dan setempat batuan gunungapi pucat, komplek retas BREUEH VOLCANIC FORMATION :amygdaloidal basalts, pyroclastics boles, cherts and pale volcanics locally: dyke complexes
Tmiu	DIORIT UNGA : stok diorit granodiorit berbutir halus UNGA DIORITES : fine-grained diorite granodiorite stocks
Tmk	FORMASI KUEH : Grit arkosa, breksi, konglomerat, batupasir gampingan, batulanau, gatugamping KUEH FORMATION : Arkosic grits, breccias, conglomerates, calcareous sandstones, siltstones, limestones
Tmp	FORMASI PEUTU PEUTU FORMATION
Tmpp	FORMASI PEUTU, ANGGOTA PAMEUE PEUTU FORMATION, PAMEUE MEMBER
Tmps	FORMASI PEUTU, ANGGOTA SENONG PEUTU FORMATION, SENONG MEMBER
Tmvc	FORMASI BATUAN GUNUNGAPI CALANG CALANG VOLCANIC FORMATION
Tpsi	FORMASI SIAP : konglomerat, sedimen, asal gunungapi, batupasir, gampingan, batulumpur kurang SIAP FORMATION : conglomerates, volcanogenic sediments, calcareous sandstones, minor mudstone
Tukt	FORMASI KOTABAKTI : batulumpur dan batulanau gampingan, batupasir, kurang, konglomerat, batugamping dan tufa KOTABAKTI FORMATION : calcareous mudstones, and siltstones, minor sandstones, conglomerates, limestones, and tuffs
Tuktm	Anggota Meuh : konglomerat anggota bahan, batupasir, konglomerat, batupasir, batulanau, dan batugamping kurang Meuh Member : polymict, conglomerates, conglomeratic sandstones, sandstones, minor siltstones, and limestones
Tuktp	Anggota Padangtiji : batupasir gampingan, konglomerat, batulanau, batugamping kurang Padangtiji Member : calcareous sandstones, conglomerates, siltstones, minor limestones
Tukts	Anggota Pintusatu : batupasir dan batupasir konglomerat Pintusatu Member : sandstones and conglomeratic sandstones
Tusec	SERPENTINIT TANGSE TANGSE SERPENTINITES
Tuset	SERPENTINIT TANGSE TANGSE SERPENTINITES
Tuse	Serpentinit lain Other serpentinites
	Batas Geologi Geological Boundary
	Sesar Fault
	Sesar Naik Thrust
	Sinklin Sincline
	Antiklin Anticline



KERANGKA ACUAN
TERMS OF REFERENCE

TOPOGRAFI
TOPOGRAPHY

Sumber :
Source : Elevasi dari SRTM (Shuttle Radar Topographyc Mission)
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

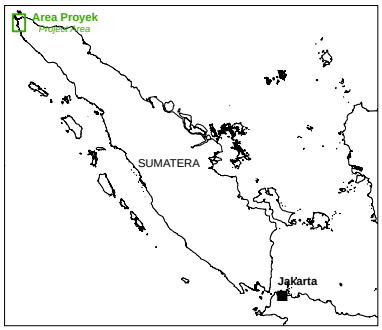
Gambar	2 - 7a	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Kontur : *(m dpal)*
Contour : (m from msl)

0 - 25	250 - 300	700 - 800	2000 - 2250
25 - 50	300 - 350	800 - 900	2250 - 2500
50 - 75	350 - 400	900 - 1000	2500 - 2750
75 - 100	400 - 450	1000 - 1250	2750 - 3000
100 - 150	450 - 500	1250 - 1500	3000 - 3250
150 - 200	500 - 600	1500 - 1750	3250 - 3500
200 - 250	600 - 700	1750 - 2000	

Area Dampak Tsunami
Tsunami Affected Area

Area Dampak Tsunami (perkiraan)
Tsunami Affected Area (estimated)



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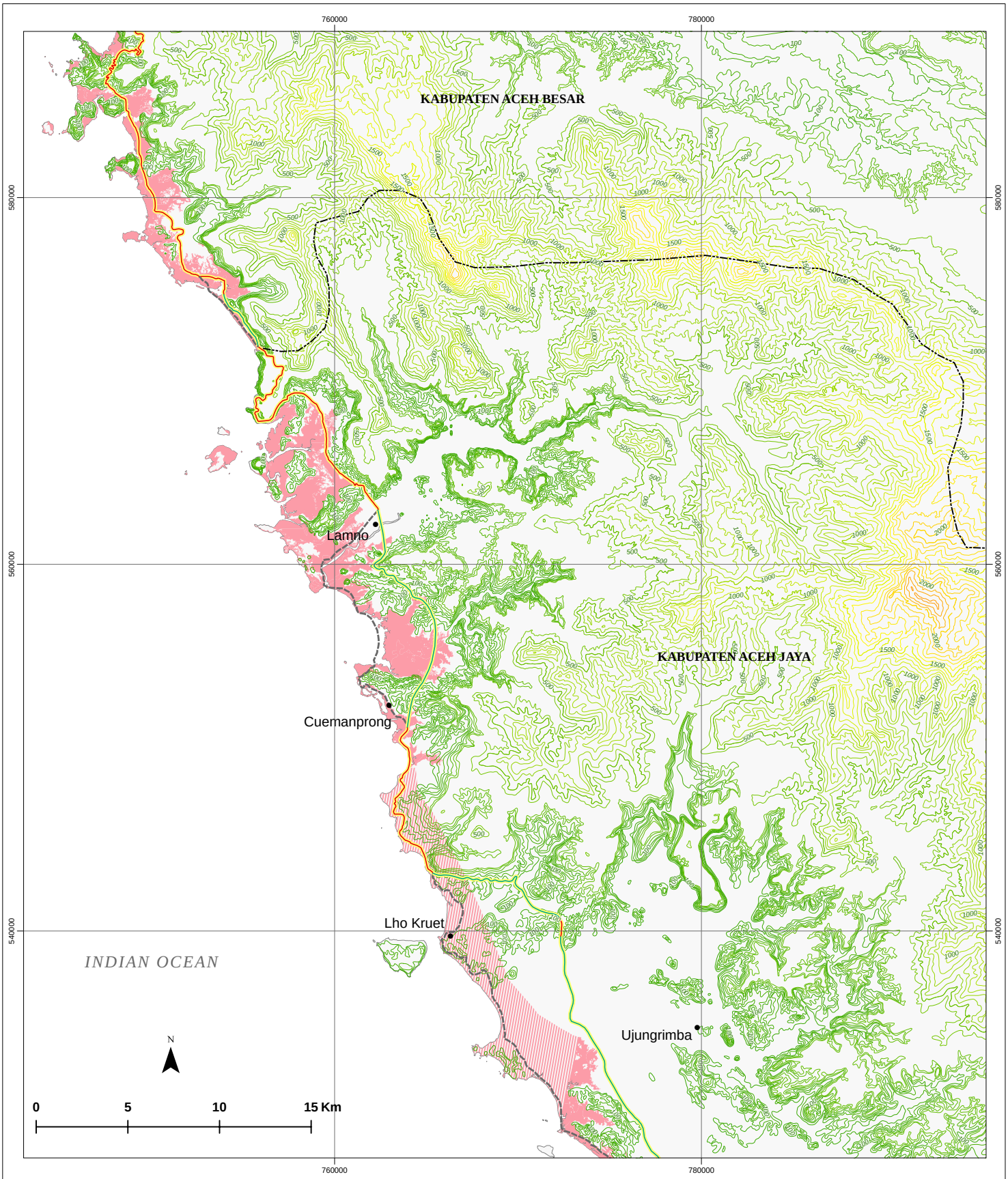
JALAN JENDRAL SUDIRMAN NO.1 BANDA ACEH - KODE POS 23239 TELP/FAX (0651)47150



KERANGKA ACUAN
TERMS OF REFERENCE

Sumber :
Source : Elevasi dari SRTM (Shuttle Radar Topographyc Mission)
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

Gambar	2 - 7b	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

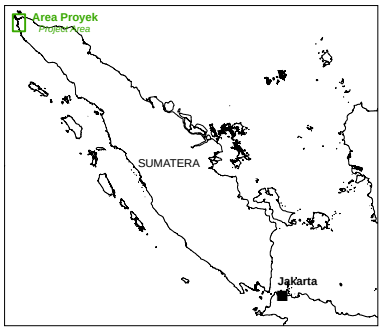
TOPOGRAFI
TOPOGRAPHY

Kontur : *(m dpal)*
Contour : (m from msl)

0 - 25
25 - 50
50 - 75
75 - 100
100 - 150
150 - 200
200 - 250
250 - 300
300 - 350
350 - 400
400 - 450
450 - 500
500 - 600
600 - 700
700 - 800
800 - 900
900 - 1000
1000 - 1250
1250 - 1500
1500 - 1750
1750 - 2000
2000 - 2250
2250 - 2500
2500 - 2750
2750 - 3000
3000 - 3250
3250 - 3500

Area Dampak Tsunami
Tsunami Affected Area

Area Dampak Tsunami (perkiraan)
Tsunami Affected Area (estimated)



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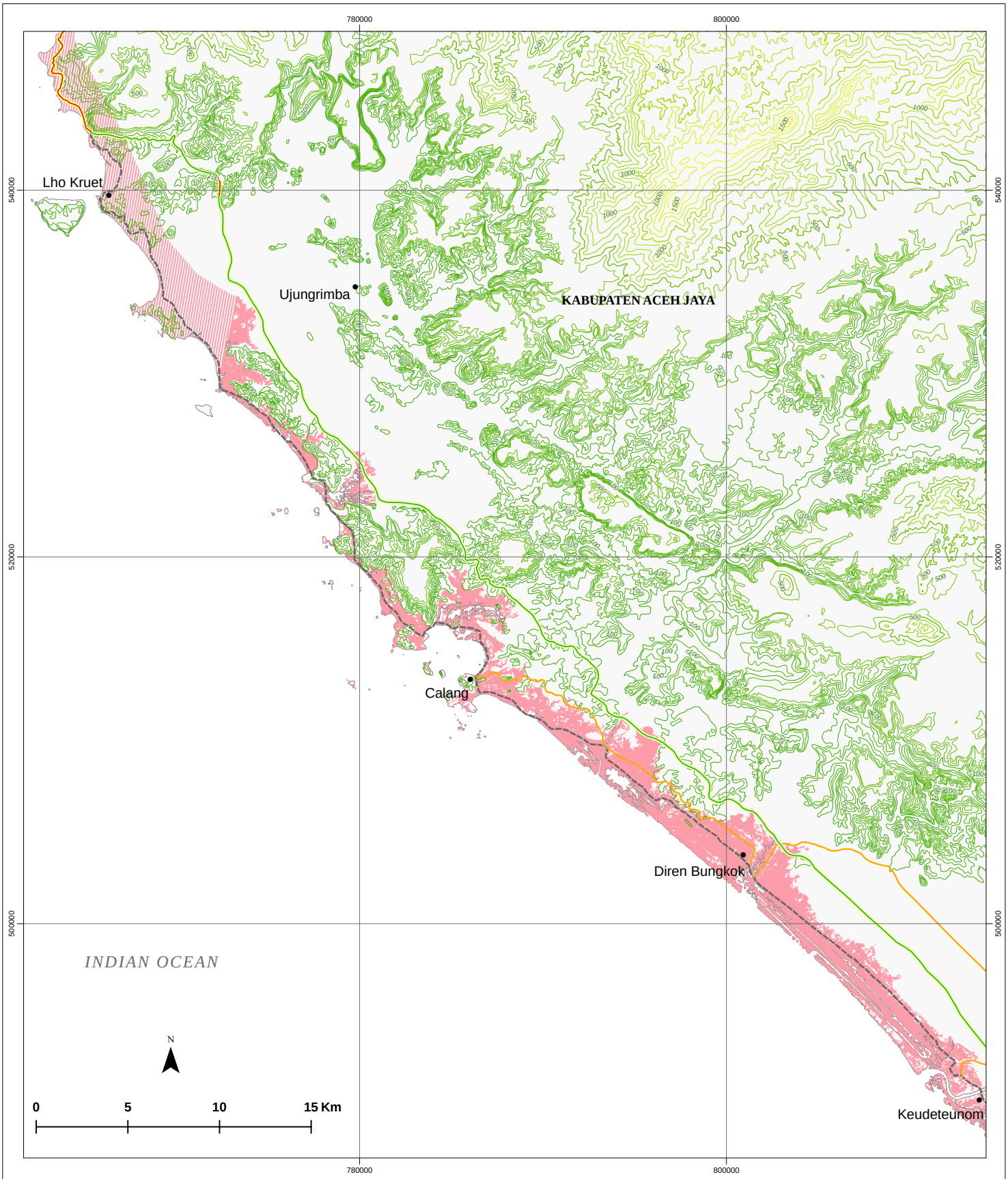


KERANGKA ACUAN
TERMS OF REFERENCE

TOPOGRAFI
TOPOGRAPHY

Sumber :
Source : Elevasi dari SRTM (Shuttle Radar Topographyc Mission)
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

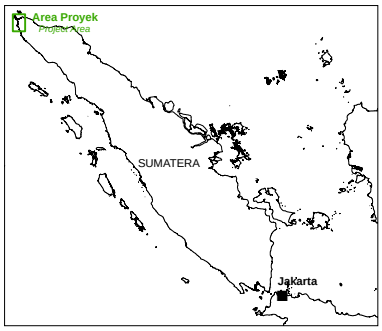
Gambar	2 - 7c	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Kontur : *(m dpal)*
Contour : (m from msl)

0 - 25	250 - 300	700 - 800	2000 - 2250
25 - 50	300 - 350	800 - 900	2250 - 2500
50 - 75	350 - 400	900 - 1000	2500 - 2750
75 - 100	400 - 450	1000 - 1250	2750 - 3000
100 - 150	450 - 500	1250 - 1500	3000 - 3250
150 - 200	500 - 600	1500 - 1750	3250 - 3500
200 - 250	600 - 700	1750 - 2000	

Area Dampak Tsunami
Tsunami Affected Area

Area Dampak Tsunami (perkiraan)
Tsunami Affected Area (estimated)



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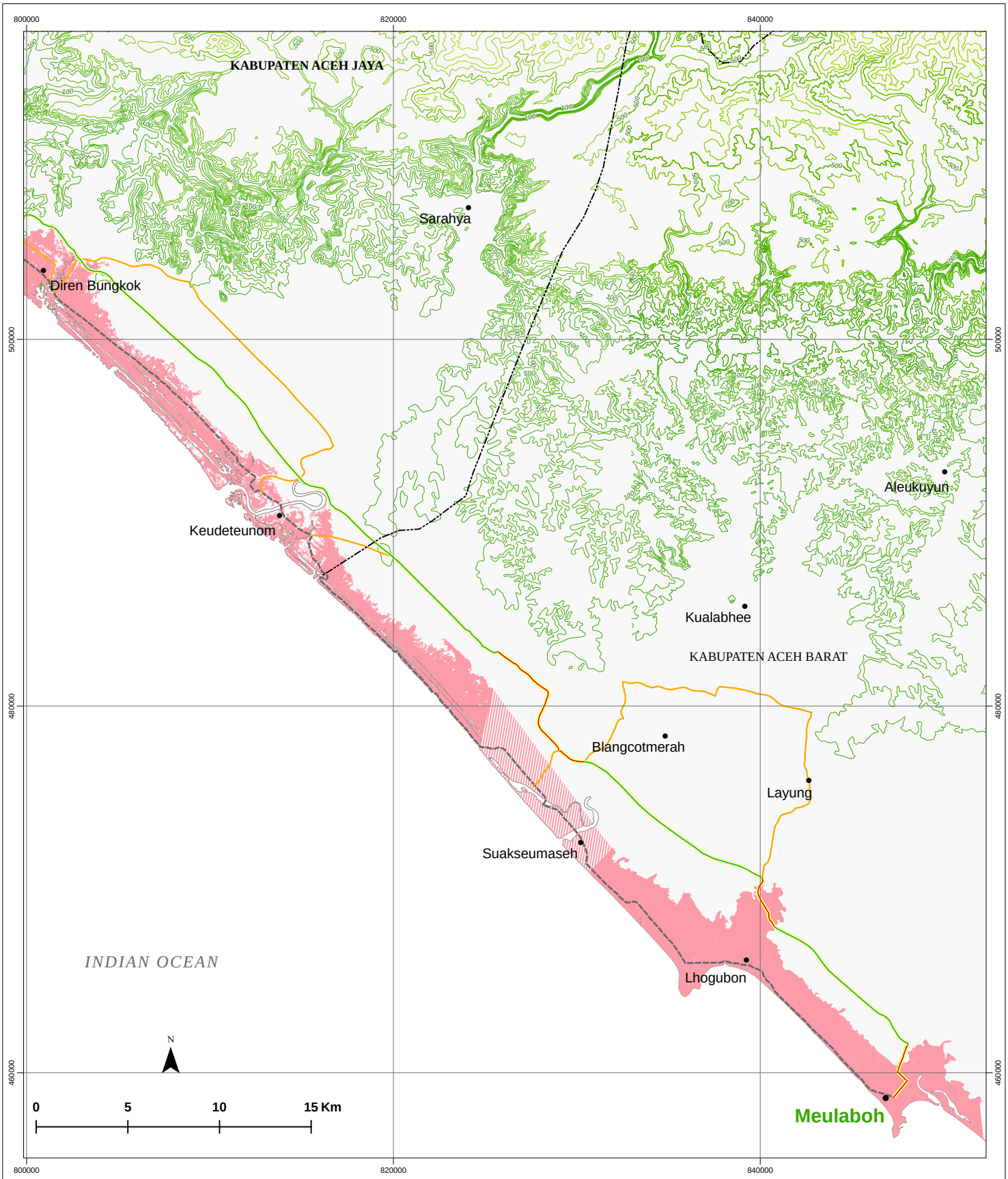


KERANGKA ACUAN
TERMS OF REFERENCE

Sumber :
Source : Elevasi dari SRTM (Shuttle Radar Topographyc Mission)
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

Gambar	2 - 7d	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

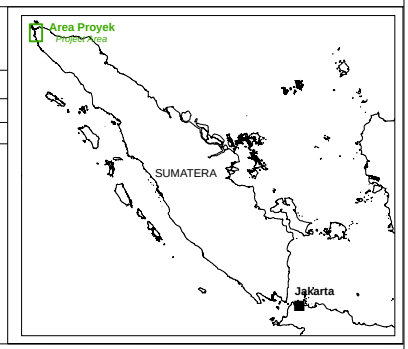
TOPOGRAFI
TOPOGRAPHY

Kontur : *(m dpal)*
Contour : (m from msl)

0 - 25
25 - 50
50 - 75
75 - 100
100 - 150
150 - 200
200 - 250
250 - 300
300 - 350
350 - 400
400 - 450
450 - 500
500 - 600
600 - 700
700 - 800
800 - 900
900 - 1000
1000 - 1250
1250 - 1500
1500 - 1750
1750 - 2000
2000 - 2250
2250 - 2500
2500 - 2750
2750 - 3000
3000 - 3250
3250 - 3500

Area Dampak Tsunami
Tsunami Affected Area

Area Dampak Tsunami (perkiraan)
Tsunami Affected Area (estimated)



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2.2.1.6 *Soil*

Data on the types of soil of the area to be covered by the new road from Banda Aceh – Meulaboh and that for the repaired roads is based on the Land Map from the Directorate of Land Use, 1986. From Banda Aceh, the road will pass the area of Lhok Nga where the soil is of alluvial type, and some of the areas contain soil of the mixed type of regosol podsolik with colours of red and yellow, with latosol and litosol. The hilly areas near Lamno have soil with the types of red and yellow podsolic and latosol in the area near Calang. After Calang, the new road will pass through areas which contain soil type of asosiasi organosol (gambut) and lei humus rendah. The latter type of soil is found along the route to Meulaboh. (**see Figure 2.8**)

2.2.1.7 *Land Uses*

Data from Geographic Information System (GIS) analysis is merged with a map of land used from National Land Body of NAD Province (BPN NAD). Most of residential area between Banda Aceh and Lhoknga has been damaged ny tsunami. The residential area located in Lamno area remains unaffected. The forest in Paroe and Geurutee is a protected area which was traversed the old road which still being used. There is no plan to wide the existing road. Near the Paroe the road crosses secondary forest area which is part of the protected forest. From the Lamno area up to new road crossing, the primary land use is for the protected forest, secondary forest and for the residential area of Ceumanprong village, which is also affected by tsunami.

The new road does not traverse through the schrubs in the Lhok Kruet area. However, the road will cross the swamp the Drien Bungkok, Keudeu Teunom, Suaksemaseh and Reusak areas. During the reconnaissance the study team observed that the local people wased swamp for fishing. Subsequent interview with the local people indicated that the fishing was not the main activity to earn living. The most part of the land between Reusak to Cot Seumeurueng and Gampa in Meulaboh was used for rubber plantation and for residential area. Detail of the land use are shown in land use map (**Figure 2.9**).

Table 2-12 shows the various sections of the road with its current land physiography and land uses.

Table 2.12 Physiographical Condition and Land Use in Banda Aceh to Meulaboh Road Segments

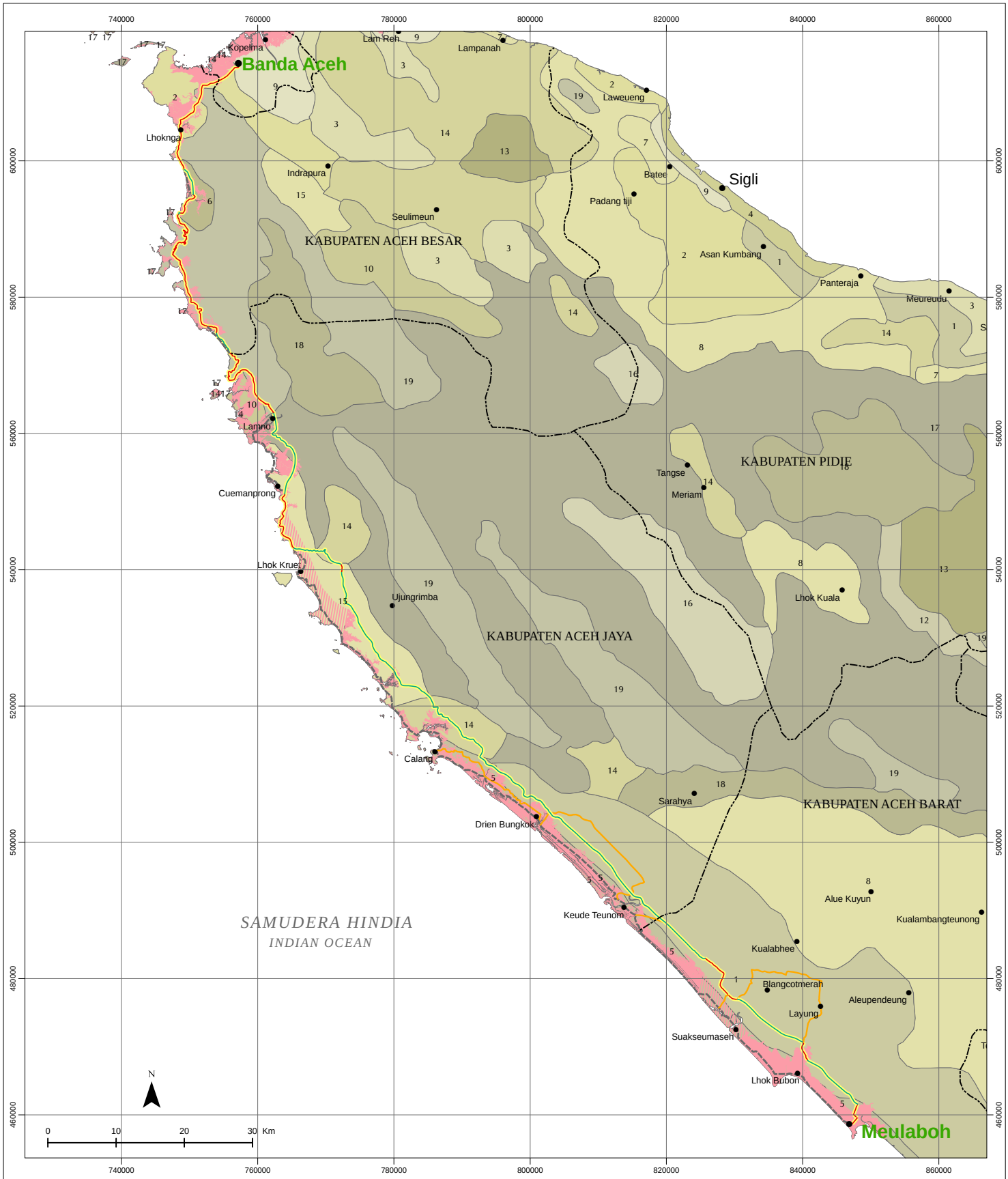
Physiographic Description	*Road Segment*	*Length (km)*	*Pass through*	*Land Usage*
1. Flat	Km $_{0}$ – Km $_{18}$	18	BNA-Gle Ludah	City, Residential, plantation
	Km $_{71}$ – Km $_{81}$	10	Meudhen-Didrieng (Lambesoi)	Residential, plantation
	Km $_{88}$ – Km $_{91}$	3	Sarah-Meudang Ghoh	Swamp
	Km $_{114}$ – Km $_{119}$	5	Paya Sialit- Senebok Langsat	Swamp
	Km $_{153}$ – Km $_{157}$	4	Blang Phong-Kr.Kabung	Residential, plantation
	Km $_{169}$ – Km $_{196}$	27	Kr Inong-Ujung Tanoh	Residential, plantation
	Km $_{196}$ – Km $_{207}$	9	Ujung Tanoh-Teupin Perahu	Residential, plantation
	Km $_{210}$ – Km $_{217}$	7	Teupin Perahu-Reusak	Swamp
	Km $_{217}$ – Km $_{223}$	6	Reusak-Bale	Residential, plantation
	Km $_{223}$ – Km $_{230}$	7	Bale-Gampa	Swamp, Rubber forest
	Km $_{230}$ – Km $_{246}$	16	Gampa–Lingkaran Tugu Meulaboh (Km $_{0}$)	City, Residential
Grand Total		**112**		
2. Flat–undulating	Km $_{18}$ – Km $_{28}$	10	Gle Ludah-Pulut	Residential, barack and plantation
	Km $_{42}$ – Km $_{58}$	16	Cot Jeumpa-Lam Paoh	Residential and plantation
	Km $_{91}$ – Km $_{104}$	13	Meudang Ghoh-Ceunamprong	Residential, Rice field, and swamp
	Km $_{119}$ – Km $_{138}$	19	Seunebok Langsat-Rawa Pengapet	Swamp, Rice field
	Km $_{157}$ – Km $_{169}$	12	Kr Kabung-Kr Inong	Residential and plantation
Grand Total		**70**		
3. Undulating - small hills	Km $_{138}$ – Km $_{146}$	8	Gle Pengapet-Gle Alue Ho	Secondary forest
Grand Total		**8**		
4. Small hills – large hills	Km $_{81}$ – Km $_{88}$	7	Didrieng-Sarah	Secondary forest
	Km $_{104}$ – Km $_{114}$	10	Ceunamprong-Gle Mayang-Paya Sialit	Secondary forest
	Km $_{146}$ – Km $_{153}$	7	Gle Alue Ho-Blang Phong	Secondary forest
Grand Total		**24**		
5. Large hills – mountainous	Km $_{28}$ – Km $_{42}$	14	Paroe (Pulut-Cot Jeumpa)	Protected area
	Km $_{58}$ – Km $_{71}$	13	Geuretee (Laqm Paoh-Mudhen)	Protected area
Grand Total		**27**		
Total Length		**241**		

Sources : Field investigation result in road segmentation

Table 2.13 Physiographical Condition and Land Use in Abandoned Road Segment in Banda Aceh to Meulaboh Road Segments

	Physiographic Description	Road Segment	Length (km)	Pass Through	Remarks
1.	Datar	Km $_{21,5}$ – Km $_{25,5}$	4	Kr. Leupung – Gle Keunekei	Covered by seawater
		Km $_{58}$ – Km $_{63}$	5	Cunien-Kr Inong Kareung	Covered by seawater
		Km $_{80,7}$ – Km $_{97,5}$	3	Pante Keutapang (Lambesoi)-Kr Ceunamprong	Abandoned and follows TNI alignment
		Km $_{108,3}$ – Km $_{243,5}$	135,2	Kra Mong-Meulaboh	Abandoned and follows TNI alignment and regency road from Cot Trap-Cot Buloh-Kuala-Bhee – Layung dan Seunebok
				Kra Mong ke Lhok Krut	A part of road still exist and usable but in bad condition
				Ligan – Calang -Teunom	A part of road stil exist but in bad condition
				Arongan Ke Meulaboh	A part of road stil exist but in very bad condition and not usable
	Jumlah		147,2		

Sources : Field investigation result in road segmentation



KERANGKA ACUAN

TERMS OF REFERENCE

PETA TANAH

SOIL MAP

Sumber :
Source : Departemen Dalam Negri Direktorat Jenderal Agraria, Direktorat Tata Guna Tanah, 1986
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM), Zona 46 Utara, WGS 84

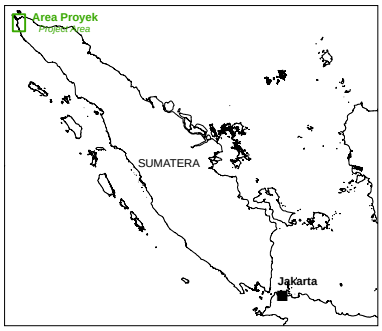
Gambar	**2 - 8**	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Satuan Tanah (bahan induk)
Soil Unit (Source Rock)

- 1 Organosol, Gleihumus (alluvial) — *Organosol, Gleihumus (alluvial)*
- 2 Alluvial (alluvial) — *Alluvial (alluvial)*
- 3 Hidromorf Kelabu (alluvial) — *Grey Hidromorf (alluvial)*
- 4 Regosol (alluvial) — *Regosol (alluvial)*
- 5 Latosol Podsolik Merah Kuning (batuan beku) — *Red-Yellow Latosol Podsolic (igneous)*
- 6 Regosol, Posolik Merah Kuning (batuan beku) — *Regosol, Red-Yellow Podsolik (Igneous)*
- 7 Podsolik Merah Kuning (batuan endapan) — *Red-Yellow Podsolic (sediment)*
- 8 Podsolik Merah Kuning (alluvial) — *Red-Yellow Podsolic (alluvial)*
- 9 Renzina (batuan endapan) — *Renzina (sediment)*
- 10 Litosol, Regosol (batuan beku) — *Litosol, Regosol (igneous)*
- 11 Regosol (batuan beku) — *Regosol (igneous)*
- 12 Regosol, Latosol (batuan beku) — *Regosol, Latosol (igneous)*
- 13 Andosol (batuan beku) — *Andosol (igneous)*
- 14 Latosol (batuan beku) — *Latosol (igneous)*
- 15 Podsolik Merah Kuning (batuan beku) — *Red-Yellow Podsolic (igneous)*
- 16 Podsolik Merah Kuning, Litosol (batuan beku) — *Red-Yellow Podsolik, Litosol (igneous)*
- 17 Podsolik Merah Kuning, Latosol, Litosol (batuan beku) — *Red-Yellow Podsolik, Latosol, Litosol (igneous)*
- 18 Podsolik Coklat, Podosol, Litos (b.beku) — *Brown Podsolic, Podsolic, Litosol (igneous)*
- 19 Renzina, Litosol (batuan endapan) — *Renzina, Litosol (sediment)*

Area Dampak Tsunami
Tsunami Affected Area

Area Dampak Tsunami (perkiraan)
Tsunami Affected Area (estimated)



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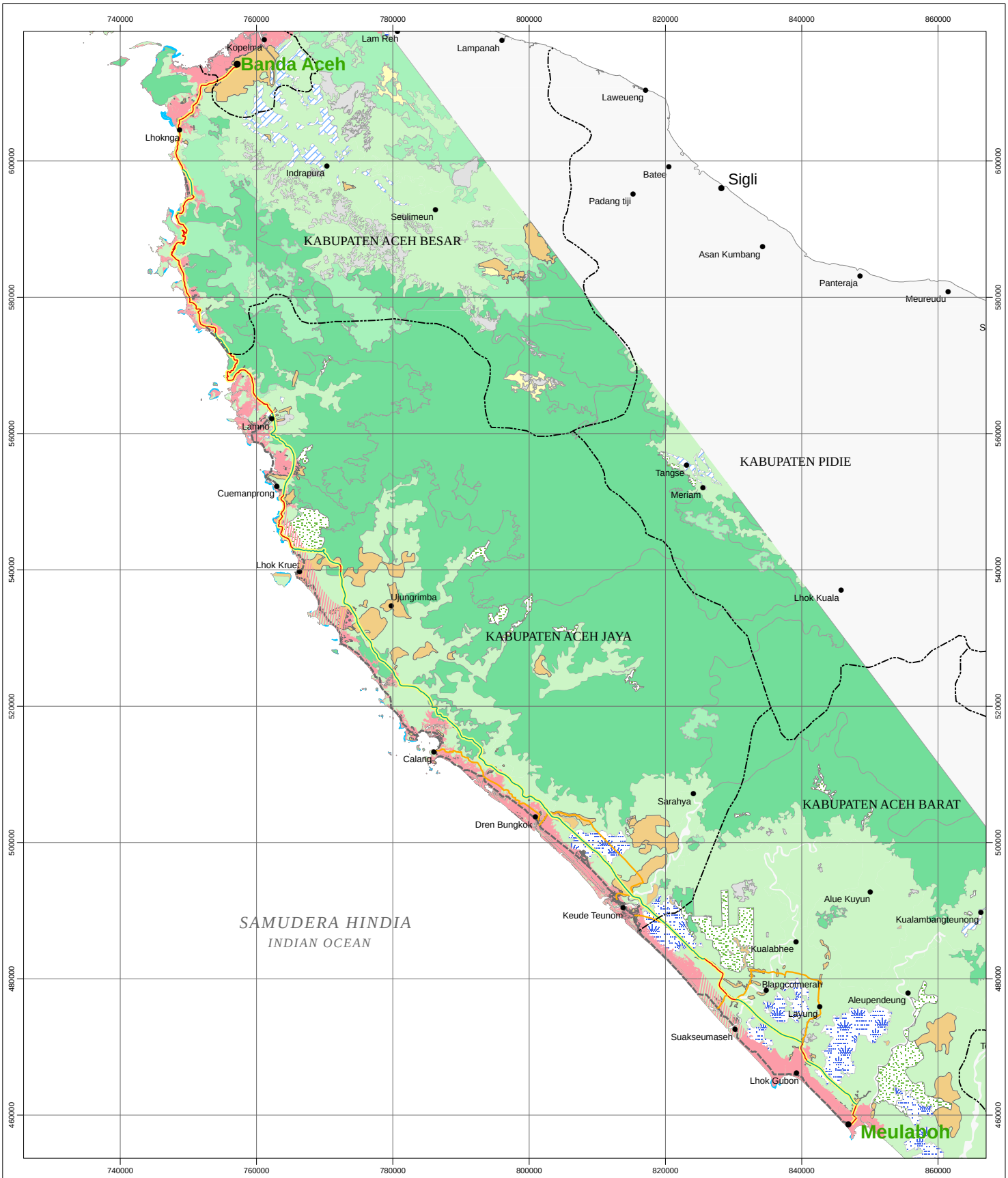


KERANGKA ACUAN

TERMS OF REFERENCE

PETA PENGGUNAAN LAHAN

LANDUSE MAP

Sumber :
Source :
Analisis Sistem Informasi Geografis (SIG)
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

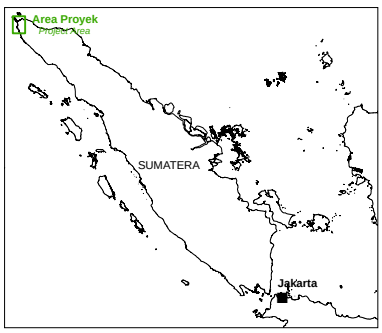
Gambar	**2 - 9**	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Legenda
Legend

- Pemukiman *Village*
- Hutan Primer *Primary Forest*
- Hutan Sekunder *Secondary Forest*
- Pertanian Lahan Kering *Dryland Agriculture*
- Semak Belukar *Scrub*
- Perkebunan *Plantation*
- Sawah *Rice Paddies*
- Perikanan *Shrimp/Fish Farm*
- Rawa *Swamp*
- Daerah Terbuka *Cleared/Bare Soil*
- Karang *Reef*
- Mangrove *Mangrove*
- Area Dampak Tsunami *Tsunami Affected Area*
- Area Dampak Tsunami (perkiraan) *Tsunami Affected Area (estimated)*

N

0 10 20 30 Km



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2.2.1.8 *Earthquakes*

The project is prone to earthquakes and not stable since it located near several faults. The Sumatra Island experiences earthquakes frequently with an intensity ranging from 4.0 to 6.0 on Richter scale. Earthquakes in the island are mostly generated by underwater landslides or volcanic eruptions along the fault zone of Sumatra.

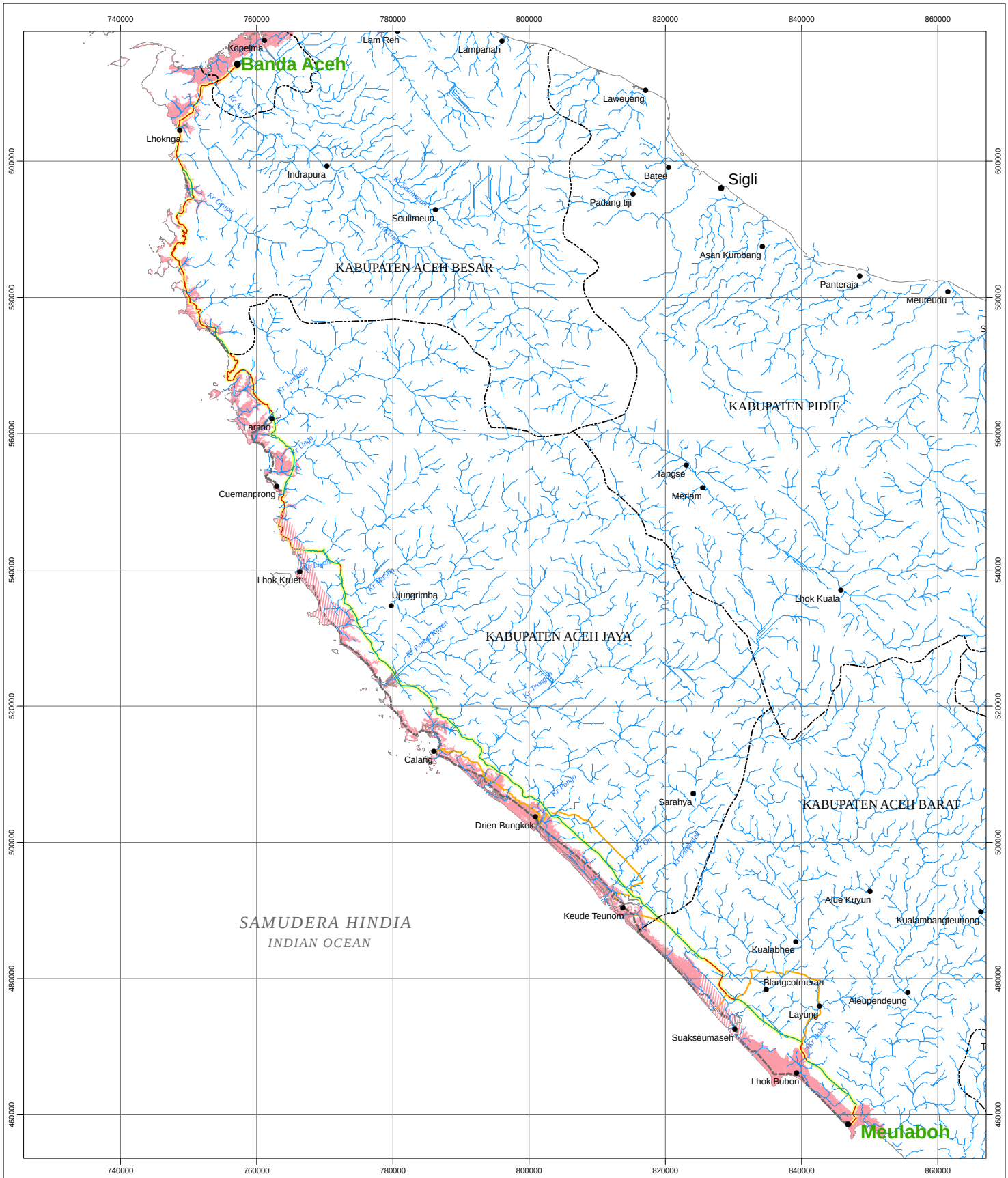
The flat land area created by the erosion of the higher areas and siltation of the shore has a texture of dusky sands and shallow marsh at the swamp area. After the tsunami, a large amount of corals slid from mountainous areas. The geological condition of the area has undergone significant changes after the tsunami and considered to be still unstable.

2.2.1.9 *Hydrology and Surface Water Quality*

The Banda Aceh – Meulaboh road crosses several rivers and streams namely Krueng Raba, Kr Sarah, Kr Lambesoi, Kr Teunom, Kr Arongan, Kr Woyla and Kr Bubon flowing from the Bukit Barisan mountain range ending into the ocean of Samudra Indonesia. The water of those rivers is used for agriculture by traditional and modern irrigation methods.

Those rivers and flood controlling areas have become new areas with an uncertain pattern of flood controls like the flow itself with its new course when it arrives at the heavily silted sites. The river flow map and hydrology map for the areas of the road courses from Banda Aceh to Meulaboh are shown in **Figures 2.10 and 2.11.**

Further description on hydrology and surface water quality is provided in the report on ANDAL.



KERANGKA ACUAN
TERMS OF REFERENCE

PETA ALIRAN SUNGAI
SURFACE DRAINAGE

Sumber :
Source :
RSGIS Forum (dari berbagai sumber)
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

Gambar	**2 - 10**	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Legenda
Legend

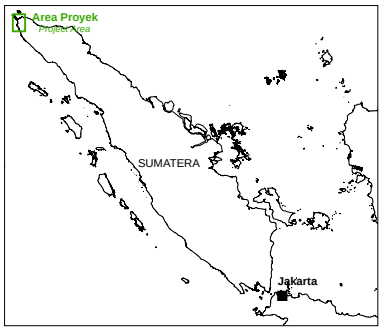
Sungai
River

Area Dampak Tsunami
Tsunami Affected Area

Area Dampak Tsunami (perkiraan)
Tsunami Affected Area (estimated)

N

0 10 20 30 Km



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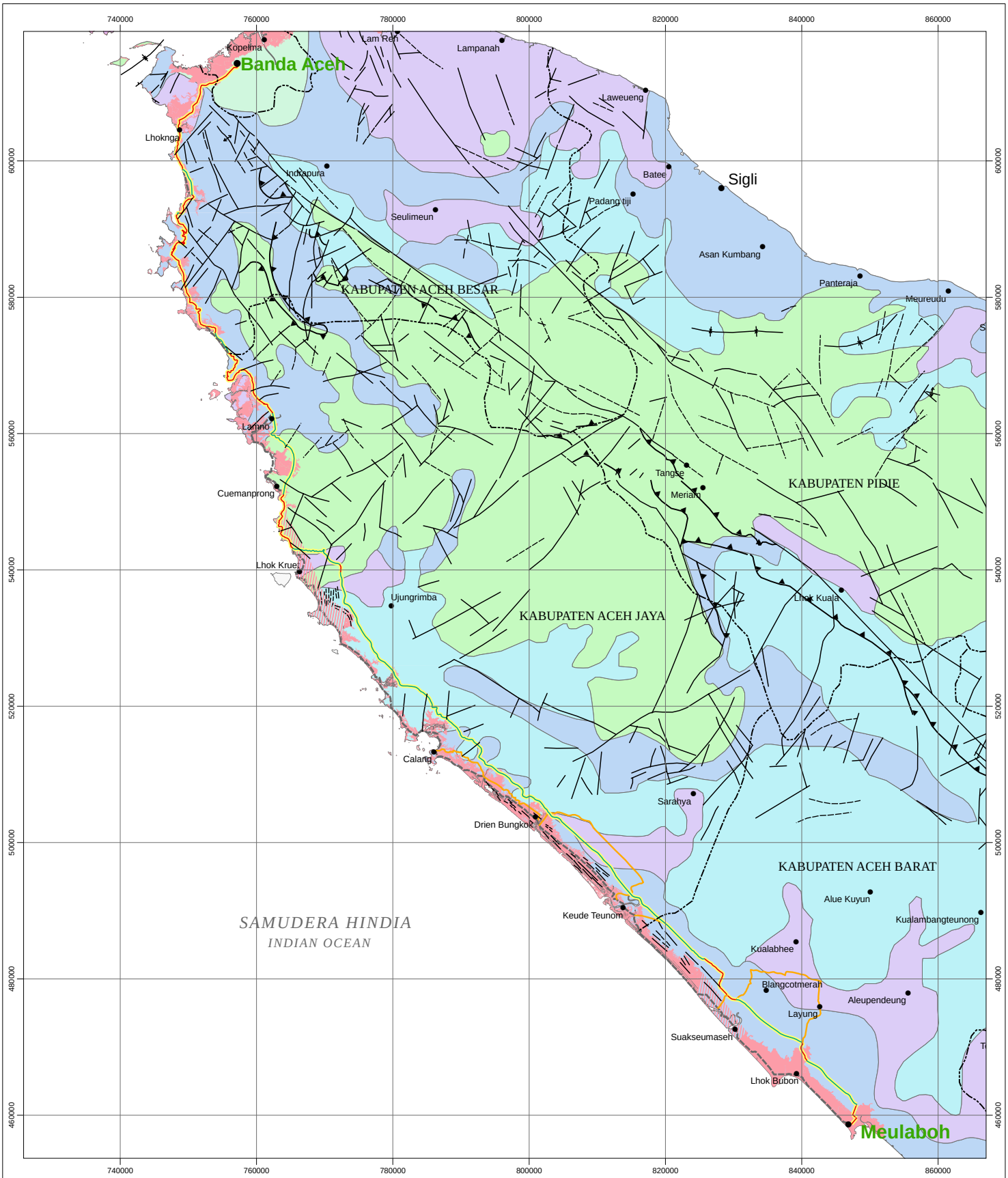


KERANGKA ACUAN

TERMS OF REFERENCE

PETA HIDROGEOLOGI

HYDROGEOLOGY MAP

Sumber :
Source :
Pusat Penelitian dan Pengembangan GTL
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

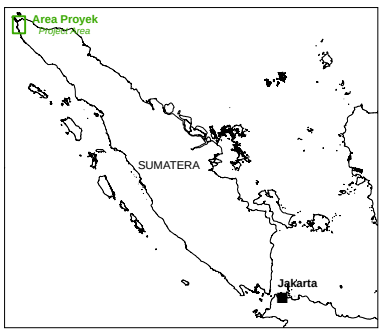
Gambar	**2 - 11**	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Legenda
Legend

- Setempat Akuifer Produktif — *Local Productive Aquifer*
- Air Tanah Dangkal — *Shallow Groundwater*
- Aquifer Rendah — *Low Productive Aquifer*
- Akuifer Sedang — *Moderate Productive Aquifer*
- Akuifer Tinggi — *High Productive Aquifer*
- Tidak Ada Akuifer — *No Aquifer*
- Batas Hidrogeologi — *Hydrogeology Boundary*
- Sesar — *Fault*
- Sesar Naik — *Thrust*
- Sinklin — *Sincline*
- Antiklin — *Anticline*
- Area Dampak Tsunami — *Tsunami Affected Area*
- Area Dampak Tsunami (perkiraan) — *Tsunami Affected Area (estimated)*

N

0 10 20 30 Km



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2.2.2. *Biological Components*

2.2.2.1 Terrestrial Flora

The flora found at the surrounding location along the Banda Aceh – Meulaboh road consists of largely the plants found in the ecosystem of mangrove, coastal areas, plantation, mixed farming and secondary natural forest. According to the UNEP's Tsunami Rapid Environmental Assessment, 2005, the total coastal forest and other mangrove growth damaged by tsunami is estimated to be a approximately 48,925 hectares.

The plants which are still growing include nipah (*Nypa fructicans*) , Bakau (*Rhizopora sp*), waru (*Hibiscus tiliaceus*), cemara laut (*Casuarina equisetifolia*) and beringin (*Ficus Benjamina*). Along the shores coconut trees (*Cocos nucifera*), partly intact and partly damaged, are still surviving.

The dominant economic plants in the areas along the sides of the roads are : mango (*Mangifera indica*), nangka (*Arthocarpus hetero*phylla), cashew nut (Anacardium ocidentale), rambutan (Nephelium lappaceum), papaw (*Carica papaya*), banana (*Musa Paradisiaca*), durian (*Durio zibethinus*), pinang (*Arecha catechu*), mlinjo (*Gnetum gnemon*). Besides the economic plants, there are trees which also survived such as swietenia mahogany, akasia (*Acacia auriculiformis*), angsana (*Pterocarpus indica*), ketapang (*Terminalia catappa*), sengon (*Albizzia chinensis*) and asam (*Tamarindus indica*). At some places agricultural land such as rice fields and other farming areas which remained unaffected.

The plants growing in the area around secondary forest consist of teak (*Tectona grandis*), trembesi (*Samanea samans*), durian (*Durio Zibethinus*), waru (*Hibicus tiliaceus)*, dadap (*Erythrina* sp), pete (*Parkia speciosa*), tampu (*macaranga sp*), pinang (*Arecha catechu*), ketapang (*Terminalia catappa*), sengon (*Albizzia chinensis*) and bamboo (*Bambussa sp*).

2.2.2.2 Terrestrial Fauna

Wild animals and cattle of this area consist of long tailed monkey (Macaca fasculiformis), cows (Bos sp), layang -layang (Hirundo sp) and reptiles like monitor lizard (Varanus sp).

2.2.3. *Social Components*

2.2.3.1 *Citizens and Education*

According to data of the end of 2003, the population of four recencies/towns in the western coast of Aceh totaled 807,918 consisting of families with gender ratio of 100.46. Structure of population according to age seems to form "distribusi juling positif"meaning that the percentage of the total of young population is relatively higher compared to the ageing population. However the loss of 224,000 people killed in tsunami disaster in December 2004 has already altered this statistics significantly.

The same situation is also encountered by the education sector. According to the census of population in year 2000 (Central Bureau of Statistics BPS 2001), half of the population of western coast of Aceh attended only elementary schools. These demographic statistics stand to be corrected in the light of the impacts caused by the tsunami in December 2004.

2.2.3.2 *Social Economy*

Local and regional economy of Aceh still relies on the primary resource sector such as agriculture, mining and oil & gas. This fact is reflected by the number of workforce being absorbed and the contribution of the region to the PDRB (income) of the province of Aceh. The population census of year 2000 (BPS, 2001) identified that more than 40% of the population of the four regencies/municipalities of the western coast of the province of NAD worked in the primary sector resulting in a contribution 43 % of PDRB of the Province.

The per capita PDBR, excluding migas (fuel oil and gas) on the basis of constant rate totals Rp. 2,710,529. - At such a level of PDRB, 24% of the population of the western areas of Aceh is classified low income; 39% as average income group, and 37 % as high end income group. About 70% of the income is mostly for consumption need.

The high income figure of the four regencies/municipalities of the western coastal areas of the province of Aceh is realized by balancing the budget. The total income of three regencies/municipalities (excluding Aceh Jaya)averaged over Rp. 706,231 million. This means that the income capacity of the region (PAD) for year 2003 was only 2.58% of the budget planned for financing the routine activities and development program of the province.

2.2.3.3 *Culture*

The Province of Nanggroe Aceh Darussalam was the center of international trading and the center of Islamic culture in Asia when it entered a golden era from 16th to 19th centuries. Aceh's tradings were largely conducted with China, Middle East and Europe. From Aceh, the Islam propagated to most parts of the Nusantara archipelago. The Province of Aceh is adhered to the calling of "Seuramoe Mekkah" meaning the "Terrace of Mecca".

Dutch invasion of Aceh in 1873 triggered unabated conflicts in the province. Several locations situated along the Banda Aceh-Meulaboh road such as Braden valley, Teluk Rigaih, Johan Pahlawan Sub Regency and Calang were once important forts. Lamno was also at one time a center of the reign of Kesultanan Jaya or Jaya Kingdom.

2.2.4. *Community Health Components*

At the end of 2003, the four regencies/municipalities of the western areas of Aceh had 258 Puskemas (Community Health Center) and Sub-Puskesmas with a total of 1868 physicians and paramedics. ISPA (Acute Infected Respiratory System), infected colon, diarrhea, skin problem, mouth problem, scabies, hypertension, are the common diseases suffered by most of the patients of Puskesmas and Sub-Puskesmas (health clinics) in the region. In December 2004 Tsunami destroyed most of those Puskesmas. Morbidity level also increased by quantity and type. At this moment health problems of the community of the region are taken care of by the domestic and foreign volunteering organizations.

2.3. ENVIRONMENTAL COMPONENTS TO BE STUDIED

According to the project activity analysis and the brief analysis on the environment baseline condition it is found that the affected environment consists of the following:

2.3.1. *Physical- Chemicals Components*

a. Climate - Temperature, Humidity, Rainfall and Wind speed & direction
b. Air Quality -Particulates and Gaseous
c. Noise and Tremor levels.

d. Hydrology and Water quality
e. Spatial management & Land use
f. Physiography - Topography, Morphology and Geology
g. Erosion
h. Landslide

2.3.2. *Biological components*

a. Biology terrestrial
   - Flora
     The obliteration of the vegetation around the location of the road construction.
   - Fauna
     Disturbances on the habitat of the fauna living in the area of road construction

b. Biology aquatic
   Impacts on the plankton, benthos and nekton caused by the decrease of the quality & quantity of water affected by the road construction.

2.3.3. *Social Components*

a. Demography/population
   - Structure of population by age, sex, occupation, education and religion
   - Social strata of the population.
   - Population growth: birth rate, baby mortality rate, circulatory migration, commuter and permanent.
   - Workforce: quality of participation of workforce and the quality of unemployment.

a. Economy
   - Household economy: income rate and double income pattern
   - Natural resources economy: ownership pattern and control system of natural resources. The use pattern of the natural resources, land and public natural resources.
   - Local and regional economy: working and business opportunities, kind and quantity of the activities of non formal economy, income distribution, gross regional domestic income, centers of economic growth, public and social facilities and regional accessibilities.

b. Culture
   - Culture: customs, and cultural values and norms
   - Social process: cooperation, social conflicts, acculturation, assimilation, integration and cohesion.
   - Social network for the sectors of economy, religion, social and family.
   - Cultural heritage: ancient remains, preserves etc.
   - Social strata: education, economy, occupation and authority.
   - Power and authority: formal and informal leadership, formal and informal authority, mechanism of decision making in the community, dominant individual group and change of leadership values.
   - Deed and perception of the communities towards a planned activity
   - Ecological adaptation.

2.3.4. *Community Health Components*

a. Environmental parameters affecting the health of the community.
b. Process and potency.
c. Potential Impacts causing diseases & deaths.
d. Specific characteristics of the local people at risk.
e. Health resources.
f. Environmental sanitary condition.
g. Nutritious status of the community
h. The environmental conditions exacerbating the spread of diseases.

2.4. MAIN ISSUES

Based on scoping and focusing process as shown in **Figure 2.12, 2.13 and 2.14**, the various hypothetically significant impacts as main issue are as following:

2.4.1. *Pre- construction Stage*

Negative community perceptions may arise due to site survey and measurement and land acquisition activities The community may be unwilling to assist due to concerns about the activity. Negative community perceptions probably may cause social conflict with the community.

2.4.2. *Construction Stage*

- Erosion and landslide due to earth work and land clearing activities as well as construction work.
- Decreased terrestrial flora diversity cause by land clearing activity.
- Disturbance to hydrology system (run off) causes by construction work.
- Disturbance to transportation due to the mobilization of materials and equipment and construction activities.
- Employment opportunity for construction worker
- Negative attitudes and negative community perception caused by negative impacts arising during construction work.

2.4.3. *Post Construction/Operational Stage*

- The increased mobility of the people, and boost to the local and regional economy generated by operation of the new road.
- The increased community livelihood generated by the operational of the new road.
- Surrounding activity impacts (illegal logging) due to easier access to the forest area.

2.5. STUDY BOUNDARY

Though the impact study focuses on the west coast area of Aceh, but the area for assessment of the environment is selected primarily on the basis receptors in various environmental media. The provision of the existing Indonesian Government rules is analyzed on the basis of various boundaries such as the boundary for the project, ecology, social and administrative.

2.5.1. *Project boundary*

The project boundary is the entire area that will experience a physical change. The road construction project area will encompass road corridor, quarry area for construction material supply, and supporting infrastructure area..

2.5.2. *Ecological boundary*

The ecological boundary encompasses all areas which may experience environmental impacts. The environment to be evaluated include the road area to be constructed from Banda Aceh to Meulaboh as well as the corridor of the road with the 1 km width stretching along the two sides of the road.

2.5.3. *Social boundary*

The boundary of the social study is the surrounding area of the project where various social activities will be affected by the impact of the construction work. The social scope of the AMDAL is limited to the primary impacts of the project.

2.5.4. *Administrative boundary*

The administrative boundary includes the government administrative agencies to be involved by the Banda Aceh – Meulaboh road project i.e. the Municipality of Banda Aceh, Regency of Aceh Besar, Regency of Aceh Jaya and Regency of Aceh Barat and their sub regencies and towns.

2.5.5. *Study boundary*

The study boundary is the scope of this study which includes the scope of project as well as degree of ecological, social and administrative impacts. The boundary of this study is shown in **Figure in 2.15)**

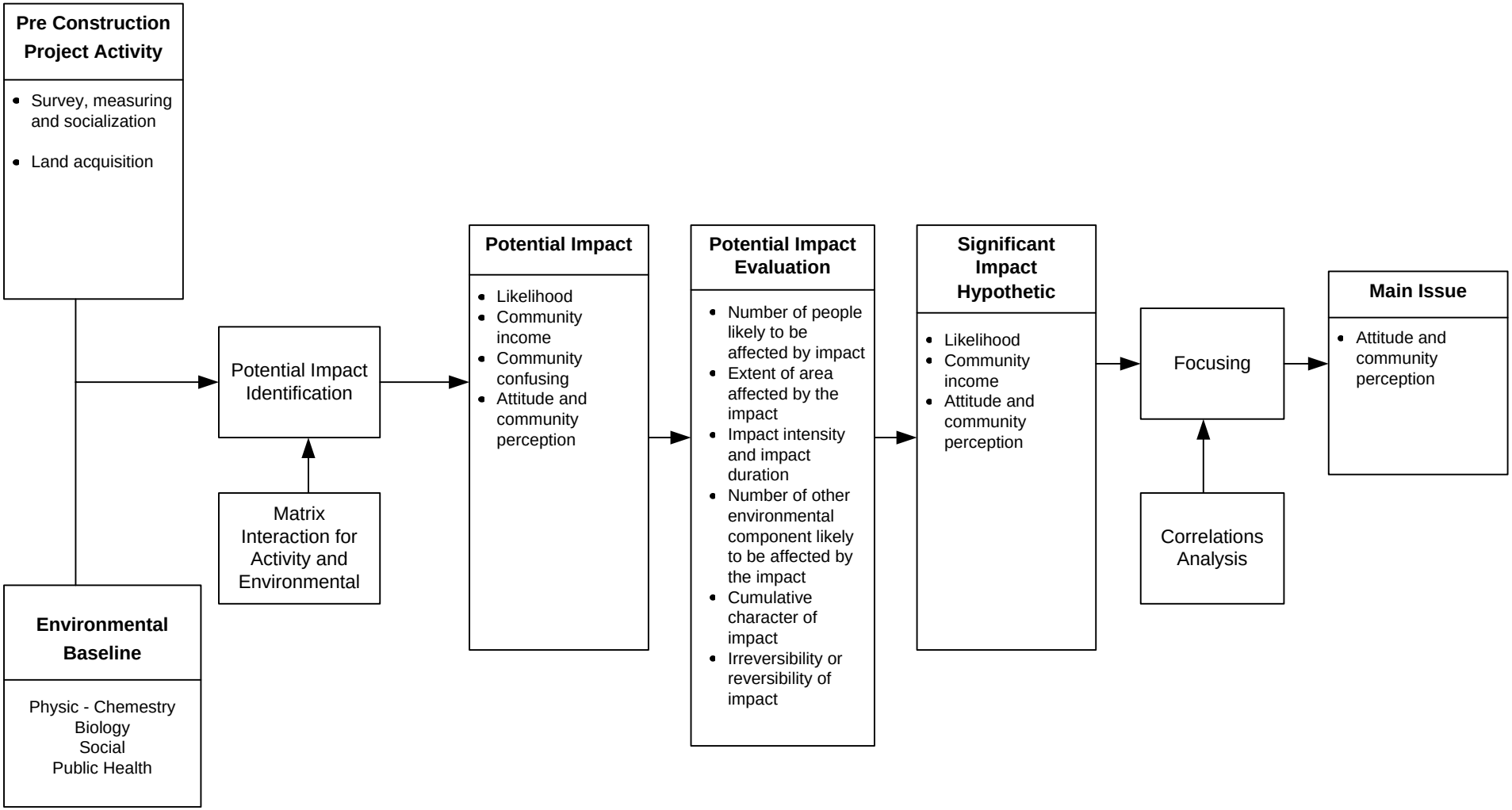


Figure 2.12
Flowchart Scoping and Focusing Rehabilitation and Reconstruction Road Banda Aceh To Meulaboh
(Pre Construction Phase)

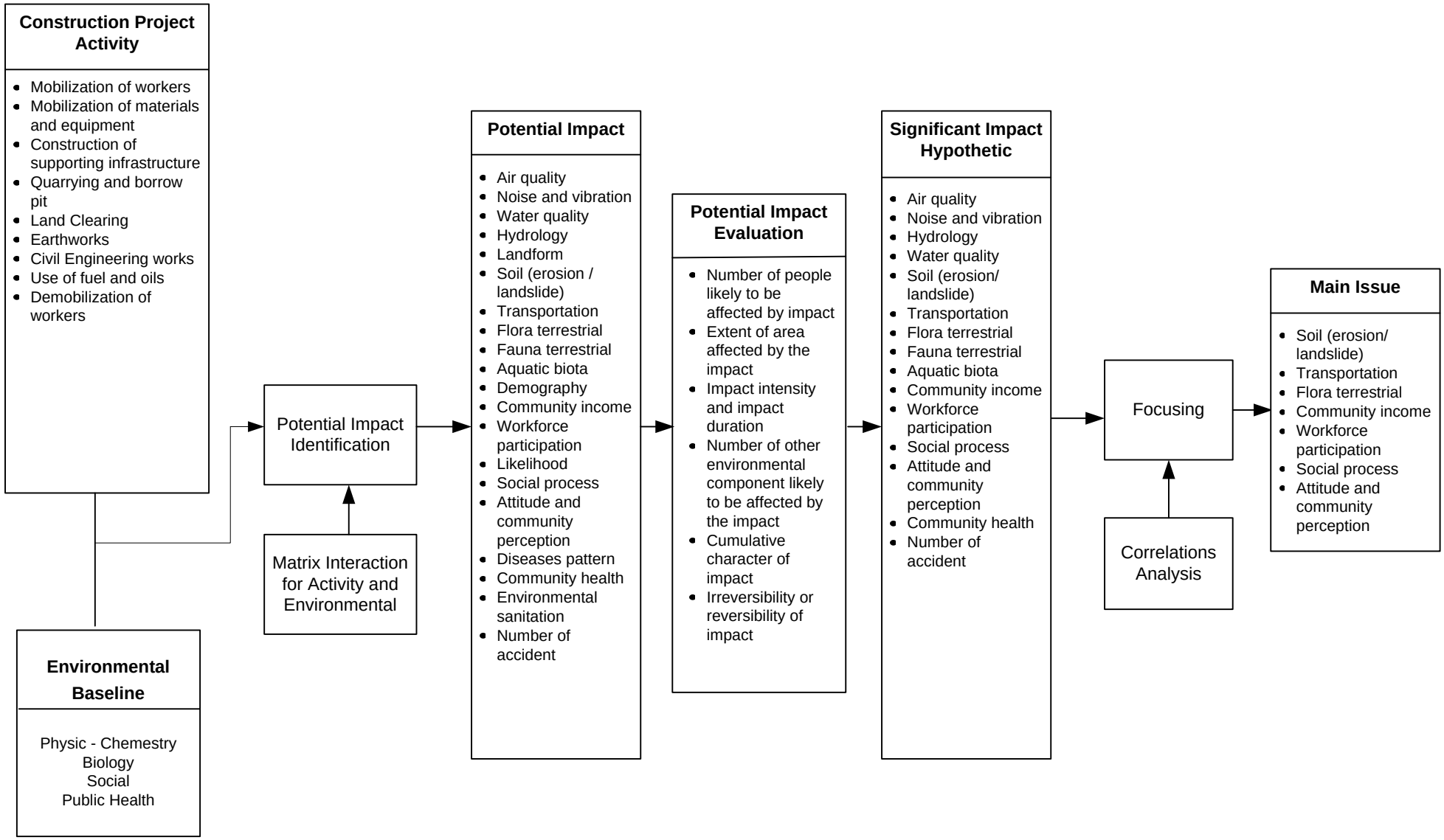


Figure 2-13
Flowchart Scoping and Focusing Rehabilitation and Reconstruction Road Banda Aceh To Meulaboh
(Construction Phase)

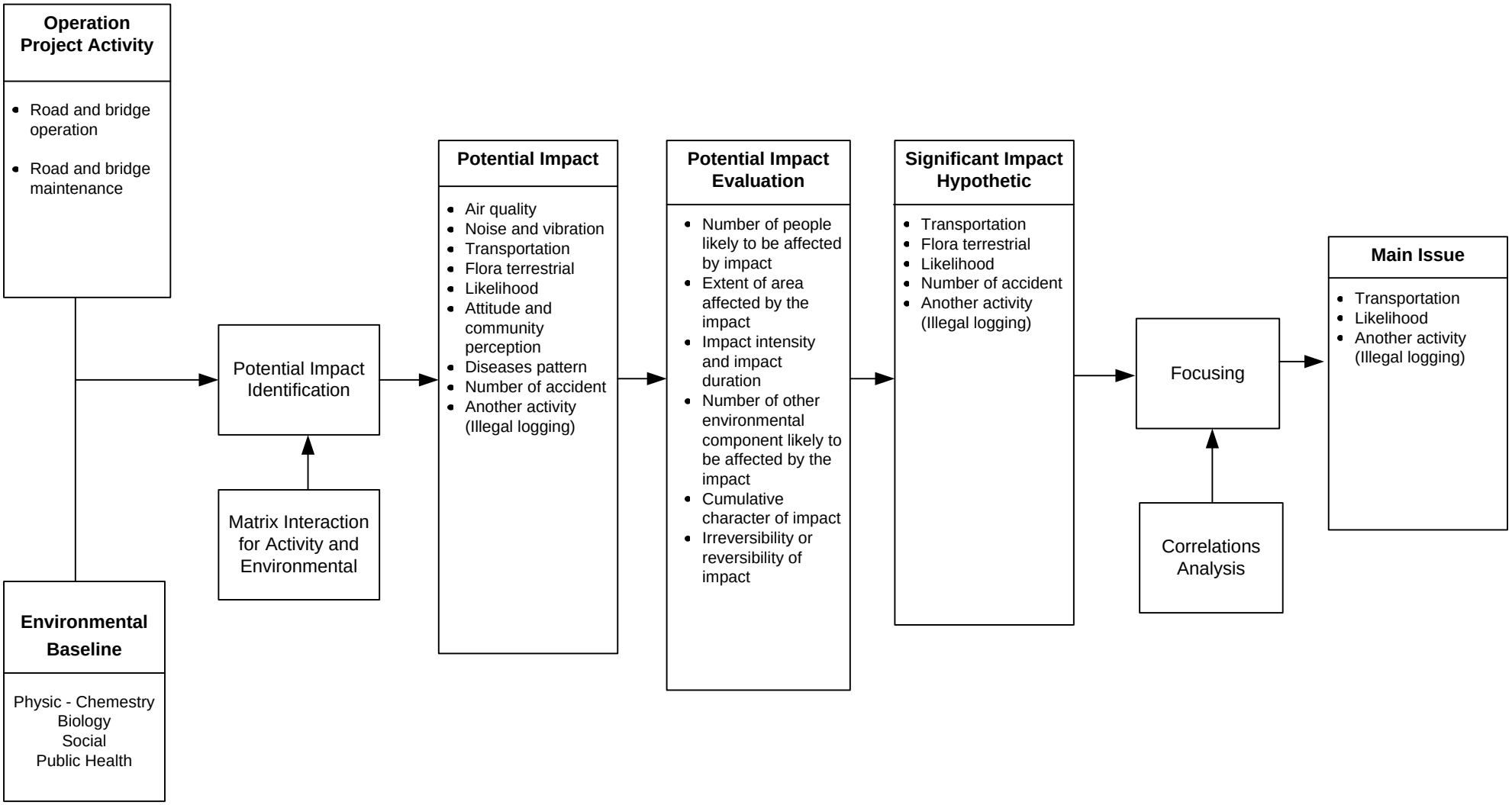
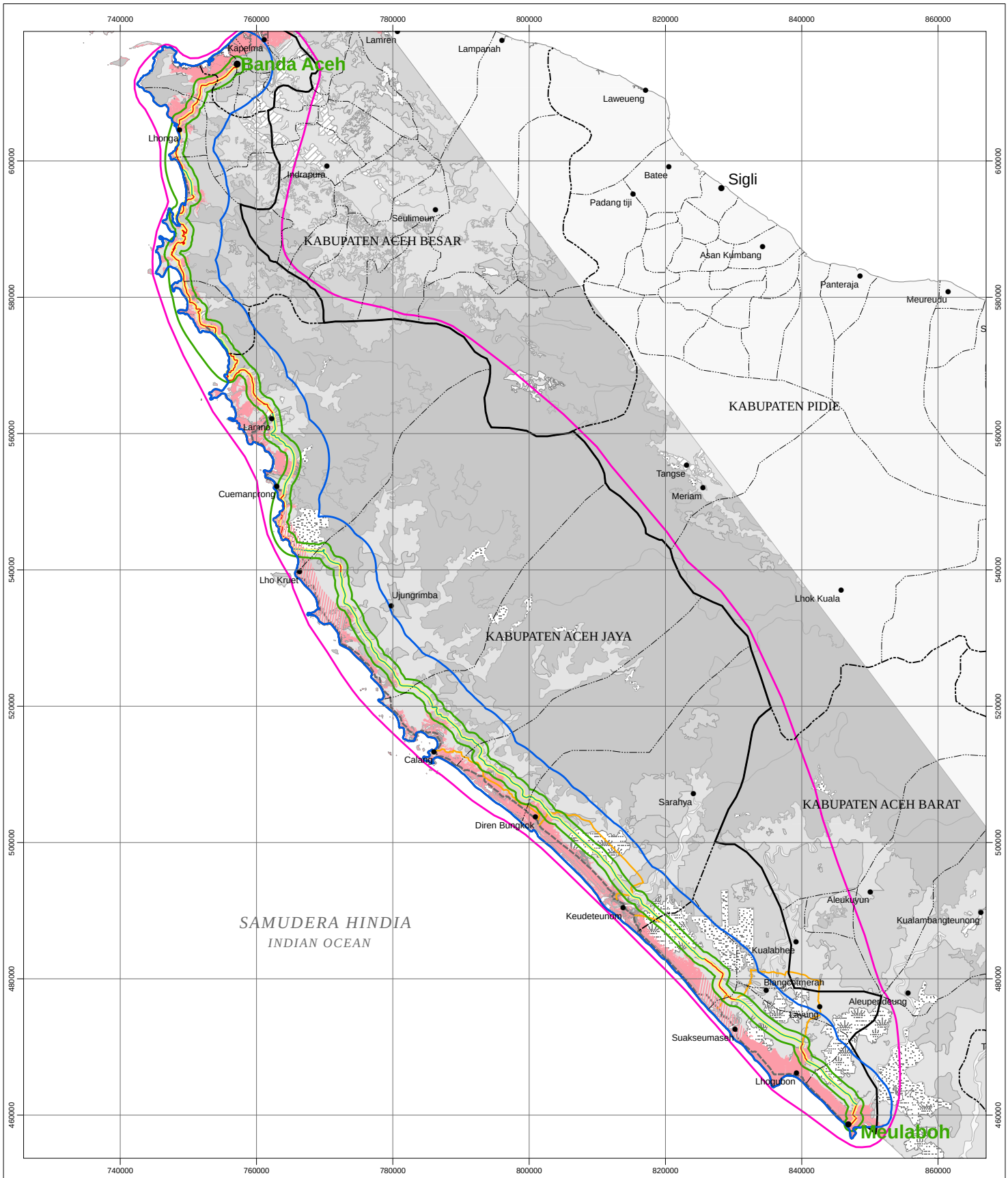


Figure 2-14
Flowchart Scoping and Focusing Rehabilitation and Reconstruction Road Banda Aceh To Meulaboh
(Operation Phase)



KERANGKA ACUAN

TERMS OF REFERENCE

BATAS STUDI

STUDY BOUNDARY

Sumber :
Source :
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM), Zona 46 Utara, WGS 84

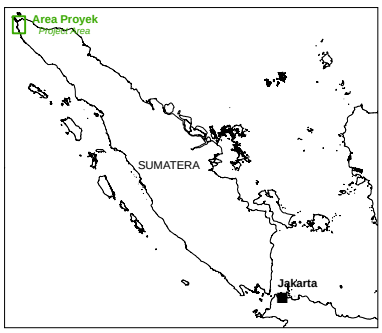
Gambar	**2 - 15**	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Legenda
Legend

- Batas Kecamatan — *District Boundary*
- Batas Kabupaten — *Regency Boundary*
- Batas Proyek — *Project Boundary*
- Batas Ekologi — *Ecological Boundary*
- Batas Sosial — *Social Boundary*
- Batas Administrasi — *Administrative Boundary*
- Batas Studi — *Study Boundary*
- Area Dampak Tsunami — *Tsunami Affected Area*
- Area Dampak Tsunami (perkiraan) — *Tsunami Affected Area (estimated)*

N

0 10 20 30 Km



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CHAPTER 3. METHODOLOGY OF STUDY

Collecting and analyzing relevant data is necessary for the prediction and evaluation of the environmental impacts. In this Chapter 3 the methodology for various components to be applied for data collection and evaluation is described.

3.1. DATA COLLECTION METHODOLOGY

The data collected for this ANDAL study consist of primary and secondary data. The primary data is obtained through the field measurement and observation, including the direct measurement and laboratory analysis. The secondary data is obtained from the literature, documents, reports and previous studies. Secondary data resources as follows:

- Local Government offices, especially BAPPEDA (regional administration office)
- PUSKESMAS (Public Health Center) of the Health Agency
- Department of Public Works
- Population and Environment Agency
- Directorate of Environmental Geology, Bandung
- BAKOSURTANAL (Coordinating National Agency for Survey and Mapping)
- Meteorological and Geophysical Agency (BMG)
- Relevant literature & publications
- Satellite photos (SPOT, LANSAT AND IKONOS)

The primary data for social, economical and cultural issues will be obtained through direct interviews with the community living within the study area. Physical, chemical and biological data are taken by direct measurements and observations at the selected sites. Due to extreme time constraints and exigencies of the project, the primary data are collected only for the environmental environments. The location of primary data collection is shown in Figure 3.1. The collection of the primary data related to the specific components is described in the following sections.

AMDAL study for Banda Aceh-Meulaboh road construction project will include the relevant data, which are compiled in the Geographic Information

System (GIS). The GIS will be developed exclusively for use of AMDAL study based on the data from the above sources, including the satellite images of the areas before and after the tsunami.

3.1.1. Physical-Chemical Components

Physical-chemical parameters include climate, air quality, humidity and noise. Data on physiography, geology hydrology, hydrogeology and land structure and land uses will also be included.

3.1.1.1 Climate

The compilation of climate data will be done by collecting secondary data from the climate stations located near the study area. The climate data will include the following:

- Rain: rainfall and rainy days
- Temperature: average, minimum and maximum
- Relative humidity
- Wind speed and direction
- Intensity of sunlight : solar radiation

3.1.1.2 Air quality and Noise levels

Measurements of the air quality and noise levels will be done directly in the field. The air quality will include the following parameters :

- Carbon monoxide (CO)
- Nitrogen Oxides (NOx)
- Sulphur dioxide (SO2)
- Lead (Pb)
- Total Suspended Particulates (TSP)

For gaseous contaminants i.e. CO, NOx and SO2, gas samplers will be used to collect the gas samples in the field later to be analyzed in the laboratory. A High Volume Air Sampler (Hi-Vol) will be used in the field to collect the TSP samples for analysis in the laboratory. Lead in the TSP will also be analyzed in the laboratory.

The noise levels in the study area will be measured directly by using a Sound level meter. Details of the sampling locations for air quality samples are given in Table 3.1. The sampling and analytical methods for measuring the air quality

and noise levels as per the Government Regulation No. 41 of 1999 is given in **Table 3.1**.

Table 3.1 Sampling & Analytical Methodology for Air Quality and Noise

No.	Parameters	Unit	Sampling Method	Analytical Method
1	CO	mg/m^3	NDIR	DIR
2	NOx	ug/m^3	Grietz Saltzman	Spectrophotometer
3	SO_X	ug/m^3	Pararosanilin	Spectrophotometer
4	TSP/Pb	ug/m^3	Gravimetric/Spectrometry	High Vol Sampler
5	Noise	dBA	Direct measurement	Sound Level Meter

Source: Government Regulation No. 41 year 1999

The sampling locations for air quality and noise level monitoring are as follows:

- Station 1 (U1) is located at the edge of Simpang Lampuuk. The sample taken for identifying quality of air and noise at the location which received the impact of recent tsunami and the reconstruction of the old road destroyed by tsunami which is impacted by the current transportation activities.
- Station 2 (U2) is located at Blang Mae, the location which has not been affected by the tsunami .
- Station 3 (U3) is located at Lamno, the location, which will be directly impacted by the road project.
- Station 4 (U4) is located at the Suak Timah area, the location for monitoring the impact during construction on the surrounding settlement.
- Station 5 (U5) is located at the Guempa, Sub Regency of Melaboh, the location for monitoring the effects at the end tail end of the proposed road.

3.1.1.3 *Hydrology and Surface Water Quality*

- *Hydrology*

  Water analysis based on the applied GIS use topography data. The tsunami damaged river channel situated near the shore has partial labile condition. Its condition is expected to improve in several years time and in due course of time a modified hydrological pattern may be expected to develop.

- Surface Water Quality

  The surface water quality has significant effects on the ocean water. It also affects the quality of sedimentation attributed to the erosion caused by tsunami. It is important to collect the data on a regular basis to determine

the trend and changes in the quality of the water. The current situation may not represent the actual condition of the environment at its natural state.

Qualitative hydrological and surface water conditions will be determined during the AMDAL study. The monitoring locations are shown in Figure 3.1. In addition, the water quality will be analyzed at two wetland areas situated east of the roadway. The locations for water quality samples are as follows:

- Krueng Meurebo
- Krueng Lambesoi
- Krueng Bubon
- Lhung Lhok (wet land area) swamp
- Suak Uleue (wet land area) swamp.

3.1.1.4 *Hydrogeology*

Hydrogeology data for surface water system of the area will be obtained from the geological information and other relevant data sources.

3.1.1.5 *Physiology and Geology.*

The study is aimed at collecting data and information related to the characteristics of land such as topography, slope stability, environtmental geology such as the distribution the top soil and earthquake tremor condition.

- Topography
  Information related to the topography is obtained from a topographic map of a scale of 1 : 50,000 will be described to the road project and the Model of Height Digital. The stability of slope will be taken from the GIS analysis.
- Geology and Landforms
  Geological data will be obtained from the secondary data sources, geological mapping (Bennet, et al, 1983) and GIS information. The geological analysis is limited to the existing investigation and literature on geological aspects such as formation and structure.

  Soil analysis will be based on secondary data and the collection of primary data (samples and observation of soil type) on the selected sections of the road alignment. The locations for soil samples are as follows (**Figure 3.1**):

- Leupung;
- Ceunamprong;
- Keudeteunom; and
- Reusak.

Appropriate samples will be collected to determine soil erosion rates. Erosion prediction is required to determine the impacts of activities such as quarrying. Erosion is estimated by using the following formula:

$$E = R \times K \times L \times S \times C \times P$$

Where:

E	The volume of lost soil per unit area of land is obtained by multiplying the factors in the above equation in ton.ha-1.year-1
R	Rainfall and runoff factor
K	Soil erodibility factor for a particular soil, and represents the loss of soil per unit area
L	Length factor of an inclined slope, which has no units, and represents the ratio of quantity of soil loss for a given slope length to the quantity of soil loss for a slope length of 72.6 ft (standard length). The L factor in this sense does not represent the actual slope length.
S	Gradient factor, which has no units, and represents the ratio of the quantity of soil loss for a slope gradient of 9 %. The S factor in this case is not the actual gradient of the slope.
C	Soil cover factor, which has no unit, and represents the ratio of the quantity of soil loss at a specific condition and the quantity of soil loss from continuously fallow and tilled land.
P	The support practice factor, which has no units, and represents the ratio of the quantity of soil loss a support practice to that of straight-row farming along the slope.

Erosivity of Rain (R)

The Lenvain (DHV,1989) equation used for measuring the level of erosion caused by rain is as follows:

$$R = 0.41 \times H1.098$$

Where:

R	=	rain erosivity index
H	=	monthly rainfall (mm)

Soil Erodibility

Soil erodibility is obtained by using the formula below:

K=(2.1 x(10-4) x (12-OM)xM1.14+3.25x(s-2)=3.25x(p-3))/100

Where :

K	=	Soil erodibility factor.
OM	=	Percentage of organic material in the land
S	=	Soil structure class (based on the USDA, 1951)
P	=	Soil Permeability class (based on the USDA, 1951)
M	=	(% dust + % fine sand) x (100- % clay)

The value of M for several standard soil texture types can be used to compare the calculated value with values available in the literature (refer to *Table 3.2*).

Table 3.2 M Values for Selected Land Textures

No.	*Land Texture Grade*	*M Score*
1	Heavy clay	210
2	Medium clay	750
3	Sandy clay	1213
4	Light clay	1685
5	Silty clay	2160
6	Sand dust clay	3830
7	Sand	3035
8	Silty sand	1245
9	Silty loam	3770
10	Sandy silt	4005
11	Silt	4390
12	Dusty silt	6330
13	Dust	8245
14	Mixed Prevalent	4000

Sources: RLKT DAS Citarum (1987)

To determine the 'K' value (the erosion index), sampling of disturbed soil and undisturbed soil is undertaken.

Various parameters and methods for soil sampling and analysis methods are shown in Table 3.3.

Table 3.3 Sampling and Analytical Methods Soil Analysis

No.	*Parameter*	*Analytical method*	*Sampling method*
1	Soil Texture	Mechanical analysis Stokes method	Stokes cylinder Electric balance
2	Organic material	Walkley & Black	Buret, Elemenyer
3	Permeability	Rate infiltration water (cm.men^{-1})	Ring sample
4	Land structure	Direct observation	

The estimated value of soil erodibility can be determined by the percentage of dust , soft sand, organic material and land structure and permeability.

Soil erodibility determined by the field investigations can be checked against a nomograph for 'K' provided in Ambar and Wiersum, 1980. The nomograph is suitable for use in Indonesia.

Condition of soil cover and soil disturbance (factors C and P)

The initial observations of the soil cover are noted before soil is excavated from the quarry areas. This data is the baseline data for the parameters C and P.

Topography Factor (LS factor)

Factor of the slope length (L) and inclination of the slope (S), otherwise called the topography index (LS), are measured by using the formula adapted from Goldmand, et al., (1986), as follows:

$$LS = \{(65.41 \times S^2)/(S^2 + 10.000) + (4.56 \times S)$$
$$= (4.56 \times S) / (S^2 + 10,000) + 0.065\}\{1/72.5)m\}$$

Where :

LS	=	Topography Factor
L	=	Length of Slope (M)
S	=	Gradient of Slope
M	=	Constant, with the value depending on the gradient, that is:
		0.2 For gradient< 1 %
		0.3 For gradient 1-3 %
		0.4 For gradient 3.5 – 4.5
		0.5 For gradient > 5%

The length and gradient of the slopes are measured directly in the field at every quarry location and covering the entire area from where soil will be quarried.

The recorded observations of soil at the quarry locations and cut and fill areas (existing conditions) are evaluated by using the following *Table 3.4*.

Table 3.4 Erosion Classes

Soil Depth (cm)	Erosion Class				
	I	II	III	IV	V
	Erosion/ ha/ year				
	<15	15 – 60	60 – 180	180 – 480	>480
Deep (>90 cm)	SR (0)	R (I)	S (II)	B (III)	SB (IV)
Midle (60 – 90 cm)	R (I)	S (II)	B (III)	SB (IV)	SB (IV)
Shallow (30 – 60 cm)	S (II)	B (III)	SB (IV)	SB (IV)	SB (IV)
Very shallow (<30cm)	B (III)	SB (IV)	SB (IV)	SB (IV)	SB (IV)

Note : (O) SR: Sangat Ringan (very light) (I) R: Ringan (light)
(II) S: Sedang (middle) (III) B: Berat (heavy)
(IV) SB: Sangat Berat (very heavy)

- Earthquake Condition

The earthquake activity will be determined by using the data on the geological structure in Sumatra and the data recorded from previous earthquake events

3.1.1.6 *Structure and Land Use*

The structure and land use are important elements for the planning by the Government and for this study as well. The critical element of the study is the data on the regional traffic movements within the tsunami damaged area.

Structure

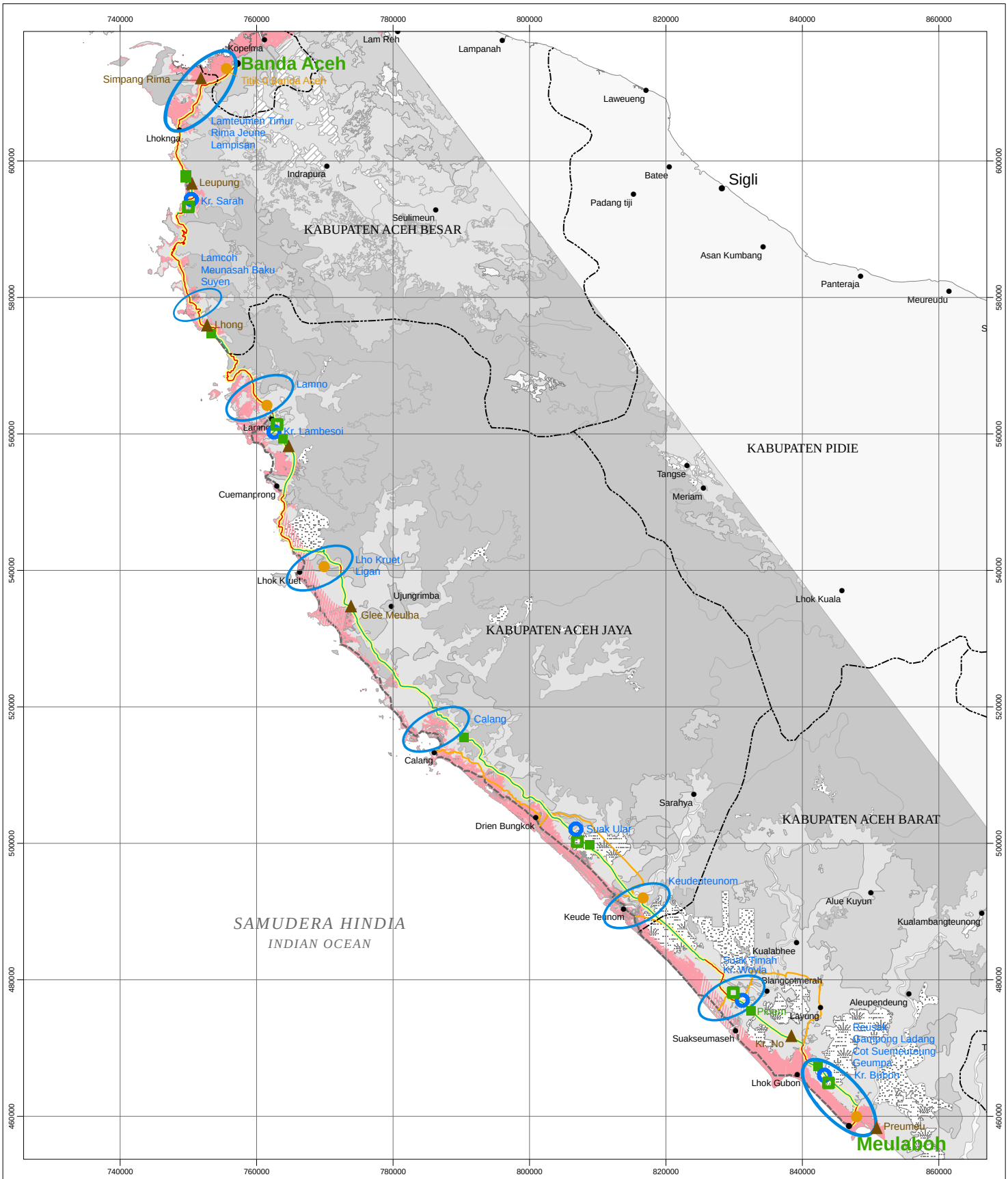
Consultation on land structure (pre- and post-tsunami) was undertaken with Government and local people. The supporting information is the secondary data issued by relevant agencies such as Bappeda (Regional Development Planning Program), BANGDES (Village Development Unit), Statistics Office, Bapedalda and BRR (Agency for the Rehabilitation and Reconstruction of Aceh), with regard to the planning of the regional and local development.

Land Use

Data on the characteristics of land use were collected for the preparation of mapping. This information provides details of the present agricultural land, forested areas, housing, damage caused by the tsunami and the significant impact of the characteristics of environmental management. The mapping assists to identify potential land use impacts along the road alignment.

3.1.1.7 *Transportation Aspects*

Traffic counts were undertaken in three locations: Simpang Lampuuk, Lamno and Simpang Kisaran. At each intersection, four sampling stations were established to account for traffic in each direction.



KERANGKA ACUAN
TERMS OF REFERENCE

LOKASI PENGAMBILAN SAMPEL
SAMPLING LOCATIONS

Sumber :
Source :
U.S Army Corps of Engineers, Honolulu District
Sistem koordinat universal transverse mercator (UTM),
Zona 46 Utara, WGS 84

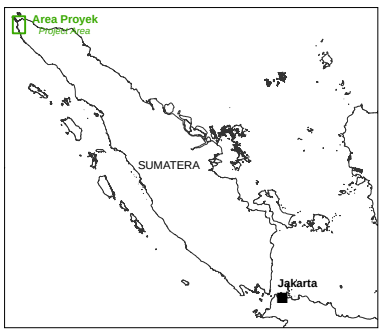
Gambar	3 - 1	Digambar Oleh	GGG
No Revisi	0	Diperiksa	KHS
Tanggal Revisi	03/07/05	Digabung Oleh	ERM

Legenda
Legend

- Kualitas Udara *Air Quality*
- Kualitas Air *Water Quality*
- Biologi Darat *Terrestrial Biota*
- Biologi Perairan *Wetland Biota*
- Tanah *Soil*
- Survei Sosial *Sosial Survey*
- Area Dampak Tsunami *Tsunami Affected Area*
- Area Dampak Tsunami (perkiraan) *Tsunami Affected Area (estimated)*

N

0 10 20 30 Km



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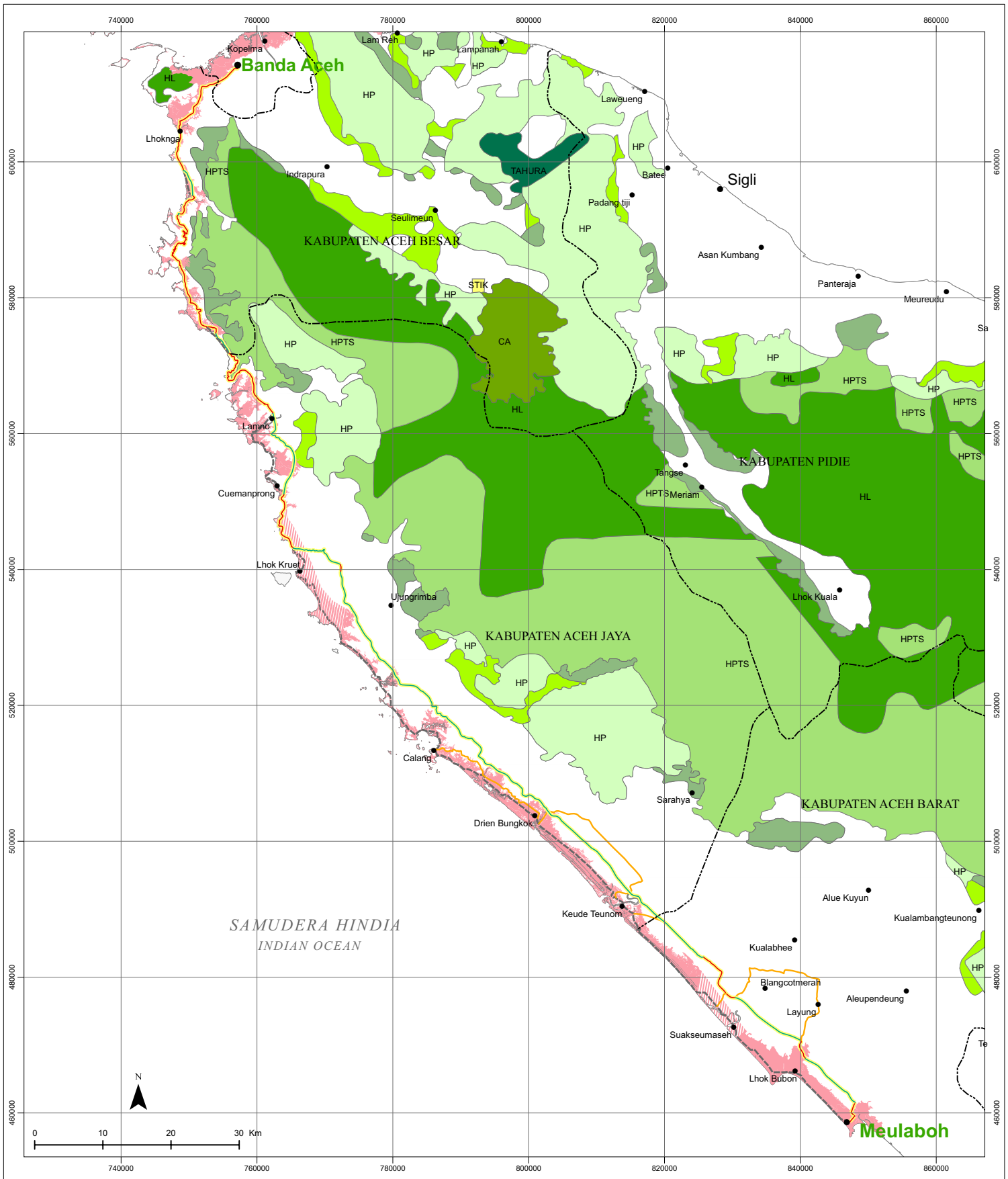


KERANGKA ACUAN
TERMS OF REFERENCE

PETA FUNGSI HUTAN
FOREST STATUS MAP

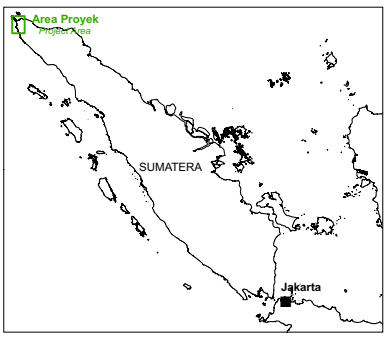
Sumber :
Source :

Kantor Wilayah Departemen Kehutanan dan Perkebunan Propinsi Daerah Istimewa Aceh, 1999.

Gambar *Figure*	3 - 2	Digambar Oleh *Drawn By*	GGG
No Revisi *Revision No*	0	Diperiksa *Checked*	KHS
Tanggal Revisi *Revision Date*	03/07/05	Digabung Oleh *Compiled By*	ERM

Legenda
Legend

- CA — Cagar Alam *Conservation Forest*
- HL — Hutan Lindung *Protected Forest*
- HP — Hutan Produksi *Production Forest*
- HPTS — Hutan Produksi Terbatas *Limited Production Forest*
- THR — Taman Hutan Raya *National Forest Park*
- Hutan Pendidikan STIK *STIK's Study Forest*
- Kawasan Budidaya Untuk Pengembangan Hutan Rakyat *Cultivation Area for People Forest Development*
- Hutan Lindung yang Ditetapkan Sementara Sebagai Hutan Produksi Terbatas *Protected Forest for limited Production Forest*
- APL — Areal Penggunaan Lain *Other Use*
- Area Dampak Tsunami *Tsunami Affected Area*
- Area Dampak Tsunami (perkiraan) *Tsunami Affected Area (estimated)*



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3.1.2. Biological Components

The biological components of the baseline consist of terrestrial flora and fauna and aquatic biota. The design of the sampling programme is based on the following:

- Location of activities which are expected to cause impact to living organisms.
- The distribution of habitats surrounding the location which are predicted to receive impacts due to the project activities
- Data to be obtained can also be representative to the variety components of biodiversity environmental components surrounding the project location and also relevant to the purpose of this study on the environmental impact Analysis

3.1.2.1 Terrestrial flora

Gradual approach will be applied to the collection of the flora data. Firstly, satellite photos will be taken to identify the areas where any significant species and their habitats have been found. These important areas are to be selected and visited immediately for interviews with the local people.

Land flora components consist of vegetation species, composition and structure of the community. The preserved vegetation, ecosystem and aquatic weed. The data taking can be conducted through the direct observation on the field (Inventory taking). Outside the activity area of the project, the growing condition of the economic plants will also be observed.

3.1.2.2 Fauna

Terrestrial fauna data will be collected by direct observation of sounds (IPA Method/Index Point of Abundance) of the species of birds and mammals, by visual observation or by identifying markings such as bite marks, claw scratching or excrement. In addition, indirect observations will be made through interviews with the local community

Sampling will be confined to the project affected area and the representative habitats in the study area. The observed fauna included:

- **Wild fauna:** Observed wild fauna was recorded in an inventory describing species type, condition, herd/group, variety of habitat and optimum environmental conditions.

- **Stock and domesticated animals:** Stock and domestic animals are assessed in terms of population and species of herd within the project activity area. The primary data collected will also be supported by secondary data in the form of local community information.

The fauna data collected focuses on wild fauna, especially the existence of threatened species. Secondary data is generally obtained through interviews with local people.

3.1.2.3 *Water biota*

The data on aquatic biota is closely related to water quality data. The aquatic biota investigation included:

- **Plankton:** Data on plankton was obtained through the filtering of 100 litres of water through a Plankton Net No. 25. The plankton sample was preserved in a 25 ml sample bottle with formalin 4%. The sample was analyzed in the laboratory to determine the type and genus level by using the reference book of Davis (1965) and APHA (1981). The formula for calculating the population of plankton is based on the formula of Lackey Drop Micro Transect Counting:

$$N = \frac{1}{W} \times \frac{V}{v} \times \frac{T}{T} \times \frac{P}{p}$$

Where :
N = Population of plankton (individual/l)
W = Volume of water into the filter (l)
V = Volume of water out of the filter (ml)
v = Precipitate volume (ml)
T = Area of Glass Cover (sq mm)
t = Area of sample on slide (sq mm)
P = Total of observed individuals
p = Area of sample being observed

Benthos: An Ekman Grab was deployed to retrieve sediment samples of watercourses in the study area. The sediment sample is preserved in formalin 5% for subsequent filtering through a sieve of 30 – 100 mesh per

inch to separate the preserved benthic organisms from the sediment for later identification in the laboratory in accordance with APHA (1981) guidelines..

3.1.3. Social Components

Before the implementation of the field work, the Evaluating Commission AMDALDA publicly announced reconstruction and rehabilitation Banda Aceh – Meulaboh Road to the community via the newspaper and through public consultation. Afterwards social, economic and cultural data was collected in the field as well in the Government agencies concerned.

Type of Data

Data relating to demographic environment and economical components is filtered from the secondary sources. Data relating to culture will be collected through interviews with the community members judging their experience and knowledge on cultural patterns and the community social system. Data on the behavior and perception of the community towards the project activity and on the household economy will be collected through interview with the head of families who are considered as part of the sample. Of this observation. Selecting a sample is mostly based on a consideration that they are either the direct or indirect receiver of the impacts generated by the project.

Secondary Data

Key sources of secondary social data include statistics compiled by the PBS (Central Agency of Statistics) in co-operation with the Bappeda of Aceh Province, other regency/ city level information and the yearly reports of other Government agencies. Some aspects of the social data collected pre-tsunami may be vastly different to the current situation and this has been taken into account in the preparation of the baseline.

Primary Data

Primary data has been obtained through observations and structured interviews with residents within the study area at the locations described in *Table 3.5.*

The interviews were performed with particular people in the community such as village leader, medic, and elderly respected people of the community.

Qualitative primary data was obtained by means of structured questionnaire interviews with respondent.

Table 3.5 Social Sampling Locations

No	*Regency/ City*	*Sub District*	*Village*	*Total Sample*
1.	Banda Aceh	Jaya Baru	Lamteumen Timur	5
2.	Aceh Besar	Peukan Bada	Rima Jeune	5
			Lampisang	5
		Lhoknga	Lam Coh	5
		Leupueng	Meunasah Bak U	5
		Lhoong	Suyen	5
3.	Aceh Jaya	Jaya	Keude Lamno	5
		Sampoi Niet	Ligan	5
		Krueng Sabe	Calang	5
		Teunom	Keude Teunom	5
4.	Aceh Barat	Samatiga	Reusak	5
			Gampong Ladang	5
			Suak Timah	5
			Pinem	5
			Cot Seumeureung	5
		Johan Pahlawan	Gampa	5

Parameters included in the data collection phase are broken down as follows:

a. Demography

- Population Structure according to the age, sex, occupation, education and religion.
- Population density level.
- Population growth (birth rate, baby mortality rate, circulating, commuting and permanent migration).
- Workforce (participation degree of workforce and of unemployment).

b. Economy

- Household economy (income level and sources of income)
- Natural resource economy (ownership pattern, natural resource management, exploitation of natural resources, land use, land value and other natural resources, public owned natural resource)
- Local and regional economy (opportunity for working and doing business, value added manufacturing process, kinds and number of non formal economy activity, income distribution, economic double effect, domestic product, regional gross income, original regional

income, economic growth centers, public facility and social facility and regional accessibility.

c. *Culture*

- Culture (custom, value and cultural norms.)
- Social process (process of association/co-operation, process of dissociation/social conflicts), acculturation, assimilation and integration and social cohesion.
- Social network/community institution in the sectors of economy (ownership by land by a certain community) education, religion, social and family.
- Cultural heritage (historical sites, cultural sanctuary)
- Social strata based on education, economy, occupation and authority.
- Power and authority (formal and leadership, formal and informal authorization, decision making mechanism in the community, dominant individual group, change of leadership value.
- Reaction and perception of the community towards planned business and activity.
- *Ecological adaptation*
- Defense/Security;
- Inter population social interaction.

3.1.4. Community Health Component

The following parameters were examined with regard to community health:

- Process and potency which cause exposure :
- Potency of the excess of impact to cause disease (ailment and mortality level).
- Characteristic 'risky' activities of the community.
- Health resources.
- Environmental sanitary condition.
- Community nutrition status.
- The condition of the environment which is prone to the spread of diseases

3.2. DATA ANALYSIS METHODS

Data analysis combines both quantitative and qualitative methods. The data analysis methods for the physical-chemical, biological, social economic, cultural and community health components are given in *Table 3.6*.

Table 3.6 Method of Data Analysis

No	*Environmental Component*	*Analytical Method*
A.	**PHYSICAL CHEMICAL**	
1.	Climate	Climate classification analysis based on Schmidt and Fergusson $Q = \frac{\text{Average of dry season *)}}{\text{Average of wet season**)}} \times 100\%$ *) rainfall < 60 mm/month **) rainfall > 100 mm/month climate A = Q = 0 – 24.3% B = Q = 14.3 – 33.3% C = Q = 33.3 - 60% D = Q = 60 – 100% E = Q = 100 – 167% F = Q = 167 – 300% G = Q = 300 – 700% H = Q = > 700%
2.	**Air Quality & Noise**	
a.	Dust	Laboratory analysis using gravimetric method
b.	Noise	Direct measurement in field using sound level meter , then take average noise level
c	Water debit	Secondary data
d.	Water Quality	Laboratory analysis using standard method (APHA, 1992)
2.	**Spatial Planning and Land used**	
a.	Spatial Planning	Analysis of spatial planning policy is conducted by RUTR map overlay with existing land use
b.	Land use	Analysis of spatial planning policy is conducted by RUTR map overlay with existing land used in each regency, satellite map analysis and field survey
c.	Land Ownership	Interviews with land owners along road corridor
3.	**Land, Physiography and Geology**	
a.	Land Stabilization	Field survey
b.	Landslide	Field survey
c.	Erosion	A = R.K.L.S.C.P A = erosion (t/ha/th) R = rain erodibility (mm) K = soil erodibility L = length of slope (m) S = slope level C = land used /covering area P = soil management
d.	Physiography	Analysis using tophographic maps
e.	Geology	Analysis using geological maps

No	*Environmental Component*	*Analytical Method*
B.	**BIOLOGY**	
1.	Terrestrial flora	Description of measurement of primary and secondary data
2.	Terrestrial Fauna	Description of measurement of primary and secondary data
3.	Aquatic Biota	Index of Diversity (H') H' = -Σ Pi log 2 Pi Pi = Ni / N Ni = number of individual species in-i N = total number of species
C.	**SOCIAL**	
1.	Demography	
a.	Population Density	Population density (Soemarwoto, 1987)' $D = \frac{Po\,(1 + r)^t}{L}$ P_o = total of population in year-o (person) r = population rate (%) t = time L = Area ((km^2)
b.	Dependency ratio	Population characteristics $DR = \frac{P_{0-14} + P_{60}}{P_{15-59}}$ P_{0-14} = number of people aged 0 – 14 years (person) P_{15-59} = number of people aged 15 – 59 years (person) P_{60+} = number of people aged > 60 years (person)
c.	Sex ratio	Sex ratio $SR = \frac{L}{P} \times k$ L = number of males (person) P = number of females (person) k = constant
2.	Income	Income level I = c + i + s c = consumption i = investment s = savings
3.	Economic	Description of secondary data
4.	Culture	Description of secondary data
D.	**PUBLIC HEALTH**	
1.	Incidence	Description of secondary data
2.	Prevalence	Description of secondary data
3.	Nutrient Status	Description of secondary data
4.	Health Facility	Description of secondary data
5.	Medical Personnel	Description of secondary data

3.3. METHOD OF PREDICTING MAJOR AND SIGNIFICANT IMPACTS

The method for predicting major and significant impacts is a study of changes to environmental quality that may be caused by project activities. The approach is applied formally and informally as follows:

3.3.1. Analogy

This approach is applied by studying the environmental impacts caused by similar activities at the same location or at a location where the environment is identical with the condition of study area, so that it can be considered in the effort to predict the impact within the study area. This approach is applied for predicting an impact towards the factors of social, economy, culture and spatial management.

3.3.2. Evaluation by Experts

In this approach, the relation of impacts with the component/sub component/parameter of the environment will be based on the experience of the experts who work in the Study Team, and the other experts who are invited to participate. The approach is used for predicting the impacts to air, organic and inorganic elements and the quality of surface water.

3.3.3. Mathematic Model

This model, the causal relation which denote an impact of the activity of the project towards the components/sub components/parameter of a certain environment is formulated through the comparison between a produced standard quality and extended change of environmental condition.

3.3.4. Environmental Quality Standards

In this approach, the causal relation between a project impact and the environmental components/sub components/parameters is formulated through comparison with a recognized standard.

Table 3.7 Mathematical Approach Model

No	*Environmental Component*	*Analysis Method*
A.	**PHYSICAL- CHEMICAL**	
1.	Noise	
	Noise Level caused by Vehicles	$LE_{equip} = LOE_{equip} + 10Log[\frac{N_{equip}}{S_{equip} * T}] + 10 Log [(\frac{15}{D})^{1+\alpha}] - 13$ LE_{equip} = Total noise level of equipment (dBA) LOE_{equip} = Unit equipment noise level (dBA) N_{equip} = Number of equipment S_{equip} = equipment velocity (km/jam) D = distance from road center line T = time α = environmental coefficient
	Noise Level caused by Operation of Heavy Equipment	$LE_{total} = 10Log [10^{\frac{LE_{equip-1}}{}} + 10^{\frac{E_{equip-2}}{}}] + \ldots]$ LE_{total} = Total noise intensity of heavy equipment at distance D (dBA) L_{equip} = individual noise intensity of heavy equipment (dBa)
	Noise Level Combination	$LD = L_{15} + 20 Log (15/D)$ $LP_2 = LP1 – 20 log$ LP_2 = Noise level at a distance R_2 LP_1 = Noise level at standard distance (R_1) R_1 = Standard distance to noise source (=15m) R_2 = Actual distance to noise source
2.	Dust Concentration	$C = \frac{Q \times L}{U \times Z}$ C = Ambient concentration ($\mu m/m^3$) Q = emission rate per square ($\mu m/debit/m^3$) L = length of study area in line with wind direction U = wind velocity Z = height of pollutant mixing (m)
B.	**BIOLOGY**	
1.	Flora	Interpretation of flora diversity index
2.	Fauna	Interpretation of fauna diversity index
C.	**SOCIAL ECONOMIC & CULTURE**	Descriptive analysis
1.	Employment	
a.	Work participation level	$TPk = \frac{\sum Ak}{\sum Tk} \times 100\%$ TPk = work participation level $\sum Ak$ = Number of work force $\sum Tk$ = Number of
b.	Unemployment level	$TP = \frac{\sum P}{\sum Tk} \times 100\%$ TP = Unemployment level $\sum Ak$ = Number of work force $\sum Tk$ = Number of labour force

No	*Environmental Component*	*Analysis Method*
2. a.	Income Income per capita	$Y = \frac{Y}{A}$ Y = Yearly income per. capita Y = total revenue A = Number of dependent, people per. capita
3.	Culture	Descriptive analysis
D.	**PUBLIC HEALTH**	Descriptive analysis

3.4. METHOD FOR EVALUATING MAJOR AND SIGNIFICANT IMPACTS

According to the Government Regulation No. 27 Year 1999 regarding the Analysis of the Environmental Impact, it is stated that the criteria with regard to a major and important impact of a project activity is determined as follows::

(A) Impact Magnitude – Social: Number of People Likely to be affected by Impact

(B) Impact Extent - Extent of Area Affected by the Impact

(C) Impact Duration

(D) Impact Intensity

(E) Secondary Impact Magnitude - Number of Other Environmental Components Likely to be Affected by the Impact

(F) Cumulative Character of Impact

(G) Irreversibility or Reversibility of Impact

Table 3.8 Matrix Identification Significant Impact Reconstruction and Rehabilitation Road Banda Aceh to Meulaboh Project

Activity Component / Environmental Component	Pre Construction		Construction										Operation	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Physic – Chemical														
Climate							X							
Air Quality				X		X	X	X	X			X	X	X
Noise and Vibrtion				X	X	X	X	X	X			X	X	X
Hydrology						X	X	X	X					
Water Quality					X	X	X	X	X	X				
Land Use					X	X	X	X						
Transportation				X	X	X		X	X				X	X
Soil Erosion					X	X	X	X	X					
Biology														
Flora				X	X	X	X	X	X					
Fauna				X	X	X	X	X	X					
Aquatic Biota					X	X	X	X	X	X				
Social														
Demography			X								X			
Community Income	X	X	X	X	X	X	X	X	X	X	X	X		X
Regional Income													X	
Livelihood	X	X	X	X	X	X	X	X	X	X	X		X	X
Custom and Traditions		X	X										X	
Attend and Community Perception	X	X	X	X	X		X	X	X	X	X	X	X	X
Social Process			X		X						X		X	
Social Institution			X								X		X	
Public Health														
Disease Pattern			X	X	X								X	
Nutrition Status			X								X		X	
Number of Accidents				X									X	
Environmental Sanitation					X				X					

Note :

1 Survey and Measurement
2 Land Acquisition
3 Mobilization of Worker
4 Mobilization of Material and Equipment
5 Contruction of Supporting Infrastructure
6 Quarrying and Borrow Pit
7 Land Clearing
8 Earthwork
9 Civil Engineering Works
10 Use of Fuel and Oils
11 Demobilization of Worker
12 Demobilization of Material and Equipment
13 Road and Bridge Operation
14 Road and Bridge Maintenance

Table 3.9 Example of Matrix Prediction Significant Impact of Reconstruction and Rehabilitation Road Banda Aceh to Meulaboh Project

Activity Component / Environmental Component	Pre Construction		Construction										Operation	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Physic – Chemical														
Climate							TP							
Air Quality				P		TP	TP	P	P			P	P	TP
Noise and Vibrtion				P	TP	TP	TP	P	P			P	P	TP
Hydrology						P	TP	TP	P					
Water Quality					P	TP	TP	TP	TP	P				
Land Use					TP	TP	TP	TP						
Transportation				P	TP	TP		P	P			P	P	TP
Soil Erosion					TP	P	P	TP	TP					
Biology														
Flora					TP	TP	P	TP	P					
Fauna					TP	TP	P	TP	P					
Aquatic Biota					TP	TP	TP	TP	P	P				
Social														
Demography			TP								TP			
Community Income	TP	P	P	TP	TP	TP	TP	TP	TP	TP	TP	TP		TP
Regional Income													P	
Livelihood	TP	P	P	TP	TP	TP	TP	TP	TP	TP	P	TP	P	TP
Custom and Traditions		TP	TP										TP	
Attend and Community Perception	P	P	P	TP	TP		TP	TP	P	TP	P	TP	P	TP
Social Process			P		TP						TP		TP	
Social Institution			TP								TP		TP	
Public Health														
Disease Pattern			TP	TP	TP							TP	TP	
Nutrition Status			TP								TP		P	
Number of Accidents				P								P	P	
Environmental Sanitation					P				TP					

Note :
P = Penting (Significant)
TP = Tidak Penting (Not Significant)

1 Survey and Measurement
2 Land Acquisition
3 Mobilization of Worker
4 Mobilization of Material and Equipment
5 Contruction of Supporting Infrastructure
6 Quarrying and Borrow Pit
7 Land Clearing
8 Earthwork
9 Civil Engineering Works
10 Use of Fuel and Oils
11 Demobilization of Worker
12 Demobilization of Material and Equipment
13 Road and Bridge Operation
14 Road and Bridge Maintenance

CHAPTER 4. STUDY IMPLEMENTATION

4.1. PROJECT SPONSOR

Name	:	Department of Public Works, Directorate General of Bina Marga, Directorate of Roads and Bridges, Temporary Working Unit for Planning and Supervision of Roads and Bridges (P2JJ) Province Nanggroe Aceh Darussalam (NAD)
Address	:	Jl. Jenderal Sudirman No. 1 Banda Aceh 23239 Telephone : +62-651-47150 Facsimile : +62-651-47150
Coordinator	:	Ir Khalidin. MT
Position	:	Head of Temporary Work Unit P2JJ Province NAD.

Technical and financial assistance is allocated to the Sponsor by the United States Agency for International Development (USAID).

4.2. AMDAL STUDY COMPILER

4.2.1. Identity

Name	:	PT ERM Indonesia
Address	:	Wisma Aldiron Dirgantara 2nd Floor, Suite # 238-239, Jl Jenderal Sudirman Kav. 72, Jakarta 12780, Indonesia
Telephone	:	+62 – 21 – 79181904
Email	:	Karlheinz Spitz @ERM.com
Coordinator	:	Dr. Karlheinz Spitz MBA
Position	:	President Director

4.2.2. Study Team

The Study Team consists of the following :

Head of AMDAL Team (Possessing AMDAL A and AMDAL B certificate)	: Ir Hasbullah Hasan	ERM
Technical Assistants	: Cindy Barger	USACE
	: Theresa Tuano	USAID

	:	Trigeany Linggoatmodjo	USAID
	:	Steven Brown, M. Eng	ERM
	:	David J. Finneren	ERM
Physical Chemical Components	:	Prof DR Ir Boiran M. Sc DEA	ERM
	:	Prof. DR Bastan Arifin M.Sc	ERM
Biology Components	:	Drs. Rafeldy Noviar	ERM
	:	Ir. Abdoeh Oelim	ERM
Socio-Economy and Socio-Cultural	:	Drs. Adnan Abdullah	ERM
		Drs Ir. Johan Yunus, SE	
		Drs Mohammad Razali	ERM
Public Health	:	dr. A Wahab Abda	ERM

4.2.3. *Study Cost*

The financier for implementation of ANDAL study is the USAID, with cost components as follows :

a. Preparation
b. Advisors and Experts
c. Field Survey
d. Collection and Analysis of primary and secondary data
e. Arrangement, presentation, revision and printing of documents of KA, ANDAL,RKL and RPL until the approval of AMDAL.

4.2.4. *Study Period*

With regard to the present condition of Aceh, the construction of the Banda Aceh-Meulaboh road should be started as soon as possible. Due to the fact that the number of the victims of tsunami tidal wave in the western coast of Aceh was tremendous, the effort taken for the reconstruction of the province is imperative. The efficiency of the reconstruction plan is much dependent on the availability and accessibility for the motor vehicles. Given the current urgent situation in Aceh, it is imperative that the AMDAL study be completed with a fast track timeline. The schedule with a 'compressed" timeframe is shown in Table 4.1.

Table 4.1 ANDAL Study Schedule

Description	2005							
	APR	MAY	JUNI	JULI	AUG	SEPT	OCT	NOV
Public Socialization								
Public Responses								
Term of Reference Preparation								
Presentation of Term of Reference								
Approval TOR								
Data Collection								
ANDAL Preparation								
RKL/RPL Preparation								
ANDAL RKL-RPL Presntation								
Approval ANDAL RKL-RPL								

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Cameron, N.R. Bennet, J.D. McC. Bridge, D. Djunuddin, A. Ghazali, S.A. Harahap, H. Jeffrey, D.H. Kartawa, W. Keats,W. Rocks, N.M.S., and Whandoyo, R. (1982) Geologic map of the Tapaktuan Quadrangle, Sumatra. Geological Research and Development Centre.

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APPENDIX

LAMPIRAN A

REKOMENDASI PERSETUJUAN KA ANDAL OLEH KOMISI AMDALDA PROVINSI NANGGROE ACEH DARUSSALAM

PEMERINTAH PROVINSI NANGGROE ACEH DARUSSALAM
BADAN PENGENDALIAN DAMPAK LINGKUNGAN DAERAH
(BAPEDALDA)
PROVINSI NANGGROE ACEH DARUSSALAM
Jalan Tgk. Malem No. 2 Telp. (0651) 635721, 635722 Fax (0651) 32456
BANDA ACEH, 23121

KEPUTUSAN
KEPALA BADAN PENGENDALIAN DAMPAK LINGKUNGAN DAERAH
PROVINSI NANGGROE ACEH DARUSSALAM
NOMOR : 660-27/IX/AMDAL/2005

TENTANG

KESEPAKATAN KERANGKA ACUAN ANALISIS DAMPAK LINGKUNGAN HIDUP (KA – ANDAL)
KEGIATAN PERBAIKAN DAN REKONSTRUKSI JALAN DARI
BANDA ACEH SAMPAI MEULABOH
PROVINSI NANGGROE ACEH DARUSSALAM

KEPALA BADAN PENGENDALIAN DAMPAK LINGKUNGAN DAERAH
PROVINSI NANGGROE ACEH DARUSSALAM,

Menimbang :

a. bahwa usaha dan/atau kegiatan Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, Provinsi Nanggroe Aceh Darussalam** merupakan usaha dan/atau kegiatan yang wajib dilengkapi dengan Studi Analisis Mengenai Dampak Lingkungan Hidup;

b. bahwa Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA – ANDAL) Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh,, Provinsi Nanggroe Aceh Darussalam** merupakan bagian dari Studi Analisis Mengenai Dampak Lingkungan Hidup yang wajib mendapatkan Keputusan Kesepakatan berdasarkan hasil penilaian Komisi Penilai AMDALDA Provinsi Nanggroe Aceh Darussalam;

c. bahwa untuk hal tersebut di atas, perlu ditetapkan dalam suatu keputusan tentang Kesepakatan Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA–ANDAL) Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, oleh Departemen Pekerjaan Umum , Dirjen Bina Marga, Direktorat Jalan dan Jembatan, Satuan Kerja Sementara Perencanaan Jalan dan Jembatan (P2JJ) Provinsi Nanggroe Aceh Darussalam dengan Konsultan Penyusun PT. ERM INDONESIA.**

Mengingat :

1. Undang – undang Nomor 24 Tahun 1992 tentang Penataan Ruang (Lembaran Negara Republik Indonesia Tahun 1992 Nomor 115, Tambahan Lembaran Negara Republik Indonesia Nomor 3501);
2. Undang – undang Nomor 23 Tahun 1997 tentang Pengelolaan Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 1997 Nomor 68, Tambahan Lembaran Negara Republik Indonesia Nomor 3699);
3. Undang-undang Republik Indonesia Nomor 22 Tahun 1999 Tentang Pemerintah Daerah (Lembaran Negara Republik Indonesia Tahun 1999 Nomor 60, Tambahan Lembaran Negara Nomor 3699);
4. Undang-undang Republik Indonesia Nomor 18 Tahun 2001 Tentang Otonomi Khusus bagi Propinsi Daerah Istimewa Aceh sebagai Provinsi Nanggroe Aceh Darussalam;
5. Peraturan Pemerintah Nomor 27 Tahun 1999 tentang Analisis Mengenai Dampak Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 1999 Nomor 59, Tambahan Lembaran Negara Republik Indonesia Nomor 3838);
6. Peraturan Pemerintah Republik Indonesia Nomor 25 Tahun 2000 Tentang Kewenangan Pemerintah dan Kewenangan Provinsi sebagai Daerah Otonom;

7. Keputusan Menteri Negara Lingkungan Hidup Republik Indonesia Nomor 40 Tahun 2000 Tentang Pedoman Tata Kerja Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup;
8. Keputusan Kepala Badan Pengendalian Dampak Lingkungan Hidup Nomor 08 Tahun 2000 tentang Keterlibatan Masyarakat dan Keterbukaan Informasi dalam Proses Analisis Mengenai Dampak Lingkungan Hidup;
9. Keputusan Kepala Badan Pengendalian Dampak Lingkungan Hidup Nomor 09 Tahun 2000 tentang Pedoman Penyusunan Analisis Mengenai Dampak Lingkungan Hidup;
10. Keputusan Menteri Negara Lingkungan Hidup Nomor 17 Tahun 2001 tentang Jenis Rencana Usaha dan/atau Kegiatan yang Wajib Dilengkapi dengan Analisis Mengenai Dampak Lingkungan Hidup.
11. Peraturan Daerah Propinsi Daerah Istimewa Aceh Nomor 09 Tahun 1995 tentang Rencana Tata Ruang Wilayah Provinsi (RTRWP) Daerah Istimewa Aceh.
12. Peraturan Daerah Propinsi Daerah Istimewa Aceh Nomor 6 Tahun 2001 Tentang Susunan Organisasi dan Tata Kerja Badan Pengendalian Dampak Lingkungan Daerah Propinsi Daerah Istimewa Aceh;
13. Keputusan Gubernur Provinsi Nanggroe Aceh Darussalam Nomor 660/047/2002 Tentang Pembentukan Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup Daerah (AMDALDA) Provinsi Nanggroe Aceh Darussalam.
14. Keputusan Gubernur Provinsi Nanggroe Aceh Darussalam Nomor 14 Tahun 2002 Tentang Pedoman Tata Kerja Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup Daerah Provinsi Nanggroe Aceh Darussalam;

Memperhatikan : 1. Hasil rapat Komisi Penilai AMDALDA Provinsi Nanggroe Aceh Darussalam di **Banda Aceh** pada tanggal **28 Juli 2005** Mengenai Penilaian Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA – ANDAL) Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, Provinsi Nanggroe Aceh Darussalam,** oleh **Departemen Pekerjaan Umum , Dirjen Bina Marga, Direktorat Jalan dan Jembatan Satuan Kerja Sementara Perencanaan Jalan dan Jembatan (P2JJ) Provinsi Nanggroe Aceh Darussalam** dan hasil perbaikan dokumen sesuai surat Nomor .PR.03.02/P2JJ/379/2005 tanggal 13 Agustus 2005.

MEMUTUSKAN :

Menetapkan :

PERTAMA : **KEPUTUSAN KESEPAKATAN KERANGKA ACUAN ANALISIS DAMPAK LINGKUNGAN HIDUP (KA – ANDAL) RENCANA KEGIATAN PERBAIKAN DAN REKONSTRUKSI JALAN DARI BANDA ACEH SAMPAI MEULABOH, PROVINSI NANGGROE ACEH DARUSSALAM "*DAPAT DISETUJUI DAN DITERIMA*".**

KEDUA : Kesepakatan Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA – ANDAL) Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, Provinsi Nanggroe Aceh Darussalam,** sebagaimana dimaksud dalam diktum PERTAMA, mengandung arti bahwa ruang lingkup dan kedalamam Studi Analisis Mengenai Dampak Lingkungan Hidup (AMDAL) bagi kegiatan Rencana **Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh, Provinsi Nanggroe Aceh Darussalam** adalah sebagaimana tercantum dalam dokumen Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL).

KETIGA : Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA – ANDAL) tersebut wajib digunakan sebagai acuan dalam pelaksanaan Studi Analisis Dampak Lingkungan Hidup (ANDAL) selanjutnya.

KEEMPAT : Kegiatan **Perbaikan dan Rekonstruksi Jalan dari Banda Aceh sampai Meulaboh,** tidak boleh dilaksanakan/dikerjakan sebelum diterbitkan keputusan Gubernur Provinsi Nanggroe Aceh Darussalam tentang Kelayakan Lingkungan Hidup berdasarkan hasil Analisis Dampak Lingkungan Hidup (ANDAL), Rencana Pengelolaan Lingkungan Hidup (RKL) dan Rencana Pemantauan Lingkungan Hidup (RPL).

KELIMA : Dokumen Kelayakan Lingkungan Hidup merupakan bagian yang tidak terpisahkan dari kontrak kerja yang dilaksanakan oleh kontraktor yang terpilih

KEENAM : Setiap kelalaian dan / atau penyimpangan yang dilakukan di luar **"Keputusan Kesepakatan"** ini dapat dikenakan sanksi sesuai peraturan yang berlaku.

Ditetapkan di : **Banda Aceh**
Pada Tanggal : 7 September 2005

KEPALA BADAN PENGENDALIAN DAMPAK LINGKUNGAN DAERAH PROVINSI NANGGROE ACEH DARUSSALAM

IR. ARSYIAH ARSYAD, MM
NIP. 010 087 342

Keputusan ini disampaikan kepada Yth :

1. Gubernur Provinsi Nanggroe Aceh Darussalam;
2. Menteri Negara Lingkungan Hidup RI di Jakarta;
3. Menteri Pekerjaan Umum di Jakarta;
4. Walikota Banda Aceh;
5. Bupati Kabupaten Aceh Besar di Jantho;
6. Bupati Kabupaten Aceh Jaya di Calang;
7. Bupati Kabupaten Aceh Barat di Meulaboh;
8. Kepala BAPPEDA Provinsi Nanggroe Aceh Darussalam;
9. Kepala Dinas PRASWIL Prov. NAD;
10. Kepala Kantor Wilayah Badan Pertanahan Nasional Provinsi Nanggroe Aceh Darussalam;
11. PT. ERM INDONESIA (Konsultan Penyusun) di Jakarta----------

LAMPIRAN B

BERITA ACARA DAN DAFTAR PERBAIKAN PRESENTASI KA ANDAL OLEH KOMISI AMDALDA PROVINSI NANGGROE ACEH DARUSSALAM

BERITA ACARA
RAPAT KOMISI AMDALDA PROVINSI NANGGROE ACEH DARUSSALAM
PEMBAHASAN KA-ANDAL KEGIATAN PERBAIKAN DAN REKONSTRUKSI JALAN DARI BANDA ACEH SAMPAI MEULABOH
NOMOR : BA/01/VII/AMDALDA/2005

HARI/TANGGAL	**: KAMIS/28 JULI 2005**
TEMPAT	**: AULA BAPEDALDA PROVINSI NAD**
PEMRAKARSA KEGIATAN	**:DEPARTEMEN PU, DIRJEN BINA MARGA, DIREKTORAT JALAN DAN JEMBATAN SATUAN KERJA SEMENTARA PERENCANAAN JALAN&JEMBATAN (P2JJ) PROVINSI NAD**
PENANGGUNG JAWAB KEGIATAN	**:KEPAL A SATUAN KERJA SEMENTARA P2JJ PROVINSI NAD**
KONSULTAN	**: PT. ERM INDONESIA**
PIMPINAN RAPAT	**: KETUA KOMISI AMDALDA PROVINSI NAD**

1. Anggota Komisi Penilai AMDALDA Provinsi NAD yang hadir adalah : Sesuai Daftar Terlampir
2. Rapat Komisi Penilai AMDALDA Provinsi NAD dalam rangka pembahasan KA-ANDAL Rencana Kegiatan Perbaikan dan Rekonstruksi Jalan dari Banda Aceh Sampai Meulaboh menyepakati beberapa hal sebagai berikut :
   a. Pemerintah Kota Banda Aceh, Kabupaten Aceh Besar, Kabupaten Aceh Jaya, Kabupaten Aceh Barat sangat mendukung rencana USAID untuk memperbaiki dan merekonstruksi jalan tersebut, mengingat keterbatasan pemerintah untuk menyediakan dana yang begitu besar untuk melaksanakan pekerjaan tersebut.
   b. DPRD Provinsi dan perwakilan masyarakat mendukung sepenuhnya rencana perbaikan dan rekonstruksi jalan tersebut. Karena jalan tersebut merupakan kebutuhan masyarakat yang sangat mendesak guna mendukung pertumbuhan perekonomian dipesisir barat selatan Provinsi NAD Pasca Tsunami.
   c. Perwakilan Masyarakat sekitar lokasi terkena dampak mengharapkan adanya sosialisasi tentang rencana kegiatan tersebut, adanya keterlibatan masyarakat dalam pelaksanaan pekerjaan sesuai dengan tingkat pendidikan/kemampuan masyarakat. Disamping itu masyarakat juga mengharapkan agar pemerintah / pemrakarsa menyediakan ganti rugi terhadap tanah yang terkena rute jalan sesuai ketentuan dan prinsip keadilan dengan membuat analisa dampak sosial.
   d. Masyarakat pemerhati lingkungan mengharapkan, kegiatan perbaikan rekonstruksi jalan tersebut memperhatikan Aspek Hukum Tata Ruang dan Kelestarian fungsi Lingkungan Hidup terutama dalam pengambilan bahan material (borrow areal) untuk kegiatan pembangunan/serta mencegah kerusakan hutan.
   e. Terhadap jalur jalan yang akan direlokasi perlu disurvey /dikaji secara cermat dengan mempertimbangkan aspek teknis, ekonomi lingkungan serta sosial masyarakat setempat.

f. Dalam pembuatan desain jalan perlu diperhatikan bahu jalan, drainase, pedestarian, dan kebisingan.

g. Perlu dimuat secara jelas informasi kunci tentang ruas jalan yang direlokasi, jalan yang lama, hutan yang dilewati, dan standard konservasi lahan.

h. Dokumen AMDAL merupakan dokumen yang tidak terpisahkan dengan dokumen Kontrak Fisik Pekerjaan perbaikan dan konstruksi jalan tersebut

3. Saran, masukan dan tanggapan secara rinci adalah sebagaimana terlampir dalam notulensi dan merupakan bagian yang tidak terpisahkan dari Berita Acara ini.

4. Atas berbagai saran, masukan dan tanggapan, Pemrakarsa menyatakan akan menanggapi semua masukan yang disampaikan oleh peserta rapat.

5. Dokumen KA-ANDAL hasil perbaikan akan disampaikan oleh Pemrakarsa kepada Komisi Penilai AMDALDA Provinsi NAD selambat-lambatnya tanggal. 28 Kugustus 2005

6. Sementara menunggu hasil perbaikan dokumen KA-ANDAL, pemrakarsa diperkenankan untuk melakukan penelitian dalam rangka untuk mempercepat penyusunan dokumen AMDAL.

Demikian berita acara ini dibuat dengan sebenar-benarnya.

Pemrakarsa	**Ketua Komisi AMDALDA Provinsi Nanggroe Aceh Darussalam**
Ir. Khalidin, MT	**Arsyiah Arsyad, MM**
Nip. 390 013 175	**Nip. 010 087 342**

ALTERNATIF KEPUTUSAN KOMISI PENILAI AMDALDA
PROVINSI NANGGROE ACEH DARUSSALAM
TERHADAP KA-ANDAL
KEGIATAN PERBAIKAN DAN REKONSTRUKSI JALAN DARI
BANDA ACEH SAMPAI MEULABOH

KAMIS 28 JULI 2005

---

1. **Dierima tanpa perbaikan**
2. **Diterima dengan perbaikan & penyempurnaan**
3. **Ditolak sementara untuk dikaji kembali**
4. **Ditolak**

◯ : **Keputusan yang dipilih**

Ketua Komisi AMDALDA
Provinsi Nanggroe Aceh Darussalam

H. Arsyiah Arsyad, MM
Nip. 010 087 342

C:\File Komisi AMDAL\Komisi Penilai\Surat\BERITA ACARA KOMISI.doc

DAFTAR PERBAIKAN
DOKUMEN KERANGKA ACUAN ANDAL
PERBAIKAN DAN REKONSTRUKSI JALAN BANDA ACEH - MEULABOH
BERDASARKAN MASUKAN ANGGOTA KOMISI PENILAI AMDALDA PROVINSI NANGGROE ACEH DARUSSALAM

HARI : Kamis, Tanggal 28 Juli 2005

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
1	2	3	4		
1.	UMUM	a. Pemerintah Kota Banda Aceh, Kabupaten Aceh Besar, kabupaten Aceh Jaya dan Kabupaten Aceh Barat sangat mendukung rencana USAID untuk memperbaiki dan merekonstruksi jalan dari Banda Aceh sampai Meulaboh, mengingat keterbatasan pemerintah untuk menyediakan dana yang begitu besar untuk melaksanakan pekerjaan tersebut b. DPRD Provinsi NAD dan perwakilan masyarakat mendukung sepenuhnya rencana perbaikan dan rekonstruksi jalan tersebut, karena jalan tersebut merupakan kebutuhan masyarakat yang sangat mendesak guna mendukung pertumbuhan perekonomian di pesisir barat selatan Provinsi NAD Pasca Tsunami c. Perwakilan masyarakat sekitar lokasi terkena dampak mengharapkan adanya sosialisasi tentang rencana kegiatan tersebut, adanya keterlibatan masyarakat dalam pelaksanaan pekerjaan sesuai dengan tingkat pendidikan/kemampuan masyarakat. Disamping itu masyarakat juga mengharapkan agar pemerintah/pemrakarsa menyediakan ganti rugi yang layak terhadap tanah yang terkena rute jalan sesuai ketentuan dan prinsip keadilan dengan membuat Analisa Dampak Sosial. d. Masyarakat pemerhati liingkungan mengharapkan, kegiatan perbaikan rekonstruksi jalan tersebut memperhatikkan aspek hukum, Tata Ruang dan Kelestarian Fungsi Lingkungan Hidup terutama dalam pengambilan bahan material (borrow areal) untuk kegiatan pembangunan/serta mencegah kerusakan hutan. e. Terhadap jalur jalan yang akan direlokasi perlu disurvai/dikaji secara cermat dengan mempertimbangkan aspek teknis, ekonomi lingkungan serta sosial masyarakat setempat.	Akan diperhatikan dan dilaksanakan Akan dituangkan dalam dokumen RKL Akan dituangkan dalam dokumen RKL		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		f. Dalam pembuatan desain jalan perlu diperhatikan bahu jalan, drainase, pelestarian dan kebisingan.	Telah dicantumkan dalam uraian kegiatan, sedangkan untuk bahu jalan (pedestrian) rencananya untuk wilayah perkotaan dan jembatan serta kebisingan akan dikelola dalam RKL		
		g. Perlu dimuat secara jelas informasi kunci tentang ruas jalan yang direlokasi jalan yang lama, hutan yang dilewati, dan standar konservasi lahan.	Telah cantumkan dalam Tabel 2-3, hal 2-9	Tidak benar, tolong dilihat kembali	Telah diperbaiki, Tabel 2-12 dan 2-13, halaman 2-28 dan 2-29.
		h. Dokumen AMDAL merupakan dokumen yang tidak terpisahkan dengan dokumen kontrak fisik pekerjaan perbaikan dan rekonstruksi jalan tersebut.	Akan dicantumkan dalam surat pernyataan dalam dokumen ANDAL		
		• Harus melakukan koordinasi dengan kabupaten-kabupaten yang dilintasi oleh jalan agar penyesuaian tata ruang kabupaten dapat sinergi/saling mendukung sehingga pemanfaatan ruang dapat lebih dioptimalkan	Akan diperhatikan dan dilaksanakan		
		• Dalam dokumen tidak ada informasi mengenai luas tanah masyarakat yang terkena proyek. Pada halaman 2-7 disebutkan, tanah masyarakat yang akan dibebaskan dalam bentuk lahan kebun, sawah dan pemukiman.	Data-data tentang lahan dan pemukiman serta jumlah KK yang lahannya terkena jalur jalan baru belum dapat diketahui karena penatapan jalur jalan yang akan dibangun belum final		
		• Disarankan untuk memasukkan : ◦ Luas lahan/tanah milik masyarakat yang terkena proyek, jika memungkinkan per kabupaten, yang terdiri atas : tanah kebun, tanah sawah dan permukiman ◦ Jumlah kepala keluarga (KK) yang tanahnya terkena proyek, jika memungkinkan per kabupaten	Telah diperbaiki		
		Setiap peta/gambar agar diberi nomor sesuai dengan narasinya			
		Pada peta lokasi pengambilan sampling terhadap 3 titik sampel biologi darat.apakah ketiga tersebut untuk flora dan fauna sekaligus, sedangkan fauna sifatnya dinamis/bergerak.	Ketiga sampel tersebut merupakan lokasi untuk sampel flora dan duna Telah diperbaiki hal. 3-12		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		Pada peta lokasi pengambilan sampling terhadap titik pengamatan untuk penyu, kenapa hanya penyu, sementara pada metode pengamatan hal 3-12 tidak disebutkan spesifik hanya untuk penyu? Sebaiknya dalam Kerangka Acuan juga dijelaskan rencana pembuatan jalan dan hubungannya dengan Tata Ruang, khususnya Tata Ruang Wilayah Propinsi ini penting karena didalam beberapa peraturan yang berhubungan dengan AMDAL, salah satu item yang dijadikan pertimbangan "apakah diterima atau ditolak" ada hubungannya dengan Tata Ruang. Sebaiknya dalam metode Studi KA ANDAL standar HIGH VALUE CONCERVATION (HVC) dijadikan prioritas dalam penentuan rencana lokasi pembuatan jalan. Di dalam Kerangka Acuan tidak dijelskan manfaat langsung yang bisa diterima oleh masyarakat dan adanya jalan baru dan hubungannya dengan akses masyarakat dalam menyelamatkan diri (fungsi escape road) ketika terjadi bencana. Dalam KA khususnya mengenai penyediaan atau kebutuhan tanah timbun dan batuan-batuan dijelaskan lokasi-lokasi sumber atau lokasi yang dipilih dan dijelaskan kriterianya seperti apa. Ini tidak dijelaskan dalam KA harusnya dijelaskan dalam KA. Ruas jalan mulai Lamno sampai dengan Meulaboh hampir 50% adalah tanah gambut (rawa) hal ini harus diantisipasi sehingga dapat menghasilkan konstruksi yang sesuai dengan kondisi alamnya.	Akan diperhatikan oleh tim disain dalam perencanaan jalan dan pada dasarnya semua kegiatan akan mengikuti stanfar High Value Concervation Pembangunan jalan ini hanya untuk jalur Banda Aceh-Meulaboh, sedangkan jalan escape road akan dibangun Pemda dan dikordinasikan dengan BRR Telah dijelaskan pada hal. 2-10 Akan diperhatikan didalam pembuatan disain jalan		
2.	1-1-	Apa judul ISEI, 2005 : 4? Mohon semua yang dirujuk ditampilkan dalam daftar pustaka	Sudah ditambahkan dalam daftar pustaka		
3.	1-2 & 1-3	Sebenarnya merupakan isu pokok, mengapa tidak dikemukakan masalah transportasi, apakah tidak terjadi dampak dibidang ini? Mohon ditambahkan masalah Bangkitan Transportasi, ini merupakan isu pokok utama	Telah ditambahkan pada halaman 1-3		
4.	1-4	PP No. 28 tahun 1995 tentang Perlindungan Hutan telah dicabut dan diganti yang baru dengan PP No. 45 tahun 2004 tentang Perlindungan Hutan.	Telah diperbaiki pada halaman 1-5		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		Point A UU item 6, UU No. 24/92 tentang Penataan Ruang, point ini benar tapi yang menjadi pertanyaan adalah apakah NAD sudah ada tata ruangnya? Apakah nanti tata ruang yang akan mengikuti jalan atau jalan yang akan mengikuti tata ruang?	Pembangunan jalan ini dengan Tata ruang akan saling mendukung		
5.	1-4 s/d 1-9	a. Beberapa peraturan perundang-undangan yang dirujuk kurang relevan dengan proyek. Disarankan untuk dihapus : 1. UU No. 4 tahun 1992 tentang Perumahan dan Pemukiman 2. PP No. 8 tahun 1998 tentang Pemanfaatan Flora dan Fauna 3. PP No. 13 tahun 1998 tentang Pengusahaan Taman Buru b. Ada peraturan yang disebutkan 2 kali, penyebutan yang salah yang disarankan untuk dihapus, yakni Keputusan Menteri Agraria/Kepala BPN No. 1 tahun 1994. c. UU Jalan tolong dilihat kembali, nomornya keliru	Telah diperbaiki dan dihilangkan pada hal. 1-4 s/d 1-8 Telah diperbaiki pada hal. 1-4 s/d 1-5 Telah diperbaiki pada hal. 1-4	Belum dihapus/dihilangkan	Sebelumnya telah diperbaiki dan dihilangkan, hal 1-4 s/d 1-8
6.	1-5	Tertulis PP No. 7 tahun 1998 tentang Pengawasan Jenis Flora dan Fauna seharusnya PP No. 7 tahun 1998 tentang Pengawetan Jenis Tumbuhan dan Satwa Tertulis PP No. 8 tahun 1998 tentang Pemanfaatan Flora dan Fauna seharusnya PP No. 8 tahun 1998 tentang Pemanfaatan Jenis Tumbuhan dan Satwa. Apa keterkaitannya dengan proyek ini? Apa ada : Taman Buru, Taman Nasional, Suaka Alam di kawasan ini Mohon dibuang saja	Telah dihilangkan pada hal. 1-5		
7.	1-6	Apa ada yang tidak bergerak? Mohon dibuang saja	Telah dihilangkan pada hal. 1-6		
8.	1-7	Apa beda dengan butir 1)? Mohon penulisan peraturan perundangan diurut berdasarkan pada jenjang dan tahun, serta nomor, untuk menghindari pengulangan Merupakan acuan penilai, apa ada penyusunan AMDAL juga menilai dokumen AMDAL? Jika tidak keberatan mohon dibuang saja.	Telah diperbaiki pada hal 1-6 s/d 1-7		
9.	1-9	Tertulis studi ANDAL dan kegunaan ANDAL, seharusnya Studi KA-ANDAL dan kegunaan KA-ANDAL	Sesuai dengan pedoman Kep. Ka Bapedal No. 09/2000 tertulis Tujuan Studi ANDAL dan Kegunaan Studi ANDAL pada hal. 1-9	Halaman ini tidak ada	Halaman 1-9 telah dimasukkan dalam laporan

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
10.	2-1	- Rencana pembangunan jalan akan dilaksanakan dari Banda Aceh ke Meulaboh dengan rencana titik 0 Kota Banda Aceh (Pante Pirak) hingga ke Bundaran Tugu Meulaboh - Kami mengusulkan titik 0 Kota Banda Aceh dari Mesjid Raya baiturrahman Disain jalan dengan standar AASHTO dan ASEAN. Tentu ini menghendaki kecepatan tinggi. Oleh karenannya rambu-rambu jalan, gorong-gorong, Box culvert dan saluran air, harap perhitungkan dengan tepat. Mohon ditambah uraian mengenai panjang jalan, penggunaan kawasan yang dilalui, misalnya : Pemukiman ….km, sawah ……km, kebun …..km, hutan ….. km, rawa …. Km, dll Gambar 2-1 mohon diberi keterangan mengenai penggunaan lahannya.	- usulan tentang titik 0 km akan disampaikan ke pihak pemrakarsa Akan diperhatikan dalam pembuatan disain jalan Telah ditambahkan pada Tabel 2-11		
11.	2-2	Mohon diberi ukuran mengenai : jembatan panjang (…m), jembatan pendek (…m), Box culvert (…mx…mx…m), Pipa culvert (diameter …). Tabel 2-1 Perlu kajian ANDAL : mengenai dampak erosi untuk jenis rincian kegiatan pekerjaan yang disajikan pada tabel Pada Tabel 2-1 tentang Rencana Kebutuhan Perbaikan dan Rehabilitasi Jalan banda Aceh-Meulaboh ada ditampilkan data tentang rawa yang dilalaui oleh jalan baru, kemudian kebutuhan penimbunan 44,0 km dan total rawa 34 (satuannya…?) Saran : 1. Sangat perlu dibahas tentang rawa ini, karena jenis tanah pada rawa ini umumnya organosol (gambut). Gambut merupakan sumber air (reservoir) potensial. Apakah pembangunan jalan baru yang melalui rawa ini tidak mempunyai pengaruh negatif terhadap sumber air tersebut? Gambut ini juga perlu diselidiki apakah termasuk kedalam gambut dangkal atau gambut dalam? 2. Pemukiman penduduk di Dren Bungkok dan Keuder Teunom berdekatan dengan rawa yang dilintasi oleh jalan baru. Perlu diteliti apakah masyarakat sebagai petani menjadikan rawa tersebut sebagai tempat untuk mencari ikan atau menggunakan rawa untuk memelihara ikan.	Akan dikaji dalam dokumen ANDAL Maksudnya kebutuhan penimbunan untuk daerah rawa sepanjang 44 km dan telah dihilangkan jumlah totalnya Gambut bukan merupakan sumber air potensial tetapi hanya sebagai penampung sisa air. Pengkajian mengenai pengaruh jalan terhadap gambut dan jenis-jenisnya akan dikaji dalam dokumen ANDAL Akan dikaji dalam dokumen ANDAL	Sebaiknya ada uraian tentang gambut ini sebelum dikaji lebih dalam dalam AMDAL Sebelum dikaji lebih dalam pada AMDAL, sebaiknya ada uraian tentang hal tersebut	

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		3. Konstruksi jalan yang melalui rawa sebaiknya tidak menimbun rawa secara total sehingga menyebabkan air tidak dapat lagi mengalir dari sebelah kiri jalan ke sebelah kanan jalan. Dengan kata lain, air tetap mengalir ke dua belah sisi meskipun jalan gambut tersebut dibuat.	Tentu, dan diperhatikan dan dilaksanakan didalam mendisain jalan	TIM AMDAL tidak terlibat dalam mendisain jalan. Jadi hal yang seperti ini harus ada di dalam uraian AMDAL	
12.	2-7	Survei dan pengukuran Mengapa setelah desain baru disurvey? Apakah halan ini tidak mendekati garis pantai Pembebasan lahan Adanya kepastian yang jelas berapa luas yang dibebaskan dalam bentuk lahan kebun, hal ini disebabkan adanya/kemungkinan kebun masyarakat yang saat ini ada keterkaitan dengan bantuan/kredit angsuran petani tersebut dengan Dinas Perkebunan, sehingga perlu diselesaikan secara administrasi, apabila ada pelepasan-pelepasan kebun masyarakat, akan tetapi masih terkait pembayaran kredit. Penyelesaian administrasi terseut sampai ke tingkat pusat, karena sumber dananya/bantuan dari APBN, sehingga perlu dilihat berita acara dalam melengkapi proses administrasi. Poit pembebasan lahan alinea terakhir "lahan-lahan yang akan dibebaskan antara lain adalah tanah masyarakat dalam bentuk lahan kebun, sawah dan pemukiman "perlu penambahan "tanah adat". Point a tahap prakonstruksi terdiri atas : survai dan pengukuran, pembebasan lahan, perlu penambahan "sosialisasi kepada masyarakat yang terkena dampak" Berdasarkan jadwal kerja, sudah dilakukan perencanaan dan pembebasan lahan (2-13). Berapa luas lahan (sawah, tanah, kebun, dll) bangunan yang dibebaskan, berapa nilai per satuan? Apakah terdapat pemindahan penduduk? Berapa jumlahnya? Mohon dijelaskan pada paragraf ini.	Telah diperbaiki pada hal 2-7 Pada umumnya jalan diharapkan menjauhi garis pantai Luasan lahan kebun yangf akan dibebaskan sampai saat ini belum dipastikan Kegiatan sosialisasi merupakan salah satu cara pengelolaan yang akan di masukkan di dalam RKL Sampai saat ini kegiatan perencanaan dan pembebasan lahan belum dilakukan		
13.	2-8	Penentuan lokasi borrow area dan penggalian - lokasi penggalian tanah timbun, batu dan pasir sudah ada izin pertambangan atau belum - pengelolaan lingkungan quarry harus dilaksanakan oleh Pemrakarsa Proyek Jalan - masalah quarry keadaan pasca tambang perlu diperhatikan	Telah dicantumkkan pada halaman 2-8 s/d 2-10		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
14.	2-9	Pembersihan lahan - kegiatan ini akan menyebabkan penebangan pohon-pohon yang tinggi dan besar - dalam penebangan tersebut kami himbau jangan asal tebang sehingga merusak ekosistem dan lingkungan hidup Truk pengangkut tanah dari borrow area hendaknya ditutup plastik/terpal agar tidak tercecer dan ajalan desa sedapat mungkin disiram untuk mengurangi debu Tabel 2-2 Lokasi material (quarry) Kamis sarankan perlu ada penambahan yaitu di Teunom berlokai di Pasi Teube dan Pante Gelima yang tersedia pasir, kerikil, batu yang mendukung pelaksanaan relokasi jalan dari Calang-Meulaboh Tentang nama lokasi pengambilan material tanah timbun dan batu …… "perlu penambahan pada daerah tersebut, perlu juga dilakukan studi/lokasi sampling kajian sosial seperti pada hal 3-16 Pembersihan lapangan, hindari penebangan pohon yang mengakibatkan erosi dan tidak mengganggu sumber air/mata air. Lokasi Aspal Mixing Plant (AMP) belum terlihat di KA-ANDAL ini Desa Sarah Perelak (Kec. Teunom), Desa Sawang Teube (Kec. Kaway XVI), Desa Meutulang (Kec. Kaway XVI) dan Desa Keramat (Kec. Pante Ceuremen)	Akan diperhatikkan dan dicantumkan di dalam dokumen RKL Telah ditambahkan dalam tabel 2-2 Bila ada pemukiman penduduk di lokasi quarry akan dilakukan pengambilan sampel sosial Akan diperhatikkan dan dicantumkan di dalam dokumen RKL Lokasi AMP akan ditetapkan pada lokasi-lokasi yang dekat dengan quarry pada hal. 2-8 Telah diperbaiki pada tabel 2-2		
15.	2-10	Pekakaian BBM dan pelumas - pekerjaan ini menggunakan bahan bakar solar), oli dan grease diperkirakan akan menghasilkan limbah minyak dan pelumas bekas yang cukup besar - kami menghimbau minyak dan oli bekas tersebut supaya dibuat tempat penampungan khusus, sehingga tidak menimbulkan efek kerusakan lingkungan nantinya. Ada pertanyaan bahwa lapisan tanah atas yang akan digunakan untuk reklamasi, atau bagaimana kalau tanah lapisan atas diberikan pada	Benar, dan akan dibahas dalam dokumen RKL		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		masyarakat mengingat lapisan tanah atas merupakan tanah yang subur untuk pertanian			
16.	2-11	Akibat pengupasan jalan, sehingga kualitas udara terutama debu akan berpengaruh terhadap pertumbuhan tanaman, hal ini disebabkan dan yang merupakan sarana/dapur bagi tanaman tidak/kurang berfungsi akibat debut yang menutupi permukaan daun, disarankan pada saat pengupasan jalan dilakukan penyiraman	Akan dibahas dalam dokumen RKL		
17.	2-12	Tidak sesuai dengan halaman 2-13, mohon disesuaikan mana yang sebenarnya	Telah disesuaikan kalimat dengan tabel 2-3		
18.	2-13	Jalan yang hendak dibangun sepanjang 240 km sedangkan jadwal waktu sampai 3 tahun lebih mengingat jalan adalah kebutuhan pokok apa mungkin dipersingkat waktu pelaksanaan Mengapa pada jadwal Q_4 pada tahun 2005 kegiatannya berhenti?	Akan disampaikan ke pihak Pemrakarsa Telah diperbaiki tabel 2-3		
19	2-14	Data iklim perlu ditambah di samping dari BMG Bandara Sultan Iskandar Muda (Blang Bintang). Juga dari data Kabupaten Aceh Barat (Meulaboh)	Suda ada di dalam Laporan KA ANDAL, lihat hal. 2-14 s/d 2-20		
20.	2-16 s/d 2-20	Tabel 2-7 sampai Tabel 2-11, data yang diambil dari tahun berapa?	Dari Tahun 1995 – 2004, data diambil tahun 2005		
21.	2-17	Memperhatikan curuh hujan yang tinggi untuk wilayah Aceh Jaya dan Aceh Barat dengan rata-rata bulanan 328,4 mm yang perlu diperhatikan menghindari pemakaian/pembuatan jalan pada tanah yang topografi/kemiringan diatas 15% hal ini adalah untuk mencegah dari longsor	Benar, dan akan dibahas di dalam dokumen RKL		
22.	2-23	1. Peta Topografi skala 1 : 50.000 dari Bakorsurtanal tolong dilengkapi 2. Peta hidrologi yang ditampilkan tolong dilengkapi dengan nama-nama sungainya, khususnya yang dilalui oleh jalan yang direhabilitasi dan direkonstruksi. Nama-nama sungai tersebut dapat dilihat pada peta topografi	Peta topografi akan disajikan dalam Map Book Akan dilengkapi dalam dokumen ANDAL	Sebaiknya dalam KA ini harus dicantumkan peta tersebut, agar dapat dilihat jalan-jalan yang berpotensi mengalami longsoran.	
23.	2-25	Karena ada kemungkinan terjadinya longsoran batuan besar, dan tidak stabil tanahnya mohon ada tanda peringatan di daerah tersebut untuk menghindari dari korban,khususnya pada saat konstruksi (ANDAL) Trace jalan antara Lhok Kruet – Calang beberapa rencana jalan membelah kawasan hutan agar pelaksanaan kegiatan sesuai dengan peraturan yang	Akan dibahas dalam dokumen ANDAL		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		ada, kami sarankan : 1. Departemen Pekerjaan Umum membuat surat permohonan Pinjam Pakai Kawasan hutan kepada Departemen Kehutanan untuk pembuat jalan umum 2. Pelaksana kegiatan agar menjaga areal kawasan hutan yang terkena pembuatan jalan sehingga tidak dirambah oleh orang yang tidak bertanggung jawab Masalah longsor dan banjir sangat perlu diperhatikan Kemudian dari Reusak ke Cot Darat, Sawang Ni ke Sawang Raya ke Senebok dan ke Simpang Kisaran	Akan diperhatikan dan dilaksanakan oleh pihak pemrakarsa Akan diperhatikan dalam dokumen ANDAL Sesuai dengan jalur yang ada jalur jalan (sementara) akan melalui Reusak – Cot Seumereung – Bale – Gampa		
24.	2-25 & 3-10	• Pada halaman tersebut dijelaskan bahwa penggunaan lahan menjadi salah satu komponen lingkungan hidup yang akan ditelaah. Salah satu informasi yang ada pada penggunaan lahan tersebut yaitu adanya fungsi hutan (diantaranya hutan lindung), namun fungsi hutan ini belum tercantum dalam peta penggunaan lahan yang ada pada kerangka acuan. Hal ini akan menyulitkan dalam penentuan kawasan hutan lindung mana saja yang akan terkena dampak dalam proyek ini. • Diperlukan lagi komponen tambahan dalam peta penggunaan lahan, yaitu peta status tanah, termasuk fungsi hutan/hutan lindung.	Telah ditambahkan dengan peta fungsi hutan		
25.	2-26	• Berapa volume material (tanah timbun, batu dan pasir) yang diperlukan • Tertulis Menteri Pertambangan seharusnya Menteri Energi Sumberdaya Mineral • Pernyataan Menteri sebaiknya didukung dengan data-data dan referensi yang memadai Krueng Woyla dan Krueng Bubon bukan Krueng Sawak Semaseh dan Krueng Sawak Timah	Sudah ada di tabel 2-1 Telah diperbaiki Telah dihilangkan Telah diperbaiki		
26.	2-27	Dalam peta Tata Guna Lahan terlihat dengan jelas bahwa trace relokasi akan melewati, diantaranya hutan primer, hutan sekunder, rawa, pertanian lahan kering. Dalam dokumen belum ada informasi tentang itu sehingga sangat sulit untuk memprediksi jalan ini dilihat dari peraturan perundang-undangan yang berlaku seperti Keppres No. 32 Tahun 1990	Telah ditambahkan pada tabel 2-12		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
27.	2-28	Peta hidrologi • Peta yang ditampilkan lebih sesuai disebut namanya "Peta Aliran Sungai" • Untuk peta hidrologi tampilkan saja peta "Isohyet rata-rata hujan tahunan"	Telah diperbaiki Telah ditambahkan Peta Isohyet		
28.	2-29	Tabel 2-2 • Ada lokasi material di Kec. Teunom Desa Timor, yaitu pasir dan batu • Tanah timbun di Sayeng Kec. Setia Bakti	Taleh ditambahkan pada tabel 2-2		
29.	2-30 & 2-31	Apa sumber data biologi flora dan fauna Penulisan nama latin baik pada flora dan fauna ada yang keliru mis : *Durio Zibethinus,* tidak kapital untuk huruf Z dan penulisan sp seharusnya tidak diitalickan/dimiringkan	Sumber datanya dari hasil Reconaisance Telah diperbaiki		
30.	2-31 & 3-31	• Pada halaman tersebut dijelaskan bahwa salah satu komponen biologi yang akan ditelaah adalah dampak proyek terhadap keberadaan fauna. Untuk meningkatkan efektivitas dalam menganalisa komponen fauna, diperlukan pemetaan populasi/posisi satwa liar (termasuk yang dilindungi) di sepanjang jalan yang akan dibangun. Data (koordinat) populasi fauna dapat diperoleh dari survey lapangan (primer dan sekunder) • Peta penyebaran fauna ini berguna untuk memperkenalkan kepada masyarakat (penggunaan jalan) mengenai perlindungan terhadap jenis-jenis satwa liar sebagai salah usaha konservasi sumberdaya alam hayati dan ekosistemnya. • Selanjutnya pada saat pelaksanaan pembangunan jalan, dapat dibangun rambu-rambu yang dapat menginformasikan kepada masyarakat (pengguna jalan) mengenai satwa liar dan habitatnya yang ada di sekitar jalan Banda ceh – Meulaboh (termasuk rambu-rambu peringatan perlintasan satwa liar)	Akan diusahakan di dalam dokumen ANDAL Akan diusahakan di dalam dokumen ANDAL Akan dibahas dalam dokumen RKL		
31.	2-32	Data mengenai PAD dan Kesehatan Masyarakat masih menggunakan data tahun 2003, sebaiknya diusahakan data tahun 2004	Sampai saat ini data tahun 2004 belum ada dan akan diusakan dimasukkan pada dokumen ANDAL		
32.	2-33	Sebaiknya komponen fisik kimia yang ditelaah ditambah yakni longsoran, karena kemungkina besar longsoran akan terjadi pada derah tertentu yang berfisiografi bergunung (15-25%) dan berbukuit (8-15%). Longsoran berbeda dengan erosi, karena faktor-faktor penyebabnya juga berbeda.	Dari hasill reconaisance jalur jalan yang baru tidak melalui fisiografi gunung sehingga tidak perlu dikaji komponen	Hasil perbaikan tersebut tidak sesuai dengan data pada Tabel 2-12 yang menyebutkan ada ruas jalan melalui fisiografi	

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		Longsoran dalam bahasa inggrisnya *Land slide* yang berbeda dengan *Erosion*. Teknologi untuk mengantisipasi *Land slide* dan *erosion* juga berbeda. Hasil pembahasan longsoran ini berguna untuk memetakan wilayah mana saja yang rawan longsoran, sehingga pada tahap konstruksi dan pasca konstruksi dapat diantisipasi Apa betul biota perairan terkena dampak pembuatan jalan? Dalam rona awal yang dikemukakan sebelumnya tidak disinggung biota perairan, mengapa jadi terkena dampak? Mohon dibuang saja, untuk penghematan. Yang penting flora rawa	longsor sehing-ga lebih mengutamakan dalam hal ketidakstabilan lahan Biota perairan akan disajikan dan dibahas dalam dokumen ANDAL	berombak-bergelombang (8km), bergelom-bang-berbukit (24km), dan berbukit-bergunung (27km). Sebaiknya masukkan sajalah komponen longsoran (land slide) dalam komponen fisik kimiia Note : Jalan Ladia Galaska adalah contoh nyata.	
33.	2-33 s/d 2-35	Tidak disinggung mengenai transportasi. Apakah memang tidak berdampak pada transportasi? Berdasarkan Kep.Men LH No. 17 tahun 2001 (lampiran H,butir 7 justru isu pokok utamanya adalah bangkitan transportasi, mohon ditambah	Pada prinsipnya bangkitan transportasi sudah dimasukkan dalam masalah Transportasi pada hal 2-33 s/d 2-35		
34.	2-35	▪ Isu-isu pokok : Dalam dokumen belum tercermin isu-isu pokok karena tidak ada hasil eveluasi dampak potensial dan pemusatan dampak penting.Untuk itu kami sarankan agar mengikuti bagan alir proses pelingkupan dampak penting. ▪ Isu-isu pokok pada tahap kronstruksi jalan sebaiknya memasukkan longsoran. Karena konstruksi jalan baru yang bersifat fisiografi bergunung dan berbukit berpotensi untuk memacu terjadinya longsoran. Karena wilayah ini memiliki curah hujan tahunan yang tinggi (rerata 3941 mm). Jika terjadi longsoran dapat berakibat kepada terganggunya lalu lintas dan kecelakaan juga dapat terjadi. Demikian juga dengan stabilitas lereng sebaiknya dimasukkan ke dalam isu-isu pokok.	Menurut hemat kami proses pelingkupan tidak perlu dilakukan karena isu-isu pokok dapat ditentukan berdasarkan pengalaman terhadap amdal sejenis Telah dijelaskan pada pertanyaan no. 32	TIM AMDAL belum memasukkan komponen longsoran dan stabilitas lereng sebagai isu pokok. Padahal jalan yang dibangun tersebut melalui fisiografi berombak-bergelombang (8km), bergelombang-berbukit (24km), dan berbukit-bergunung (27km)	
35.	2-38	Mohon perhatian : batas sosial terbatas pada kawasan permukiman/perkotaan saja, tidak termasuk hutan. Jadi batasannya tidak seperti yang berwarna biru pada gambar itu, mohon diperbaiki	Dari hasil reconaisance di sepanjang rencana jalan ada kegiatan manusia/ pemukiman sehingga batas sosial digambarkan di sepanjang jalur jalan.		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
			Sebagai contoh ekonomi sumberdaya ternyata masuk dalam kawasan hutan		
36.	3-2	• Data iklim kan sudah ada, mengapa harus dicari lagi • Apakah metode analisis sama dengan alat ? Mohon perhatian pada parameter kebisingan • Dalam pengukuran mohon dicatat koordinatnya	Untuk melengkapi dalam pembahasan rona lingkungan Telah diperbaiki tabel 3-1 Akan diusahakan		
37.	3-3	Bukan desa Gempa tapi Desa Gampa	Telah diperbaiki pada hal. 3-3		
38.	3-4	Perlu ditampilkan analisis/rumus hidrologi untuk memprediksi kemiringan daya …….. pada lintasan lurus (drainase & jembatan) hingga kita ketahui debit banjir rencana untuk mendimensi jembatan dan drainase Perlu dilampirkan data mengenai posisi jalan pada satuan lereng atau dengan "Peta Lereng", longsoran perlu ditampilkan kondisi lereng ditepi jalan bila jalan membelah bukit, kemungkinan lonsor Tambahan "perlu di cek juga untuk seluruh sungai-sungai besar atau sungai utama Tambahan "perlu diperbanyak daerah pengambilan sampel tanah Data hidrologi mohon ditambah paramete debit badan air (sungai) beserta karakteristiknya Krueng Reundeung yang benar adalah Krueng Merebo dan Desa Suak Ular adalah Desa Suwak Ulee	Rumus-rumus hidrologi di perlukan dan digunakan untuk mendisain jalan Data-data debit sungai akan diambil dari data sekunder Lokasi Krueng Reundeng diganti dengan Krueng Sarah sedangkan Suwak Ular yang benar adalah Suak Eleu		
39.	3-10	Simpang Gampang (Kec. Johan Pahlawan)	Yang benar adalah Simpang Gampa		
40.	3-11	Penentuan sampling untuk flora apakah diacak atau ditentukan sehingga pada peta lokasi pengambilan sampling terdapat 3 titik Pada peta lokasi pengambilan sampling terhadap 3 titik sampel biologi darat.apakah ketiga tersebut untuk flora dan fauna sekaligus, sedangkan fauna sifatnya dinamis/bergerak	Dilakukan dengan acak dan dan ditentukan tiga titik yang dapat mewakili dan pengambilan sampel untuk flora dan fauna darat sekaligus dan tidak melihat dari sifatnya		

<table>
<tr><th>No.</th><th>Halaman</th><th>Evaluasi / Pertanyaan / Saran Perbaikan</th><th>Hasil Perbaikan</th><th>Komentar Terhadap Hasil Perbaikan</th><th>Hasil Perbaikan</th></tr>
<tr><td>41.</td><td>3-11 s/d3-12</td><td>Biologi :
Mohon ditegaskan lokasi pengambilan contoh : dimana saja (secara konkrit) ditambah di Lhok Kruet dan rawa, jumlah petak (kuadrat) pada setiap lokasi (agar tidak kurang dari 5 petak pada setiap lokasi, tergantung panjang komunitas yang dilalui trase jalan), cara penempatan petak. Bagaimana pengambilan data flora rawa.
Khusus untuk Fauna : berapa titik IPA (tidak kurang dari 5 titik pada setiap lokasi), berapa panjang dan jumlah jalur pengamatan (kemana arah jalur, yang benar tegak lurus terhadap trase jalan, jumlah jalur tidak kurang dari 5 jalur pada setiap lokasi).
Mohon diperbaiki, analisis INP mohon dilampirkan pada Laporan Andal</td><td>Telah ditambahkan dan untuk jumlah petak yang ambil tidak kurang dari 2 petak sesuai dengan kondisi di lapangan. Begitu juga dalam hal pengambilan fauna, jalur pengamatan tidak kurang dari 2 jalur

Akan dilampirkan dalam dokumen ANDAL</td><td></td><td></td></tr>
<tr><td>42.</td><td>3-13</td><td>Paragraf III : Apakah habitat sama dengan relung
Mana yang akan didata</td><td>Telah diperbaiki</td><td></td><td></td></tr>
<tr><td>43.</td><td>3-14</td><td>Paragraf III : Apa betul Eckman Dredge? Jangan salah tulis, itu nama orang lho
Berapa banyak formalin yang ditambahkan ? agar dijelaskan</td><td>Yang benar adalah Ekman Grab dan formalin yang 5% dengan jumlah secukupnya</td><td></td><td></td></tr>
<tr><td>44.</td><td>3-16</td><td>Tabel 3-5
<table>
<tr><td>No.</td><td>Kab/Kota</td><td>Kecamatan</td><td>Desa</td><td>Sampel</td></tr>
<tr><td>1.</td><td>Banda Aceh</td><td>Meuraxa</td><td>Lamteumen Timur</td><td>5</td></tr>
</table>
Seharusnya Kecamatan Jaya Baru bukan Kecamatan Meuraxa</td><td>Telah diperbaiki Tabel 3-5</td><td></td><td></td></tr>
<tr><td>45.</td><td>3-17</td><td>3.1.4. Kesehatan Masyarakat
Untuk menghindari efek samping dari hasil pelaksanaan perbaikan jalan B. Aceh – Meulaboh khususnya pada tahap konstruksi ini benar-benar harus diperhatikan tingkat kesehatan masyarakat, karena dampak kebisingan, debu, limbah dapat munculnya/terjadinya, berbagai macam penyakit akibat :
• Timbulnya kondisi lingkungan (sanitasi) yang kumuh/kotor
• Munculnya penyakit yang berbasis lingkungan : ISPA, Diare, Scabies, Malaria, dll
• Untuk mendukung pelaksanaan tersebut data juga dapat diambil di Poskelit (Pusat Kesehatan Satelit)
• Data pola penyakit harus ada dan dilampirkan dalam KA Andal nanti menurut Kabupaten Wilayah yang terkena dampak</td><td>Akan dibahas dalam dokumen ANDAL dan RKL</td><td></td><td></td></tr>
<tr><td>46.</td><td>3-18</td><td>Tampilkan juga Pada Metode analisis data Rumus mengenai perhitungan Run off dan banjir rencana untuk mendisain drainase dan bentang</td><td>Rumus-rumus hidrologi dipergunakan untuk</td><td></td><td></td></tr>
</table>

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		jembatan dan box culvert Pada tabel 3-6 point 2 Tata Ruang dan Lahan, *pertanyaan Tata Ruang mana yang dipakai, sedangkan RTRWP belum selesai* Kemudian *perlu juga dilampirkan peta arahan fungsi hutan* sesuai Keputusan Gubernur DI Aceh No. 19 tahun 1999 tentang Penyesuain Arahan Fungsi Hutan dalam Rencana Tata Ruang Wilayah Provinsi Daerah Istimewa Aceh.	mendisain jalan, jembatan dan box culvert dan termasuk dalam kajian teknik Tata Ruang yang dipakai adalah yang terdapat di dalam Blue print Rencana Tata Ruang Prov. NAD Peta fungsi hutan telah dimasukkan dalam laporan		
47.	3-18, 3-19	1. Tabel 3-6 tentang Metode Analisis Studi ANDAL Perbaikan dan Rekonstruksi Jalan Banda Aceh-Meulaboh ada menyebutkan Analisa Klasifikasi Iklim berdasarkan Schimidt & Ferguson : Bulan kering CH < 60 mm/bulan (OK) Bulan basah CH > 60 mm/bulan (not OK), perbaiki CH>100 mm/bulan 2. Tabel 3-6 tentang Metode Analisis Studi ANDAL Perbaikan dan Rekonstruksi Jalan Banda Aceh-Meulaboh ada menyebutkan debit air dihitung dengan Rumus Q = V x A. Debit yang dihitung ini adalah debit puncak (*peak flow*) pada periode ulang tertentu. Tujuannya adalah untuk masukkan pada desain jembatan yang melalui sungai. Kalau sungai tersebut sebagai sumber air untuk irigasi dan sumber air minum perlu juga dihitung debit andalannya. 3. Tabel 3-6 tentang Metode Analisis Studi ANDAL Perbaikan dan Rekonstruksi Jalan Banda Aceh-Meulaboh ada menyebutkan Stabilitas tanah dan longsoran diamati berdasarkan survai lapangan. Jadi tolong parameter stabilitas tanah dan longsoran ini dimasukkan ke dalam Tabel 3-9 tentang matriks Evaluasi Dampak (hal. 3-26)	Telah diperbaiki pada Tabel 3-6 Data debit air menggunakan data sekunder, komponen ini telah dihilangkan dalam tabel 3-6 Komponen longsoran telah dihilangkan, karena kami anggap tidak ada dampaknya	Sebaiknya jalan dihilangkan, diprediksi saja, baik untuk debit puncak dan debit andalannya Note : data sekunder debit belum tentu ada. Komponen longsoran telah dihilangkan, karena kami anggap tidak ada dampaknya	
48.	3-22	Yang dicari Indeks keanekaragamanannya hanya flora langka saja ? untuk apa? Bagaimana mengetahui jenis langka/dilindungi undang-undang? Apakah yang dicari indeks keanekaragamannya fauna langka saja ? Apa model dan formula untuk indeks keanekaragaman fauna Apakah dapat dicari dengan itu ? INPnya model apa?	Telah diperbaiki menjadi Indeks keanekaragaman jenis flora Dengan melihat daftar pada Lampiran PP No. 07/1998 tentang Pengawetan Jenis Tumbuhan dan Satwa		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
		Bagaimana mengetahui jenis fauna langka/dilindungi undang-undang Data biota perairan jadi dicari atau tidak ? bagaimana analisisnya			
49.	3-23	Pada pengaruh utama pada aktivitas proyek dst …. *Perlu penambahan point h "struktur dan pranata sosial masyarakat"*	Tidak bisa ditambahkan karena sudah ditentukan dari Kep. Ka Bapedal No. 056/1994 tentang Kriteria Penentuan Dampak Penting		
50.	3-25	Apa model analisis yang holistis (menyeluruh) itu? Mohon dikemukakan secara jelas (Gunakan panduan pada Kep. Ka Bapedal No. 09 tahun 2000	Sesuai dengan yang dikemukakan dalam SK. Ka Bapedal No. 09/2000		
51.	3-25	- Hidrologi untuk pasca konstruksi berdampak juga - Pada halaman tersebut terdapat tabel 3-8 diamana salah satu komponen lingkungannya yaitu fauna. Menurut saya keberadaan fauna di sekitar proyek akan terkena dampak pada saat pembuatan jalan dan jembatan juga pada saat pengoperasian jalan dan jembatan. Jadi kolom 9 dan 12 pada komponen fauna mohon disilang juga dan dianalisis	Hidrologi pada tahap pasca konstruksi tidak berdampak Telah ditambahkan untuk kolom 9 dan 12		
52.	3-26	Tabel 3-9 tentang Matriks Evaluasi Dampak. Tolong masukkan parameter Stabilitas tanah dan longsoran. Kemudian perlu dibuat tanda P (penting) pada tahap konstruksi, khususnya pada pekerjaan nomor 8 (pekerjaan tanah) dan nomor 9 (pekerjaan jalan dan jembatan) Apakah judulnya betul ? jika betul, saya kira tidak perlu dicari dilakukan pengumpulan data, kan sudah ada kesimpulan mana dampak pentingnya	Komponen stabilitas tanah dan longsoran tidak dikaji Telah diperbaiki menjadi Tabel Contoh Matrik Evaluasi Dampak	Tidak setuju, wajib dikaji, karena fakta fisografi menunjukkan ada jalan yang melalui fisiografi berombak-bergelombang (8km), bergelombang-berbukit (24km) dan berbukit-bergunung (27km) Tabel 2-12, hal 2-28)	
53.	3-27	Lokasi pengambilan data debit belum tampak pada peta lokasi pengambilan sampling. Tolong dilengkapi	Debit air sungai didapat dari data sekunder	Tidak boleh percaya penuh terhadap data sekunder tersebut, jadi harus anda koreksi dengan data debit aktual di lapangan. Jadi data debt dan lokasi sampelnya sangat perlu dibahas.	
54.	3-34	Ekonomi pada saat pembangunan jalan dapat disediakan kantong kegiatan ekonomi berbasis kepada ekonomi rakyat (seperti, adanya kawasan/objek daya tarik wisata), dapat tumbuh ekonomi rakyat dan sekeliling objek (kawasan wisata). Budaya dengan pembangunan ini kesatuan masyarakat tidak terpisahkan baik sosial atau budaya	Akan dimasukkan dalam dokumen RKL		

No.	Halaman	Evaluasi / Pertanyaan / Saran Perbaikan	Hasil Perbaikan	Komentar Terhadap Hasil Perbaikan	Hasil Perbaikan
55.	4-2	Point 4.3 Biaya studi, pemyandang dana ditanggung oleh USAID, pertanyaannya apakah dana ini hibah atau pinjaman??. Jadi dalam hal ini harus ada penjelasan atau keterangan resmi terhadap sumber dana tersebut Biaya pelaksanaan tertulis Studi Andal, seharusnya Studi AMDAL karena proyek ini melintasi hutan lindung maka perlu penelaahan khusus	Merupakan dana hibah dari USAID dan telah dijelaskan dalam Point 1.1. Latar Belakang pada hal. 1-2 Telah diperbaiki menjadi Studi AMDAL		
56.	5	Diharapkan kepada kontraktor utama, agar dapat memberdayakan pengusaha lokal, seperti pekerjaan drainase, gorong-gorong, penyuplaian bahan-bahan material	Akan dimasukkan dalam kajian dokumen RKL		
57.	7	Pihak Bapedalda, DPRD dan Instansi terkait dapat membentuk tim monitoring, sewaktu-waktu akan mengadakan pengecekan ke lapangan, terhadap dampak lingkungan hidup pekerja atau yang dilaksanakan	Akan dimasukkan dalam kajian dokumen RPL		
58.	Kata Pengantar	Pemrakarsa Proyek seharusnya Pemrakarsa Kegiatan	Telah diperbaiki menjadi Pemrakarsa Kegiatan		
59.	Lampiran				
60.	Daftar Pustaka	• Hal : 3-15, APHA (1981) dan Juffig (1956) tidak ada Daftar Pustaka. Apa bukunya ? mohon dilengkapi	Telah dilengkapi		

LAMPIRAN C

CURRICULUM VITAE TENAGA AHLI

Karlheinz Spitz

President Director, ERM Indonesia

Dr. Karlheinz Spitz MBA, President Director of ERM Indonesia, is based in Jakarta since 1994 and has 20 years experience in environmental consulting.

He acted as lead consultant on numerous environmental impact assessment studies for the mining, oil and gas, and power generation sectors. He has undertaken a wide variety of environmental audits and has developed environmental management systems according to the ISO 14000 series of standards. He is fully familiar with international standards for conducting environmental assessments of large-scale resource development projects such as World Banks' environmental safeguard policies, commonly referred to.as the Equator Principles.

Dr. Spitz has a proven record of directing and managing large-scale environmental projects and has worked on projects in Belgium, Bolivia, Canada, Germany, India, and most parts of SE Asia.

Professional Affiliations & Registrations

- NWWA - National Water Well Association
- DVWK - Deutscher Verein für Wasser und Kulturbau

Fields of Competence

- Environmental Strategic Advice
- Business and Project Management
- Environmental Assessment and Auditing
- Water Management and Numerical Modelling
- Contaminated Site Management

Education

- Heriot-Watt University, Master of Business Administration, 1999
- University of Stuttgart, Germany, Doctor, Civil Engineering, 1985
- University of Stuttgart, Germany, Master, Civil Engineering, 1980

Languages

- German, native speaker
- English, Excellent
- Indonesian, Fair
- French , Fair

Key Industry Sectors

- Mining and mineral processing
- Oil and gas
- Engineering and construction

Honours & Awards

- NATO Post – Doctoral Scholarship Award, University of Waterloo Canada, 1986 to 1988
- Award for Outstanding Research, University of Stuttgart, Germany, 1980

Publications

- Spitz, K., Kuntjoro, D., McDonough R.: " Environmental Assessment of Mining Projects – What Matters and Why" publication in preparation.
- Spitz, K. and Moreno, J: "Practical guide to groundwater and solute transport modelling," John Wiley & Sons, Inc., 1996, ISBN 0-471-13687-5 (Japanese translation by Gihodo Publishing Co. in 2003).
- Spitz, K.: "Dispersion in porösen Medien: Einfluß von Inhomogenitäten und Dichteunterschieden," Mitteilungen des Instituts für Wasserbau, Heft 60, Stuttgart, 1985, ISBN 0343-1150.
- Spitz, K.: Co-author of "Stofftransport im Grundwasser," DVWK-Schriften'88 Verlag Paul Parey, 1989, ISBN 3-490-08997-9.
- Numerous publications in environmental journals.

Selects Projects

Environmental Assessment (mining projects)

- Dairi Zinc/Lead and Zinc Mine, North Sumatra. Environmental and Social Impact Assessment study including environmental assessment of the land transportation corridor (pipeline/road)..
- Cibaliung Gold Mine. Environmental and Social Impact Assessment study in Banten, Java. Preparation of land acquisition and resettlement action plan, public disclosure and participation plan, and indigenous people and community development plan.
- Environmental Management and Monitoring Plans for PT KPC coal mine operation in Kalimantan.
- Environmental Impact Assessment Study for the Weda Bay Nickel Project on Halmahera Island.
- Revision of the environmental management and monitoring plans for Newmont Batu Hijau Project, Nusa Tenggara.
- Tayan Bauxite Mining and Processing Project, West Kalimantan. Developing EIA Addendum, Environmental Action Plan, Resettlement Action Plan, Public Disclosure and Consultation Plan and Indigenous People Development Plan.
- Environmental Impact Assessment Study of the Bukit Baru Mining Area of PT. Arutmin Indonesia, following IFC guidelines.
- Environmental impact assessment studies related to the 300 K expansion of PT. Freeport Indonesia's mining in Irian Jaya. Directed the socio-cultural studies as part of the overall study.
- Regional Development Plan for the Maruwai Coal Project, Kalimantan, Indonesia.

Environmental Assessment (other)

- Environmental impact assessment for the Banda Aceh to Meulaboh Road Rehabilitation and Reconstruction.
- Environmental impact assessment for the Unocal Seturian Field, Kalimantan.
- Project Manager for conducting of the Environment Impact Assessment study for the Mitsubishi copper smelter at Gresik, Indonesia.
- Environmental appraisal of the Mass Rapid Transit (MRT) system in Jakarta during the basic design phase including the preparation of the TOR for the environmental impact assessment study.
- Environmental assessment of Hemoco's private oil refinery proposal, Selayar Island, Indonesia. Scoping study and preparation of Terms of Reference.
- Environmental Management and Environmental Monitoring Plans for deep well installation in Bintuni Bay, Irian Jaya.
- Environmental impact assessment and the preparation of environmental management and monitoring plans for a 260 MW coal fired power plant in Irian Jaya. The services include the environmental permitting of a 100km-long transmission line from the power plant to the mine area.
- Environmental permitting of jetty construction, effluent discharge, water abstraction, and ash landfilling of a planned power plant in Central Java, Indonesia.

Environmental Scoping/Baseline Studies

- Environmental scoping for a planned gas processing facility in eastern Indonesia
- Environmental and social baseline study for QNI, Philippines.
- Environmental and social scoping study for Bintan-Singapore Water Supply Project.
- Environmental assessment of the Duri Canal, Caltex, Sumatra.
- Environmental baseline study of the CPP and Bekasap Oil Production Blocks, Caltex, Sumatra.
- Environmental Scoping Study for the Muriah Shell Gas Concession in the Java Sea.
- Environmental scoping study for a planned primary lead smelter in Java using Ausmelt technology.
- Environmental scoping study for a planned nickel processing plant in Halmahera island, Indonesia.

Environmental Auditing/Phase II/II Investigations

Mineral Processing

- Due diligence audit of a lead smelter at Mulde, Freiberg.
- Project manager and advisor on measures to close an existing slag disposal site and on designing a new disposal area in Germany.
- Project manager for investigation of various contaminated soils: former copper smelter at Kall; lead smelter at Stolberg (slag disposal site); zinc smelter at commercial area close to Duisburg; Bernsdorf (groundwater contamination by phenoles and BTX); zinc recyling plant near Lissabon,

Portugal.
- Conceptual design of remedial measures for an industrial site highly contaminated by mercury in Egypt.
- Soil and groundwater investigation at the site for the Mitsubishi copper smelter in Gresik, Indonesia.

Mining
- Reviewing EIA for both Asia Pacific Potash Corporation and ASEAN Potash Mine projects in Thailand against World Bank EIA standard.
- Environmental audit of PT. Freeport Indonesia's mining activity in Irian Jaya. Responsible for evaluating the environmental management system of the operation at corporate and job site level.

Manufacturing
- Environmental Phase I audits for various sites: electronic assembly plant near Surabaya; tool factory in SIER, East Java; electroplating plant and spring steel factory in Jakarta; maintenance yards in Batam Island and Nusa Tenggara; pulp and paper mill, West Java, transformer production plants in Indonesia and India; large cement plant in Citeureup, Java; electronic assembling factory, Vietnam.
- Various galoanzinplants, including eleven sites in Belgium and four sites in France.

Power Generation
- Environmental audits for the 260 MW coal fired powerplant at Amamapare, and several diesel power plants, Irian Jaya.
- Darajat Power plants environmental audit.

Pharmacheutical
- Environmental Audits numerous pharmacheutical manufactures such as Novartis.

Heavy Industry
- Environmental Audits of Indocement plants.

Plantation and related processing facilities
- Environmental Audits of two rubber plantation and several crumb rubber factories, Sumatera.

Groundwater Assessment/Modeling
- Prelimenary hydrology and hydrogeology study for the Maruai Coal Project, Kalimantan, Indonesia
- Hydrogeological Study of the Duri Field, Caltex. Developing conceptual hydrogeological model and preliminary environmental risk assessment.
- Hydrology and hydrogeology study for a banana plantation in Sumatera
- Field data acquisition and numerical groundwater model study of the tailings disposal area of PT. Freeport Indonesia as part of a comprehensive Environmental Risk Assessment study.
- Assesment of thermal impact of cooling water discharge into surface water for three projects: Mitsubishi Copper Smelter at Gresik (discharge into the sea), PTFI power plant at Amamapare (discharge into an estuary), 400 MW power plant at Cilacap (discharge into the river).
- Lecture training of geologists from various government institutions worldwide on groundwater modeling, on behalf of BGR, Hannover.
- Lecture training of geologists from various government institutions worldwide on groundwater modeling, on behalf of BGR, Hannover.
- Lecturer for a series of courses on groundwater modelling and on the investigation and control of groundwater pollution at the Directorate of Environmental Geology, Indonesia (ADB Loan 641-INO, Geological and Mineral Survey Project).
- Investigations of age and origin of groundwater using chemistry, isotope, and hydrogeological data on behalf of Sudhessische Gas and Wasser AG.
- Groundwater plant near Darmstadt. Development of a master plan to optimise groundwater management including recharge of treated Rhine River water.
- Industrial site near Frankfurt. Numerical simulation of the spreading of hydrocarbons in groundwater and evaluation of the impact of various decontamination schemes.
- Hydrogeological study of the Semarang Basin (Indonesia), field survey of water wells and geology, development of a groundwater flow model for Semarang area.
- Research on groundwater pollution transport including interpretation of the extensive field data of the Borden tracer experiment and development of numerical models.
- Numerical and experimental study of dispersive pollutant migration in groundwater.

- Analytical and numerical study of heat transport in aquifers.
- Determination of groundwater protection zones.
- Assessment of large-scale groundwater pollution due to salt in the upper Rhine valley.
- Preliminary assessment of mine depressurisation requirements for a proposed open cast oil-sand mine at Alberta, Canada.

EMS and QA/QC Studies

- Project Manager and team leader for the pilot study of the European environmental audit scheme (Eco-audit) at a secondary lead refinery/smelter in Germany.
- QA/QC, Tailings Remediation Project for Marcopper, Philippines.
- QA/QC monitoring of site remediation at Shell Brunei.
- Project Manager and team leader for the development of the Environmental Management System of PT. Timah, Bangka Island, Indonesia, a large-scale tin mining operation.
- Project manager, design of environmental management system of a large chemical plant, Germany.

Others

- Preparation of Project Design Document for the Indocement CDM Project.
- Environmental Country Profile of Indonesia and Thailand on behalf of E&E Solutions/JBIC.
- Design of Web-based Environmental Impact Assessment Compliance Tracking System for the BP Tangguh Project in Papua.
- CO2 offset study for Santa Fe, Indonesia.
- Bapedal Regional Network Project, ADB Loan No. 1449-INO. Assisting and advising Bapedal in the implementation of the overall project which comprises establishing a network of four regional Bapedal offices, fostering human resource development, setting regionally appropriate environmental standards and to establishing an appropriate management information system.
- Technical director and team leader for the development of the hazardous waste management center in East Java, Indonesia.

Hasbullah Hasan

Senior Consultant, ERM Indonesia

Hasbullah Hasan is a Senior Consultant within ERM based in Indonesia

Mr Hasbullah Hasan is Environmental Impact Assessment Specialist. He has extensive experience in environmental impact assessments especially in oil and gas sector and manufacture.

Before Joining PT. ERM Indonesia he worked as Environmental Baseline Study Group Leader at PT. Corelab Indonesia. He had experience in ANDAL RKL-RPL, UKL-UPL and Environmental Baseline Study

Fields of Competence

- Environmental Impact Assessment (EIA)
- Environmental due diligence audit

Education and Course

- Chemistry, B.Sc., Faculty of Mathematics and Natural Science, Padjadjaran University, 1989.
- Environmental Impact Analysis Course, Department of Agriculture, 1994
- Environmental Impact Analysis Course Type A, Institute of Technology Bandung, 1996.
- Environmental Impact Analysis Course Type B, University of Indonesia, 2001.
- Environmental Impact Control in Oil and Gas Sector, Directorate General of Oil and Gas, Department of Energy and Mineral Resources, 2002.
- Environmental Due Diligence Lead Assessor Training Course, ERM Group, Hongkong, 2004

Languages

- Indonesia, native speaker
- English, good

Key Industry Sectors

- Mining
- Oil and gas
- Chemical

Key Projects

Environmental Site Assessment of tin mining area of ex illegal miners, Bangka Province, PT. Koba Tin, 2004
Project Manager
PT. Koba Tin wanted ERM to conducted site visit of ex illegal tin mining area and proposed the rehabilitation strategy for the site of ex illegal mining area. Hasbullah was carried out site visit and formulated the rehabilitation strategy for ex illegal mining area

Environmental Compliance Audit, Tangerang West Java, PT. Multi Bintang Indonesia (member of Heineken International), 2004
Team Member
PT. Multi Bintang Indonesia asked ERM to conducted of a compliance audit at the Multi Bintang Brewery, member of the Heineken International, to assess compliance against corporate organization goals and principles. Hasbullah as team member was responsible to assess PT. Multi Bintang Indonesia activities whether comply with regulation and legislation

Environmental Impact Assessment (AMDAL) of Oil Field Development KE-38, KE-39 and KE-54 Field, West Madura Offshore Block, Kodeco Energy Co. Ltd, 2004
Project Coordinator
Kodeco needed an AMDAL study as a complementary of Oil Field Development. The AMDAL study comprises of Public Consultation, Term of Reference (KA) ANDAL and RKL-RPL. Hasbullah worked as Project Coordinator and was responsible to managed and coordinated AMDAL project includes arranged and coordinated public consultation, field study, report writing and driving the approval process with AMDAL Committee.

Environmental Management and Monitoring Plan Revision (RKL-RPL Revision) SES FEED Gas Project, CNOOC, 2003
Project Coordinator

CNOOC was developed a new gas plant, drilling gas wells and constructed a pipeline from Pabelokan to Serang Regency, the project required a RKL-RPL Revision Study. As a Project Coorditor Hasbullah was responsible to managed and coordinated the project includes field study, report writing and led for driving the approval process with the AMDAL Committee.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL), Of 2 D Seismic Survey at Bukat Block, Sulawesi Sea, ENI Bukat, 2003
Project Coordinator
ENI Bukat BV intended to conducted 2D Seismic Survey, prior to executed the seismic survey ENI Bukat BV required to provided Environmental Management Program and Environmental Monitoring Program (UKL&UPL). Hasbullah acted as Project Coordinator and his responsibilities was managed the project and led for driving approval process.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of Pipeline Gas Construction from Block Samberah to PLTD Karang Asam and PLTD Tanjung Batu, PT. Semberani Persada Oil, East Kalimantan, 2003.
Project Coordinator
PT. Semberani Persada Oil planned transfer gas by pipeline to PLTD Karang Asam and PLTD Tanjung Batu as fuel gas. Hasbullah worked as Project Coordinator and was responsible for overall project management and for driving the approval process with the AMDAL Committee of Ditjen Migas

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of Rajawali #1 and Jangkrik #1 Exploration Wells, Eni Muarabakau B.V., East Kalimantan, 2003
Project Coordinator
Eni Muarabakau B.V. was planned to drill three exploration wells in offshore of Makassar Strait, East Kalimantan. Before implemented the drilling acitivity Eni Muarabakau required to provided Environmental Management Program and Environmental Monitoring Program (UKL&UPL). Hasbullah acted as Project Coordinator and his responsibilities was managed the project and led for driving approval process.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of NE-O1, AJA-1, NE-AJA, AJI-1, KABRA-1 and NE KABRA-1 Exploration wells, Petrochina International Bermuda, Sorong Regency, Papua Province, 2003
Project Coordinator
Petrochina International Bermuda was planned to drill five drilling exploration wells in onshore of Sorong, West Papua. An Environmental Management Program and Environmental Monitoring Program required for this drilling activities. Hasbullah acted as Project Coordinator, his responsibilities was managed the project and led for driving approval process with the AMDAL Committee of Ditjen Migas.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL), of Wakamuk #1 and Klatoa #1 Exploration Wells. Petrochina International (Bermuda) Ltd. Sorong Regency, Papua Province, 2003
Project Coordinator
Petrochina International Bermuda was planned to drill two drilling exploration wells in onshore of Sorong, West Papua. An Environmental Management Program and Environmental Monitoring Program required for this drilling activities. Hasbullah acted as Project Coordinator, his responsibilities was managed the project and led for driving approval process with the AMDAL Committee of Ditjen Migas.

Environmental Baseline Study of Donggala Block, TotalFinaElf, Makassar Strait, East Kalimantan, 2002
Team Member
TotalFinaElf was plan to developed the deep-water oil field in Makassar Strait. Prior to develop the oil field TotalFinaElf needed an initial environmental baseline data The Environmental Baseline Study collected data of benthos (macro and micro) in 2000-meter water depth, air quality, water quality in surface, middle and bottom of the sea and hydrology and meteorology data. Hasbullah was a team member had responsibility for collected water quality data.

Environmental Management and Monitoring Plan Revision (RKL-RPL Revision) of Sengkang Block Natural Gas Field, Energy Equity (Sengkang) Pty. Ltd., South Sulawesi Province, 2002
Team Leader
Energy Equity (Sengkang) planned to expands gas production capacity regarding increasing demand of fuel gas from PLTGU Sengkang. Expansion of gas production capacity required an Environmental Management and Monitoring Plan Revision (RKL-RPL Revision) study. Hasbullah worked as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committe.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of Halimun #1 and Papandayan #1 Exploration Wells, Amerada Hess-Tanjung Aru) Ltd., East Kalimantan, 2002
Team Leader
Amerada Hess (Tanjung Aru) Ltd prepared for drilling two exploration wells in offshore Makassar Strait. The drilling activity required an Environmental Management Program and Environmental Monitoring Program (UKL&UPL). Hasbullah worked as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committee of Ditjen Migas.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of Popodi #1 Exploration Well, Unocal Indonesia Company, Makassar Strait, East Kalimantan Province, 2002
Team Leader
Unocal required an Environmental Management Program and Environmental Monitoring Program (UKL&UPL) for drilling one exploration well in offshore of Makassar Strait. For this project, Hasbullah acted as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committee of Ditjen Migas

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of 3 D Seismic Survey in NIB Block, Unocal Indonesia Company, East Kalimantan, 2002
Team Leader
Unocal required an Environmental Management Program and Environmental Monitoring Program (UKL&UPL) for 3 D Seismic Survey in NIB Block, Makassar Strait
Hasbullah worked as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committee of Ditjen Migas.

Environmental Management and Monitoring Plan Revision (RKL-RPL Revision) of Tarakan Oil and Gas Field, East Kalimantan, Exspan Tarakan, 2001
Team Member
Exspan Tarakan planned to expansion their gas production capacity and required an Environmental Management and Monitoring Plan Revision (RKL-RPL Revision study. Hasbullah worked as Water Quality Expert and was responsible for site research, taking water sample and writing the document for water quality aspect.

Oil Spill Response Document for Seram #1 Exploration Well, Nexen Petroleum Indonesia Ltd., 2001
Compiler
Nexen Petroleum Indonesia Ltd. prepared to drill Seram #1 Exploration Well and required Oil Spill

Response Document. Hasbullah worked as a compiler of the document

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of 3D Seismic Survey in Sambidoyong Block, KNOC Sambidoyong Ltd., 2001
Team Leader
KNOC Sambidoyong Ltd. required Environmental Management Program and Environmental Monitoring Program (UKL&UPL) for 3D Seismic Survey.
Hasbullah worked as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committee of Ditjen Migas.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of Lombosang #1 Exploration Well, Sangkarang Block, Unocal Indonesia., Flores Sea Offshore, South Sulawesi Province, 2001
Team Leader
Unocal required Environmental Management Program and Environmental Monitoring Program (UKL&UPL for Lombosang #1 drilling exploration well.
Hasbullah worked as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committee of Ditjen Migas

Environmental Monitoring Study of Lasmo Runtu Block Close Out Program, East Kalimantan, Lasmo Runtu, 2000
Team Leader
Lasmo Runtu was relinquished the Runtu Block to Pertamina. Before closed out the block, Lasmo Runtu conducted environmental monitoring study to evaluated environmental condition after Lasmo Runtu operated in that block. The aim of the study was evaluated environmental condition of Runtu Block and evaluated the environmental management conducted by Lasmo Runtu i.e. revegetation program.
Hasbullah acted as team leader and was responsible for coordinated team member in field study and report writing.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of Five Drilling Exploration Wells at Muriah Block, East Java, bp Indonesia, 2000
Team Leader
BP Indonesia required Environmental Management Program and Environmental Monitoring Program (UKL&UPL) for five drilling exploration wells in offshore Java Sea.
Hasbullah worked as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committee of Ditjen Migas

Environmental Monitoring Program VICO Indonesia, East Kalimantan, 2000
Team Member
VICO Indonesia was implemented the Environmental Monitoring Program as a part of RKL-RPL implementation. The study was evaluated the environmental condition in VICO operational area. Environmental aspect was evaluated for air quality, water quality, soil, seawater quality, flora and fauna and socio economic and culture**.**
Hasbullah worked as water quality, air quality and seawater quality and was responsible for taking sample and writing the document

Environmental Impact Assessment of Oil and Gas Field Development of Southern and Northern Area, Unocal Indonesia Company, Kutai and Pasir Regencies, East Kalimantan, 1999
Team Member
Unocal Indonesia was developed the Southern and Northern operational area and required an AMDAL study. Hasbullah worked as water quality expert and his responsibilities were taking water quality sample, writing the report for water quality aspect.

Baseline Study of The Manna Block, Manna Regency, Bengkulu Province, Canadian Petroleum Manna Ltd., 1999.
Team Member
Canadian Petroleum Manna Ltd planned to develop the Manna Block and required an initial environmental baseline data The objective of Environmental Baseline Study was to provided the data of flora and fauna, air quality sample, soil sample, water quality sample, and socio economic and culture prior to exploration activities commencing. Hasbullah worked as water quality expert and was responsible for taking water quality sample and report writing for water quality aspect

Revision of Environmental Management and Monitoring Plan (Revision RKL-RPL) of Mutiara-Beras Field, Pamaguan and Nilam Fields, as well as Mutiara-Nilam Piping Facilities, VICO Indonesia, East Kalimantan, 1999
Team Member
VICO Indonesia was developed a new gas plant, drilling gas wells and constructed a pipeline from Mutiara to Nilam. Environmental. Vico Indonesia required Revision of Environmental Management and Monitoring Plan (Revision RKL-RPL). Hasbullah worked as water quality expert and his responsibilities were taking water quality sample, writing the report for water quality aspect.

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of the Jetty Construction, Riau Island Regency, Gulf Resources Ltd., 1999
Team Member
Gulf Resources Ltd., planned to developed Jetty in Matak Island to support their operation in Natuna Sea Block. Hasbullah worked as water quality expert and his responsibilities were taking water quality sample, writing the report for water quality aspect and involving in approval process with AMDAL Committee of Departemen Perhubungan

Environmental Baseline Study of the Malagot Block, Inanwatan Sub District, Sorong Regency, Irian Jaya, Lasmo Malagot Ltd., 1999
Team Member
Lasmo Malagot prepared for developed their onshore block in Sorong, West Papua. Prior to execute the exploration activities Lasmo Malagot required initial environmental baseline data. Hasbullah worked as water quality expert and was responsible for taking water quality sample and report writing for water quality aspect

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of Mina#1 and Belalang #1 Drilling Exploration Wells, East Nusa Tenggara Province, Japex Sabo Ltd., 1999
Team Leader
Japex Sabo Ltd. required an Environmental Management Program and Environmental Monitoring Program for two drilling exploration wells in offshore East Nusa Tenggara. Hasbullah worked as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committee of Ditjen Migas

Environmental Management Program and Environmental Monitoring Program (UKL&UPL) of Saritu#1, Saritu #2 and Sajengga Drilling Exploration Wells, Irian Jaya Province, Arco Bomberai Inc., 1998
Team Leader
Arco bomberai required an Environmental Management Program and Environmental Monitoring Program for three drilling exploration wells in onshore Bintuni West Papua. Hasbullah worked as Team Leader and was responsible for coordinating the team members for field study, report writing, presentation of the document and driving the approval process with the AMDAL Committee of Ditjen Migas

Baseline Study of Ketapang Block, Northern Madura Island Offshore, East Java Province, Gulf Resources Katapang Ltd., 1998
Team Member
Gulf Resources Ketapang required an initial environmental baseline data for Ketapang Block, Northern Madura offshore. Hasbullah worked as water quality expert and was responsible for taking water quality sample and report writing for water quality aspect

Environmental Impact Assessment of Development Makmur Oil and Gas Field, Tanjung Jabung Regency, Jambi Province, Santa Fe Energy Resources, 1997
Team Member
Santa Fe Energy Resources needed an AMDAL for development Makmur Block oil and gas field. Hasbullah acted as water quality aspect an was responsible for taking water quality sample and report writing for water quality aspect

Prof. DR. Bastian Arifin, M.Sc

Associate Consultant

Bastian Arifin has extensive experience in environmental impact assessment. Hold Doctoral Degree in Environmnetal Engineering.

With his specialization and educational background, Boiran has excellent experiences as Team Leader as well as vice Team Leader and Team Coordinator at numbers of Environmnetal research and studies in Indonesia.

Fields of Competence

- Environmental Impact Assessment (EIA)

Education and Course

- Post Graduated in Environmnetal Engineering, Bandung Institute of Technology (ITB), 2002.
- Graduated in Environmental Engineering, Asian Institute of Technology, Bangkok, Thailand, 1982
- Bachelor in Chemistry, University of North Sumatera, Medan, 1977

Profesional Affiliation

- Member of Indonesian water Associations

Languages

- Indonesia, native speaker
- English, good

Key Industry Sectors

- Mining
- Oil & Gas
- Manufacture
- Public Service

Environmental Impact Assesemnt (EIA) Projects

(As a Team Leader)

- IEE for Diesel Power Plant Rimo, Singkil 2004
- EIA for Development of Air port in Blang Bpidie, South Aceh, 2004
- Environmental Management and Monitoring for Road Improvement in Sabang, 2004
- EIA for Development of Aceh Railway, 2000
- EIA for Palm Oil Manufacturing, PT Astra Agro Niaga, West Aceh, 1995
- IEE for Diesel Power Plant Meulaboh, Tapak Tuan, Kutacane, 1994
- IEE for Final Waste Disposal, Meulaboh, Langsa, 1994
- Environmental Management Planning for Coffee Manufacturing PT Genap Mupakat, Takengon, 1993
- EIA for Alternating Road, Lhokseumawe, 1992
- EIA for Alternating Road, Banda Aceh, 1992
- IEE for Hospital of Banda Aceh, Meulaboh, Sigli, and Langsa, 1991 – 1992
- IEE for Hygienic Laboratory, Banda Aceh, 1992
- IEE for Reclamation of Pusong, Lhokseumawe, 1991
- IEE for LPG plant of PT Arun, Lhokseumawe, 1989
- EIA for Pulp and Paper Industry of PT Kertas Kraft Aceh, 1986
- EIA for Packaging of Urea Fertilizer in Belawan and Cilacap, 1985
- EIA for expansion of air craft industry PT Nurtanio, Bandung, 1984

(As Vice-team leader and team coordinator)

- EIA for Cement Manufacturing, Sigli 202
- EIA for Meutia Hotel, Lhokseumawe, 1993
- EIA for Fertilizer Plant PT Asean Aceh Fertilizer, Lhokseumawe 1993
- EIA for Cement Andalas Manufacturing, Lhoknga, 1992
- EIA for Fertilizer Plant, PT PIM Lhokseumawe, 1988

Prof. DR. Ir. Boiran M.Sc. DEA

Associate Consultant

Boiran has extensive experience in environmental impact assessments and Environmental Management Effort studies. He holds Doctoral Degree in Agronomy from Institue National Polytechnique Lourain, France

With his specialization and educational background, Boiran has done several research and studies on environmental resource management also involved at many large-scale projects in Indonesia.

Fields of Competence

- Environmental Impact Assessment (EIA)
- Environmental Management Effort (EME)

Education and Course

- Doctor de I'Ecole National Superioure d'Agronomie et Industrie Alimantaire – Institute National Polytechnique Lourain, Nancy, France.
- Diplome tude Appoprondi (DEA) d'Ecologie Microbienne de I'Universite Lyon I Universite Claude Benard, France
- Graduated in Soil Chemistry, Institue Geologie –Rijk Universiteit Gent, Belgie
- Bachelor in Agriculture, University of North Sumatera, Medan
- Course on Environmental ImpactAssessment, Basic AMDAL A, University of Syaiah Kuala, Banda Aceh, 1986.
- Comparative Study of Environmental Management in Singapore, 1989
- Comparative Study of Environmental Management in The Netherlands, 1989
- Training on Water Pollution, National Oceanology Board, Jakarta

Languages

- Indonesia, native speaker
- English, good

Key Industry Sectors

- Mining
- Oil and Gas
- Manufacture
- Public Service

Environmental Impact Assesemnt (EIA) Projects

- IEE for Diesel Power Plant, Rimo, Singkil, 2004
- EIA for Development of Airport in Blang Pidie, South Aceh, 2004
- Environmental Management and Monitoring for Road Improvement in Sabang, 2004
- EIA for Development of Airport in Kutacane, 2002
- EIA for Development of Aceh Railway, 2000
- EIA for Palm Oil Manfuacturing, PT. Astra Agro Niaga, West Aceh , 1995
- IEE for Diesel Power Plant, Meulaboh, Tapak Tuan, Kutacane, 1994
- IEE for Final Waste Disposal, Meulaboh, Langsa, 1994
- EIA for Cement Manufacturing in Muara Batee, Sigli,
- EIA for Meutia Hotel, Lhokseumawe, 1993
- EIA for Fertilizer Plant PT Asean Aceh Fertilizer, Lhokseumawe, 1993
- EIA for Cement Andalas Manufacturing, Lhoknga, 1992
- EIA for Fertilizer Plant, PT. PIM, Lhokseumawe, 1988
- EIA for Pulp and Paper Industry of PT Kertas Kraft Aceh, 1986

Rafeldy Noviar, S.Si

Associate Consultant

Raveldy Noviar has extensive experience in environmental impact assessment. Graduated from Faculty of Biology.

With his specialization in Biology, he involved at numbers of Environmental Impact Analyses Studies and Environmental Management projects throughout Indonesia.

Fields of Competence

- Environmental Impact Assessment (EIA)

Education and Course

- Graduated from Faculty of Biology, National Unviersity, jakarta

Languages

- Indonesia, native speaker
- English, good

Key Industry Sectors

- Mining
- Oil & Gas
- Manufacture
- Pharmaceutical
- Public Service

Environmental Impact Assesemnt (EIA) Projects

- EIA study for Pharmaceutical Industry, PT. Aventis Pharma, East Jakarta, 2005
- EIA study for Manufacture Industry, PT. Nikomas Gemilang, Serang, Banten, 2005
- EIA study for Controlled Dam II Sepinggan River, Balikpapan, East Kalimantan, 2004
- Environmental Management Effort and Environmental Monitoring Effort, Kabuyutan Bridge, Brebes District, Central Java, 2004
- Environmental Management Effort and Environmental Monitoring Effort Duwur Bridge, Brebes, Central Java, 2004
- Environmental Management Effort and Environmental Monitoring Widening Road Pemalang - Pekalongan, Central Java, 2004
- EIA Study for Kayan River, Bulungan District, East Kalimantan, CV Mikros Konsultan, 2003
- Environmental Management Effort and Environmental Monitoring Effrot Batching Plant Adhimix Precast Indonesia at Tanjugn Duren Location, West Jakarta, 2002
- Environmental Management Effort and Environmental Monitoring Effort for Kasih Insani Hospital, Cilegon City, West Java, 2002
- Environmental Management Effort and Environmental Monitoring Effort for Swamp Area Muara Adang, East Kalimantan, CV Wydia Aika, 2001
- Environmental Management Effort and Environmental Monitoring Effort Swamp Area, Tanjung Aru, East Kalimantan, CV Reka Citra, 2001
- Instutional Developing Department of Cleanliness Research Study, Department of Cleanliness DKI Jakarta, Pt. Sewun Indo Konsultan, 2000
- EIA revision study for Train A – G LNG Factory and Train H Expansion roject, Bontang, East Kalimantan, 1997
- EIA Study for Industry Area PT Grahapermai Raharja, Tangerang, West Java, 1997
- Environmental Management Effort and Environmental Monitoring Effort Steel Industry, PT. Jakarta Kyoei Steel, 1996
- EIA study for Industry Area Medan PT KIM, Median, South Sumatera, 1996
- Technical Guideliness Environmental Audit Sea Transportation Study, Communciation Department – Research Institute IPB, 1995
- EIA study for Apartment and Hotel Atap Merah, Jakarta, 1995
- EIA study, PT Nikomas Gemilang, West Java, 1995
- EIA study, PT Siti Swadaya, Karawang, West Java, 1995
- EIA Study PT Pancapuri Indoperkasa, Karawang, West Java, 1995
- EIA study Golden Industrial Park Area, Karawang, West Java, 1995
- EIA study for Casablanca Apartment, Jakarta 1995
- Technical Guidelines Compiling Environmental Management Effrot and Environmental Monitoring Effort Air Study, Communications Sector, Communication Department – Research Institute IPB, 1994
- EIA study for Reagent Hotel, 1994

Drs. Adnan Abdullah

Associate Consultant

Adnan Abdullah has extensive experience in environmental impact assessments. He is Lecturer and researcher at one of the state university in Banda Aceh, Indonesia.

His specialization is Environmental Impact Assessment and has done has done several research and studies on environmental resource management also involved at many large-scale projects.

Fields of Competence

- Environmental Impact Assessment (EIA)

Education and Course

- Drs., Darussalam Institute of Education,Banda Aceh, 1967.
- Environmental Impact Analysis Course, Government of Aceh Province, 1987
- Environmental Management for Roads & Bridge (ISEM B), Department of Housing and Infrastructre, Aceh 2003

Languages

- Indonesia, native speaker
- English, good

Key Industry Sectors

- Mining
- Oil and Gas
- Manufacture
- Public Service

Environmental Impact Assesemnt (EIA) Projects

- EIA arrangement, Gunung Pudong irrigation, South Aceh Distric, 1998
- EIA arrangement, Jeram irrigation, West Aceh District, 1998
- EIA project, PT. Nova Baizury Graha, Pasir Muara Krueng Tingkem, Krueng Samalng, and Krueng Peudada, Aceh, 1998
- EIA project, PT. Monopoli Raya, 1997
- RKL /RPL Studies, Novotel Aceh Hotel, Banda Aceh, 1997
- EIA Project, Mobil Oil Indonesia, East Aceh, 1996
- EIA Project, PT. Arun NGL. Co, Lhokseumawe, Aceh, 1996
- RKL/RPL studies, Yayasan Cempaka Lima Hospital, Banda Aceh, 1996
- RKL/RPL studies, Rumah Sakit Bersalin Yayasan Ibu dan Anak, Lhokseumawe (hospital), Aceh 1995
- RKL / RPL studies Dermaga Singkil, 1995
- EIA project, PT. Astra Agro Niaga, 1995
- EIA project, Meutia Hotel, Lhokseumawe, Aceh, 1993
- EIA project, PT. Semen Andalas Indonesia, Lhoknga, Aceh Besar, 1993
- Environmental Evaluation Studies, PD Genap Mupakat (manufacture), Takengon, Aceh, 1993
- Environmental Evaluation Studies, PT. Asean Aceh Fertilizer, 1993
- RKL/RPL arrangement, PT. Arun NGL, Aceh, 1992
- Environmental Management Plan and Environmental Observation Plan, PT. Kertas Kraft Aceh, 1992
- Environmental Management Plan and Environmental Observation Plan, PT. Bahari Lestari, 1992
- Environmental Evaluation Studies, PT. Pupuk Iskandar Muda, 1989
- EIA project, PT. Kertas Kraft Aceh, 1987

LAMPIRAN D

PENGUMUMAN KEGIATAN DI SURAT KABAR

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KOMISI ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP DAERAH

(AMDALDA)

PROVINSI NANGGROE ACEH DARUSALAMA

Jalan Tgk. Malem No. 2 Telp. (0651) 635722, Fax. (0651) 32456 Banda Aceh

KOMISI PENILAI AMDALDA

PROVINSI NANGGROE ACEH DARUSSALAM

PENGUMUMAN

Nomor: 02/V/AMDAL/2005

Sesuai UU No. 23 Tahun 1997 tentang Pengelolaan Lingkungan Hidup dan PP No. 27 Tahun 1999 Tentang AMDAL serta Keputusan Kepala BAPEDAL No.8 Tahun 2000 tentang Keterlibatan Masyarakat dan keterbukaan informasi dalam Proses AMDAL, diumumkan bahwa: akan disusun studi AMDAL Kegiatan Rehabilitasi dan Rekonstruksi Jalan Nasional Banda Aceh -Meulaboh yang rusak akibat gempa bumi dan Tsunami tanggal 26 Desember *2004* yang lalu dengan dana hibah oleh USAID, kegiatan utama sebagai berikut :

1. Jalan Nasional tersebut melewati 4 (empat) Kabupaten/Kota: Kota Banda Aceh, Aceh Besar, Aceh Jaya dan Aceh Barat.
2. Jalan sesuai dengan Standard Association *of* American State Highway and Transportation Officials (ASSHTO) dan memenuhi standard jalan ASEAN, panjang jalan 240 Km; lebar perkerasan 7 m; bahu jalan : 2 x 2 m.
3. Jenis kegiatan yang akan dilakukan adalah :
   - Memperbaiki jalan, pelebaran, penimbunan, perkerasan dan pengaspalan.
   - Pembangunan jembatan, gorong-gorong atau perlintasan air.
4. Dampak lingkungan hidup yang mungkin timbul :
   - **Dampak positif** ; terbukanya kesempatan kerja bagi masyarakat sekitar, tersedianya sarana transportasi jalan untuk mobilitas penduduk, jasa dan barang.
   - **Dampak negatif** ; terjadinya perubahan bentang alam, pencemaran udara, kebisingan, pencemaran air, terganggunya habitat flora/fauna pada saat pelaksanaan kegiatan dan terganggunya aktifitas masyarakat dan lain-lain.

Kepada masyarakat yang terkena dampak (sekitar lokasi) akibat kegiatan tersebut dan pemerhati lingkungan agar dapat memberikan saran pendapat, tanggapan serta masukan tertulis selambat-lambatnya **30 (Tiga Puluh)** hari kerja setelah pengumuman ini, kepada ;

1. Komisi Penilai AMDALDA Provinsi Nanggroe Aceh Darussalam Jalan Tgk. Malem 2, Banda Aceh Telp. (0651) 635722, Fax (0651) 32456.
2. Satuan Kerja Perencanaan dan Pengawasan Jalan dan Jembatan Provinsi Nanggroe Aceh Darussalam jalan Jenderal Sudirman No.1 Telp. (0651) 47150, Fax (0651) 47232.

Banda Aceh, 30 Mei 2005

KOMISI PENILAI AMDALDA
PROVINSI NANGGROE ACEH DARUSSALAM
Ketua,

IR. ARSYIAH ARSYAD, MM
Nip. 010 087 342

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KOMISI ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP DAERAH

(AMDALDA)

PROVINSI NANGGROE ACEH DARUSSALAM

Jalan Tgk. Malem No.2 Telp.(0651) 635722, Fax. (0651) 32456 Banda Aceh

KOMISI PENILAI AMDALDA

PROVINSI NANGGROE ACEH DARUSSALAM

PENGUMUMAN

Nomor: 02/V/AMDAL/2005

Sesuai UU No.23 Tahun 1997 tentang Pengelolaan Lingkungan Hidup dan PP No.27 Tahun 1999 Tentang AMDAL serta Keputusan Kepala BAPEDAL No.8 Tahun 2000 tentang Keterlibatan Masyarakat dan keterbukaan informasi dalam Proses AMDAL, diumumkan bahwa: akan disusun studi AMDAL Kegiatan Rehabilitasi dan Rekonstruksi Jalan Nasional Banda Aceh-Meulaboh yang rusak akibat gempa bumi dan Tsunami tanggal 26 Desember 2004 yang lalu dengan dana hibah oleh USAID, kegiatan utama sebagai berikut:

1. Jalan Nasional tersebut melewati 4 (empat) Kabupaten/Kota: Kota Banda Aceh, Aceh Besar, Aceh Jaya dan Aceh Barat.
2. Jalan sesuai dengan Standard Association *of* American State Highway and Transportation Officials (ASSHTO) dan memenuhi standard jalan ASEAN, panjang jalan 240 Km; lebar perkerasan 7 m; bahu jalan : 2 x 2 m.
3. Jenis kegiatan yang akan dilakukan adalah:
   - Memperbaiki jalan, pelebaran, penimbunan, perkerasan dan pengaspalan.
   - Pembangunan jembatan, gorong-gorong atau perlintasan air.
4. Dampak lingkungan hidup yang mungkin timbul:
   - **Dampak positif**; terbukanya kesempatan kerja bagi masyarakat sekitar, tersedianya sarana transportasi jalan untuk mobilitas penduduk, jasa dan barang.
   - **Dampak negatif**; terjadinya perubahan bentang alam, pencemaran udara, kebisingan, pencemaran air, terganggunya habitat flora/fauna pada saat pelaksanaan kegiatan dan terganggunya aktifitas masyarakat dan lain-lain.

Kepada masyarakat yang terkena dampak (sekitar lokasi) akibat kegiatan tersebut dan pemerhati lingkungan agar dapat memberikan saran pendapat, tanggapan serta masukan tertulis selambat-lambatnya **30 (Tiga Puluh)** hari kerja setelah pengumuman ini, kepada:

1. Komisi Penilai AMDALDA Provinsi Nanggroe Aceh Darussalam Jalan Tgk. Malem 2, Banda Aceh Telp. (0651) 635722, Fax. (0651) 32456
2. Satuan Kerja Perencanaan dan Pengawasan Jalan dan Jembatan Provinsi Nanggroe Aceh Darussalam jalan Jenderal Sudirman No.1 Telp. (0651) 47150, Fax. (0651) 47232

Banda Aceh, 30 Mei 2005
KOMISI PENILAI AMDALDA
PROVINSI NANGGROE ACEH DARUSSALAM

Ir. ARSYIAH ARSYAD, MM
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LAMPIRAN E

KUESIONER SOSIAL EKONOMI BUDAYA DAN KESEHATAN MASYARAKAT

Questioner

Sosial Ekonomi dan kesehatan Masyarakat

No. Urut : ……

Desa : ……

Kecamatan : ……

Kabupaten : ……

I. IDENTITAS RESPONDEN

1. Usia Bapak/Ibu : ……...th
2. Jenis Kelamin :
   a. Laki – laki b. Perempuan
3. Pendidikan terakhir Bapak/Ibu :
   a. Tidak sekolah e. Lulus SMA
   b. Tidak lulus SD f. Lulus Akademi /D3
   c. Lulus SD g. Lulus Sarjana /S1
   d. Lulus SMP
4. Jumlah anggota keluarga yang tinggal serumah : ……..… jiwa (termasuk KK)
5. Status dalam keluarga :
   a. Kepala Keluarga b. Anggota keluarga
6. Status dalam perkawinan :
   a. Belum nikah c. Duda / Janda
   b. Sudah nikah
7. Agama :
   a. Islam d. Bundha
   b. Kristen Prostestan e. Hindu
   c. Katholik
8. Suku : …….

II. MATA PENCAHARIAN DAN KONDISI EKONOMI

9. Pekerjaan utama Bapak/Ibu :
   a. PNS e. Pensiunan
   b. Wiraswasta / Pedagang f. TNI / Polisi
   c. Petani g. Tidak bekerja
   d. Buruh
10. Pekerjaan sampingan responden :
   a. Pertani c. Petani
   b. Wiraswasta / Pedagang d. lainnya, ……

11. Berapa luas kediaman Bapak/Ibu :
    a. Tanah pekarangan dan rumah : …….. Ha/m2
    b. Lahan sawah : …….. Ha/m2
    c. Lahan kering / tanah darat : …….. Ha/m2
    d. Lainnya …….. : …….. Ha/m2

12. Bagaimana status kepemilikan tanah?
    a. Milik sendiri
    b. Kontrak
    c. Milik keluarga
    d. lainnya ……

13. Darimana Bapak/Ibu memiliki tanah?
    a. Membeli dari orang lain
    b. Tanah warisan
    c. Tanah garap milik negara
    d. lainnya ……

14. Bagaimana kondisi fisik rumah Bapak/Ibu?
    a. Permanen
    b. Semi permanent
    c. Non permanen

15. Apakah rumah dan tanah Bapak/Ibu terkena dampak Tsunami?
    a. Ya
    b. Tidak

16. Kalau ya, mohon dijelaskan

……
……
……
……
……
……
……

III. KETERIKATAN TEMPAT TINGGAL DAN HUBUNGAN KEKERBATAN

17. Apakah Bapak/Ibu lahir di Desa / Kampung ini
    a. Ya
    b. Tidak, sebutkan ……

18. Apakah sejak lahir Bapak/Ibu tingga di Desa / kampung ini?
    a. Ya
    b. Tidak, tahun berapa ……..

19. Apakah orang tua Bapak/Ibu tinggal di Desa / Kampung ini?
    a. Ya
    b. Tidak

20. Apakah sanak keluarga Bapak/Ibu banyak tinggal di Desa / Kampung ini?
    a. Ya
    b. Tidak

21. Apakah Bapak/Ibu betah tinggal di Desa / Kampung ini?
    a. Ya b. Tidak

22. Bagaimana kondisi Keamanan di Desa / Kampung Bapak/Ibu?
    a. Aman Sekali c. Akhir-akhir ini kurang aman
    b. Aman, hanya ada kasus-kasus kecil d. Dari dulu tidak aman

23. Bagaimana kehidupan beragama di Desa / Kampung Bapak/Ibu?
    a. Sering diadakan pengajian dan ceramah di Masjid c. Masyarakat berkumpul kalau sholat Jum'at saja
    b. Diadakan pengajian di rumah-rumah d. Masjid nggak pernah di pakai

24. Apakah ada permasalahan sosial yang ada di Desa / Kampung Bapak/Ibu?
    a. Ada b. Tidak

    Kalau ada, jelaskan,

    ……
    ……
    ……
    ……
    ……
    ……
    ……

IV. KESEHATAN MASYARAKAT

25. Darimana sumber kebutuhan untuk air minum?
    a. Sumur c. Air hujan
    b. Sungai d. Membeli

26. Darimana sumber kebutuhan air untuk MCK?
    a. Sumur c. Air hujan
    b. Sungai d. Membeli

27. Bagaimana fasilitas MCK milik Bapak/Ibu?
    a. KM dan WC higienis tiap rumah c. KM sendiri, WC di Sungai
    b. KM dan WC umum d. Sungai / empang

28. Adakah sakit yang diderita anggota keluarga Bapak/Ibu dalam sebulan terakhir
    a. Ada b. Tidak

    Kalau ada, sebutkan jenis penyakit ……..

29. Rujukan bila menderita sakit
    a. Praktek Dokter Umum
    b. Puskesmas
    c. Dukun
    d. Diobati sendiri

V. KETERKAITAN RESPONDEN DENGAN RENCANA KEGIATAN

30. Apakah Bapak/Ibu sering berpergian ke luar Desa / Kampung menggunakan ruas jalan Banda Aceh - Meulaboh?
    a. Sering
    b. Jarang
    c. Pernah sekali
    d. Tidak pernah

31. Apabila Bapak/Ibu berpergian ke luar Desa / Kampung menggunakan apa?
    a. Jalan kaki
    b. Sepeda
    c. Sepeda motor
    d. Bus / angkutan umum
    e. Kendaraan pribadi

32. Apakah menurut Bapak/Ibu kegiatan perdagangan sudah berjalan dengan baik/normal?
    a. Ya
    b. Tidak
    c. Tidak tahu

33. Kegiatan perekonomian apa yang sudah berjalan?
    a. Pasar
    b. Distribusi kebutuhan pokok
    c. Warung/toko
    d. Lalu lintas bus/angkutan umum
    e. Pedagang eceran

VI. PERSEPSI TERHADAP RENCANA KEGIATAN

34. Tahukah bahwa di lokasi Desa / Kampung Bapak/Ibu akan dilakukan kegiatan perbaikan dan pembangunan jalan dan jembatan yang rusak akibat tsunami?
    a. Ya
    b. Tidak

35. Kalau Ya, darimana Bapak/Ibu memperoleh informasinya?
    a. Kepala Desa
    b. Camat
    c. Teman
    d. Lainnya ……..

36. Menurut pengetahuan Bapak/Ibu, kegiatan perbaikan dan pembangunan jalan dan jembatan ini menimbulkan dampak negatif

    a. Ya b. Tidak c. Tidak tahu

    Kalau Ya, sebutkan :

    1. ……
    2. ……
    3. ……
    4. ……
    5. ……

37. Apakah Bapak/Ibu setuju terhadap rencana perbaikan dan pembangunan jalan dan jembatan yang rusak akibat tsunami

    a. Setuju b. Tidak setuju c. Tidak tahu

    Alasannya :

    ……
    ……
    ……
    ……
    ……
    ……

38. Apakah harapan Bapak/Ibu terhadap kegiatan perbaikan dan pembangunan jalan dan jembatan yang akan dilaksanakan?

    ……
    ……
    ……
    ……
    ……
    ……
    ……
    ……
    ……
    ……

Questioner

KOMPONEN SOSIAL BUDAYA

A. Kebudayaan

1. Penduduk kampung ini, asli maupun pendatang, umumnya terdiri dari suku bangsa
   a. Penduduk asli : _____
   b. Penduduk pendatang : _____

2. Sistem kekerabatan yang berlaku di kampung ini didasarkan pada :
   a. Penarikan garis keturunan : _____
   b. Peminangan dari pihak : _____
   c. Pemilihan tempat tinggal : _____
   d. Penerimaan harta warisan : _____

3. Sikap dan perilaku masyarakat di kampung ini umumnya didasarkan pada adat tata kelakuan yang dijadikan pedoman :
   a. Adat muhakamah dalam perilaku : _____
   b. Adat qadimah dalam perilaku : _____
   c. Adat hadisah dalam perilaku : _____
   d. Adat maqamah dalam perilaku : _____

4. Dalam bersikap dan berperilaku penduduk kampung ini juga mempedomani norma-norma yang berlaku :
   a. Norma agama dalam kegiatan : _____
   b. Norma adat dalam kegiatan : _____
   c. Norma susila dalam kegiatan : _____
   d. Norma hukum dalam kegiatan : _____

5. Interaksi sosial antar warga masyarakat di kampung ini umumnya didasarkan pada nilai-nilai budaya :
   a. Kebenaran dalam hubungan dengan : _____
   b. Kerukunan dalam hubungan dengan : _____
   c. Kebersamaan dalam hubungan dengan : _____
   d. Kepentingan dalam hubungan dengan : _____

B. Kebudayaan

1. Dalam hal apa sajakah penduduk kampung ini cenderung untuk bersikap saling :
   a. Kerja sama : _____
   b. Konflik : _____
   c. Bersaing : _____
   d. Acuh tak acuh : _____

2. Menurut pengalaman Bapak/Ibu, adakah unsur-unsur budaya luar yang sekarang menjadi budaya lokal di kampung ini :
   a. B udaya baru : _____
   b. Pengganti unsur budaya lama : _____
   c. Saling melengkapi : _____
   d. Budaya lama hilang tanpa pengganti : _____

3. Kelompok sosial budaya manakah yang dipandang penting dalam masyarakat di kampung ini :
   a. Kelompok kerabatan, karena : _____
   b. Kelompok kampung, karena : _____
   c. Kelompok agama, karena : _____
   d. Kelompok politik, karena : _____

4. Menurut pengalaman Bapak/Ibu, unsur budaya manakah yang sangat berperan dalam meredam kerisauan dalam masyarakat terutama di saat-sat menghadapi masalah/kesulitan :
   a. Persamaan keturunan, karena : _____
   b. Persamaan agama, karena : _____
   c. Persamaan daerah asal, karena : _____
   d. Persamaan pekerjaan, karena : _____
   e. Persamaan kepentingan, karena : _____
   f. Persamaan pandangan politik, karena : _____

5. Menurut pengalaman Bapak/Ibu, bagaimanakah sikap dan perilaku warga masyarakat di kampung ini sekarang. Khususnya dalam hubungan dengan :

	Kuat	Lemah
a. Gotong royong	_____	_____
b. Tolong menolong	_____	_____
c. Kondisi sosial ekonomi	_____	_____
d. Kepemimpinan	_____	_____
e. Sikap terhadap orang lain	_____	_____

C. Pranata Sosial

1. Pola perilaku dan sikap apakah yang terdapat pada pranata sosial di bawah ini :
   a. Kelembagaan ekonomi : _____
   b. Kelembagaan pendidikan : _____
   c. Kelembagaan agama : _____
   d. Kelembagaan sosial : _____
   e. Kelembagaan keluarga : _____

2. Unsur budaya simbolis apakah yang terdapat pada pranata sosial di bawah ini :
   a. Kelembagaan ekonomi : _____
   b. Kelembagaan pendidikan : _____
   c. Kelembagaan agama : _____
   d. Kelembagaan sosial : _____
   e. Kelembagaan keluarga : _____

3. Unsur budaya manfaat apakah yang terdapat pada pranata sosial di bawah ini :
   a. Kelembagaan ekonomi : _____
   b. Kelembagaan pendidikan : _____
   c. Kelembagaan agama : _____
   d. Kelembagaan sosial : _____
   e. Kelembagaan keluarga : _____

4. Kode spesifikasi lisan atau tertulis apakah yang diperlukan oleh pranata sosial berikut ini :
   a. Kelembagaan ekonomi : _____
   b. Kelembagaan pendidikan : _____
   c. Kelembagaan agama : _____
   d. Kelembagaan sosial : _____
   e. Kelembagaan keluarga : _____

5. Pandangan/ideologi manakah yang merupakan unsur pranata sosial berikut ini :
   a. Kelembagaan ekonomi : _____
   b. Kelembagaan pendidikan : _____
   c. Kelembagaan agama : _____
   d. Kelembagaan sosial : _____
   e. Kelembagaan keluarga : _____

D. Warisan Budaya

1. Sejauh yang Bapak/Ibu ketahui, di kampung ini atau sekitarnya (pernah) terdapat situs perbakala atau cagar budaya, yaitu berupa :
   a. Manusia purba
   b. Makam keramat
   c. Candi/mesjid
   d. Pusat kerajaan
   e. Benteng kuno

E. Pelapisan Sosial

1. Berdasarkan kriteria tertentu, ciri-ciri apakah yang biasa digunakan masyarakat di kampung ini dalam menetapkan orang-orang yang termasuk kelompok atas :
   a. Pendidikan : _____
   b. Ekonomi : _____
   c. Pekerjaan : _____
   d. Kekuasaan : _____

2. Ciri-ciri apakah yang biasa digunakan masyarakat di kampung ini dalam menetapkan kedudukan seseorang dalam masyarakat sebagai kelompok menengah :
   a. Pendidikan : _____
   b. Ekonomi : _____
   c. Pekerjaan : _____
   d. Kekuasaan : _____

3. Ciri-ciri apakah yang biasa digunakan masyarakat di kampung ini dalam menetapkan kedudukan seseorang sebagai lapisan bawah dalam masyarakat :
   a. Pendidikan : _____
   b. Ekonomi : _____
   c. Pekerjaan : _____
   d. Kekuasaan : _____

F. Pelapisan Sosial

1. Menurut yang Bapak/Ibu ketahui, di kampung ini siapa saja yang dapat dipandang sebagai
   a. Pemimpin formal : _____
   b. Pemimpin informal : _____
   c. Orang yang berpengaruh : _____

2. Berdasarkan apa yang Bapak/Ibu ketahui, pengambilan keputusan tentang berbagai masalah masyarakat dan pembangunan di kampung ini didasarkan pada :
   a. Musyawarah masyarakat, yaitu untuk _____
   b. Pendapat Pemimpin kampung, yaitu untuk _____
   c. Keputusan kepala desa, yaitu untuk _____
   d. Intruksi kecamatan, yaitu untuk _____

3. Menurut pengalaman Bapak/Ibu ketahui, apakah kewibawaan kepemimpinan masyarakat di kampung ini masih cukup kuat?
   a. Pemimpin formal : _____
   b. Pemimpin informal : _____
   c. Orang yang berpengaruh : _____

4. Menurut pendapat Bapak/Ibu, faktor apakah yang lebih menentukan kewibawaan kepemimpinan di kampung ini
   a. Pemimpin formal : _____
   b. Pemimpin informal : _____
   c. Orang yang berpengaruh : _____

5. Menurut pendapat Bapak/Ibu, bagaimanakah situasi kehidupan masyarakat di lingkungan kampung ini?
   a. Penduduk acuh tak acuh satu sama lain
   b. Penduduk akrab satu sama lain
   c. Kurang aman, karena sering terjadi keributan
   d. Kurang aman, karena sering terjadi pencurian
   e. Lain-lain : _____

G. Sikap dan Persepsi Masyarakat

1. Apakah Bapak/Ibu pernah mendengar bahwa melintasi kampung ini akan dilakukan pekerjaan perbaikan dan rekonstruksi jalan Banda Aceh – Meulaboh? Jika pernah, apakah ada di antara lahan yang Bapak/Ibu miliki terkena pembebasan lahan untuk keperluan pembangunan jalan tersebut
   a. Tidak pernah mendengar
   b. Tidak ada lahan yang dibebaskan
   c. Ada, yaitu seluas ; _____ m^2

2. Menurut pendapat Bapak/Ibu, kegiatan perbaikan dan rekonstruksi jalan Banda Aceh – Meulaboh tersebut akan memberi manfaat kepada masyarakat dalam bentuk :
   a. Perluasan kesempatan kerja
   b. Peningkatan pendapatan masyarakat
   c. Peningkatan fasilitas sosial ekonomi
   d. Peningkatan jumlah penduduk
   e. Peningkatan harga produk masyarakat
   f. Perluasan pergaulan dan pengalaman
   g. Lain-lain : _____

3. Sebaliknya, gangguan apakah yang mungkin dirasakan masyarakat sebagai akibat langsung maupun tidak langsung dari kegiatan perbaikan dan rekonstruksi jalan Banda Aceh – Meulaboh tersebut :
   a. Penyempitan sumber daya lokal
   b. Peningkatan persaingan dalam masyarakat
   c. Penurunan kualitas lingkungan
   d. Peningkatan biaya hidup
   e. Lain-lain : _____

4. Menurut pendapat Bapak/Ibu, upaya apakah yang dapat dilakukan sejak dini untuk mengurangi gangguan atau memperbesar manfaat yang mungkin akan timbul sebagai akibat langsung ataupun tidak langsung dari kegiatan perbaikan dan rekonstruksi jalan Banda Aceh – Meulaboh tersebut :

   _____
   _____
   _____
   _____

H. Adaptasi Ekologis

1. Upaya apakah yang biasa Bapak/Ibu lakukan untuk dapat menikmati kehidupan yang sehat?
   a. Mentaati aturan – aturan kesehatan
   b. Membiasakan diri hidup dalam alam terbuka yang sehat
   c. Tidak melakukan upaya apapun, karena kesehatan itu semata-mata tergantung pada nasib kita sendiri

2. Menurut pendapat Bapak/Ibu, upaya apakah yang dapat dilakukan untuk menghindari diri dari bencana banjir?
   a. Mengungsi saat datang banjir
   b. Membuat saluran agar air lancar mengalir
   c. Membangun tempat tinggal yang lebih tinggi

3. Menurut pendapat Bapak/Ibu, upaya apakah yang dapat dilakukan untuk mendapatkan pengairan yang cukup bagi usaha tani tambak
   a. Membuat tambak yang tergantung pada curah hujan
   b. Membuat tambak yang letaknya dekat dengan sungai
   c. Menbuat saluran yang dapat mengalirkan air ke dalam tambak

4. Menurut pendapat Bapak/Ibu, tinggi rendahnya hasil tambak sangat tergantung pada :
   a. Usaha kita sendiri untuk merawatnya
   b. Rezeki yang diberikan Tuhan
   c. Tergantung pada lokasi tambak