

Initial Environmental Examination

July 2018

INO: Advanced Knowledge and Skills for Sustainable Growth Project

Prepared by the Ministry of Research, Technology and Higher Education for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 23 June 2018)

Currency unit	–	Rupiah (Rp)
Rp1.00	=	\$0.000070911
\$1.00	=	Rp 14,102

ADB	- Asian Development Bank
AIDS	- Acquired Immune Deficiency Syndrome
AKSI	- Advanced Knowledge and Skills for Sustainable Growth
AMDAL	- Analisis Mengenai Dampak Lingkungan (Analysis of Environmental Impact)
ANDAL	- Analisa Dampak Lingkungan (Environmental Impact Assessment)
ASEAN	- Association of South-East Asian Nations
BAPPE DA	- Badan Perencanaan Pembangunan Daerah (Regional Development Planning Board)
BAPPE NAS	- Badan Perencanaan Pembangunan Nasional (National Development Planning Board)
BODBA PPENA S	- Biological Oxygen Demand Planning Board) Badan Perencanaan Pembangunan Nasional (National Development Planning Board)
BOQBO D	- Bill of Quantity Biological Oxygen Demand Planning Board)
CEMPB OQBOD	- Contractor's Environmental Management (and Monitoring) Plan Bill of Quantity Biological Oxygen Demand
CODCE MPBOQ	- Chemical Oxygen Demand Contractor's Environmental Management (and Monitoring) Plan Bill of Quantity
CSSCO DCEMP	- Country Safeguards System Chemical Oxygen Demand Contractor's Environmental Management (and Monitoring) Plan
DDCCS SCOD	- Detailed Design Consultant Country Safeguards System Chemical Oxygen Demand
DELHD DCCSS	- Dokumen Evaluasi Lingkungan Hidup (Environmental Evaluation Detailed Design Consultant Country Safeguards System Document)
DELHD DC	- Dokumen Evaluasi Lingkungan Hidup (Environmental Evaluation Detailed Design Consultant)
DLH(K) DELH	- Dinas Lingkungan Hidup (dan Kehutanan) [Environmental and Document] Dokumen Evaluasi Lingkungan Hidup (Environmental Evaluation (Forestry) Agency]
DLH(K)	- Dinas Lingkungan Hidup (dan Kehutanan) [Environmental and Document]
DODLH(K)	- Dissolved Oxygen (Forestry) Agency] Dinas Lingkungan Hidup (dan Kehutanan) [Environmental and
EADO	- Executing Agency Dissolved Oxygen (Forestry) Agency]
EADO	- Executing Agency Dissolved Oxygen
EA	- Executing Agency
EIA	- Environmental Impact Assessment
EMC	- Environmental Monitoring Checklist (of ADB)
EMP	- Environmental Management Plan
EMMP	- Environmental Management and Monitoring Plan
EPA	- Environmental Protection Agency

EPM	- Environmental Protection Measures
GOI	- Government of Indonesia
GRM	- Grievance Redress Mechanism
GRC	- Grievance Redress Committee
HIV	- Human Immunodeficiency Virus
HM	- Hazardous Material(s)
HW	- Hazardous Waste(s)
IA	- Implementing Agency
IEE	- Initial Environmental Examination
JFPR	- Japan Fund for Poverty Reduction
KEPME	- Keputusan Menteri (Ministerial Decree)
N	
KEPRE	- Keputusan President (Presidential Decree)
S	
MEA	- Masyarakat Ekonomi ASEAN (ASEAN Economic Community)
MENLH(K)/MOE	- Menteri Lingkungan Hidup dan Kehutanan [Minister of Environment and Forestry
F	
MORTH	- Ministry of Research, Technology and Higher Education (or Kemristekdikti)
E	
NTU	- Nephelometric Turbidity Unit
OHS	- Occupational Health and Safety
PISC	- Project Implementation Supervision Consultant
PMSC	- Project Management Supervision Consultant
PIU	- Project Implementation Unit
PMU	- Project Management Unit
PERPR	- Peraturan Presiden (Presidential Regulation)
ES	
PP	- Peraturan Pemerintah (Government Regulation)
PPEs	- Personal Protective Equipment/s
PPTA	- Project Preparation Technical Assistance
UKL	- Upaya Pengelolaan Lingkungan (Environmental Management Effort)
UPL	- Upaya Pemantauan Lingkungan (Environmental Monitoring Effort)
REA	- Rapid Environmental Assessment
RKL	- Rencana Pengelolaan Lingkungan (Environmental Management Plan)
RPJM	- Rencana Pembangunan Jangka Menengah (Medium-term Development Plan)
UPL	- Upaya Pemantauan Lingkungan (Environmental Monitoring Plan)
UU	- Undang-Undang (Law/Act)
SEMR	- Semi-annual Environmental Monitoring Report
SEMS	- Social and Environmental Management Systems
SPS	- Safeguards Policy Statement (ADB)
SPPL	- Surat Pernyataan Kesanggupan Pengelolaan Lingkungan (Promise Letter for Environmental Management)
STDs	- Sexually Transmitted Disease(s)
SWM	- Solid Waste Management
TA	- Technical Assistance

- UNIMAL - University of Malikussaleh
- UNJA - University of Jambi
- UPI - Universitas Pendidikan Indonesia
- UNRI - University of Riau
- WHO - World Health Organization
- WWTP - Waste Water Treatment Plan

NOTES

- (i) The fiscal year of the Government of Indonesia and its agencies ends on 31 December. "FY" before a calendar year denotes the year in which the fiscal year ends, e.g., FY2011 ends on 31 December 2011.
- (ii) In this report, "\$" refers to US dollars unless otherwise stated. This initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the "terms of use" section on ADB's website.

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LIST OF INDONESIAN LAWS AND REGULATIONS CITED IN THIS IEE

- *Keputusan Menteri Negara Lingkungan Hidup Nomor: KEP-48/MENLH/11/1996 - Environmental Ministry Regulation 48 /1996 On Noise Level Ranges*
- *Undang-undang Nomor 23 Tahun 1997 tentang Pengelolaan. Lingkungan Hidup- Law 23/1997 on Environmental Management*
- *Peraturan Pemerintah Republik Indonesia Nomor 41 Tahun 1999 Tentang Pengendalian Pencemaran Udara – Government Regulation 41/1999 on Air Pollution Control*
- *Peraturan Pemerintah Republik Indonesia Nomor 82 Tahun 2001 Tentang Pengelolaan Kualitas Air Dan Pengendalian Pencemaran Air- Government Regulation 82/2001 about Water Quality Management and Water Pollution Control*
- *Peraturan Kepala Kepolisian Negara Republik Indonesia Nomor 23 Tahun 2007 Tentang Sistem Keamanan Lingkungan – National Police Chief Regulation 23/2007 on Environmental Protection System*
- *Undang-undang No. 18 Tahun 2008 tentang Pengelolaan Sampah – Law 18/2008 on Waste Management*
- *Peraturan Kementrian Tenaga Kerja Dan Transmigrasi PER.07/MEN/IV/2008 Tentang Penempatan Tenaga Kerja. - Ministry of Manpower and Transmigration Regulation No. Per.07/Men./IV/2008 on placement of manpower;*
- *Peraturan Menteri Pekerjaan Umum Nomor: 10/Prt/M/2008 Tentang Penetapan Jenis Rencana Usaha Dan/Atau Kegiatan Bidang Pekerjaan Umum Yang Wajib Dilengkapi Dengan Upaya Pengelolaan Lingkungan Hidup Dan Upaya Pemantauan Lingkungan Hidup – Ministerial Regulation Department of Public Works No. 10/PRT/M/2008 on Establishing mandatory environmental management measures (ULK) environmental monitoring measures and criteria (UPL).*
- *Peraturan Menteri Pekerjaan Umum Nomor : 26/Prt/M/2008 Tanggal 30 Desember 2008 Tentang Persyaratan Teknis Sistem Proteksi Kebakaran Pada Bangunan Gedung Dan Lingkungan – Ministry of Public Works Regulation 26/Prt/M/2008 on Technical Requirements of Fire Protection Systems for Buildings and the Environment*
- *Undang-undang No. 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan Law No. 22/2009 on traffic and road transport*
- *Undang-Undang Nomor 32 Tahun 2009 Tentang Perlindungan Dan Pengelolaan Lingkungan Hidup – Law 32/2009 about Environmental Management and Protection*
- *Peraturan Menteri Negara Lingkungan Hidup Nomor 07 Tahun 2010 Tentang Sertifikasi Kompetensi Penyusun Dokumen Analisis Mengenai Dampak Lingkungan Hidup Dan Persyaratan Lembaga Pelatihan Kompetensi Penyusun Dokumen Analisis Mengenai Dampak Lingkungan Hidup - Regulation of Ministry of Environment (Permen LH) No. 07/2010 on Competence Certification of AMDAL Preparation and Training Requirements for AMDAL Preparation*

- *Undang-Undang Nomor 11 Tahun 2010 Tentang Cagar Budaya* - Law 11/2010 – Law 11/2010 on Concerning Cultural Heritage
- *Rencana Usaha Dan/Atau Kegiatan Yang Wajib Memilikianalisis Mengenai Dampak Lingkungan Hidup* Peraturan Menteri Negara Lingkungan Hidup Nomor 05 Tahun 2012 *Tentang Jenis* - Decree of the Minister of Environment No. 05/2012 on Screening Criteria (type/scale/magnitude) for activities requiring AMDAL/EIA;
- *Peraturan Pemerintah Nomor 81 Tahun 2012 tentang Pengelolaan Sampah Rumah Tangga Dan Sampah Sejenis Sampah Rumah Tangga*- Government Regulation No. 81/2012 on Managing Household and Neighborhood Waste
- Peraturan Pemerintah Nomor 27 Tahun 2012 *Tentang Izin Lingkungan* - PP 27/2012 on Environmental Permits
- *Peraturan Pemerintah Republik Indonesia Nomor 81 Tahun 2012 Tentang Pengelolaan Sampah Rumah Tangga Dan Sampah Sejenis Sampah Rumah Tangga* – Government Regulation 81/2012 on household and neighborhood waste management
- *Peraturan Pemerintah nomor 50 Tahun Peneratpan Sistem Manajemen Kelslematan dan Kesehatan Kerja.* – Government Regulation 50/2012 on Occupational Health and Safety
- *Peraturan Menteri Perkerjaan Umum Nomor 03/PRT/M/2013 tentang Penyelenggaraan Prasarana Dan Sarana Persampahan Dalam Penanga-nan Sampah Rumah Tangga Dan Sampah Sejenis Sampah Rumah Tangga* – Ministry of Public Works Regulation 03//PRT/M/2013 on Implementation of Solid Waste Facility infrastructure and equipment for household and neighborhood garbage collection
- *Peraturan Pemerintah nomor 66 Tahun 2014 tentang kesehatan lingkungan* – Government Regulation No. 66/2014 on Environmental Health
- *Peraturan Menteri Lingkungan Hidup Nomor 5 Tahun 2014 Tentang Baku Mutu Air Limbah* - Ministry of Environment Regulation 5/2014 concerning Wastewater Quality Standard

EXECUTIVE SUMMARY

1. The Government of Indonesia with loan funding from the Asian Development Bank (ADB) has proposed to implement the Advanced Knowledge and Skills for Sustainable Growth in Indonesia (AKSI) Project. The Executing Agency for the project is the Ministry of Research, Technology, and Higher Education (MORTHE) and the Implementing Agencies are four universities: University of Malikussaleh (UNIMAL), University of Riau (UNRI), University of Jambi (UNJA), and Universitas Pendidikan Indonesia (UPI).
2. The AKSI project's scope of work entails three categories of activities (i) Development of teaching and research facilities and procurement of equipment; (ii) Development of human resources for lecturers and university staff; and (iii) Development of academic curriculum, applied research, and services, with an aligned management system in a specific focus area, which is referred to as a center of excellence. Under the physical component, AKSI will construct 39 new buildings, complete one unfinished building, and demolish one building; activities will take place on seven campuses within the four universities. The construction will all take place on university campuses that are already developed. All buildings will have Environmental Permits as required by Indonesian laws. These permits will be issued after environmental impact assessments have been completed and plans to mitigate negative environmental impacts have been accepted by the government's environmental protection authorities. Similarly, the ADB's environmental safeguards policy stipulates that MORTHE and the universities must prepare and publish a draft Initial Environmental Examination (IEE), including an Environmental Action Plan (EAP) for public consultation. Progress in implementing the EAP is required twice per year, and the progress report will be made public.
3. The objectives of this IEE are to (i) provide information about the general environmental setting of the project area; (ii) identify impact of the project activities (physical infrastructure development of the buildings) on the bio-physical, socio-economic, and cultural environment of the project, recommend site specific environmental mitigation measures; and (iii) prepare an environmental management plan for the project area to ensure that the IEE addresses the requirements of the following (i) Relevant Indonesian laws, regulations, and standard practices and (ii) ADB's Safeguard Policy Statement, July 2009, applicable treaties and agreements.
4. The assessment of the project has been carried out for both positive and negative impacts. It is expected that the project activities will not have any significant adverse impact on the environment. Impacts are most likely to occur during the construction phase; these are expected to be temporary in nature and can be mitigated with proper management and good practices. During the operational phase, the most likely risk is disposal of small amounts of waste from teaching laboratories and teaching workshops that will be mitigated with standard procedures and good practices used by universities for managing educational laboratories and school workshop waste.
5. The IEE and EMP are "living documents" and can be amended and updated further during detailed design of respective proposed subprojects.

I. INTRODUCTION

A. Project Background

1. The Advanced Knowledge and Skills for Sustainable Growth (AKSI) project is part of Indonesia's long-term development plan for higher education with the stated objectives of (i) Increasing access to higher education, thus increasing enrollment rate; (ii) Improving quality, relevance, competitiveness, and accreditation of higher education through the enhancement of academic quality, facilities, human resources development, and research; (iii) Increasing quality and competitiveness of higher education graduates. Project activities will be carried out in four universities: University of Malikussaleh (UNIMAL), University of Riau (UNRI), University of Jambi (UNJA), and Universitas Pendidikan Indonesia (UPI), a teacher education university to provide high quality and demand-based programs as part of the first phase of support to the longer-term higher education reform strategy.

2. The Government of Indonesia (GOI) with loan financing from the ADB will upgrade these four universities that were selected on a competitive basis based on proposals that indicated they have the capacity to implement a relatively large project for constructing new buildings, upgrading academic and non-academic human resources, and creating Centers of Excellence aligned with their missions. AKSI's envisioned scope of work entails three categories of activities (i) Development of teaching and research facilities, supporting infrastructures, and procurement of equipment; (ii) Development and improvement of the quality of human resources, including degree and non-degree programs for lecturers and university staff; (iii) Development of academic curriculum, applied research, and services, with an aligned management system in a specific focus area, which is referred to as a center of excellence.

3. The AKSI project includes financing the construction of 39 new buildings, completion of one unfinished building, and the demolition of one building on seven locations within the boundaries of the four university campuses. The Executing Agency for the project is the Ministry of Research, Technology, and Higher Education (MORTHE) and the Implementing Agencies are the four universities. Within MORTHE, the key unit for the AKSI implementation will be the Project Management Unit (PMU) established to manage and implement project/subprojects wholly at the national level. Under the MORTHE PMU, Project Implementation Units (PIU) will be established in each university to act as the Implementing Agencies (IA) that will manage and implement subprojects on a day-to-day basis.

4. All buildings constructed under this project will obtain all necessary permits and meet all environmental protection, construction, and contracting requirements covered by Indonesian laws and regulations as well as safeguards required by the ADB as they apply to this project. Indonesian Environmental Permits can be issued for each building after environmental impact assessments have been completed and plans to mitigate negative environmental impacts have been accepted by the environmental protection authorities. Similarly, the ADB's environmental safeguards policy stipulates that MORTHE and the universities must prepare and publish a draft Initial Environmental Examination (IEE), including an Environmental Action Plan (EAP) for public consultation and that progress reporting on the EAP is required twice per year, and the progress report will be made public.

B. Purposes of IEE

5. The purposes of conducting this IEE are (i) to provide the government and ADB with information about the general environmental setting of the seven campuses where construction

will take place; (ii) to identify the impact of the proposed construction on the bio-physical environment; and (iii) to recommend site specific environmental mitigation measures. Based on these initial recommendations, the IEE includes an Environmental Management Plan (EMP) to ensure that the IEE addresses the requirements of (i) relevant Indonesian laws, regulations, and (ii) ADB's safeguard Policy Statement, July 2009. The initial assessment of the project's environmental impacts has been carried out, and the project activities are not likely to have any significant adverse impacts on the environment that cannot be mitigated through proper management and application of good practices.

C. Methodology and Approach of IEE

6. The works include the following activities¹:

- Desk review of information such as maps, and environmental analysis previously prepared for the universities;
- Preparation of checklists for collecting project related information;
- Review of national and local laws/regulations and procedures relating to environment, health and safety, resettlement and rehabilitation, etc.;
- Field visits to collect data relevant to the study area; and
- Discussions and interviews with the relevant stakeholders including: PIU teams, environmental study centers at each university, lecturers, students, relevant environmental agencies, and some project-influenced community members.

7. From time to time this IEE will be updated and the updates will be made publicly available.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

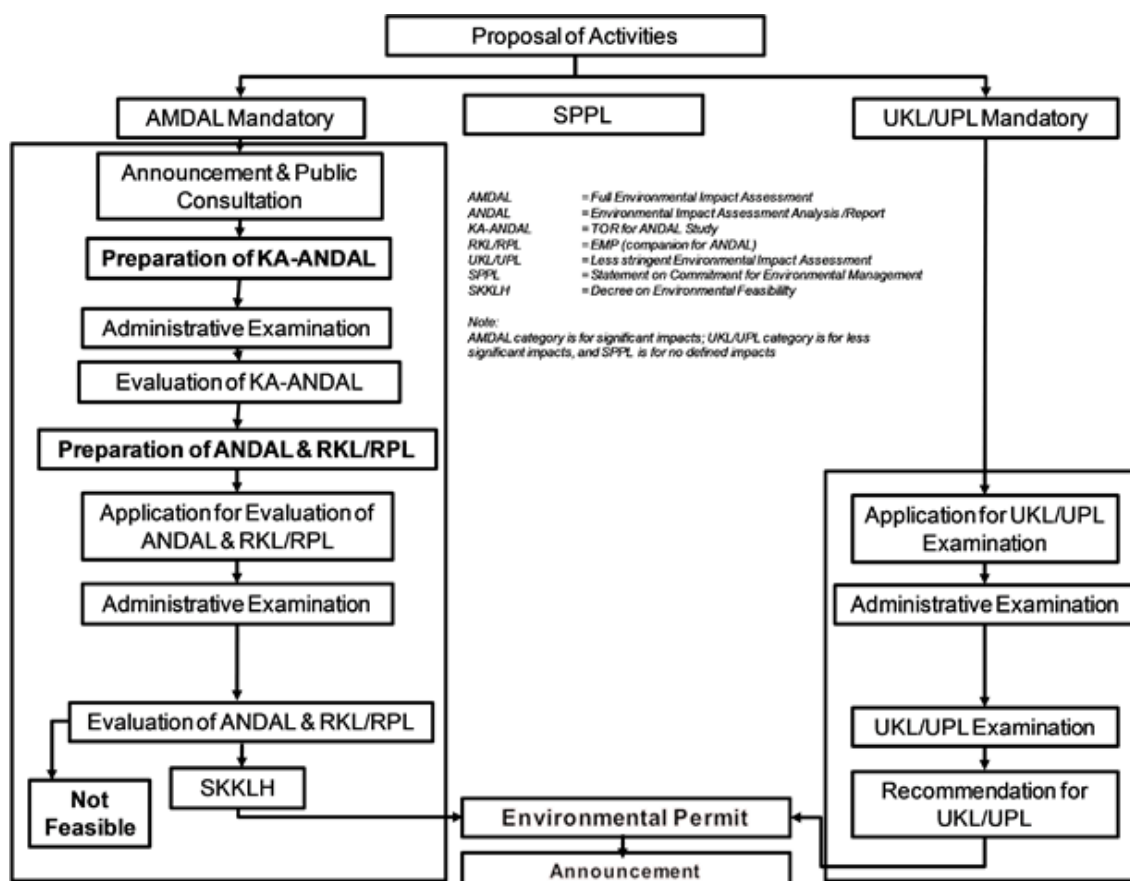
A. Environmental Laws and Regulations in Indonesia

8. In 2014, the Ministry of the Environment and the Ministry of Forestry were merged into the Ministry of Environment and Forestry, which is the cabinet-level government ministry responsible for managing and conserving the nation's environment and forests. In addition, each district/province has its own Environment Agency that is responsible to the head of district or province. Either level can issue Environmental Permits, depending upon the scope and nature of the proposed activities.

9. All projects must comply with the review and clearance procedures specified under Indonesia's legal and regulatory framework for environmental management, construction, public health, and safety including those listed in this document under Indonesian Laws and Regulations Cited in this Document (page 1): Figure 1 depicts the flow of activities needed to obtain environmental clearance in Indonesia.

¹ ADB. 2017. *Technical Assistance to Indonesia for Preparing the Advanced Knowledge and Skills for Sustainable growth Project*. Manila,

Figure 1: Flowchart of Indonesian Environmental Clearance



Source: ADB 2015. Draft Environmental Assessment and Review Framework for Indonesia: Flood Management in Selected River Basins Sector Project

B. ADB Environmental Safeguard Guidelines in the Context of Indonesia

10. ADB's environmental management guidelines easily conform to the Indonesian AMDAL system. According to Indonesian regulations, all projects should undergo environmental clearance before proceeding to implementation. Essentially, ADB's Environmental Impact Assessment (EIA), conforms to the Analysis of Environmental Impact (AMDAL) study and an IEE corresponds to an Environmental Management Measure (UKL) and Environmental Monitoring Measure (UPL). The AMDAL and EIA are somewhat equivalent, though the criteria used for categorization under the Government of Indonesia's AMDAL procedure and the ADB's EIA requirement are slightly different. Indonesian regulations provide quite rigid quantitative criteria, while ADB relies on quantitative criteria (e.g., significance). For example, Indonesia's AMDAL procedure classifies projects based on specific magnitude (length, depth, width, size, or other physical dimensions), whereas ADB's SPS 2009 categorizes projects based on the "significance of impacts". Table 1 shows the relationship between Indonesia's regulations/policies and those under ADB's environmental categorizations.

Table 1: ADB and Indonesia Project Categorization Systems

ADB Project Categories	AMDAL Project Categories
Category A: Projects with potential for significant adverse environmental impacts, requiring an environmental impact assessment (EIA).	AMDAL: Projects that according to law requires an Environmental Impact Assessment (AMDAL).
Category B: Projects judged to have some adverse environmental impacts, but of lower degree and/or less significant than those for category A projects. Category B projects require an initial environmental examination (IEE).	UKL/UPL: Projects that according to law requires Environmental Management Measure (UKL) and Environmental Monitoring Measure (UPL). However, special discretion and judgment of environmental agencies at local and national level (based on particular consideration) may override the category, and UKL/UPL Category may be “upgraded” to AMDAL Category.
Category C: Projects unlikely to have adverse environmental impacts. No special requirement, but the environmental aspects are reviewed as well.	SPPL: Projects that do not require AMDAL or UKL-UPL are obliged to submit a ‘statement of management and environmental monitoring ability’ or SPPL.
Category FI. Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system unless all projects will result in insignificant impacts.	Not Applicable

Source: ADB 2015. Draft Environmental Assessment and Review Framework for Indonesia: Flood Management in Selected River Basins Sector Project

C. Environmental Studies Required for AKSI under Indonesian and ADB Regulations

11. Under Indonesia’s environmental protection legal and regulatory framework, the type of environmental studies required depends upon the land area and building size; AMDAL is required for areas >5 hectares or buildings larger than 10,000 square meters. The project preparation team held discussions with the universities and local or regional environmental authorities to agree upon which type of environmental study was required at each campus. When appropriate, buildings were grouped into clusters. Table 2 provides a summary of those discussions and an estimated date when the documentation needed for Environmental Permits will be completed.

Table 2: Environmental Studies Required at each University in accordance with the prevailing Government Laws and Regulations

University/ Campus	Proposed Buildings	Required GOI Environmental Study Document and Tentative Date of Completion		
		AMDAL	UKL-UPL	DELH/Addendum
University of Malikussaleh				
Bukit Indah	Cluster I		✓ (Aug’18)	
	Cluster II		✓ (Aug’18)	
	Cluster III		✓ (Aug’18)	
Reuleut	Reuleut Campus			X (Oct’18)

University/ Campus	Proposed Buildings	Required GOI Environmental Study Document and Tentative Date of Completion		
		AMDAL	UKL-UPL	DELH/Addendum
	(4 Clusters)			
University of Riau				
Binawidya	Ten Buildings			X (Aug'18)
University of Jambi				
Telanaipura	PC (8,733 m ²)		✓ (Oct'18)	
Buluran	FMHS (6,236 m ²)		✓ (Oct'18)	
Mendalo	Seven Buildings	✓ (Nov'18)		
Universitas Pendidikan Indonesia				
Bumi Siliwangi	PICL (8,200 m ²)		✓ (Apr'18)	
	FEBE (8,800 m ²)		✓ (Apr'18)	
	FADE (9,800 m ²)		✓ (Apr'18)	
	FTVE (9,900 m ²)		✓ (May'18)	
	TVET CoE (9,800 m ²)		✓ (May'18)	
	PPG Center (6,750 m ²)		✓ (May'18)	

Notes:**University of Malikussaleh (UNIMAL), Bukit Indah Campus:**

- (i) Cluster I, covering buildings of Faculty of Technic (3,000 m²), Faculty of Social and Politics (2,300 m²), and Integrated Laboratory for Renewable Energy over (2,700 m²), total 8,000 m².
- (ii) Cluster II, covering buildings of General Lecture (3,000 m²), and Faculty of Economics (2,200 m²).
- (iii) Cluster III, covering building of Library and Student Activity Center (7,200 m²).

UNIMAL, Reuleut Campus:

- (i) Cluster I, covering buildings of Rectorate, Administration Office and Language Training Center (8,000 m²).
- (ii) Cluster II, covering buildings of Center for University Education and Training, Exposition and Event Center (4,800 m²), and General Lecture Room/Building (3,000m²).
- (iii) Cluster III, covering buildings of Faculty of Agriculture (2,300 m²), Agriculture Laboratory (2,700 m²), and Green House (800 m²).
- (iv) Cluster IV, covering buildings of Faculty of Education (2,100 m²), and Faculty of Medicine (2,200 m²).

University of Riau (UNRI):

Covering proposed buildings of Integrated Classrooms (8,500 m²), Integrated Laboratories (7,500 m²), Information and Technology Center (4,000 m²), Student Center (3,500 m²), University Main Library (2,000 m²), Boat House and Marine Center (2,000 m²), Health Study Complex (5,500 m²), Postgraduate Building (7,500 m²), University Training Center (4,000 m²), Food Science and Technology Center (4,000 m²), and its associated supporting facilities.

University of Jambi (UNJA):

Proposed Mendalo campus buildings covering University and Faculty Administration Center (9,361 m²), Integrated Classroom A [Hexagon building] (8,500 m²), Integrated Classroom B (8,250 m²), Integrated Classroom C (6,600 m²), Engineering (Science) Laboratory (3,600 m²), Integrated Social Science Laboratory (3,600 m²), Student Activity Center (4,800 m²), Road [inside the campus] (4,000 m²) and other associated facilities. Wholly total 48,711 m².

Universitas Pendidikan Indonesia (UPI):

Postgraduate Integrated Classrooms and Laboratory (8,200 m²), Faculty of Arts and Design Education Integrated Classrooms, Laboratories, Studios and Performing Arts Laboratories (9,800 m²), Faculty of Technology Vocational

Education (TVET) Integrated Classroom, Laboratories, Workshops and Studios (8,500 m²), Professional Teacher Education and Training Center (6,000 m²).

III. DESCRIPTION OF THE PROJECT

A. Project Overview

12. AKSI's envisioned scope of work entails three categories of activities (i) Development of teaching and research facilities, supporting infrastructures, and procurement of equipment; (ii) Development and improvement of the quality of human resources, including degree and non-degree programs for lecturers and university staff; and (iii) Development of academic curriculum, applied research, and services, with an aligned management system in a specific focus area, which is referred to as development of center of excellence.

13. The project has the following outputs:

14. **Output 1** is delivery of market responsive programs by UNIMAL, UNJA, and UNRI, by (i) upgrading UNIMAL, UNJA, and UNRI through completing construction and equipping 33 new buildings, and finishing and equipping one unfinished building (with gender responsive, inclusive, and sustainable infrastructure); (ii) training at least 586 additional teaching, management, research and support staff (of which 40% women) of UNIMAL, UNJA, and UNRI, to increase their understanding on market responsive programs and research; and (iii) Supporting development of centers of excellence in UNIMAL, UNJA and UNRI in Sustainable Natural Resources, Agriculture, Marine and Aquatic Science, respectively, in collaboration with industry, community and other stakeholders (a) to upgrade or develop at least 40 curricula; (b) to launch at least 21 new research programs connected to the center or excellence; (c) to provide at least 65 additional training or service programs; and (d) to sign at least 21 additional Memorandum of Understandings with industry and other stakeholders. In addition, as part of output the project will support MORTHE in developing a long-term investment strategy for the Higher Education and Advanced Skills Development Sector.

15. **Output 2** is provision of improved teacher training by UPI by (i) Upgrading UPI by completing construction and equipping 6 new buildings (including gender responsive, inclusive, and sustainable infrastructure) to become center of excellence in TVET teacher education and training; (ii) Training at least 53 teaching, management, research and support staff (of which 40% are women) to increase understanding on designing and delivering accredited TVET teacher education programs; and (iii) Supporting UPI as part of its center of excellence development to (a) establish 6 new S1 TVET teacher education programs; (b) to train at least 240 SMK-teachers (at least 40 % female) in-service training programs, in collaboration with MOEC, relevant polytechnics, SMKs and industry; (c), to certify at least 300 participants (at least 40% female) by the established LSP and PUK; and (d) to disseminate at least two case studies of UPI model for TVET teacher education and training model. In addition, as part of Output 2, MORTHE will support the development of a long-term vocational teacher education strategy in collaboration with all relevant stakeholders.

16. The Executing Agency for the project is the Ministry of Research, Technology, and Higher Education (MORTHE) and the Implementing Agencies are the four universities. Within MORTHE, the key unit for the AKSI implementation will be the Project Management Unit (PMU) established to manage and implement project/subprojects wholly at the national level. Under the MORTHE PMU, Project Implementation Units (PIU) will be established in each university to act as the Implementing Agencies (IA) that will manage and implement subprojects on a day-to-day basis.

B. Need for Project

17. Indonesia's public universities are in need of capital improvements. In 2018, the gross enrollment rate (GER) for HE in Indonesia was 31.2%, up from 14.9% in 2000. The number of general universities expanded from 46 to 63 between 2005 and 2017 an increase of 37%, while enrollment expanded by 207% during the same period.² The rapid expansion of the public university system was not matched by capital improvements sufficient to keep up with rising demand. Shortages of lecturers with appropriate qualifications made it difficult for universities to improve their performance, and many public universities hired temporary lecturers. Nearly 60,000 lecturers—permanent civil-service (PNS) and temporary non-civil service (non-PNS) lecturers—teach in public universities. Approximately 3% of PNS and 14% of non-PNS lecturers have Bachelor's degrees as their highest credential, 66% of PNS and 68% of non-PNS have Master's degrees, and 31% of PNS and 18% of non-PNS have PhDs.

18. The Government seeks to expand enrollment, upgrade quality and improve the relevance of public universities to provide highly skilled professionals needed to support regional growth. In addition, the Government also seeks to develop 'World-Class Universities', meaning institutions with research capacity in science and technology, which are seen as necessary to achieve current and future national goals.

19. Public investment in higher education infrastructure has not been able to keep pace with the expansion and the increasing number and types of programs offered. Most public universities need additional and modern facilities that offer the quality and types of study programs needed to support the Government of Indonesia (GOI's) plans for economic growth and diversification. The GOI's higher education strategy includes upgrading public universities in terms of expanding the enrollments by building new classrooms, laboratories, data centers, libraries, and faculty and administration buildings.

20. The four universities in the AKSI project have prepared a detailed justification for each building including usage and size of each building, floor by floor. Building design complies with existing regulations and standards and makes conscious effort to use best practices for (i) improving climate-change responsiveness (both in terms of adaptation and mitigation), (ii) increasing cost-efficiency over a building's life cycle to justify costs associated with construction costs for 'green' buildings, and (iii) strengthening the overall academic environment, including safe, sustainable and gender responsive campuses.

C. Category of Project

21. The government understands that the ADB classifies AKSI as Environment Category B, a category that requires an IEE study level document. This categorization means that the project is expected to have some adverse impacts that can be mitigated locally. The project/subprojects are located at four sites: UNIMAL in Aceh Province, UNRI in Riau Province, and UNJA in Jambi Province, three universities in Sumatera Island; and UPI in the City of Bandung in West Java Province.

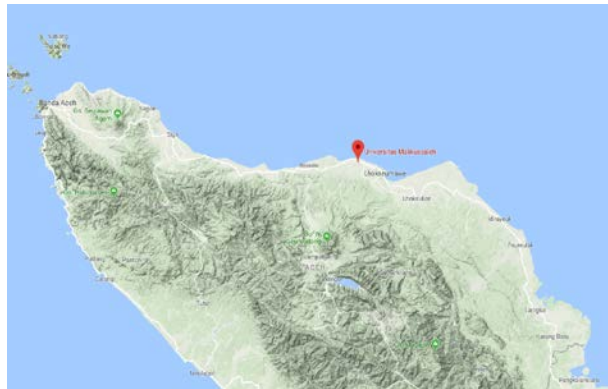
² Indonesia's higher education system has both a general stream under MORTHE and a religious stream under the Ministry of Religious Affairs

D. Location of Project

22. The project/subprojects are located at four sites: UNIMAL in Aceh Province, UNRI in Riau Province, and UNJA in Jambi Province, three universities in Sumatera Island; and UPI in the City of Bandung in West Java Province.

23. **UNIMAL.** Infrastructure and human resource improvement in UNIMAL is expected to enable the university to establish a Center of Excellence (CoE) for Applied Innovation and Technology in Agriculture. The project will be implemented in two campuses, Bukit Indah and Reuleut Campuses, which are located in the City of Lhokseumawe and North Aceh District, respectively, both are entirely located on land belonging to the local government.

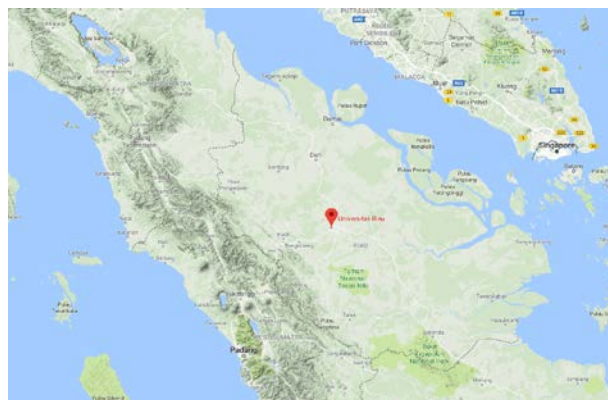
Figure 2. UNIMAL Location



Source: Google Maps

24. **UNRI.** The project will take place in the main campus area of the University of Riau, Binawidya Campus, at Jalan H.R. Soebrantas Km 12.5, in Pekanbaru City. All the new buildings proposed in the UNRI proposal located on university owned land.

Figure 3: UNRI Location

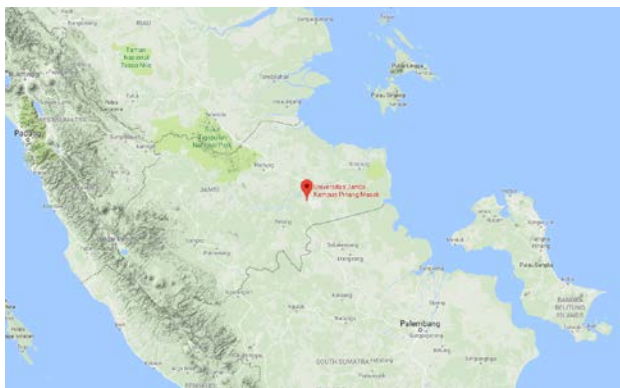


Source: Google Maps

25. **UNJA.** The project is located in three campuses, namely Mendalo, Telanaipura, and Buluran. In the Mendalo, UNJA's main campus, the project will focus on development of most colleges. The Mendalo campus is located in Mendalo Indah Village, Kecamatan Jambi Luar

Kota (Sub-district), Kabupaten Muaro Jambi (District). While the Telanaipura and Buluran campuses are located in Telanaipura Sub-District, Kota Jambi (Jambi City).

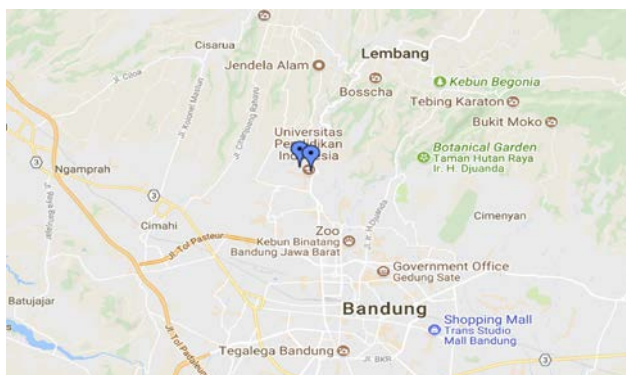
Figure 4. UNJA Location



Source: Google Maps

26. **UPI.** UPI will undertake new construction only on its main campus on the outskirts of the City of Bandung. The campus has an area of 36 hectares totally owned by the university.

Figure 5: UPI Location



Source: Google Maps

26. **UNIMAL.** UNIMAL has one campus in the city of Lhokseumawe and one in Aceh Utara. The project will be implemented in both locations (i) the Bukit Indah campus has an area of approximately 105 hectares, and (ii) the Reuleut Campus has 84 hectares.

27. On the Bukit Indah Campus, the AKSI Project will construct seven buildings (i) School of Engineering, (ii) School of Economics, (iii) School of Social and Political Science, (iv) School of Law, (v) General Lecture Building, (vi) Central library and Student Activity Center; and (vii) Integrated Laboratory. On the Reuleut Campus, the AKSI Project will construct eight buildings (i) School of Agriculture, (ii) School of Education, (iii) School of Medicine, (iv) General Lecture Building, (v) an Integrated Laboratory, (vi) Green House, (vii) Administrative Offices, and (viii) University and Community Education Center. Table 3 shows the proposed buildings to be constructed in UNIMAL by AKSI.

Table 3: Size and Number of Buildings to be constructed in UNIMAL, Aceh

Location	Building – UNIMAL	Number of Floors	Area (M2)
Bukit Indah Campus	1) General Lectures Building (C)	3	3,000
	2) Finish and modify the Unfinished Administration Building to become Central Library Building and Student Activity Centrum	3	7,500
	3) Integrated Laboratory of Renewable Energy	2	2,700
	4) School of Engineering Building	2	3,000
	5) School of Economic Building	2	2,800
	6) School of Social Science and Politics Building	2	2,300
	7) School of Law Building	2	2,200
	Supporting Infrastructures: Roads and Parking, Drainage, Culverts, Energy Power Supply, IT connections, Landscaping, Water supply		
Reuleut Campus	8) General Lectures Building (D)	3	3,000
	9) Integrated Laboratory for Agriculture, Medicine and other general Sciences	2	2,700
	10) Green House	1	800
	11) Administration Office of Reuleut Campus, Integrated with Data center, international office and language Training Center	3	8,000
	12) School of Agriculture Building	3	2,300
	13) School of Teaching and Education	3	2,700
	14) School of Medicine Building	3	2,200
	15) University and Community Education, Exposition and Event Center integrated with University Training Center	2	4,800
	Supporting Infrastructures: Roads and Parking, Drainage, Culverts, Energy Power Supply, IT connections, Landscaping, Water supply		
Total	15 buildings, 14 new building, 1 unfinished building to be completed		50,000

Source: UNIMAL Readiness Criteria Document, June 2018.

28. **UNRI.** UNRI will undertake new construction on its main campus located in the outskirts of the City of Pekanbaru. The Binawidya Campus is comprised of 362.4 hectares of which less than 15% has been used for existing buildings. The AKSI project will construct 10 buildings consisting of Classrooms, Laboratories, Student Center, Postgraduate Center, Marine Center, Food Science and Technology Center and a Training Center. The proposed buildings in UNRI to be constructed by AKSI as shown in the following Table 4.

Table 4: Size and Number of Buildings to be constructed in UNRI, Pekanbaru

Location	Building – UNRI	Number of Floors	Area (M2)
Main Campus	1) Integrated Classrooms	3	8,500
	2) Integrated Laboratories	3	7,500
	3) Information and Technology Center	3	4,000
	4) Student Center	2	3,500
	5) University Main Library	3	2,000
	6) Boat House and Marine Centre	2	1,500
	7) Health Studies Complex	3	5,500
	8) Postgraduate Centre	6	7,500
	9) University Training Centre	2	4,000
	10) Food Science and Technology Centre	3	3,500
	Supporting Infrastructures: (i) Road and facility 10 km; (ii) Drainage 20 km; (iii) Culvert 10 unit (iv) Energy Power Supply 3 unit		
Total	10 new Buildings		47,500

Source: UNRI Readiness Criteria Document, June 2018.

29. **UNJA.** UNJA will undertake new construction through the AKSI Project on their three campuses, i.e., Mendalo campus in Muaro Jambi District, and campuses of Telanaipura and Buluran in Jambi City, the capital of Jambi Province. The AKSI project will add seven buildings in Mendalo campus, that are (i) University and Faculty Administration Center, (ii) Integrated Class Room A (Hexagon Building), (iii) Integrated Class Room B, (iv) Integrated Class Room C, (v) Engineering (Science) Laboratory, (vi) Integrated Social Science Laboratory, and (vii) Student Activity Center. The Mendalo Campus has approximately 103 hectares of land and is located on the outskirts of Jambi City. While the Telanaipura and Buluran campuses are located closer to downtown Jambi City. The Telanaipura campus comprised of approximately 5.3 hectares, and through the AKSI Project will construct an Integrated Class Room building for Postgraduate Studies which will allows the campus to house all current 23 postgraduate courses. While the Buluran Campus has 3.3 hectares of land and the AKSI Project will construct an integrated Medical School Classrooms, Offices, Laboratories, and other facilities, and will be located adjacent to the Regional General Public Hospital (RSUD) of Raden Mattaher, Jambi. The size of the buildings to be constructed in UNJA is described as in Table 5.

Table 5. Size and Number of Buildings to be constructed in UNJA, Jambi

Location	Building – UNJA	Number of Floors	Area (M2)
Mendalo Campus	1) University and Faculty Administration Center	7	9,361
	2) Integrated Classroom A	5	8,500

Location	Building – UNJA	Number of Floors	Area (M2)
	3) Integrated Classroom B	5	8,250
	4) Integrated Classroom C	3	6,600
	5) Engineering (Science) Laboratory	3	3,600
	6) Integrated Social Science Laboratory	3	3,600
	7) Student Activity Center	4	4,800
	Road and parking		4,000
	Solar Energy System		
	Water Treatment System		
	Landscaping		
Telanaipura Campus	8) Postgraduate Center	6	8,733
Buluran Campus	9) Faculty of Medical & Health Sciences	6	6,236
Total	9 new buildings		63,680

Source: UNJA Readiness Criteria Document, June 2018

30. **UPI.** UPI will undertake new construction only on its main campus at Bumi Siliwangi in the outskirts of the City of Bandung. The UPI Bumi Siliwangi campus has 36 hectares of land. The AKSI project will construct six buildings consisting of Integrating Classrooms, Workshops, Laboratories, Studios, Business Incubators, as well as Training and Testing Centers.

Table 6: Size and Number of Buildings to be Constructed in UPI, Bandung

Location	Building – UPI	Number of Floors	Area (M2)
Main Campus in Bandung	1) Postgraduate Integrated Classrooms and Laboratory	6	8440
	2) Faculty of Economy and Business Education Integrated Classrooms and Laboratories	6	8800
	3) Faculty of Arts and Design Education Integrated Classrooms, Laboratories, Studios and Performing Arts Laboratories	6	9810
	4) Faculty of TVET Integrated Classroom, laboratories, workshops and studios	8	9940
	5) TVET Center of Excellence integrated building - Professional Certification and Competence Test Center - TVET Research and Development - Business Incubator and Partnership Center	8	9820
	6) Professional Teacher Education and Training Center	7	7690
Total	6 new buildings		54,500

Source: UPI Readiness Criteria Document, June 2018.

31. All universities are located on land wholly and solely owned by the government. There are no cultural heritage sites, no non-university population in residence, and no special areas (legally protected, wetlands, mangrove, estuarine, or special for protecting biodiversity) on any of the campuses. The following sections describe the physical and ecological resources on the

campuses as well as the human and economic development and quality of life values in the four universities.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Condition

1. University of Malikussaleh

32. **Geo-physical.** Geographically, the Bukit Indah Campus in Lhokseumawe City is sited in a hilly area located at 5°10'48" N of the equator; and at 97°9'3" E from the North Pole to the South Pole. Generally, the topographical condition in the project and its surrounding areas is undulating and hilly terrain with an elevation of approximately 10 m above mean sea level. To the North and East direction of the study area, the terrain is rather steep (<15%) while to the South the terrain is plain. The Bukit Indah campus borders in the North with PT. Pertamina Arun Gas (PAG), while to the South, East, and West it borders with the villages of Cot Trieng/Ujong Pacum, Padang Sakti, Batupahat Timur, respectively.

33. Reuleut Campus is located at 5°14'2.56" N from the equator, and at 96°59'14.22" E from the North Pole. Its topographical condition is characterized by rolling hills with an elevation of about 10 m above the sea level. The northern area is somewhat steep with slope of less than 15% while the southern areas is generally flat. The Reuleut campus is located wholly within three villages in North Aceh, which includes Reuleut Timur, Reuleut Barat and Keumuning villages, in Muara Batu Sub-district.

34. **Climate, Air Quality, and Noise.** Aceh's climate is classified as Af (tropical rainforest), according to the Koppen and Geiger categorization. In Lhokseumawe, the average annual temperature is 27.3°C and the rainfall averages 1,531 mm. Climate conditions for the Bukit Indah area and Lhokseumawe City are wet-tropical with a low temperature of 26.6°C and a high of 28.1°C. The relative humidity (RH) of the project area varies between 88 and 92%.

35. The air quality level in the study area meets the standard set in Government Regulation No. 41/1999 on the Air Pollution Control and the State Minister of Environment Decree No. 50/1996 on the Standard for Smell. Average air quality values in the UNIMAL Campus area are: CO (214.6 µg/Nm³), SO₂ (137 µg/Nm³), and NO₂ (12,37 µg/Nm³).

36. Noise levels in the locations surrounding the project were recorded at 53.9 dBA. This level is well below the allowable noise level limit according to standards set in the State Minister of Environment Decree No. 48/1996 on the Noise Level Standard, i.e., 55 dBA (for resident area and/or education activity area).

37. **Hydrology and Water Quality.** Clean water for domestic purpose is sourced from deep wells. This water source was tested with the following results: temperature at 24-25°C; pH level at 6.8; total dissolved suspended (TDS) of 647 mg/l; and turbidity of 0.06 NTU. While for chemical content level of Iron (Fe) is 0.1112 mg/l; and Magnesium (Mg) 1,3760 mg/l.

2. University of Riau

38. **Climate.** Riau's climate is classified as Af (tropical rainforest), according to the Koppen and Geiger categorization. For Pekanbaru City, the average annual temperature is 27.0 °C and yearly precipitation averages 2,696 mm.

39. **Air Quality.** In 2015, UNRI conducted a DELH study that includes tests of the ambient air quality in the environment surrounding Binawidya Campus. The results met the allowable standard/limit (Nilai Ambang Batas=NAB) as determined in Government Regulation (PP) No. 41/1999 regarding air pollution control. The physical measurement tests were conducted during sunny bright weather with air temperature at 32.4°C. This air temperature was “normal” air condition for Pekanbaru City and the relative humidity was 74.2%. Dust content in the air during testing was 8.5µg/Nm³. Chemical parameters test results were: Sulphur Dioxide (SO₂) content at 28.8 µg/Nm³, Nitrogen Dioxide (NO₂) at 54.66µg/Nm³, Carbon Monoxide (CO) at 1.337µg/Nm³, and Oxidant (O₃) at 23.33µg/Nm³, Ammonia (NH₃) is 0.150µg/Nm³, Hydrogen Sulphide (H₂S) is < 0.001µg/Nm³. While result of total particulate testing is 3.57 mg/Nm³, Carbon Monoxide (CO) is 21.11mg/Nm³, Nitrogen Oxide (NO_x) as NO₂ is 2.99mg/Nm³, Sulphur Dioxide (SO₂) is 3.17mg/Nm³, and Opacity at <10 %.

40. Pekanbaru occasionally suffers from haze problems due to forest fires, particularly in the dry season, since there is very little rain to extinguish the fires. While much progress has been made since 2015, the practice continues in 2018.

41. **Noise.** Noise test results in Binawidya Campus-University of Riau reported noise levels values above the allowable limit/standard. The average noise level in the area surrounding environment at Binawidya Campus were 66.40 dBA in residential area and market/trading area near the entrance gate to Campus, and 71.20 dBA at the area nearby genset/diesel machine in rectorate. These values are above the allowable noise level standard according to the Decree of State Minister for Environment No. 48/1996 regarding on Noise Level Standard, i.e., 55 dBA.

42. **Surface Water Quality.** Samples of surface water were taken from water flowing in the drainage canal traversed by UNRI-Binawidya Campus. Out of 23 tested parameters, three (3) parameters were found to be above the limit set by PP (Government Regulation) No. 82/2001 for Class III, namely the limits set for COD, DO and Total Phosphate. The COD parameters have an average value of 58.864 mg/l, above the allowable standard 50 mg/l. While the DO parameter has an average value 4.8 mg/l, higher than allowable standard of 3 mg/l, and the Total Phosphate parameter has an average value 4.982 mg/l, higher than allowable standard of 1 mg/l.

43. **Ground Water Quality.** Samples of ground water quality were taken from a drilled deep-well located behind the LPPM building. Out of 22 tested parameters three (3) parameters did not meet the allowable standard set by the Health Minister in Regulation No. 492/MENKES/PER/IV/2010. The pH value was 6.21, while the allowable standard is ranging from 6.5 to 8,5; Iron (Fe) content test results were 0.751, higher than allowable standard of 0.3 mg/l; and Plumbum (Pb) content test results 0.068 mg/l higher than allowable standard 0.01 mg/l.

3. University of Jambi

44. **Climate.** Jambi's climate is classified as Af (tropical rainforest) according to the Köppen and Geiger categorization. Jambi City experiences an average annual temperature of 26.9 °C and an average annual rainfall of 2,347 mm.

45. **Air Temperature.** According to Meteorology and Geophysical Agency (BMG), information from Climatology station at Kabupaten Muaro Jambi, the average monthly air temperature between 2005 and 2009 in Kabupaten Muaro Jambi was 26.55°C. Range of

daily temperature varies from an average minimum of 22.8°C, up to an average maximum at 32.4°C.

46. **Rainfall.** The average rainfall per year for Kabupaten Muaro Jambi and its surrounding area is 199.75 mm/month, with the annual amount rainfall as much as 2,397 mm. In this District, rainfall over 100 mm/month occurred throughout the year, ranging from 130 mm to 333 mm. The highest rainfall with potential for flooding typically occurs between September and April. In 2009, the period of lowest rainfall (< 100 mm) was in April (88.7 mm). The average rainfall in 2009 was 17.16 days per-month, with the lowest at 10 rainy days in August and the highest at 22 rainy days in December and January.

47. **Air Humidity and Length of Sunshine.** According to climatology data, the relative humidity ranges between 82% and 89%, with an average of 86.08%. This high air humidity occurs every month both during day and night. The average hours of daily sunshine are 4.19 hours ranging from 2.7 to 5.5 hours per day.

48. **Wind Direction and Velocity.** Wind in Kabupaten Muaro Jambi is generally Northwesterly with speed of about 3-5 m per-second. During October-January period, Westerly winds reaches 5 m/second and Southeasterly winds can reach 3m/second. Harsh weather usually happens in October to December.

49. **Hydrology and Water Quality.** The main campus is located far from the tributaries of Sungai Batanghari river which is in the Eastern part Mendalo Indah village at a distance of 1.4 km from the project location. The high and low levels of this river are influenced by upstream rainfall and by the downstream water levels of Batanghari River. Therefore, the water discharge varies from year to year, and in the dry season, it is almost totally dry. Local villagers seldom use this river water for their daily needs because visually the water is always dirty or muddy.

50. Generally, local people in Mendalo Indah use dug wells, PDAM/taped water or refilled water for their daily needs. The water quality in the surrounding project location is as follows: the water quality from dug well, spring water, and water from pond/pool adjacent to the project location is still in good condition, almost all the tested parameters meet the allowable standards set either by PERMENKES RI No. 907/MENKES/SK/VII/2002, or Governor's Regulation No. 20/2007 regarding on Environmental Quality Standards of Jambi Province. The good water quality is perhaps attributable to the vegetation (mostly secondary forest or rubber plantations) that surrounds the project location.

51. **Physiography.** Generally, the soil type in the Mendalo campus area is categorized as red-yellow podzolic soil within Enim formation, with thick sufficient topsoil (humus). The area designated for the Faculty of Medicine is mostly flat terrain with slopes of about 5% in small part of area of the Southern side.

4. Universitas Pendidikan Indonesia

52. **Rainfall.** The City of Bandung has wet and dry seasons associated with monsoon wind flow. From October to April, the West/Northwesterly winds contain high amounts of water vapor causing a rainy season, while from July to September, the Easterly winds contain little water vapor. The wind directions change every half year following a May and October transition period called the "pancaroba."

53. In 2014, wind speeds observed by BMG station were almost the same in every month, ranging from 1 to 4 knots. Air temperature is determined by the area's elevation and its distance to the coast. Rainfall varies by climate condition, geography, and wind flow and rotation. In 2014, Bandung City had an average monthly rainfall ranging between 16 and 199 mm, with an average of 2 dry months (rainfall < 60 mm) and 10 wet months (rainfall >100 mm) per-year.

54. **Air Quality and Noise.** Baseline features of ambient air quality and noise levels in the area surrounding the UPI Campus was obtained from sampling 3 points: the project location, settlement area in to the west of the campus, and the road/highway in the Northern part. All measured parameters are within the allowable standards, except noise level near the road area.

55. **Physiography and Geology.** The soil in Bandung City and its surrounding area is formed in the "kwartier" period and has an alluvial soil layer resulting from the Tangkuban Perahu volcano eruption. Typical of soil materials at the northern side generally belong to andosol type, the same as in the middle and western part of Bandung. The southern and eastern parts consist of grey-alluvial type soil with silt deposited.

56. **Earthquake.** According to the zoning map of earthquake danger areas in West Java, the proposed project site is within the "pink zone", an area designated as at risk for earthquake and with earthquake index ranging from 1.0 – 1.2.

57. **Water Quality.** Testing of waste water coming out from the existing UPI building has been done at two (2) sample points, i.e., at the sewerage chanel of Management Center building and drainage canal in Kecamatan Sukasari at the backward point of FPEB UPI campus building. Those sewerage and drainage canal are channel to flow the domestic waste water. Testing results of waste water key parameters (pH, TSS, BOD, and COD) at those 2 points are still meeting the allowable limit/standard.

B. Biological Conditions

1. University of Malikussaleh

58. **Flora.** Trees are not abundant in the project area and there are relatively few wild animals. The project area borders directly with gardens and cultivated fields belonging to the community and grow Cacao (*Theobroma cacao*) and Coconut (*Cocos nucifera*), and adjoin the residential complex of PT. Pertamina Aceh Gas. No protected species were found.

59. **Fauna.** There were 18 types of wild animals found from field observations and interviews with local people including birds, primate mammals, and reptile species. According to the protection status, there are no protected species.

2. University of Riau

60. **Flora/Vegetation.** The Binawidya campus in UNRI is dominated by cultivated vegetation. Plant species found in UNRI project area include: *Swietenia mahagoni* (Mahoni), *Agathis dammara* (Damar), *Cinnamomum burmannii* (Kayu manis), *Phyrium pubinerve* (Patat), *Villebrunea rubescens* (Nangsi/Blume), *Eugenia* sp. (Brush cherries), *Osmanthus insularis kodi* (Holly olive/false olive), *Breynia vitis* (Hujan panas/Semomah), *Derris trifoliata* (Ketui/Salang/Selang/Setui), *Euodia lucida* (jeruk-jerukan), *Acanthus ebracteatus* (Sea holly/holly mangrove), *Hevea brasiliensis* (Rubber tree), *Protium spruceanum* (Benth),

Simaba cedron planch (Cedron). None of the species is protected species or endemic which need protection.

61. **Fauna.** The fauna found in the surrounding UNRI's Binawidya Campus are influenced by types of vegetation found and land coverage. They consists of 5 species of Mammalia (mostly wild rats), 9 species of Amphibia (mostly frogs), and 13 species of Reptilia (mostly snakes). None of the species is protected species or endemic which need protection.

62. **Aquatic Biota.** The project area does not contain a river ecosystem with a sizeable discharge. The existing small river acts as a catchment or collection basin for surface run off originating from residential activities and drainage canals in the surrounding area. **Plankton** analysis of samples taken from small river tributaries in the surrounding area found nine types of plankton at both stations. In the first station (ST-1) plankton were abundant, with up to 239,177 cell/liter with a Diversity Index of (H') = 0.877; Dominancy Index of (C) = 0.508 and Uniformity Index of (E) = 0.919. In the second station (ST-2) plankton were also abundant with as many as 282,737 cell/liter and Diversity Index of (H') = 0.645, Dominancy Index of (C) = 0.123 and Uniformity Index of (E) = 0.676.

63. **Benthos** analysis of the surrounding water (river system) at the Binawidya Campus found three types of benthos at ST-1 and 5 types of benthos at ST-2. Benthos were abundant at the ST-1 with as many as 1,025 ind/m with Diversity Index of (H') = 0.409, Dominancy Index of (C) = 0.786, and a Uniformity Index of (E) = 0.857. At ST-2, benthos was also abundant with as many as 399ind/m and a Diversity Index of (H') = 0.890, Dominancy Index of (C) = 0.516 and Uniformity Index of (E) = 1.274.

3. University of Jambi

64. **Flora.** According to field the survey, flora commonly found at the project locations and their surrounding areas were dominated by cultivated plants with economic value, such as rubber, coconut (*Cocos nucifera*) trees, and banana (*Musa sp.*) trees, and no protected species were found. In between villagers' rubber plants the survey found cultivated bush/shrubs plants along with several kinds of wild grasses, such as alang-alang (*Imperata cylindrica*), rumput teki (*Kyllinga monocephala*), rumput pahitan (*Axonaphus compresus*), and a few kinds of paku-pakuan (*Dicranophteris spp.*).

65. **Fauna.** The survey found fauna that is commonly found in settled area such as chickens, ducks, goats, sheep, cows, cats and dogs. Chicken are a common domesticated animal raised by local residents for their own consumption and to sell in local markets. Wild animals found in the area surrounding the Mendalo Campus include: civet, wild pig/hog, tupai, and various kinds of reptiles and birds. Birds easily found in this local ecosystem include burung puyuh batu, burung ayam-ayaman, and common reptiles include biawak (*Varanus salvator*), and few species of snakes. No protected species were found.

66. **Aquatic Fauna.** Aquatic habitats in surrounding locations include sewerage/drainage canals for flowing rain water, water ponds or pools originating from spring water, and runoff water/flow from western part of the Mendalo Campus. These ponds are never dry even in dry season. Aquatic faunas commonly found in these ponds are fish with economic value such as Gabus (*Luciasma sp.*), Nila, Gurame, Betok, and Sepat. Some species were introduced for cultivation. No protected species were found.

4. Universitas Pendidikan Indonesia

67. **Flora.** The UPI project is in an area zoned residential and office use, and there is no cultivated vegetation or protected flora in the area. The campus flora consists of ornamental plants (flowers); fruits, and grasses (e.g. alang-alang rumput etc.), and shrubs. No protected species were found.

68. **Fauna.** The fauna present in the area near the project are dominated by domesticated fauna such as chickens, cats, and dogs; rats, butterflies, grasshopper, and wild birds (burung gereja) are also present in the area. No protected species were found.

C. Socio Economic Condition

1. University of Malikussaleh

69. **Socio Economic.** Sectors that dominate the economy in Lhokseumawe and Aceh Utara District include: agriculture, trade, and service. Apart from oil and gas activity and fertilizer production, local economic activity is small scale. Service and trade activity has increased since the Bukit Indah Campus was established, particularly for food and beverage businesses located in the area immediately surrounding the campus and serving the campus population. UNIMAL will provide space on campus for local coffee shops and snack sellers under the campus development plan in which AKSI plays a part, vendors will be required to conform to health, sanitation, and environmental codes. While a few students enroll from outside the surrounding districts and city, most students are local, nevertheless, student demand for housing created a market for room rental. The expansion of these two sectors has had a positive impact on economic conditions in nearby neighborhoods. Aceh's traditional social customs and practices are influenced by Islamic value and culture. Islamic boarding schools have been established near the Reuleut campus.

70. **Sanitation and Health.** Bukit Indah Campus at Blang Pulo village is served directly by the Puskesmas (community health care center) for Kecamatan Muara Satu, which borders Blang Pulo. UNIMAL's Faculty of Medicine provides community education on health issues.

71. **Socio-Culture.** Social-culture activities in community in the surrounding of Project's location is growing good enough. Relation order among the presence ethnich is the Project's site is also good. In terms of language using for their daily communication there is any a bit changing of Jambi language influenced by Jambi Malay ethnic language. And in their big ceremonies such as Hari Raya, marriage ceremonial, and khitanan (circumcision). There is no (found) such foreign cultures within the community, due to directly and indirectly community activities are influenced by their religious factors as a moslem community.

72. **Community Health.** According to the data of local Puskemas and Puskesmas in Desa Simpang Sungai Duren, diseases commonly suffered by local people generally include: ISPA (infection of upper breathing line), malaria, maag/ulcer, toothache, infections and allergies.

2. University of Riau

73. **Socio-Economic.** Economic activities are in the area around the university are growing fast along with overall economic growth and development. A 2013 study recorded economic facilities that were growing year by year, including: 3 markets, 22 banks, 1,458 shops, and 2,224 small kiosk/warung. Immediately surrounding the campus are some small coffee shops and stores that serve the university community.

74. **Livelihood.** The existence of Binawidya Campus-University of Riau has a positive impact on the livelihoods of people living in the area surrounding of campus. This was documented by interviews conducted in Kelurahan/Village of Simpang Baru, Tampan Subdistrict, a community area very close to the Binawidya Campus-University of Riau. More than half of the respondents (62.5%) work as the businessman (traders and other business owners). Respondents' livelihood in the area surrounding of campus is dominated by trading (49%), and to some extent also laundry, photocopy, office work, rented rooms and laborers.

75. **Work Force.** In 2013, the population aged >15 years old who live in four villages in Tampan Sub-district in UNJA and were actively employed was 48,398 persons, the population of students was 40,004 persons, and the population who were seeking job opportunities was 20,688 persons.

76. **Demography.** Administratively the UNJA Mendalo Campus is located in the Mendalo Darat Village of Jambi Luar Kota Subdistrict in District of Muaro Jambi. The total population of Jambi Luar Kota Subdistrict is 65,239 people, consisting of 33,027 males and 32,212 females, while the population of Desa/Village of Mendalo Indah has 21,361 people with population density of 496 person/km².

3. University of Jambi

77. **Demography.** Administratively the UNJA Mendalo Campus is located in Mendalo Indah, located in the Kecamatan of Jambi Luar Kota. The total population of Kecamatan Jambi Luar Kota is 65,239 people, consisting of 33,027 males and 32,212 females. While the population of Mendalo Indah numbers 21,361 people with population density of 496 person/km².

78. **Socio-Economic.** To meet family economic needs, most long-term residents work as rubber plantation farmers. New residents (since 2000) typically work as traders, workshop labors, government officers, etc. Local economic activities in Desa Mendalo Indah are growing from the addition of small shops, bengkel (workshops), eateries, coffee and snack shops (warung makan), and other businesses such as kost/renting rooms. Local branches of banks and post offices also contribute to local economic activity.

79. **Socio-Culture.** In the communities surrounding of Project, many local people use the Malay ethnic language, using it for daily communications as well in their major ceremonies, such as Hari Raya, marriage ceremony, and khitanan (circumcision). There are other ethnic groups within the community. Islam is a strong unifying element as it was introduced centuries ago by Arab traders.

80. **Community Health.** According to the data of local Puskesmas and Puskesmas in Desa Simpang Sungai Duren, common diseases suffered by local people include: ISPA (infection of upper breathing line), malaria, ulcer, and allergies.

4. Universitas Pendidikan Indonesia

81. **Demographics.** In 2015 the population of Bandung numbered 2,575,478 people and its total area was 167.31 km² making the population density 15,393 people/km². Kecamatan Sukasari, where the UPI main campus is located, has an area of 6.27 km² and a population of 85,059 making the population density 13,566 people/km². The Population growth rate in Bandung City was 1.19% between 2000 and 2012, while in Sukasari Sub-district was 3.35%.

82. **Economic development.** Bandung City is the capital of West Java Province and, is the province's the economic development center. The Bandung economy is mainly built upon tourism, business, creative industry, hi-tech and manufacturing industries, educational institutions, technology, retail services, financial services, pharmaceutical companies, and food production. Bandung has nearly 50 higher educational institutions and is among the most popular destination for education in Indonesia. The creative culture has also shaped some of Bandung's economy. Small businesses known as "distro" sell non-trademarked products made by local designers. Books, indie label records, magazines, fashion products and accessories are typical distro products. Distros are popular with young people and distinguish themselves from factory outlets in term of philosophy. Distros arise from individual designers and young entrepreneurs, while factory outlet products are sourced from large scale garment factories.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

83. The following sections detail possible impacts that might occur during the project period from design/pre-construction through the operational phase. The present IEE views adherence to regulatory frameworks, standards, and good practices in project management as sufficient to meet the government's and ADB's environmental protection standards. The potential impacts or risks are briefly described below by phase (design/pre-construction, construction, and operation phases). Where potential adverse or negative impacts are considered possible or likely, mitigation measures are proposed to minimize risks. Management plans to mitigate these possible or likely environmental risks are discussed under Environmental Monitoring Plan (EMP) in Chapter VII.

B. Design/Pre-Construction Phase Impacts

84. **All licenses or permits required for the proposed buildings will be obtained prior to their construction** in accordance with Law No. 28/2002 and Government's Regulation No. 27/2012 on building structure and environmental permit, respectively. Depending on the design, required licenses may include: environmental clearance, discharge permit for the treated waste water effluent to be discharged to open surface water body, hazardous waste management requirement, and permits for water extraction.

85. **Climate change adaptation consideration will be included in the design of every buildings to be proposed by AKSI project.** The major impacts of climate change on the proposed project (i) Haze produced by forest fires which frequently occur annually in Sumatra, can raise air quality index to over 300 in Riau and Jambi, (ii) Rainfall related flood control measures already in place may not be sufficient to prevent seasonal flooding if annual rainfall increases significantly after 2040; and (iii) Water availability in Bandung may become a serious issue after 2040. To minimize these risks, the following mitigation measures will be included in EMP (i) Detailed engineering designs of the proposed buildings in the project sites will include specifications to minimize risks to buildings from earthquakes, flooding, temperature increases, and hazardous air quality due to smoke haze; and (ii) Green building design will include energy efficient and reduction in waste production and procurement of equipment that will meet health and safety standards.

86. **Accidental discovery of PCR or cultural property sites will be managed according to government guidelines.** If archeological or cultural artifacts are discovered on the campuses during construction, the finds will be handled by the contractor in

accordance with government standards and procedures set forth in the Law No. 11/2010 concerning cultural conservation.

87. Soil erosion from pre-construction activities will be mitigated prior to construction as needed. In a few building site in UNJA and UNRI, project pre-construction activity will involve tree and brush removal. In all building sites, clearing of vegetation, and land preparation (digging, excavations) will take place. The contractors will take precautions to avoid soil erosion due to water runoff during construction; good practice measures will be followed as appropriate for each building site. Common good practices in Indonesia include (i) Clearing sites as close as possible to construction start date; (ii) Revegetating exposed areas as soon as possible following the completion of construction works in that area; (iii) In the event there is a steep slope as a specific site land compaction should be conducted on that slope after land clearing; and (iv) managing drain run-off water will conform to good practices for reducing soil erosion.

C. Construction Phase Environmental Impacts

88. The following section describes possible impacts from activities undertaken during construction phase. While unlikely, these potential impacts could delay construction or otherwise have a negative impact on the environment, communities surrounding the universities, or university-community relationships. In the unlikely event of these disturbances, procedures already in place at the universities for managing community and public relations, such as handling complaints, will be used. In addition to complying with government laws and regulations, AKSI contractors will appoint one member of their staff to be the liaison between university, surrounding communities, and the contractor.

89. Dissatisfied unemployed local workers could disrupt construction. To manage this possible adverse impact, the Contractor should adhere to Government Regulation No. Per.07/Men.IV/2008 Ministry of Manpower and Transmigration on placement of manpower and the use of local labor. The contractor representative will use good practices to minimize potential disruptions from unemployed local workers.

90. Worker compounds could impact the health and safety of the workers. While it is likely construction workers in Bandung, Pekanbaru, Jambi and Lhoksumawe will be accommodated off campus, it is a possibility that construction workers may need to be housed in worker compounds on campuses. In this eventuality, the contractor will adhere to PP (Government's Regulations) No. 50/2012 on occupational health and safety management system, including, but not limited to (i) to provide adequate housing/shelter/living quarters for all workers at the construction camps; (ii) to establish clean canteen/eating and cooking areas; (iii) to provide potable water, clean water for showers, hygienic toilets with sufficient water supply; (iv) to provide first aid facilities for the workers; and (v) to provide separate toilets for male and female workers.

91. Construction activities could facilitate the spread of communicable diseases. With the presence of construction workers in the project site and their contact with local people, there may be potential to spread of communicable diseases such as DBD (dengue fever) and malaria, STDs (sexually transmitted diseases) including HIV/AIDS. To mitigate this risk, the Contractor shall consult with the university on how to implement good practices in curtailing the spread of communicable diseases, including but not limited to (i) construction camp(s) will be established in areas with adequate drainage to prevent water logging at the camp and formation of breeding sites for mosquitoes to facilitate flow of the treated effluents;

(ii) implementation of disease awareness (including HIV/AIDS and STDs) and prevention program for contractor's workers and staff; and (iii) implementation of disease awareness (including HIV/AIDS and STDs) and prevention program for the campus and surrounding communities.

92. Waste disposal in worker compounds could result in soil, ground, and water pollution. The establishment and operation of contractor's compound and living quarters in the project site may lead to increased waste load. If this waste is not properly controlled and managed, it will lead to pollution of ground, soil, and water resources. To manage this potential adverse impact, the Contractor should be required to carry out mitigation measures in accordance with PP No. 81/2012 on domestic wastes and garbage, and PP No. 82/2001 on management of water quality and control of water pollution, including, but not limited to the following measures (i) areas for waste disposal should be agreed with local authorities and checked and recorded and monitored by the PIU; (ii) Organic (biodegradables) waste should be collected and disposed of on-site; (iii) burning of waste associated with the project or the supporting activities is NOT allowed anywhere; and (vi) wastewater effluent discharges from contractor's camp and associated facilities should have permits from local authorities before the works commence.

93. Impact on regular traffic and accessibility in and out campus. Mobilization of construction materials and heavy equipment may increase traffic in project's sites, particularly in campus located in major cities, such as Lhokseumawe, Pekanbaru, Jambi, and Bandung, and this increase may affect activities of the academic community within the respective campus as a result of accessibility disruption in the campus area. To mitigate this possible disruption the contractor will follow Law No. 22/2009 on traffic and road transport for details including, but not limited to (i) conducting appropriate and proper management of transport of materials and heavy equipment; (ii) arranging transportation schedule and use of transportation modes which will minimize traffic disruption; and (iii) posting traffic officers in certain areas/intersections where there is a heavy traffic.

94. The increase in traffic in project's sites as a result of mobilization of construction materials and heavy equipment, will cause secondary impact in the form of increased noise level in the campus area. To manage this potential adverse impact, the Contractor will adhere to Environmental Ministry Regulation No. 48/MENLH/11/1996 on noise level standard, including, but not limited to the following mitigation measures (i) use silencer when transporting construction materials and heavy equipment; and (ii) arrange transportation schedule so as not to do it during rush hours and during hectic student activities.

95. Vehicles and equipment/machinery operation in the construction site will impact on air quality at the construction site through generating emissions from engines. In addition, construction work and movement of vehicles along unpaved roads will generate dust, which will also impact air quality. Air quality will also be affected by dust generation from uncovered loads in trucks and dust from exposed stockpiles during the operation of construction facilities. To manage this adverse impact, the Contractor will adhere to government standard set forth in PP No. 41/1999 on air pollution control using good practices including but not limited to (i) construction equipment and machinery will be maintained to a good standard; (ii) prohibition of the use of equipment and machinery that causes excessive pollution (i.e., visible smoke) at the subproject site; and (iii) material stockpiles being located in sheltered areas and be covered with tarpaulins or other such suitable covering to prevent material becoming airborne.

96. **The construction of 40 building in the four universities plus their associated structures in the project areas may have an impact on occupational and public health and safety.** To mitigate this impact, the Contractor should adhere to occupational health and safety standards, particularly for on work in high buildings, including, but not limited to (i) provision of an appropriate and proper PPEs (such as helmet, dust mask, gloves, eye glasses, safety shoes, and safety belt for working in high rise buildings) for workers; (ii) installation of warning signs and/ boards/posters in public/student areas for their awareness of potential danger from building construction activities; and (iii) agreements with local health care providers such as Puskesmas (community health care center) and/or a regional hospital for emergency treatment of those injured during construction.

97. **Impact of spoil disposal on the environment.** Excavation for civil works almost always requires depositing earth into spoil mounds temporarily for the duration of construction until the spoils can be reused as filling materials. During the handling of excavation material or spoil, handling, transport, locations of spoil areas and rehabilitation pose threats to the environment particularly their impacts to habitat and water courses, if the spoil is not properly managed by the project's contractor. Mitigations measure should include, but not be limited to (i) Contract should include a section on spoil disposal; (ii) spoil should be reused as far as possible for bulk filling; (iii) spoil disposal site should be located at least 50m from surface water courses and should be protected from erosion by avoiding formation of steep slopes; (iv) surplus spoil should not be stockpiled at the road side or dumped over the crash barriers; (v) spoil will not be disposed on fragile slopes, flood ways, wetland, farmland, forest, mangrove and associated salt flats, beaches, religious or other culturally sensitive areas or areas where a livelihood is derived; (vi) spoils will only be disposed in areas approved by the local authority; and (vii) disposed spoil will be spread in 15cm layers and compacted to optimum moisture content, covered with topsoil, landscaped and provided with drainage and vegetation to prevent erosion in line with best practice.

98. **Impact of foundation and piling works on noise and vibration.** Building construction activity will essentially need the works of foundation and piling to construct base-foundation of the proposed buildings. This work will an impact on noise and vibration. To minimize this impact, the contractor should adhere to Ministry of Environment's Regulation No. 48/MENLH/11/1996 on noise standard, and Ministry of Environment's Regulation No. 49/MENLH/11/1996 on standard vibration level, including the following mitigation measures (i) The contractor should use "vibro" technology to reduce vibration; (ii) using silencer to reduce noise; (iii) installation of fence and/or barricade while working for foundation and piling; and (iv) arranging the foundation and piling works to be done outside peak hours of student activities and lecture period.

99. **Impact of mixed concrete for building erection on soil/ground water pollution.** Building construction works involving the use of mixed concrete for building erection will have an impact on soil/ground and water pollution. To mitigate this impact, at least the following mitigation measures should be undertaken (i) prohibition to dispose water cement and/or any residual mixed concrete material into ground and/or drainage canal; and (ii) provision of specific tank or drum to collect construction waste.

D. Operation Phase Environmental Impacts

100. **Impact of building operation on soil/ground and water pollution from improper waste management.** Wastes produced by building operation are classified into two categories:

- Non-hazardous solid wastes, which include domestic refuse and waste water. Wastewater includes domestic wastewater from activities such as from kitchens or showers and may contain pollutants such as grease, soap, mild detergents, and liquid sanitary waste (black water) that contains nutrients, organic substances and pathogens.
- Hazardous solid wastes, which include chemical wastes, medical wastes, batteries, paints, solvents; disused electronic equipment; and used oil and grease. These wastes can have the most severe impacts on the environment. A material is categorized as hazardous when it is ignitable; corrosive; reactive; or toxic (causing bodily damage, sickness, or death). Some materials are of long-term concern due to bioaccumulation, or carcinogenic or mutagenic effects.

101. To minimize the impact of these wastes, the university management should carry out mitigation measures in accordance with PP No.81/2012 on management of domestic wastes and garbage, and Public Work Ministry's Regulation No. 03/PRT/M/2013 on implementation of infrastructure and facility for waste handling, including, as needed, some of the following (i) placing/installation of segregated waste bins at strategic locations in the building and its surrounding area; (ii) applying 3R for waste management (reduce-reuse-recycling) as much as possible; (iii) having an agreement with local authorities for wastes disposal and management; (iv) burning of domestic waste and any kind of waste should be prohibited; (v) dumping of wastes to the watercourses, streams/rivers should be prohibited; and (vi) wastewater effluent discharges from building operation should have permits from local authorities before the work commences.

102. **Impact of building operation on fire potential.** During building operation another adverse potential impact is fire or burning incident from laboratory activities working with inflammable chemical products, electrical short circuit incident, or fire triggered from waste burning in the campus area. Fire/burning incident can be very dangerous to the material loss and/or human life. To minimize this impact, University Management must adhere to Public Work Ministry's Regulation No. 26/PRT/M/2008 on technical requirements of fire protection system in building an environment, including the following mitigation measures (i) no burning of any kind of wastes within campus premises and complex; (ii) proper installation of electrical network which should be properly maintained; and (iii) provision of sufficient APAR (light fire extinguisher tools) at every building following building codes/standard for fire management.

103. **Impact on building operation on security problem.** Another anticipated adverse impact of building operation is increased security problem affecting students, lecturers and other people working in the campus complex. To mitigate this impact, university management must adhere to Regulation of Head of Police No. 23/2007 on environmental security system, including the following mitigation measures (i) sufficient lighting within campus, inside the buildings, and around the campus; (ii) posting sufficient security officers within campus area and inside the buildings; and (iii) installation of CCTV at certain vulnerable points.

104. **Positive impact on educational activity (teaching and learning).** During the operational phase, there will a positive impact of building operation on students and the surrounding community in the project area as a result of educational activity in UNIMAL, UNRI, UNJA, and UPI campuses. This positive impact is in the form of improvement of human resource quality. To maximize this potential positive impact, the following mitigation

measures may be considered by the university (i) inclusion of all categories of students, including students from poor families, with no discrimination against races, religion and sex, to enable all students to achieve good education in the campus; (ii) provision of subsidy or scholarships for students from poor families; and (iii) other appropriate mitigation measures to be determined later.

105. **Positive impact on economic opportunity.** During the operational phase, there will be another positive impact of the project in terms of increased economic opportunity as there will be increased population of students and lecturers in the campus which, in turn, will promote increased investment by businessmen to meet the increased demand for dormitories, restaurants, photocopy, books, laundry and other economic activities. To maximize this positive impact, the following mitigation measures may be considered by the university (i) manpower recruitment to support education activity to be conducted in transparent and fair manner; (ii) recruitment process will be undertaken in accordance with national and regional/local regulations; and (iii) the university authority to promote small and medium-scale business and economic activities through entrepreneurial and partnership programs with the private sector.

106. **Impact of teaching laboratory operation on soil/ground and water pollution.** Operation of new technical, science, and medical teaching laboratories at the four universities have the potential for impact on soil/ground and water pollution as a result of discharge of wastewater containing oil/grease, chemical products or chemical reagents from the new teaching laboratories and workshops. Specific to the new teaching laboratories at the medical school, there is also potential impact of sharp objects (e.g., needles) and biological waste materials needing special handling. To minimize this adverse impact, university management must adhere to Environmental Ministry's Regulation No. 5/2014 on waste water standard, including the following mitigation measures (i) hazardous wastes such as residual oil, oily rags, and toxic chemical materials residual should be stored in specific container (tank/drum) for further treatment; and (ii) having an agreement with local authority or other third party for hazardous materials waste handling, transportation, treatment, and disposal.³

107. **Other impacts.** During the operational phase of the project, there may be a potential adverse impact coming from natural hazard/disaster, such as fire, earthquake, tsunami, and flooding from overflow run off/surface water which may result in human and materials losses. To manage this potential adverse impact, the university authority will be required to carry out the following environmental mitigation measures (i) determination of evacuation route and meeting assembly point within campus complex and inside buildings; (ii) provision of access route for SAR (safety and rescue) units of fire/burning and natural hazard/disaster; and (iii) provision of first aid and "clinic" or sick-bay room inside campus.

VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Information Disclosure

108. Activities for information disclosure, public consultation, and public participation are part of the overall planning, design process, and construction of the proposed buildings for classrooms, laboratories, faculty and administration offices, training centers, and libraries. All the information of project/subproject's activities and anticipated/potential environmental

³ For references on standards, see EPA document on Environmental Management Guide for Small Laboratories <https://nepis.epa.gov>.

impacts including the disruptions may be affected by the project during pre-construction, construction, and operational phase should be informed to university community as well as to the village community in the surrounding areas of the campus. Information delivery of project/subproject activities and its associated impacts can be undertaken in the form of posters and/or pamphlets/leaflets/booklets and in the project's announcement board.

B. Consultations

109. Ensuring subproject success requires meaningful stakeholder's consultation and participation, particularly during the preparation of environmental study documents (AMDAL, UKL-UKL, DELH) as public involvement and information openness is required by GOI rules for EIA process (Ministry of Environment's Regulation No. 17/2012).

110. The four universities have previously prepared draft proposals. During the consultation phase, joint teams from ADB and Consultants reviewed, discussed and improved the proposals to ensure they would meet the needs of the universities and the requirements stipulated by GOI and the ADB.

111. Consultation and coordination meetings with the local environmental officers have been conducted to get information for the preparation of IEE for the proposed construction of buildings at UNIMAL, UNJA, UNRI, and UPI campus. Summary of coordination and consultation meetings between the joint teams and the respective universities, PIU and stakeholders is shown in Table 11.

Table 7: Summary of Consultation Meetings Conducted for IEE Preparation

Place and Date	Meeting Participants	Issue/Topic
University of Malikussaleh		
Bukit Indah campus Lhokseumawe, 25 April 2018	Tetira PPTA team PIU's environmental expert DLHK Kota Lhokseumawe	Discussion on required environmental study for AKSI project in Bukit Indah Campus
Reuleut campus-Aceh Utara, 26 April 2018	Tetira PPTA team PIU's environmental expert DLHK Kabupaten Aceh Utara	Discussion on required environmental study for AKSI project Reuleut Campus
University of Riau		
Binawidya campus Pekanbaru, 02 Mei 2018	ADB team Tetira PPTA team UNRI PIU team	UNRI readiness criteria status, and discussion with PIU team on environmental aspects
Binawidya campus- Pekanbaru, 03 Mei 2018	Tetira PPTA team UNRI PIU and PSL team DLHK Kota Pekanbaru	Discussion on required environmental study for AKSI project in UNRI, Binawidya Campus
University of Jambi		
Mendalo, Telanaipura, Buluran campus, Jambi, 19 April 2018	ADB team Tetira PPTA team UNJA-PIU team	UNJA readiness criteria status, and discussion with PIU team on environmental aspects/requirements
Mendalo campus, Muaro Jambi 20 April 2018	Tetira PPTA team PIU team Chief of PSL	Discussion on required environmental studies for AKSI project in UNJA campuses
Universitas Pendidikan Indonesia		
Bumi Siliwangi campus, Bandung,	ADB team Tetira PPTA team	UPI readiness criteria status, and discussion with PIU team

Place and Date	Meeting Participants	Issue/Topic
17 April 2018	PIU-UPI team PIU environmental expert	on environmental aspects and UKL-UPL documents
Bumi Siliwangi campus-Bandung, 09 May 2018	ADB team Tetira PPTA team PIU-UPI team PIU environmental expert	Discussion on update status and progress of all required UKL-UPL studies/ documents

Source: Field visits of PPTA team, April-May 2018.

C. Participation

85. MORTHE will disclose the IEE to the public through their website to provide public an opportunity to review the project design and be engaged in further consultation if necessary. Similarly, ADB will disclose the final IEE on its website for public dissemination. Disclosure of information at an early stage of the project processing has many benefits such as to negate any objections by the public towards the project, and avoid misinformation getting in to the public through agitating groups and some NGOs.

VII. GRIEVANCE REDRESS MECHANISM

112. Local grievance redress mechanism (GRM) is important in the planning and implementation of the proposed AKSI project since any complaint and concern of the affected people must be address promptly at no cost to the complainant and without retribution. The grievance will be presented to stakeholder's representatives during the initial public consultation meeting. The GRM for the construction activities will be explained fully in areas where construction activities will be undertaken. This is appropriately done during public consultation during detailed design phase (pre-construction phase). During the operation of buildings in all campuses complaints about environmental performance can also be brought to the attention of PIU, University authority, and local environmental agency (Dinas Lingkungan Hidup dan Kehutanan or DLHK).

113. The GRM for the construction activities will again be disclosed to the public in consultation meeting before the start of construction activities. The Project Implementing Unit (PIU) of each university and the contractors will inform the local officials and representatives, at the district, sub-district and village levels, about the GRM. There will be three levels of GRM. The first level GRM will handle the first instance of a complaint. If not resolved, then the complaint will go to the second or even to the third level, as shown in Table 12.

114. **First Level GRM.** A fast resolution to most grievances during construction can easily be handled by the contractor' representative at the construction site. At this level, the grievance should be resolved within two days maximum. If the complaint is not resolved at this level, the complaint may be elevated to the second level GRM which is the Environmental Complaints Committee (ECC).

115. **Second Level GRM.** Environmental Complaint Committee will be created and will be chaired by the Head of Local PIU. Members will include the following (i) contractor's highest official at the site such as the Construction Manager or Construction Superintendent, and (ii) PIU representative, and (iii) environmental specialist at PIU level. Creation of the Environmental Complaint Committee (ECC) and its operation, including the procedures for filling of complaints, will be included in appropriate sections of the civil works contracts with the contractors. This mechanism will be disclosed in public consultations during detailed design and in public meetings during the construction phase.

116. **Third Level GRM.** If the complaint cannot be resolved at the ECC level, the complainant will bring his complaint to the PMU.

117. Fast resolution of complaints during construction is important since activities are sometimes continuous and several changes may occur within a week. For the quick filing of complaints, the ECC will prepare a form to be used for the filing of complaints. The use of this form will facilitate the filing of complaints by persons who cannot write which may require the assistance of another person.

118. The steps to be followed in filing complaints and the procedure for handling it are as follows (i) complainants will be provide the background information and file the complaint verbally or in writing to the ECC secretary who will assist the complainant in filling-up the complaint form; (ii) within two working days, the Local PIU representative, contractor representative, and complainant will discuss it if the complaint can be resolved without calling for a ECC meeting; (iii) If the complaint cannot be resolved by the Local PIU and Contractor's Representative, a ECC meeting will be called with the complainant to resolve the complaint within five working days; and (iv) If the complaint cannot be resolved by the ECC meeting, a PMU meeting will be called with the complainant to resolve the complaint within seven working days.

Table 8: GRM Processing of Complaints

GRM Level	Maximum number of days to decide on complaint	Person to handle the complaint
First Level	2 days	Contractors' representative at the construction site
Second Level	5 days	Environmental Complaint Committee (ECC)
Third Level	7 days	PMU

VIII. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

A. Overview

119. The Environmental Management and Monitoring Plan (EMMP) contains a number of components crucial to effective environmental management within the Project. These include:

- (i) Evaluate the performance of mitigation measures proposed in IEE;
- (ii) Provide information which could be used to verify predicted impacts and thus validate impact prediction techniques;
- (iii) Suggest improvement in environmental mitigation measures if required; and
- (iv) Provide information on unanticipated adverse impacts or sudden change in impact trends.

B. Institutional Arrangements

120. This sub-section of EMMP presents a discussion of the environmental management activities will be undertaken as part of overall AKSI Project implementation. The roles and responsibilities of various agencies in undertaking these activities are defined and the institutional

strengthening activities that will be required to allow those organizations to fulfil their roles and responsibilities are identified as discussed below (summary in Table 13).

121. **Directorate General of Resources for Science, Technology, and Higher Education (DGRSTH).** As the executing agency for AKSI Project, DGRSTH under MORTHE has overall responsibility for preparation, implementation, supervision and financing of environmental management and monitoring tasks as they pertain to the project overall, sub-projects at university level, and inter-agency coordination. DGRSTH will exercise its function through Project Management Unit (PMU) which will be responsible for project execution, coordination, monitoring and project management on day-to-day basis. DGRSTH focuses its efforts on overall management, coordination, and monitoring and reporting at project level, and oversight and support of the four universities.

122. The PMU will be supported by a team of consultants who will provide their services to assist PMU for carrying out project management, coordination, monitoring and supervision, including environmental management and monitoring.

123. **Project Management Unit.** The PMU already established in DGRSTH, MORTHE will be augmented sufficiently to implement the project and coordinate the activities of the four universities. The PMU is headed by a Project Director who will be supported by a team of full-time and part-time staff and consultants engaged under different project arrangements. PMU will be responsible for overall project management, coordination, supervision, supporting the universities, and reporting and monitoring at project level. PMU will also coordinate with Bappenas, Ministry of Finance and other concerned ministries and agencies.

124. In the implementation of environmental management and monitoring tasks specific technical assistance will be provided by a national environmental specialist attached to PMU. The specialist will assist the PIUs in all aspects of implementation of environmental assessment and management, internal monitoring and evaluation (M&E), and training of PMU, PIU and other relevant government agencies. More specifically the PMU will be responsible for the following activities related to environmental safeguards:

- i. Confirm that the IEE is updated in accordance with ADB's SPS based on detailed designs and submit to ADB for review and approval prior to contract award;
- ii. Confirm that for each university the required AMDAL, a GOI requirement, has been prepared during detailed design and approved by the respective environment agency, the Dinas Lingkungan Hidup (DLH/DLHK);
- iii. Confirm that PIUs have included the EMP in the bidding documents and civil works contracts;
- iv. Ensure that the PIUs check that Contractor's EMPs (CEMPs) are prepared by contractors prior to actual construction;
- v. Establish with the PIUs a system to monitor environmental safeguards of the subprojects including monitoring the indicators set out in the monitoring plan of the EMP;
- vi. Supervise the implementation of environmental mitigating measures required for the construction activities by the PIUs;
- vii. Review, monitor and evaluate the effectiveness of the CEMP implementation together with the PIUs, and recommend necessary corrective actions;
- viii. Verify that the PIUs prepare monthly, quarterly, and semi-annual environmental monitoring reports for submission to PMU;
- ix. Ensure timely disclosure of final IEE and EMP in locations and form accessible to the

public; and

- x. Address, record, and report on any grievances brought about through the Grievance Redress Mechanism either at university or MORTHE level in a timely manner.

125. PMU will prepare and submit to MORTHE and ADB Semi Annual Environmental Monitoring Report. The PMU environmental specialist will assist PMU in the preparation of this report which will incorporate the main items raised through the PIUs and Contractor's reports and the environmental monitoring reports, as well as all other items required by MORTHE and ADB.

126. Project Management Consultant (PMC). The PMU will be supported by a PMC. The PMC will comprise specialists as required to supplement existing PMU resources and deliver a capacity building program. In respect of safeguards the PMSC will include a national environment specialist of 6 person-months and a national gender/social development specialist for 18 months. The first inputs of each specialist will be 3-6 months to maximize capacity building efforts across number of activities required in first phases of implementation as well as for more general awareness raising and training needs.

127. A capacity building program in environmental assessment and management will be delivered by the environmental specialist (ES). Staff in the MORTHE, PMU, PIUs and contractors will receive training and capacity support from the ES to ensure smooth and effective implementation of the EMP.

128. **Project Implementation Unit.** The PIUs at university level are responsible for implementation of project activities at university level. They will engage Project Management and Supervision Consultant (PMSC) from a fully qualified firm which will assist the PIU, among others, in the implementation of the EMMP for their university. PIU will appoint one of their staff whether from M&E or Civil Work team to be designated as their environmental officer to effectively manage the environmental aspects of the University subproject. The environment officer in PIU has an important role in ensuring that the required environmental mitigation measures are implemented in a timely manner by actively participating in construction supervision. PIU is also an important in addressing grievances during the construction period as its chief shall be the chairperson of the ad-hoc Environmental Complaints Committee (ECC) for the respective PIU.

129. PMSC will be engaged to assist PIU in project monitoring and supervision, including environmental management and monitoring tasks. The PMSC, supported by the national environmental specialist from the PMU, will support the PIU (i) review the revised IEE for its respective university prepared during detailed design stage; (ii) assist PIU in ensuring that EMPs are included in the bidding documents and civil works contracts; (iii) assist the PIU in monitoring of EMP implementation by the contractors, and (iv) assist PIU in the preparation of monthly and quarterly environmental monitoring reports, and forward them to the PMU for preparation of the semi-annual environmental monitoring reports to be submitted to ADB.

130. **Regional Environmental Agency.** The regional environmental agency (DLH or DLHK) at Province, City or District levels, was consulted at the outset of the IEE process, and during preparation of environmental study documents required under GOI rules and regulations by PIU. Ongoing consultation with respective regional environmental agency will be required during the construction of the project and DLH/DLHK will be asked to assist in the monitoring of implementation of the EMP and ensure that environmental management and mitigation of the project is undertaken to an acceptable standard.

131. External environmental monitoring will be done by DLH/DLHK as required by its mandate. DLH/DLHK is tasked to prepare and implement regional policies and rules to promote environment protection and conservation. It reports to the Governor, Mayor or Bupati through the Regional Secretary. Its functions are to: (a) formulate and recommend policies on environmental management; and (b) prepare and carry out work plans and programs on environmental management and monitoring and AMDAL (EIA system). It is responsible for enforcing the AMDAL system. It is also involved in monitoring the ambient and effluent quality (air and water) of respective province/city/district.

132. The Contractor. The civil works Contractor will be responsible for implementing fully all contract conditions including those covering environmental mitigation, social mobilization and awareness and monitoring. The Contractor will be responsible for implementing all environmental, health and safety (HSE) actions included in the EMP and relevant clauses in the bidding documents and contract during the pre-construction and construction period.

133. The Contractor will prepare the Contractor's EMP (CEMP) based on the specific construction methodologies they propose to use. The CEMP will further develop the EMP contained in this IEE and will detail measures for all environmental health and safety management. The PMU will review and approve the CEMP before implementation.

134. The contractor will appoint an environment, health and safety officer (ESO) who will be responsible for site inspections on a daily and weekly basis to check compliance with the approved CEMP and ensuring implementation of all health and safety requirements. These will be documented and subject to monitoring by PMU and DLH/DLHK. The responsibilities of the Contractor include (i) Participate in induction on EMP and mitigation measures to be delivered; (ii) Participate in induction on EMP and mitigation measures to be delivered by PIU prior to preparation of the CEMP; (iii) Appointing an ESO and staff, sending letter to PIU confirming that these positions have been filled and by whom (the bidding documents and contract specify the roles and tasks of the ESO); (iv) Seeking training and support from PIU on any aspects of environmental management, as required; (v) Coordinating with PIU for preparing and submitting the CEMP following detailed design, the ESO will be responsible for ensuring that the Contractor complies with the clauses in the contract and bidding documents in respect of environment, health and safety; (vi) As required, preparing, and submitting for approval, appropriate plans (spoil disposal plan, waste management plan, etc.); (vii) Engaging an approved service provider to undertake STIs and HIV/AIDS briefings and awareness raising among the contractor's employees and communities, and reporting on the same; (viii) Coordinating with PIU in respect of community consultation i.e. establishing GRM etc; and (ix) Undertaking daily and weekly site inspections (by the ESO) recording the same in a site diary, and participating in monitoring and coordinating with PIU to ensure that environmental management activities are reported in Monthly Progress Reports as required.

Table 9: Institutional Arrangements for EMMP

Unit	Unit Functions	Responsible for Environmental Aspects/Functions	Consultant/ Functions
Construction Phase			
Ministry of Research, Technology and Higher Education	Executing Agency for the AKSI; provides technical supervision and responsibility over the financing/		

Unit	Unit Functions	Responsible for Environmental Aspects/Functions	Consultant/ Functions
Project Management Unit already established under the Directorate General of Resources for Science, Technology, and Higher Education (DGRSTH)	<p>budgeting.</p> <p>Responsible for the AKSI implementation in project cities/ districts; coordinates with ADB and other external agencies.</p>	<p>PMU-environment specialist (to be designated under PMU-PMSC); Responsible for overall environmental supervision of project/subprojects; Coordinates with PIU-environment officer to ensure environmental requirements are addressed affectively; Responsible for semi-annual environmental monitoring reports preparation.</p>	<p>Project Management Supervision Consultants (PMSC); The national environmental specialist (part of PMSC) will (i) review the revised IEEs prepared during detailed design stage, (ii) assist PMU in ensuring that EMPs are included in the bidding documents and civil works contracts; (iii) assist the PMU, and PIU in monitoring of EMP implementation, (iv) training of PMU and PIU staff in environmental safeguards and monitoring; and (v) assist PMU in preparation of semi-annual environmental monitoring reports.</p>
Project Implementation Unit (PIU)	<p>Key implementation unit in the field; Provides construction contracts' supervision; closely monitors construction progress; coordinates with University for its participation in the AKSI project before turnover during the operation phase.</p>	<p>PIU-environment officer; responsible for overall environmental supervision of construction activities; ensured that the Contractor's EMP is properly implemented and monitored; prepares monthly environmental monitoring reports; Provides input to the CPMU Environment Officer in the preparation of the semi-annual environmental monitoring reports preparation; Coordinates with respective Province's/ City's/District's environment agency, Dinas Lingkungan Hidup (dan Kehutanan) [DLH/K]; assists the Environmental Complaints Committee (ECC) in addressing</p>	<p>Advisory services to be provided by the national environmental specialist in PMSC.</p>

Unit	Unit Functions	Responsible for Environmental Aspects/Functions	Consultant/ Functions
		environmental complaints; PIU chief sits as the Chairperson of the ad-hoc Environmental Complaints Committee.	
Regional Environmental Agency (DLH/DLHK)	External environmental monitoring agency (its mandate).	Its function is to: (a) formulate and recommend policies on environmental management and (b) prepare and carry out work plans and programs on environmental management and monitoring and AMDAL (EIA system). It is responsible for enforcing the AMDAL system. It is also involved in monitoring the ambient and effluent quality	
Construction Contractors of the proposed AKSI project/subprojects	Implement construction activities; Implement the Contractors' EMP.	Contractor's environment officer (to be designated); responsible for implementation of the Contractor's EMP; coordinates with the PIU-environment officer and DLH/DLHK; assist the PIU-environmental complaints committee in addressing environmental complaints; contractor's highest official at the site such as the Construction Manager or Construction Superintendent sits as a member of the ECC.	
Operational Phase			
Project Implementation Unit (PIU)	Key implementation unit; Responsible on taking coordination with DLH/DLHK during the operational phase.	PIU-environment officer (or to be designated later under PSL/environmental study center); responsible for overall environmental supervision of	

Unit	Unit Functions	Responsible for Environmental Aspects/Functions	Consultant/ Functions
		operational activities; ensured that the EMP is properly implemented and monitored; preparation of the semi-annual environmental monitoring reports preparation.	

C. Environmental Management and Monitoring Plan

135. Table 14 presents summary information on (i) project activity causing impacts by project's phase; (ii) anticipated impacts associated with project activity; (iii) proposed mitigation measures for each environmental impact, (iv) responsible party for carrying out mitigation measures, and (v) associated cost (tentative). Details of mitigating measures are already discussed in Chapter V where the need for mitigation of each impact was determined in the screening process. In the integrated EMMP, Table 14 also presents the information on Impact Monitoring including (i) parameters to be monitored; (ii) frequency and means of verification; and (iii) party responsible for monitoring.

136. **Budget for Environmental Management Plan.** The construction contract documents will contain a provision allocating part of the construction cost for the implementation of the environmental management and monitoring plan including environmental mitigating measures during construction and impact monitoring and its reporting. For budgetary purposes, this is estimated at 1% of the total cost of the AKSI Project for overall EMP budget, including for recruiting national environmental specialist under PMU-PMSC, conducting trainings/workshops, etc.

137. To ensure that funds will be allocated during implementation of the AKSI project/subprojects, tender documents during the bidding process will include a lump sum bid item in the bill of quantities to be titled "Environmental Mitigation Measures". It will be clarified in the specification documents that the environmental mitigating measures identified in the construction EMP are to be charged to this item. This will allow the construction supervision engineer of the AKSI project/subprojects to require the contractor to quickly address the environmental issues during construction.

138. The PIU environment officer will provide the PMU with its monthly and quarterly environmental monitoring reports. PMU will consolidate these reports for the preparation of semi-annual environmental safeguards progress report of AKSI project which will be submitted to ADB detailing the status of mitigating measures implementation. The suggested outline of the monitoring reports is presented in Annex 2, while Annex 3 shows how to monitor the project performance on environmental safeguards for AKSI Project.

Table 10: Environmental Management and Monitoring Plan

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
PRE-CONSTRUCTION PHASE							
License and permit process	Construction activity without license and appropriate permits	All licenses or permits required for the proposed buildings will be obtained prior to commencing construction in accordance with Law No. 28/2002 and Government's Regulation No. 27/2012 on building structure and environment permits, respectively.	PIU/Contractor	TBD	All required licenses and permits	Ensure all licenses and permits have been settled prior construction work	PIU
Climate change adaptation	<ol style="list-style-type: none"> 1. Haze produced by wildfires can raise air quality index to over 300 in Riau and Jambi 2. Rainfall related flood control measures already in place may not be sufficient to prevent seasonal flooding if rainfall increases after 2040 3. Water availability in Bandung become an issue after 2040 	<ul style="list-style-type: none"> • Detailed engineering designs and checks prepared that include specification to minimize risks to buildings from earthquakes, flooding, temperature increases, and hazardous air quality due to smoke haze. • Green building designed that includes energy efficient and reduce waste. 	PIU/Contractor	TBD	<p>Earthquake damage</p> <p>Flooding due to increase in intensity or frequency of rainfall</p> <p>Predicted rises in maximum and average temperatures</p>	Ensure all measures incorporated in design are implemented	PIU/PMU
Site clearance, clearing of vegetation, land preparation (digging, excavations)	Accidental discovery of PCR or cultural property sites	<ul style="list-style-type: none"> • In case there is accidental discovery of PCR or cultural property sites, the contractor will adhere to government standard set forth in the Law No. 11/2010 on cultural heritage. 	PIU, PMU Contractor	TBD	Sites and/or resources discovered and their protection	During activities ,stop work order issued; Site/resources dealt with appropriately	Contractor; Min. of Education and Culture; PMU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
	Erosion of sediment/ soil due to run off water, and pollution of water bodies due to tree removal, site clearance, clearing of vegetation, and land digging and excavation.	<p>The contractors will take precautions to avoid soil erosion due to water runoff during construction; good practice measures will be followed:</p> <ul style="list-style-type: none"> • Site Clearance measures implemented • Progressive revegetation implemented • land compaction soon after land clearing as needed for buildings on steep slopes implemented • Drainage ditches lined or otherwise conform to good practice standards 	Contractor	TBD	No erosion of sediment has occurred; No pollution to waterways and/or watercourses	During land preparation; and Clearing of vegetation activities, with visual observation/ inspection	PIU
CONSTRUCTION PHASE							
Project's job/employment opportunity, recruitment and mobilization of contractor, presence of construction workers, association with local people	Social restlessness/ disruption	<p>The contractor will adhere to Government Regulation No. Per.07/Men.IV/2008 on placement of manpower pertaining to:</p> <ul style="list-style-type: none"> • Contractor liaison officer appointment • Job opportunities for the local people 	Contractor	TBD	Complaints of incidents between workers and villagers/local people;	Monthly - Observation and consultation	Contractor PIU
	Health & safety	<p>The contractor will adhere to Government Regulations No. 50/2012 on occupational health and safety</p>	Contractor	TBD	Camp, yard, steams/rivers	Monthly Observation and consultation	Contractor PIU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
		<p>management system pertaining to</p> <ul style="list-style-type: none"> • Construction camps health and safety standards met • first aid facilities for workers available on site; • Separate toilets available for male and female workers; 					
	Spread of communicable diseases	<p>The contractor should adhere to Government Regulation No. 81/2014 on environmental health pertaining to;</p> <ul style="list-style-type: none"> • Construction camp location conforms to PP • Communicable disease awareness and prevention program conforms to PP 	Contractor and Approved service provider	TBA	<p>Communicable disease prevention.</p> <p>Increased awareness of communicable diseases for university and worker communities</p>	Prior to construction - check contractor records, consultation with employees, discussions with university	PIU
	Uncontrolled and un-managed waste disposal and its impact on Soil/ground and water pollution	<p>The contractor should adhere to Government Regulation No. 82/2001 on management of water quality and control of water pollution pertaining to.</p> <ul style="list-style-type: none"> • Waste disposal permits obtained prior to construction 	Contractor	TBD	<p>Permits</p> <p>Disposal areas</p> <p>Complaints</p> <p>Camp waste conditions</p> <p>Site waste conditions</p> <p>Streams/rivers</p>	<p>Regular observation – waste management and disposal</p> <p>Monthly – Observation and consultation</p>	PIU Contractor

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
		<ul style="list-style-type: none"> • Waste disposal areas agreed with local authority • Waste management interventions in workers' camps in place • Wastewater interventions from building sites fully operational • Wastewater interventions from worker camps fully operational. 					
Mobilization of construction materials and heavy equipment	Increased traffic and accessibility disruption (in and out campus)	<p>The contractor will adhere to Law No. 22/2009 on traffic and road transport pertaining to</p> <ul style="list-style-type: none"> • Materials and heavy equipment transport measures in operations and effective • Traffic disruption minimization measures implemented • Traffic and pedestrian safety measures implemented 	Contractor	TBD	Duration and points of congestion, accident, people complaint	Regular observation – occurrence of accident and number of complaint (to be recorded/reported)	PIU
	Noise impact	<p>The contractor will adhere to Environmental Ministry's Regulation No. 48/MENLH/11/1996 on noise level standard pertaining to</p>	Contractor	TBD	People complaint, use of silencer	Regular observation	Contractor PIU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
		<ul style="list-style-type: none"> • Noise minimization interventions used and effective • Congestion minimization measures deployed 					
Operation of construction facilities and vehicles generating emissions	Air quality impact by emission of exhaust from vehicles and machinery; dust from construction facilities	<p>The contractor will adhere to Government Regulation No. 41/1999 on air pollution control in particular</p> <ul style="list-style-type: none"> • Construction equipment maintenance schedule followed • Equipment and machinery exhaust reduction measures implemented and effective 	Contractor	TBD	Air quality, emissions, dust, particulate matter; Use of tarpaulins and loading of vehicles; Stockpiles	Monthly or after complaint , periodic visual inspection; any particulate matter and smoke managed as per EMMP	Contractor PIU
Construction of buildings and its associated facilities	Occupational and general/public health and safety	<p>The Contractor will adhere to Public Work Regulation No. 9/2016 on occupational health and safety in high buildings in particular</p> <ul style="list-style-type: none"> • Worker safety measures implemented • Signage in place • Health facilities in worker camps available and used • First aid kits on building sites available and used; 	Contractor	TBD	Number of accident and incident in building construction area	Observation and record on any accident and incident (to be reported in Contractor's Monthly Report)	PIU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
		<ul style="list-style-type: none"> • Agreement with local health care providers reached and followed 					
Spoil disposal management	Improper disposal impacts on habitat and water courses	<p>The Contractor will use good practices on spoil disposal;</p> <ul style="list-style-type: none"> • Spoil disposal interventions in place and used • Surplus spoil use measures in place and used, if appropriate 	Contractor	TBD	Stream/rivers, habitat, people complaint	Regular observation on spoil disposal and management – scattered spoils, water pollution, people complaint (to be recorded/ reported)	PIU
Foundation and pilling works	Noise and vibration	<p>The contractor should adhere to Ministry of Environment's Regulation No. 48/MENLH/11/1996 on noise standard, and Ministry of Environment's Regulation No. 49.MENLH/11/1996 on standard vibration level. In particular</p> <ul style="list-style-type: none"> • Vibration reduction measures in place and effective • Noise reduction measures in place and effective • Fencing/ barricades in place and effective 	Contractor	TBD	Noise and vibration level Number of falls into the foundation hole	Regular observation - crack of nearest structure/building, people complaint (to be recorded/ reported)	PIU
Mixed concrete for building erection	Soil/ground and water pollution	The contractor will use Good practices on	Contractor	TBD	Construction area and its surrounding	Visual observation on construction waste	PIU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
		concrete waste disposal for: <ul style="list-style-type: none"> • Cement residual mixed concrete disposal in place and followed 					
OPERATION PHASE							
Buildings operation	Soil/ground and water pollution from improper/unmanaged waste management	University Management should adhere to Government's Regulation No. 81/2012 on management of domestic wastes and garbage, Public Work Ministry's Regulation No.03/PRT/M/2013 on implementation of infrastructure and facility for waste handling in particular <ul style="list-style-type: none"> • Waste water treatment plant available and sufficient; • Campus waste management program in place and implemented • Waste disposal areas agreed with local authorities and followed; • Permits obtained by university for wastewater effluent discharges from building operation 	PIU/University Management	TBD	Campus complex and respective building	Visual observation on waste management, consultation to local authority	PIU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
	Fire/burning potential	<p>University management must adhere to Public Work Ministry Regulation No. 26/PRT/M/2008 on technical requirements of fire protection system in building and environment, in particular</p> <ul style="list-style-type: none"> • Waste burning prohibition enforced • Electrical network well-maintained and functional; • Provision of sufficient APAR at every building • Fire management building codes/standard followed 	University Management	TBD	Campus complex and respective building	Consultation, observation – regular inspection	PIU
	Security and criminal potential	<p>University Management must adhere to Regulation of Head of Police No. 23/2007 on environmental security system, in particular for.</p> <ul style="list-style-type: none"> • Campus lighting sufficient for security and operational • Security officers and posts in place • CCTV installed, if appropriate 	University Management	TBD	Campus complex and respective building	Consultation, observation – criminal cases (to be recorded)	PIU
Operation of Laboratory (Technical,	Impact to soil/ground and water pollution	University Management must adhere to Environment Ministry's	University Management	TBD	Teaching Laboratory waste	Regular inspection, observation –	PIU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	ENVIRONMENTAL IMPACT	MITIGATION MEASURES TO BE INCLUDED IN EMP	MITIGATION RESPONSIBILITY	MITIGATION COST (US\$)	PARAMETER TO BE MONITORED	FREQUENCY AND MEANS OF VERIFICATION	MONITORING RESPONSIBILITY
Science, Medical)		<p>Regulation No. 5/2014 on waste water standard, in particular.</p> <ul style="list-style-type: none"> • Waste water treatment standards for teaching laboratories and workshops followed. • Hazardous wastes treatment guidelines for teaching laboratories and workshops followed • Agreement reached with local authority or other third party for toxic waste handling, transportation, treatment, and disposal, if needed 			management and disposal record	teaching laboratory waste handling management	
Any other	Unintended or unanticipated impacts	As required to avoid or minimize effects or impacts	University Management	TBA	TBA	As required	PIU

IX. CONCLUSION AND RECOMMENDATION

139. The AKSI projects is aimed to support Indonesia's higher education system in providing advanced skills and knowledge to support inclusive and sustainable economic growth as part of a first phase in a long-term higher education reform strategy. The project aims to contribute to improving access, quality and relevance of higher education by upgrading UNJA, UNIMAL, UNRI and UPI, to increase access, quality and relevance of their education and research, with a focus on a specific academic discipline supporting economic development plans. Investment in UNJA, UNIMAL, and UNRI is aligned with government priorities to support local economic development focusing on opportunities in sustainable natural resources, agriculture, and marine and aquatic science, in Jambi, Aceh (Malikussaleh), Riau, respectively, while UPI will focus on TVET-teacher education to meet national priorities. The project will support each university in its path to become a center of excellence in the respective disciplines, aligned with capacity and need of the university. The focus of center of excellence development can be on infrastructure, program development, organizational development and/or capacity development, depending on the capacity of the university.

140. The environmental screening process has highlighted the environmental issues and concerns of the proposed buildings to be built through AKSI project. The screening has considered that there are no significant negative environmental impacts and risks that cannot be mitigated. With the EMP, the proposed AKSI project/subprojects can be implemented in an environmentally acceptable manner. There is no need for further environmental assessment study following the ADB requirements. The IEE will therefore be finalized as the final environmental assessment document of the proposed AKSI project. But, this IEE including EMMP will need to be "living documents" and can be amended and updated further during detailed design of respective proposed subprojects.

141. Under Indonesia's environmental law, the environmental studies that are part of the AMDAL system (ANDAL-RKL-RPL), UKL-UPL, and DELH must be completed in order to receive an Environmental Permit. The studies have been scheduled for completion and will subsequently be submitted for approval to the relevant local or regional Environmental Agencies (Dinas Lingkungan Hidup dan Kehutanan or DLHK).

142. Implementation of the proposed AKSI project is hereby recommended with emphasis on the following (i) EMP of AKSI project will be included in the design process; (ii) IEE Report/EMP will be forwarded to the design consultant for consideration in the design process; (iii) Tendering process will advocate environmentally responsible procurement by ensuring the inclusion of EMP provisions in the bidding and construction contract documents; (iv) Contractor's submittal of a CEMP will be included in the construction contract; (v) Contract provisions on creation and operation of the ECC (Environmental Complaint Committee) will be included in the construction contracts; (vi) Training and/or workshop on environmental management and monitoring plan will be programmed for PMU, PIU, Contractor and other relevant parties for the implementation of AKSI project; (vii) Monitoring of health and safety requirements will be given more importance during construction and operation to reduce risks to the public and to personnel; and (viii) PMU and PIU of AKSI project will continue the process of public consultation and information disclosure during detailed design and construction phases.