INITIAL ENVIRONMENTAL EXAMINATION

Stage: Draft

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Indonesia: Flood Management in North Java Project

Cimanuk River Flood Risk Management Subproject

Prepared by the Ministry of Public Work and Housing for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 6 July 2023)

Currency unit	–	rupiah (Rp)
Rp1.00	=	$0.000067
$1.00	=	Rp15,015

ABBREVIATIONS

ADB	–	Asian Development Bank
AMDAL	–	*Analisis Mengenai Dampak Lingkungan Hidup* (environmental impact assessment process in Indonesia)
ANDALIN	–	Environmental Impacts Assessment on Traffic
BAPPENAS	–	*Badan Perencanaan Pembangunan Nasional* (Ministry of National Development Planning of the Republic of Indonesia)
BBWS	–	*Balai Besar Wilayah Sungai* (river basin organization of a larger watershed management body)
BPBD	–	*Badan Penanggulangan Bencana Daerah (Regional Disaster Management Agency)*
BWS	–	*Balai Wilayah Sungai* (river basin organization of smaller watershed management body)
COVID	–	Corona Virus Disease
CPMIU	–	Central Project ManagementImplementation Unit
DAS	–	*Daerah Aliran Sungai (*watershed)
DED	–	Detailed Engineering Design
DELH	–	*Dokumen Evalusasi Lingkungan Hidup*
DGWR	–	Directorate General of Water Resources (Ditjen *Sumber Daya Air* - SDA)
DLH/DLHK	–	*Dinas Lingkungan Hidup/Dinas Lingkungan Hidup dan Kehutanan (*provincial and district environmental protection agencies)
DPLH	–	*Dokumen Pengelolaan Lingkungan Hidup*
EA	–	Executing Agency
EARF	–	Environmental Assessment and Review Framework
ECC	–	Environmental Complaint Committee
EHS	–	Environment, Health, and Safety
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management and Monitoring Plan
ESP	–	Engineering Services Project
EWSIP	–	Enhanced Water Security Investment Project
FMNJP	–	Flood Management in North Java Project
FRM	–	Flood Risk Management
GHG	–	Greenhouse Gas
GOI	–	Government of Indonesia
GRM	–	Grievance Redress Mechanism
IA	–	Implementing Agency
IBAT	–	Integrated Biodiversity Assessment Tool
IEE	–	Initial Environmental Examination
IFC	–	International Financing Corporation
IUCN	–	International Union for Conservation of Nature
KBA	–	Key Biodiversity Areas

LARP	–	Land Acquisition and Resettlement Plan
MOEF	–	Ministry of Environment and Forestry
MPWH	–	Ministry of Public Work and Housing (PUPR)
NBS	–	Natural-Based Solution
OHSP	–	Occupational Health and Safety Plan
OSS	–	Online Single Submission
PAM	–	Project Administration Manual
PCO	–	Public Complaints Officer
Permen LH/LHK	–	MOE Regulation/ MOEF Regulation (after the merger of the Ministry of Environment and Ministry of Forestry)
PIPPIB	–	*Peta Indikatif Penundaan Pemberian Izin Baru* (Indicative Map for Moratorium of New Permit)
PIU	–	Project Implementation Unit
PMC	–	Project Management Consultant
PPC	–	Project Preparation Consultant
PPE	–	Personal Protective Equipment
PUPR	–	*Pekerjaan Umum dan Perumahan Rakyat* (Ministry of Public Works and Housing)
REA	–	Rapid Environmental Assessment
ROW	–	Right of Ways
RPJMN	–	*Rencana Pembangunan Jangka Menengah Nasional* (GOI National Medium-Term Development Plan)
SDA	–	*Sumber Daya Air (*Directorate General of Water Resources, DGWR)
SPPL	–	*Surat Pernyataan Pengelolaan Lingkungan Hidup*
SPS	–	Safeguard Policy Statement
TCLP	–	Toxicity Characteristic Leaching Procedure
TRTA	–	Transaction Regional Technical Assistance
UKL-UPL	–	*Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup* (Environment Permit)
UNFCCC	–	United Nations Framework Convention on Climate Change

GLOSSARY

desa	–	village (administrative division)
kabupaten	–	District or regency
kecamatan	–	sub-district

NOTE

In this report, “$” refers to United States dollars.

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CONTENTS

EXECUTIVE SUMMARY i

I. INTRODUCTION 1

A. Project Background 1
B. Extent and Scope of IEE 1
C. Approach and Methodology 2
D. IEE Contents 2

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK 2

A. ADB Policy 2
B. Indonesia's Environmental Safeguard Policy and Regulatory Framework 4
C. International Environmental Agreements 15

III. DESCRIPTION OF SUBPROJECTS 16

A. Subprojects Location 17

IV. DESCRIPTION OF ENVIRONMENT (BASELINE DATA) 32

A. Physical Resources 32
B. Biological Resources 37
C. Social Economy 39
D. Social Culture 40
E. Health 43
F. Public Sanitation 44

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES 45

A. Project Area of Influence 45
B. Assessment of Potential Environmental Impacts 45
C. Anticipated Impacts and Mitigation Measures 46
D. Cumulative Environmental Impacts 59
E. Climate Change Impacts 68

VI. ANALYSIS OF ALTERNATIVES 68

VII. INFORMATION OF DISCLOSURE, CONSULTATION, AND PARTICIPATION 69

VIII. GRIEVANCE REDRESS MECHANISM 70

A. Complaint to Environmental Agency 72

IX. ENVIRONMENT MANAGEMENT PLAN 73

A. Environmental Mitigation and Management Plan 73
B. Environmental Monitoring Plan 81

X. IMPLEMENTATION ARRANGEMENT 84

XI. CONCLUSION AND RECOMMENDATION 87

Appendix 1. Screening and Rapid Environmental Assessment (REA) 88

Appendix 2. List of Indonesia Regulations Related to Environmental Safeguard 92
Appendix 3. Ambient Air Quality and Noise Standard 95
Appendix 4. Water Quality Standard 96
Appendix 5. TCLP of Hazardous Wastes 97
Appendix 6. Project Description of Cimanuk River FRM Subproject 98
Appendix 7. Inventory and Analysis of Flora and Fauna 101
Appendix 8. Dredging Management Plan (Template) 106
Appendix 9. Public Consultation 108

EXECUTIVE SUMMARY

1. **Background.** The proposed Flood Management in North Java Project (FMNJP) will strengthen climate resilience of the people and the economy in the Cimanuk-Cisanggarung (CimanCis) and the Seluna river basins.[1] It will help in reducing the risk to people, agricultural crops, and assets from flooding, in the rapidly urbanizing and industrializing northern coast of Java Island.[2] The project will operationalize the flood risk management (FRM) approach by (i) establishing earth observation services (EOS) and flood forecasting early warning and flood evaluation systems (FFEWFES) to enhance flood preparedness of communities; (ii) improving planning and land zoning to reduce exposure to floods; and (iii) increasing climate resilience of flood protection infrastructure and their operation and maintenance (O&M). The project is aligned with the following impact: climate resilience enhanced to support economic growth. It will have the following outcome: flood risk in North Java Coast reduced and will have two outputs: Output 1: Flood risk management operationalized; and (ii) Output 2: Climate resilient infrastructure and O&M enhanced.

2. The Directorate General of Water Resources (DGWR) under the Ministry of Public Works and Housing (MPWH) will be the executing agency. River Basin Organizations (RBOs) will be implementing agencies to deliver civil works. DGWR will be responsible for overall coordination, policy directions and administration, including those related to environmental safeguards. The Central Project Management Unit (CPMU) will have a designated environmental safeguards expert. The RBO will appoint an environmental safeguards focal person to support activities for compliance with environmental safeguards. The detailed structure of institutional/implementation arrangements is documented in Section X.

3. The project will finance the construction of selected flood risk management (FRM) subprojects in the Cimanuk-Cisanggarung river basins that have been designed under Loan 3455-INO: Accelerating Infrastructure Delivery through better Engineering Services Project (ESP).[3]

4. The Initial Environment Examination (IEE) provides necessary details to eliminate or reduce the environmental risks associated with thesubprojects such as loss of biodiversity, long-term damage to ecosystems, pollution, climate change, damage to aquatic ecosystems, land degradation, improper use and disposal of chemicals, and depletion of non-renewable resources. Specific safeguards seek to preserve sensitive natural areas (e.g., wetlands and critical habitats), areas of importance to indigenous peoples, and historical or cultural sites. This IEE has been prepared based on the feasibility study, rapid environmental assessment (REA), Environmental Survey and Assessment, and public consultations with affected people, local communities, and local authorities. The objectives are to ensure the environmental soundness and sustainability of the project and to support the integration of environmental considerations into the project decision-making process.

5. In particular, the IEE will, (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a proactive, feasible, and practical working tool to enable the

[1] The CimanCis river basin territory is in West Java province, where Cirebon City is located. The Seluna river basin territory is in Central Java province, adjacent to Semarang City.

[2] The North Java Coast is a strategic corridor with (i) a population of 63.2 million in 2020 - a third of the Java island population – which is projected to reach 97.2 million by 2045; and (ii) more than 20% of the national gross domestic product. National Statistic Agency 2010-2022. BAPPENAS. 2020. National Medium Development Plan 2020-2024.

[3] Asian Development Bank (ADB). 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Technical Assistance Loan to the Republic of Indonesia for the Accelerating Infrastructure Delivery through Better Engineering Services Project*. Manila. (Loan 3455-INO).

measurement and monitoring of environmental performance on-site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that occupational health and safety recommendations are complied with.

6. **Screening and Categorization.** Screening and categorization for the Cimanuk River System FRM subproject (the subproject) have been based on ADB's REA Checklist for Ports and Harbor. The results of the assessment indicate that the subproject and its components are unlikely to cause significant adverse environmental impact. Thus, the subproject is categorized as environmental category B as per ADB SPS, 2009 and this draft IEE has been prepared under ADB SPS requirements for environment category B projects.

7. **Environmental Management Plan (EMP).** The EMP forms part of this IEE. It will guide the environmentally sound construction of the subproject and ensure efficient lines of communication among the parties involved in the project. The EMP identifies three phases of development (i) pre-construction phase; (ii) construction phase; and (iii) post-construction (operation phase).

8. The purpose of the EMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensuring that safety recommendations are complied with.

9. **Consultation, Disclosure, and Grievance Redress**. The public participation process included identifying interested and affected parties (stakeholders); informing and providing the stakeholders with sufficient background and technical information on the subproject; creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns); giving the stakeholders feedback on process findings and recommendations; and ensuring compliance to process requirements with regards to the environmental and related legislation.

10. The subproject's Grievance Redress Mechanism provides a platform for redressal of their grievances and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

11. **Monitoring and Reporting.** The RBO supported by consultants will undertake internal monitoring. The CPMU will prepare semi- annual safeguards monitoring reports.

12. **Recommendations and Conclusions**. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and incorporation or application of recommended mitigation measures and procedures.

13. The mitigation measures have been developed to reduce all negative impacts to acceptable levels. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their

participation during project implementation. Based on the findings of this IEE, the subproject's environmental category "B" is confirmed.

I. INTRODUCTION

A. Project Background

1. The proposed Flood Management in North Java Project (FMNJP) will strengthen climate resilience of the people and the economy in the Cimanuk-Cisanggarung (CimanCis) and the Seluna river basins.[1] It will help in reducing the risk to people, agricultural crops, and assets from flooding, in the rapidly urbanizing and industrializing northern coast of Java Island.[2] The project will operationalize the flood risk management (FRM) approach by (i) establishing earth observation services (EOS) and flood forecasting early warning and flood evaluation systems (FFEWFES) to enhance flood preparedness of communities; (ii) improving planning and land zoning to reduce exposure to floods; and (iii) increasing climate resilience of flood protection infrastructure and their operation and maintenance (O&M). The project is aligned with the following impact: climate resilience enhanced to support economic growth. It will have the following outcome: flood risk in North Java Coast reduced and will have two outputs: Output 1: Flood risk management operationalized; and (ii) Output 2: Climate resilient infrastructure and O&M enhanced.

2. The Directorate General of Water Resources (DGWR) under the Ministry of Public Works and Housing (MPWH) will be the executing agency. River Basin Organizations (RBOs) will be implementing agencies to deliver civil works. DGWR will be responsible for overall coordination, policy directions and administration, including those related to environmental safeguards. The Central Project Management Unit (CPMU) will have a designated environmental safeguards expert. The RBO will appoint an environmental safeguards focal person to support activities for compliance with environmental safeguards. The detailed structure of institutional/implementation arrangements is documented in Section X.

3. The project will finance the construction of selected flood risk management (FRM) infrastructure subprojects in the Seluna and Cimanuk-Cisanggarung river basins that have been designed under Loan 3455- INO: Accelerating Infrastructure Delivery through better Engineering Services Project (ESP).[3] The project will promote natural based solutions for river works where technically, socially, economically feasible.

4. The Cimanuk River system Flood Risk Management (FRM) Subproject (the subproject) will normalize the river, upgrade the river banks, upgrade river channeld to increase flow capacity, and integrate nature-based solutions in the context of enhanced FRM measures.

B. Extent and Scope of IEE

5. The Rapid Environmental Assessment (REA) for the subproject is in Appendix 1. The results of the screening show that the subproject and its components with mitigation measures are unlikely to cause significant adverse environmental impact. Thus, the Subprojects are categorized as environmental category B as per ADB SPS, 2009. This draft initial environmental

[1] The CimanCis river basin territory is in West Java province, where Cirebon City is located. The Seluna river basin territory is in Central Java province, adjacent to Semarang City.

[2] The North Java Coast is a strategic corridor with (i) a population of 63.2 million in 2020 - a third of the Java island population – which is projected to reach 97.2 million by 2045; and (ii) more than 20% of the national gross domestic product. National Statistic Agency 2010-2022. BAPPENAS. 2020. National Medium Development Plan 2020-2024.

[3] Asian Development Bank (ADB). 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Technical Assistance Loan to the Republic of Indonesia for the Accelerating Infrastructure Delivery through Better Engineering Services Project*. Manila. (Loan 3455-INO).

examination (IEE) has been prepared by ADB SPS requirements for environment category B projects.

6. All works are subject to environmental assessment and approval as required under the ADB Safeguard Policy Statement and Indonesian law, as applicable.

C. Approach and Methodology

7. The IEE study was carried out using a reconnaissance survey (as per the findings documented in several appendices), review of previous studies, field visits, consultation with stakeholders and non-government organizations (NGOs), review of existing data, assessment to identify adverse impacts, and the preparation of EMP. Secondary data, available published literature, documents, and maps (e.g., topographic, geological maps, forest, satellite imagery, and Google image maps) related to the influence area were reviewed. The existing policies, legislation, guidelines, and manuals related to water resources and the environment in Indonesia and ADB's policies and guidelines were also reviewed. The project concept and other project documents were also considered when preprating this IEE. The IEE will be updated in case there is major changes.

D. IEE Contents

8. This IEE (i) provides information on the subproject and its environmental requirements; (ii) provides necessary baseline conditions of the physical, ecological, physical cultural, and socio-economic environments and/or resources in and surrounding of project's area of influence; (iii) identifies and assesses potential impacts arising from the implementation of the project on these environments and/or resources; (iv) recommends measures to avoid, mitigate, and compensate for the adverse impacts; (v) presents information on stakeholder consultations and participation during project preparation; (vi) recommends a mechanism to address grievances on the environmental performance of the project; and (vii) provides an EMP which includes an environmental monitoring plan, and the responsible entities for mitigation and monitoring.

9. In particular, the EMP will, (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject, and (v) ensure that safety recommendations are complied with. The IEE will be made as a binding document for all contractors and a copy is required to be kept on-site as a reference.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

10. All projects supported by ADB must comply with ADB's SPS (2009), which sets out the policy objectives, scope and triggers, and principles for environmental safeguard areas to be followed across all aspects of its operations. ADB adopts a set of specific safeguard requirements that borrowers/clients are required to meet in addressing environmental impacts and risks. Borrowers/clients must comply with these requirements during the project preparation and implementation phases. ADB's environmental safeguard requirements are defined in ADB's SPS, Appendix 1 (Safeguard Requirements 1: Environment. Pages 30-40).

11. All environmental safeguard principles and requirements of ADB's SPS are reflected in this IEE.

12. **International good practice.** ADB's SPS requires that during the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards including the IFC / World Bank Group's *Environment, Health, and Safety Guidelines* (EHS Guidelines)[4], and ADB Environment Safeguards: A Good Practice Sourcebook (Draft Working Document)[5]. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent.

13. **Screening and Categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature, and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impact are assigned to one of the following four categories:

(i) **Category A**. Projects could have significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.
(ii) **Category B**. Projects could have some adverse environmental impacts, but of lesser degree or less significant than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
(iii) **Category C**. Projects are unlikely to have adverse environmental impacts. Neither EIA nor IEE is required, although environmental implications are reviewed.
(iv) **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.

14. **Environmental Management Plan.** An environmental management plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

15. **Public Disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

(i) For environmental category A projects, draft an EIA report at least 120 days before Board consideration;
(ii) Final or updated EIA and/or IEE upon receipt; and
(iii) Environmental Monitoring Reports submitted by Implementing/Executing Agencies during project implementation upon receipt.

[4] http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines.
[5] https://www.adb.org/documents/environment-safeguards-good-practice-sourcebook.

B. Indonesia's Environmental Safeguard Policy and Regulatory Framework

16. Indonesia's laws and regulations generally cover all items of environmental safeguards and related sector regulations on Occupational Health and Safety (OHS), employment conditions/labor, hazardous waste management, biodiversity, and climate change. A more complete list of Indonesian environmental Laws, Presidential Decrees, Sector Regulations, and MPWH Decrees relevant to environmental safeguards are presented in Appendix 2.

1. Regulations on Environmental Assessment

17. Besides ADB's SPS (2009), the subprojects shall also comply with the Government of Indonesia's environmental laws, standards, rules, and requirements which impose restrictions on activities to avoid, minimize, or mitigate likely impact on the environment. It is the responsibility of the executing and implementing agencies to ensure that all activities under the project are following the legal framework, both national and local regulations. Compliance is required in all stages of the subprojects' implementation, including design, construction and operation and maintenance. The key laws and regulations that apply to this IEE include, but may not be limited to, those presented below.

18. **Law No 11/2020[6].** As the promulgation of Law No. 11/2020 on Jobs Creation (Omnibus Law) and Law No 32 of 2009 on Protection and Management of Environment law has been diluted, several clauses of the environmental law have been changed, deleted, or new clauses inserted into Law No. 11/2020.

19. Article 22 of the Law states that any business and activity that has a significant impact on the environment shall have an environmental impact assessment (AMDAL), and article 34 specifies that any business and activity that has no significant impact shall meet the standard of UKL-UPL. While Article 35 mentions low-risk activities that do not require a UKL-UPL, shall prepare a statement of ability to undertake environmental management and monitoring, *Surat Pernyataan Pengelolaan Lingkungan* (SPPL). In case the project causes significant traffic impacts, the proponent shall prepare ANDALALIN (Environmental Impacts Assessment on Traffic).[7]

20. **Government Regulation No. 22/2021[8]** on Implementation of Environmental Protection and Management and **Government Regulation No. 5/2021** on Risk-Based Commercial Business Permitting, it is stated that the construction of water resource infrastructure buildings is an activity with a high-medium risk level.

21. **Decree of Minister of Environment and Forestry No. 4/2021.** The Government's screening procedure is presented in the Minister of Environment Decree No. 4/2021 on List of Business Plans and/or Activities Requiring AMDAL, UKL-UPL, or SPPL (Attachment 1 of the Decree provides a list of business and/or activities that need environmental impact assessment). The screening considers potential significant impacts as well as the magnitude or size of business or activities. The decree mentions that the types of business and/or activities that are required to have an Environmental Impact Assessment (AMDAL) are determined based on: (i) potential significant impact, and (ii) uncertainty of technological capabilities available to overcome significant negative impacts that will arise. Flood control activities including the normalization of

[6] As the approval of newly issued Omnibus Law, this law was diluted in the Omnibus Law with some changes, deletion and insertion of new clauses.

[7] Stipulated further in regulations of minister of transport and local regulations (Ministerial Regulation *No.* 17/2021 on Traffic Impacts Assessment).

[8] Closing Clause of Government Regulation No. 22/2021 withdrawn Government Regulation No. 27/2012.

rivers in large or medium cities with a certain amount of dredging and embankment requires AMDAL document.

22. Article 8 of Government Regulation No. 22/2021 sets criteria for the business and/or activities with a significant impact on the environment and requires AMDAL:

(i) Changes in land and natural landscape;
(ii) The exploitation of natural resources, both renewable and non-renewable resources;
(iii) Process and activity which potentially cause pollution and/or environmental deterioration and wasting and depletion of natural resources and their utilization;
(iv) Process and activity which results may affect the natural environment, built-up environment, and social-cultural environment;
(v) Process and activity which results will affect the preservation of natural resource conservation area and/or protection of cultural heritage protection;
(vi) Introduction of plants species, animals, and, microorganisms;
(vii) Preparation and use of biological and non-biological materials;
(viii) High-risk activities and/or affect state defense; and/or
(ix) Application of technology that potentially affects the environment. All project or business proposals will undergo screening to classify whether a project proposal would require AMDAL, UKL-UPL, or SPPL. Using criteria outlined in the regulation and recommendation of the respective environmental agency, the project will be screened as shown in Figure 1.

Table 1: AMDAL, UKL-UPL, SPPL Categorization Based on Project Scale

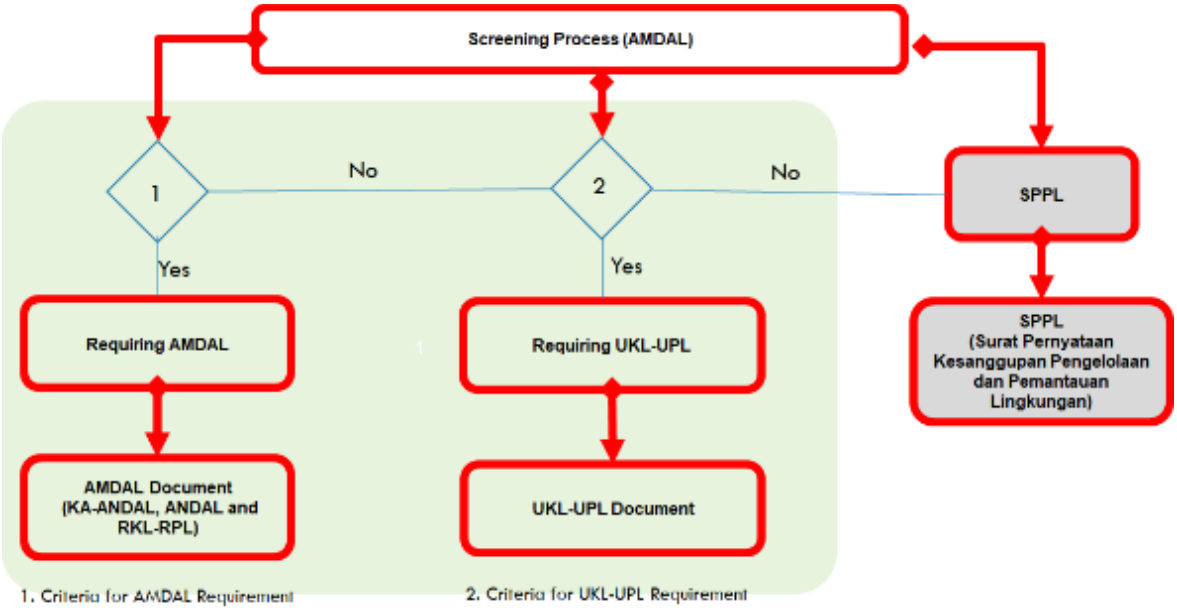
Project	Scale		
	AMDAL	**UKL-UPL**	**SPPL**
River Normalization			
Metropolitan City	River length ≥ 5 km; dredging volume ≥500.00 m^3	5 km > river length ≥ 1 km; 50.000 m^3 > dredging volume ≥ 50.00 m^3	River length <1 km; dredging volume <50.000 m^3
Large or medium city	River length ≥ 10 km; dredging volume ≥500.00 m^3	10 km > river length ≥ 1 km; 50.000 m^3 > dredging volume ≥ 50.00 m^3	River length <1 km; dredging volume <50.000 m^3
Small city or rural area	River length ≥ 15 km; dredging volume ≥500.00 m^3	15 km > river length ≥ 1 km; 50.000 m^3 > dredging volume ≥ 50.00 m^3	River length <1 km; dredging volume <50.000 m^3

Source: MoEF Regulation No. 4/2021.

23. The regulation of Minister of Environment and Forestry No. 4/2021 on List of Business and/or Activity Requiring AMDAL, UKL-UPL, or SPPL (Attachment 1) provides a list of business and/or activities that require environmental impact assessment, including public work (water resources and flood). All project or business proposals will undergo screening to classify whether a project proposal would require AMDAL, UKL-UPL, or SPPL.[9] The process is shown in Figure 1.

[9] The project screening procedure for both according to ADB SPS and Indonesia regulation is discussed and shown in EARF.

Figure 1: Environmental Screening and Environmental Documentation (Indonesian Regulation)



Source: Presentation of PDLUK (Ministry of Environment)

2. Regulations on Occupational Health and Safety

24. Relevant requirements concerning workers' health and safety include Law No.1/1970 on Workers' Safety and Decree of Minister of Workforce No. 5/2018 on Safety and Occupational Health.

25. Ministry of Public Work and Housing (MPWH) Instruction No. 02/IN/M/2020 on Coronavirus Disease 2019 (Covid-19) Prevention on Construction Work guides worker health and safety.

26. In addition to the requirements on worker safety through the national law on Labor, the Ministry of Public Work and Housing (MPWH) has issued its internal K3 (occupational health and safety) policy[10] requiring MPWH projects and their workers to be provided with safe and healthy working conditions and measures to be defined and implemented to prevent accidents, injuries, and occupational disease. This decree applies to employees and laborers in all units of the ministry (including DGWR and RBOs). Additionally, national laws on disaster management also provide for the protection of communities through disaster risk management measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.

3. Regulations on Labor and Employment

27. Law No. 11/2020 on Job Creation provides that every worker has equal right and opportunity to get appropriate employment and livelihood regardless of gender, ethnicity, race,

[10] Regulation of Minister of Public Work and Housing No. 02/PRT/M/2018 on Revision of PUPR Regulation No. 05/PRT/M/2014 on Guidance of Occupational Health and Safety for Public Work Construction.

religion, and political orientation as their interest and competence, including equal treatment of disabled people.

28. Ministry of Workforce regulation derived from the law covers other items related to labor and employment, among others working hours, safety and occupational health, wage, layoff, compensation for work termination and leave, etc.

4. Regulations on Hazardous Wastes Management

29. The Indonesian legal framework on the environment requires cleaner production processes and good energy efficiency practices, avoidance of pollution, or, when avoidance is not possible, minimizing or controlling the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gas emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage.

30. This regulation (as stipulated in Government Regulation No. 22/2021) applies in the case of removal and transportation of hazardous sediments and other hazardous materials and wastes from river or flood works. The planned activities are not expected to produce significant amounts of Hazardous and Toxic Materials (B3) waste. Thus, there is no need to do a B3 waste test (Toxicity Characteristic Leaching Procedure or TCLP) as shown in Appendix 5.

31. The details of the hazardous wastes management described in MOEF Regulation No. 6/2021. The regulation set the procedure and requirement for (i) status of hazardous wastes, (ii) reduction of hazardous wastes, (iii) storage of hazardous wastes, (iv) collection of hazardous wastes, (v) transport of hazardous wastes, (vi) treatment of hazardous wastes, (vii) piling of hazardous wastes, (viii) dumping of hazardous wastes, (ix) trans-boundary transport of hazardous wastes, and (x) application and issuance of technical approval for hazardous waste management (PLB3) and operational feasibility certificate (SLO-PLB3).

5. Regulations on Protected Areas and Biodiversity

32. **MOEF Regulation No. 76/MenLHK-Setjen/2015 on Protected Forest Zoning**. This regulation sets forth the criteria for zoning of national park and management block of natural sanctuary, wildlife sanctuary, wilderness park, and natural tourism park. Management zones of national park consist of (i) core zone, (ii) wilderness zone, (iii) utilization zone, and/or (iv) other zones as applicable. The other zones consist of (i) marine protection zone; (ii) traditional zone; (iii) rehabilitation zone; and (iv) religious, cultural and historical zone, and/or special zone. The zones are set forth for each national park through a ministerial decree and supported with maps.

33. The regulation describes the criteria for each zone. Especially for core zone in national park, the following criteria apply:

(i) Has ecosystem or represent original and natural ecosystem type or natural phenomenon and geological formation;
(ii) Represent concentration of plant/biotic community and/or represent area with high biodiversity value;
(iii) Represent mating and nesting area of target fauna/animal and/or breeding and growing area for the target fauna/animal; and/or
(iv) Transit area for periodical migrant animals.

34. **MOEF Regulation No. 7/2021** on Forestry Planning, Change of Forest Areas Allocation and Function, and Use of Forest Area. Under this regulation, use of forest area for other than

forestry activities are only allowed in production forest and protected areas with certain criteria, as follows:

(i) Production Forest Conversion (HPK) function as set forth in laws and regulations;
(ii) Not charged for Approval of Forest Area Use, Commercial Permit for Forest Use and/or other approval from Minister (MOEF), and not located in Forest Area set forth as Forest Area with Special Purpose (KHDTK) and Forest Area for Food Security (KHKP);
(iii) Nonproductive, except at province which nonproductive HPK is not available; and
(iv) Criteria for nonproductive forest is set forth based on dominance of non-forested land cover which is not greater 70% consisting among other shrubs, open space, and mixed farms.

35. The exception for the above criteria includes the following activities:

(i) National Strategic Project;
(ii) National economic recovery;
(iii) Land acquisition for *Food Estate* and energy;
(iv) Land acquisition for natural disaster;
(v) Procurement of Agrarian Reform Land Object (TORA; *Tanah Objek Reforma Agraria*); and
(vi) Commercial activities built and permitted in the forest areas before enactment of Law No. 11/2020 on Jobs Creation (Omnibus Law).

36. The development of reservoir and dam, agricultural cultivation, fishery, livestock, and plantation are some of activities other than forestry that are allowed in the forest area. The minimum distance of proposed facilities or building is also regulated under Government Regulation No. 16/2021, which requires that every building shall comply and acquire Approval of Building Permit (PBG). The permit granted to the proponent to develop new building, replace, expand, reduce, and/or maintain the building according to the technical standard.

37. MOEF Regulation No. P.106/MENLHK/SETJEN/KUM.1/12/2018 on Second Revision of MOEF Regulation No. P.20/MENLHK/SETJEN/KUM.1/6/2018 on Types of Protected Flora and Fauna. The regulation also refers to IUCN and other international conventions. Chapter III (Section III.2.1) and Appendix 7 presents the protected flora and fauna in the respective districts and province.

38. In addition to two regulations above, there are some other regulations related to biodiversity and protected areas, as follows:

(i) Government Regulation No. 7/1999 on Preservation of Flora and Fauna Species;
(ii) Government Regulation No. 8/1999 on Utilization of Flora and Fauna Species;
(iii) Government Regulation No. 45/ 2004 on Forest Protection;
(iv) Government Regulation No. 28/ 2011 on Management of Natural Sanctuary and Natural Conservation Areas and revised with Government Regulation No. 108/2015;
(v) Government Regulation No. 71/2014 on Protection and Management of Peatland Ecosystem and revised with Government Regulation No. 57/2016;
(vi) Government Regulation No. 32/1990 on Management of Protected Areas;
(vii) MOE Regulation No. 29/2009 on Biodiversity Conservation at Local Level;
(viii) MOE Regulation No. 03/2012 on Biodiversity Parks;

(ix) MOEF Regulation No. P.94/MENLHK/SETJEN/KUM.1/12/2016 on Types of Invasive Species;
(x) Regulation of DG Natural Resource Conservation and Ecosystem No. P.8/KSDAE/BPE2/ KSA.4/9/2016 on Guideline for Determining Wildlife Corridor as Essential Ecosystem; and
(xi) Regulation of DG Natural Resource Conservation and Ecosystem No. P.5/KSDAE/SET/ KUM.1/9/2017 on Technical Guidance on Determination of High Biodiversity Areas Beyond Natural Sanctuary Area, Natural Preservation Area, and Hunting Park.

6. Indonesia Environmental Standards

39. Standards issued by the MOEF generally consist of environmental quality (ambient) standards applicable to the receiving environment and emission standards applicable to the pollution source. The standards for ambient air quality and noise are presented in Appendix 3, while water quality is presented in Appendix 4.

Table 2: Indonesia Environmental Standards

Aspect	Regulation
National Water Quality Standard	Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management, Appendix VI on National Water Quality Standard
Ambient Air Quality Standard	Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management, Appendix VII on Ambient Air Quality Standard
Noise Level Standard	State of Ministry of Environmental No. 48/1996 on Noise Level Standard
Vibration Level Standard	State of Ministry of Environmental No. 49/1996 on Vibration Level Standard

Source: Government Regulation No. 22/2021.

40. **Ambient Air Quality and Noise Standard.** Previous regulation on ambient air quality standards has been replaced with Government Regulation No. 22/2021. The former regulation still referred to the period when the sampling and measurement were carried out during the period. To compare with international standards, the latest regulation is compared with WB-IFC EHS Guidelines (2007), as presented in Table 3.

Table 3: Ambient Air Quality Standard and International Standards

No.	Parameters	Measurement Time	Air Quality Standard, µg/m^3	
			GR No. 22/2021	WB – IFC EHS Guidelines 2007
1.	Sulfur Dioxide (SO_2)	10-Minutes	-	500
		1 hour(s)	150	
		24 hour(s)	75	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
		1 year	45	
2.	Carbon Monoxide (CO)	1 hour(s)	10000	
		8 hour(s)	4000	

No.	Parameters	Measurement Time	Air Quality Standard, µg/m^3	
			GR No. 22/2021	WB – IFC EHS Guidelines 2007
3.	Nitrogen Dioxide (NO_2)	1 hour(s)	200	200
		24 hour(s)	65	
		1 hour(s)	50	
		1 year	50	40
4.	Photochemical Oxidant (O_2) as Ozone (O_3)	1 hour(s)	150	
		8 hour(s)	100	
		1 year	35	
5.	Non-Methane Hydrocarbon (NMHC)	3 hour(s)	160	
6.	Dust particulate < 100 µm (TSP)	24 hour(s)	230	
	Dust particulate < 10 µm (PM_{10})	24 hour(s)	75	150 (interim target 1) 100 (interim target 2) 75 (interim target 3)
		1 year	40	70 (interim target 1) 50 (interim target 2) 30 (interim target 3)
	Dust particulate < 2.5 µm ($PM_{2.5}$)	24 hour(s)	55	75 (interim target 1) 50 (interim target 2) 37.5 (interim target 3)
		1 year	15	35 (interim target 1) 25 (interim target 2) 15 (interim target 3)
7.	Lead (Pb)	24 hour(s)	2	

µg/m^3 = concentration in microgram per cubic meter, at normal atmosphere condition, namely pressure (P) 1 atm and temperature (T) 25^{o}C.

Notes:

1. Concentration which reported for measurement period for 1 (one) hour is concentration of measurement result which carried out for each 30 (thirty) minute (in 1 hour carried twice measurement) and carried between 11.00 – 14.00 local time.
2. Concentration which reported for measurement period for 8 (eight) hours is concentration from measurement time carried out between 06.00 – 18.00 local time.
3. Concentration which reported for measurement period for 3 (three) hours is concentration which carried out for measurement time for 3 (three) hours is concentration from measurement time which carried out between 06.00 – 10.00 local time.

Source: Government Regulation No. 22/2021 and WB – IFC EHS Guidelines 2007.

41. As shown in the above table, Indonesia air quality standard values are the same for one-hour measurement time of Nitrogen Dioxide (NO_2), but less strict than WB – IFC EHS for one-year measurement time. The thresholds value for sulfur dioxide and dust particulate is still in the range as targeted in WB – IFC EHS Guidelines (2007). The rest of the parameters (for example, lead, Non-Methane Hydrocarbon (NMHC) and Photochemical Oxidant (O_2) are regulated in the Government regulations, but not in WB – IFC EHS Guidelines (2007). Considering this, Indonesia standard for air quality standard prevails for the project.

42. Similar comparison also carried with Indonesia noise level standard (Regulation of Ministry of Environment No. 48/1999), as shown in Table 4. Indonesia noise standard values are same as WB – IFC EHS Guidelines 2007, except that Indonesia regulation does not differentiate noise level of daytime and nighttime and no measurement of background level of noise. Considering its comparability, Indonesia standard for noise level prevails for the project.

Table 4: Noise Level Standard and Its Comparison with International Standard

Receptor	Unit	National Noise Level Limits[a]	WB – IFC EHS Guidelines 2007	
			Daytime (7:00-22:00)	Nighttime (22: – 7)
Residential, educational, hospital, institutional, and religious	One hour Laeq (dBA)	55	55	45
Industrial andcommercial		70	70	70
Office and trade		65	70	70
Green open space		50	Background level + 3dB at the nearest receptor location offsite	Background level + 3dB at the nearest receptor location offsite
Government andpublic space		60	Same as above	Same as above
Recreation		70	Same as above	Same as above
Cultural heritage		60	Same as above	Same as above

Source: Government Regulation No. 22/2021.

43. **Water Quality Standard.** Surface Water (Rivers and Lakes). Water quality standard surface water covers key parameters of physical, chemical, and biological aspects, including radioactivity as presented below. The parameters and threshold values for both surface water types (i.e., river and lake) is presented in Table 5.

44. Based on its utilization, there are 4 classes of surface water quality as mentioned in Appendix VI of GR No. 22/2021. For irrigation water it shall meet at least Class III (raw water provided for irrigation purpose). In case the water is also used as raw water for domestic use, it shall meet Class II requirement. The requirement for irrigation is less stringent than one for domestic use. The quality standard for Class III (for irrigation/agricultural purpose) is less stringent than one for domestic use (Class II).

Table 5: Quality Standard for Rivers, and Similar Water Bodies

Parameters ((All Max limit in mg/L except noted otherwise.)	Class II (raw water for domestic use)		Class III (raw water for Irrigation use)	
	Lake	River	Lake	River
Temperature (℃)	Dev 3	Dev 3	Dev 3	Dev 3
Total Dissolved Solids (TDS)	1000	1000	1000	1000
Total Suspended Solids (TSS)	50	50	100	100
Transparency (Pt-Co)	4		2.5	
Color (Pt-Co)	50	50	100	100
Acidity Level (pH)	6-9	6-9	6-9	6-9
Biological Oxygen Demand (BOD)	3	3	6	6

Parameters ((All Max limit in mg/L except noted otherwise.)	**Class II (raw water for domestic use)**		**Class III (raw water for Irrigation use)**	
	Lake	**River**	**Lake**	**River**
Chemical Oxygen Demand (COD)	25	25	40	40
Dissolved Oxygen (DO, >)	4	4	3	3
Sulfate (SO_4^{2-})	300	300	300	300
Chloride (Cl^{-1})	300	300	300	300
Nitrate (as N)		10		20
Nitrite (as N)		0.06		0.06
Ammonia (as N)		0.2		0.5
Total Nitrogen	0.75	15	1.90	25
Total Phosphate (as P)	0.03	0.2	0.1	1.0
Fluoride (F^-)	1.5	1.5	1.5	1.5
Sulfur as H_2S	0.002	0.002	0.002	0.002
Cyanide (CN^{-1})	0.02	0.02	0.02	0.02
Free chlorine	0.03	0.03	0.03	0.03
Barium (Ba) dissolved				
Boron (B) dissolved	1.0	1.0	1.0	1.0
Mercury (Hg) dissolved	0.002	0.002	0.002	0.002
Arsenic (As) dissolved	0.05	0.05	0.05	0.05
Selenium (Se) dissolved	0.05	0.05	0.05	0.05
Iron (Fe) dissolved				
Cadmium (Cd) dissolved	0.01	0.01	0.01	0.01
Cobalt (Co) dissolved	0.2	0.2	0.2	0.2
Mangan (Mn) dissolved	0.4		0.5	
Nickel (Ni) dissolved	0.05	0.05	0.05	0.05
Zinc (Zn) dissolved	0.05	0.05	0.05	0.05
Copper (Cu) dissolved	0.02	0.02	0.02	20
Lead (Pb) dissolved	0.03	0.03	0.03	0.06
Hexavalent Chromium (Cr-(VI))	0.05	0.05	0.05	0.5
Oil and Grease	1	1	1	1000
Total Detergent	0.2	0.2	0.2	1.0
Phenol	0.005	0.005	0.01	1.5
Aldrin/ Dieldrin				
BHC	210	210	201	210

Parameters ((All Max limit in mg/L except noted otherwise.)	Class II (raw water for domestic use)		Class III (raw water for Irrigation use)	
	Lake	River	Lake	River
Chlordane				
DDT	2		2	-
Endrin	4	2	4	2
Heptachlor		4		4
Fecal Coliform (MPN/100 mL)	1000	1000	2,000	2,000
Total Coliform (MPN/100 mL)	5000	5000	10,000	10,000
Chlorophyll-a (mg/m3)	50		100	
Solid waste	None		None	nil
Radioactivity				
Gross- A (Bq/L)	0.1	0.1	0.1	0.1
Gross- B (Bq/L)	1	1	1	1

Source: Appendix VI of Government Regulation No. 22/2021.

45. Rivers and lakes are similar as surface water, but some specific parameters are only required for lakes, among others: transparency, (dissolved) manganese, DDT, and Chlorophyll-a. In addition, threshold values for Total Nitrogen and Total Phosphate for lake are less than those of river, as shown in Table 16. Such standard for river and lake water apply to the project's requirements once the freshwater taken from one or both sources for irrigation or as raw water for domestic use in the farm site or its facilities, agro-processing facility, agribusiness terminal/sub terminal, or laboratory. Measurement for the water quality in this project only cover key parameters (excluding radioactivity and specific organic chemicals that are not relevant).

46. **Groundwater Standard.** Referring to Regulation of Minister of Health No. 32/2017, the groundwater standard for hygiene and sanitation use (including water supply for domestic use, i.e. equal to drinking water standard) comprising of three parameters, as shown in Table 6. Such standard for groundwater applies to the project's requirements once the freshwater abstracted as raw water for domestic use. According to the law, water especially groundwater is prioritized for basic human needs over other uses, even though groundwater is allowed for other uses such as irrigation, once basic community needs are met, as per regulation of Ministry of Public Works and Housing.

Table 6: Groundwater Standard for Hygiene-Sanitation Purpose

No	Parameters	Unit	Quality Standard (Minimum Value)
A.	**Physical Parameters**		
1.	Turbidity	NTU	25
2.	Color	TCU	50
3.	TSP (Total Dissolved Solid)	mg/l	1000
4.	Temperature	°C	air temperature ± 3
5.	Taste		No taste
6.	Smell		No smell
B	**Biological Parameters**		

No	Parameters	Unit	Quality Standard (Minimum Value)
1.	Total coliform	CFU/100ml	50
2.	E. coli	CFU/100ml	0
C	**Chemical Parameters**		
1.	pH	mg/l	6,5 – 8,5
2.	Iron	mg/l	1
3.	Fluoride	mg/l	1,5
4.	Hardness (CaCO3)	mg/l	500
5.	Manganese	mg/l	0,5
6.	Nitrate, as N	mg/l	10
7.	Nitrite, as N	mg/l	1
8.	Cyanide	mg/l	0,1
9.	Detergent	mg/l	0,05
10.	Total Pesticide	mg/l	0,1

Source: Regulation of Minister of Health No. 32/2017).

7. Local Regulations on Environmental Management

47. Relevant local regulations (both at the provincial and district level) related to environmental protection and management were also consulted, among others those related to environmental protection and management, mangrove protection and restoration, spatial plan, coastal areas and small islands spatial plan, coastal area zoning, etc. As applicable the necessary permits and related legislation at national and local level shall be complied with.

8. Indonesia Country Safeguard System

48. The Indonesia AMDAL system generally conforms to the intent of ADB's environmental policy principles, requirements, and management guidelines. According to the regulation, all projects should undergo environmental clearance before proceeding to implementation. Table 7 shows the relationship between the ADB environmental categorization and those under Indonesia's regulations/policies. Essentially, an AMDAL study corresponds to an EIA, and a UKL-UPL corresponds to an IEE. The Statement of Environmental Management and Monitoring undertaking (*Surat Pernyataan Kesanggupan Pengelolaan dan Pemantauan Lingkungan Hidup* – SPPL) generally corresponds to the environmental implication review of Category C projects as per the ADB SPS 2009. Several studies have been carried out to study the alignment of the Indonesia safeguard system and ADB SPS.[11]

(i) **AMDAL** and EIA correspond to a certain extent, though the criteria used for categorization under the Government of Indonesia's AMDAL procedure and ADB SPS 2009 requirements differ. Indonesia regulation provides rigid quantitative criteria, while ADB relies on qualitative criteria (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". Not all activities requiring AMDAL per Indonesia's AMDAL procedure may categorize as category A per ADB SPS 2009.

(ii) **UKL-UPL** is required for certain business activities which are unlikely to have significant impacts on the environment but still require environmental assessment

[11] Aligning Asian Development Bank and Country Systems for Improved Project Performance (https://www.adb.org/projects/documents/aligning-asian-development-bank-and-country-systems-improved-project-performance-tar) and https://www.adb.org/sites/default/files/project-document/185257/43220-014-pssa-01.pdf.

and approval. There is no specific certification for the team required for the preparation of a UKL-UPL.

(iii) **SPPL** requires the proponent to monitor and manage the environmental impact of low-risk businesses and/or activities that are not required to prepare AMDAL or UKL-UPL.

Table 7: ADB and Indonesia Project Categorization Systems

ADB Project Categories	GOI Project Categories
Category A: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required.	**AMDAL**: Projects with significant impact that according to the law require an Environmental Impact Assessment (AMDAL). The detailed criteria that trigger an AMDAL are defined in the Decree of Minister of Environment and Forestry No. 4/2021.
Category B: A proposed project is classified as category B if its potentially adverse environmental impacts are less adverse than those of Category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases, mitigation measures can be designed more readily than for Category A projects. An initial environmental examination is required.	**UKL-UPL**: Projects with no significant impact that according to the law requires Environmental Management and Environmental Monitoring Measures (UKL-UPL).
Category C: A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed	**SPPL**: Projects that do not require AMDAL or UKL-UPL are obliged to submit a 'statement on commitment for management and environmental monitoring' or SPPL**.**

Source: Compiled from ADB SPS and Indonesia Regulation on AMDAL.

C. International Environmental Agreements

49. Indonesia has ratified several international conventions, some relevant to the subproject. The list of international conventions ratified by the Government of Indonesia related to the environment includes, among others:

(i) Convention on Biological Diversity, for parties to require the environmental assessment of their proposed projects that are likely to have significant adverse impacts on biological diversity with a view of avoiding or minimizing such impacts. Indonesia is obliged to respect and protect traditional knowledge related to sustainable utilization of biodiversity, including promoting fair benefit sharing of the use of traditional knowledge. Based on this convention, the Nagoya Protocol was established, which was also ratified by the Government of Indonesia;

(ii) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1972). Indonesia follows an international agreement to control the continuous encroachment of wetlands in the present and future, to recognize the basic ecological functions of wetlands follow the economic, cultural, scientific, and recreation.

(iii) Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (1972). Indonesia follows an international agreement to control marine pollution due to the accumulation of waste and other materials and to encourage regional agreements to complement the Convention; the London Convention came into effect in 1996.

(iv) Vienna Convention for the Protection of the Ozone Layer, in 1998, and subsequent protocol and amendments, for parties to take appropriate measures to protect human health and the environment against adverse impacts likely to arise from human activities that will/likely modify the ozone layer.

(v) Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL). Indonesia has ratified the international agreement to conserve the marine environment/marine pollution by banning oil and other hazardous substances and disposal of hazardous substances to suppress levels that do inadvertently (e.g., due to accidents).

(vi) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989). Indonesia has ratified the international agreement to reduce cross-country movement of waste following the minimum limit of the Convention to create environmentally friendly waste management and efficiency; reduce the toxicity of waste generated and ensure that environmental management is the basis for resource development.

(vii) United Nations Framework Convention on Climate Change (1992). Indonesia has ratified the international agreement to achieve stabilization of greenhouse gas concentrations in the atmosphere as low as possible to prevent dangerous anthropogenic interference with the climate.

(viii) Kyoto Protocol to the United Nations Framework Convention on Climate Change. Indonesia has ratified the international agreement to reduce greenhouse gas emissions by promoting national programs in developed countries aimed at reducing greenhouse gas emissions and determining the percentage of reduction targets for developed countries.

(ix) Indonesia has ratified the Paris Agreement within the United Nations Framework Convention on Climate Change (UNFCCC) dealing with greenhouse gases emissions mitigation, adaptation, and finance in October 2016.

(x) Convention on Fishing and Conservation of Living Resources of the High Seas (Marine Life Conservation). Objectives: Solve the problem of preservation of biological resources on the high seas through international collaboration with the consideration that the use of modern technology for the exploitation of resources in excess will cause harm to these resources.

III. DESCRIPTION OF SUBPROJECTS

50. The Cimanuk River system is one of the rivers or sub-watersheds in the Cimanuk watershed system. The Cimanuk watershed management is under the authority of the Cimanuk-Cisanggarung RBO. The Cimanuk River has its upstream in Cikajang subdistrict of Garut, which flows to the northeast for 180 km and empties into the Java Sea in Indramayu. The Cimanuk watershed crosses 4 (four) districts, namely Garut, Sumedang, Indramayu, and Majalengka.[12] Lateral erosion of the watershed and riverbed degradation often causes flooding. In Indramayu, there are 13 flood-prone locations covering an area of 8,834 ha. During the rainy season in the lower reaches of the river often overflows and inundates rice fields. The flood disaster needs further attention and handling[13] Therefore, through Cimanuk-Cisanggarung RBO has developed a program as follows:

(i) Construction of Sabo dams to control or secure erosion or lava flooding by accommodating sediment that flow downstream.

[12] Rahman, Ali. 2016. Flow Analysis in the Upper Cimanuk River Basin (Case Study of Cimanuk-Bojongloa Garut). Garut. Journal of Construction of the Garut High School of Technology. 14: (1).

[13] BBWS Cimanuk-Cisanggarung. 2010. Pattern of Water Resource Management In The Cimanuk River.

(ii) Construction of detention basin to temporarily accommodate rainwater to store water and avoid overflow and flood residential areas
(iii) Improvement and elevation of river embankments to withstand flood overflows as well as bridge protection from potential erosion of river water
(iv) Repairing existing cribs to regulate the direction of river currents, reduce the speed of river flows, accelerate sedimentation, and can prevent erosion/scouring on embankments or river cliffs that can cause landslides.

51. The subproject components include raising and repairing the embankments, repairing existing cribs, constructing Detention Basin, and Sabo dams. More information on the project description provided in Appendix 6.

A. Subprojects Location

52. The subprojects components will be located in districts of Indramayu, Sumedang, Majalengka, and Garut. The location of each subproject is shown in Table 8 below.

Table 8: Location of Proposed Subproject Components

No.	Proposed Sub Project	Village	Sub-District	District	Type of Works
1.	Sabo Dam (CM-0a)	Ngamplangsari	Cilawu	Garut	Construction of Sabo Dams
		Muara Sanding	Garut Kota	Garut	
2.	Sabo Dam (CM-0c)	Barusuda	Cigedug	Garut	
		Mekarsari	Cikajang	Garut	
3.	Detention Basin of Jayawaras (CM-4)	Jayawaras	Tarongong Kidul	Garut	Construction of Detention Ponds
4.	Detention Basin of Paminggir (CM-4b)	Paminggir	Tarongong Kidul	Garut	
5.	Detention Basin of Sukakarya (CM-4c)	Sukakarya	Tarongong Kidul	Garut	
6.	Rising Dikes at Upper Cimanuk River (CM-7)	Sukakarya Sukajaya Jayawaras Haurpanggung	Tarogong Kidul	Garut	Rising Dikes at Upper Cimanuk River
		Muarasanding Sukamantri Paminggir	Garut Kota	Garut	
		Mekarsari			
		Mekarsari	Cikajang		
		Lengkongjaya Cimurah Karangsari	Karangpawitan	Garut	
		Sukaratu	Banyuresmi	Garut	
		Sukaseneng			
7.	Rising Dikes of Cipeles (CM-8)	Cipeles	Tomo	Sumedang	Rising Dikes of Cipeles
8.	Rising Dikes of Tomo (CM-9)	Tomo Tolengas	Tomo	Sumedang	Rising Dikes of Tomo
		Palabuan	Ujung Jaya	Sumedang	
		Kadipaten	Kadipaten	Majalengka	
9.	Rising Dikes along Rambatan Channel (CM-11)	Krasak Jatisawit Jatisawit Lor Kalimati Lohbener Lor Lohbener	Jatibarang	Indramayu	Rising Dikes of Rambatan Channel

No.	Proposed Sub Project	Village	Sub-District	District	Type of Works
		Pamayahan Bojongslawi Sindangkerta Lohbener Rambatan Kulon Legok	Lohbener	Indramayu	
		Panyindangan Kulon Rambatan Wetan	Sindang	Indramayu	
		Lamarantarung	Cantigi	Indramayu	
		Arahan Lor	Arahan	Indramayu	
10.	Rising Dikes of Kertasemaya (CM13)	Beduyut	Bangodua	Indramayu	Rising Dikes of Kertasemaya
		Kertasemaya	Kertasemaya	Indramayu	
11.	Repairing Existing Cribs (CM-10a)	Lohbener	Jatibarang	Indramayu	Repairing Existing Cribs
12.	Repairing Existing Cribs (CM-10b)	Pamayahan	Lohbener	Indramayu	
13.	Repairing Existing Cribs (CM-10c)	Rambatan Kulon	Lohbener	Indramayu	
14.	Repairing Existing Cribs (CM-10d)	Rambatan Kulon	Lohbener	Indramayu	
		Rambatan Wetan	Sindang	Indramayu	
15.	Repairing Existing Cribs (CM-10e)	Rambatan Wetan	Sindang	Indramayu	
		Panyindangan Kulon	Sindang	Indramayu	

Source : Engineering Detail Data, 2022.

53. The subrproject will also conserve at the upstream of Cimanuk River.. Lava floods can occur due to continuous rain for a certain time on piles of material deposits around the peaks and slopes of the mountain[14]. Therefore, to prevent sediment from flowing downstream, the construction of a Sabo Dam is planned in several locations in the upstream area of the Cimanuk River. In detail, the plan for making Sabo–Dams is presented in Table 9.

Table 9: Basic Design of Sabo-Dams

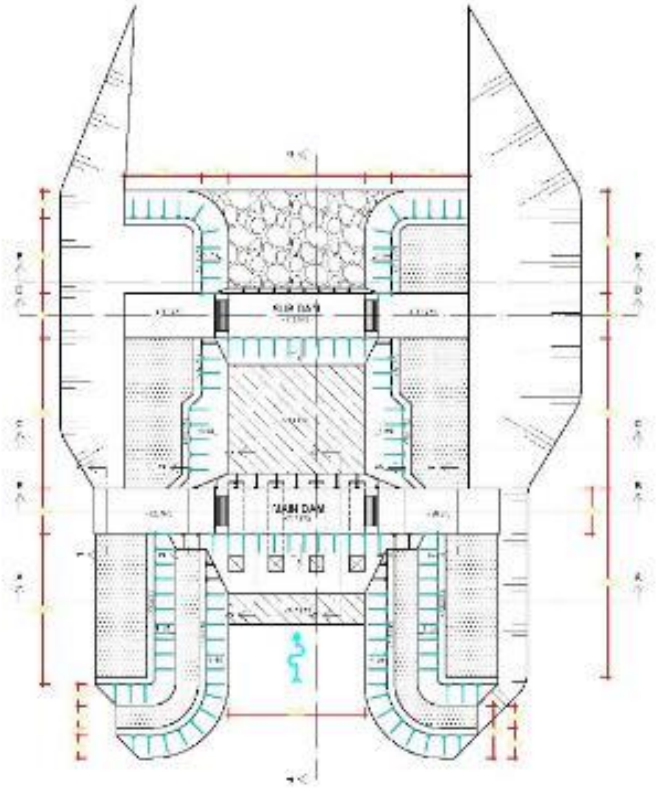
No.	Proposed Sub-Project	Description
1	Sabo Dam CM-0a	Length: 6,6 m Wide: 37 m
2	Sabo Dam CM-0c	Length: 5,2 m Wide: 39,2 m

Source: Detail Engineering Design, 2022.

54. The typical design of Sabo-Dam is presented in Figure 2 and Figure 3.

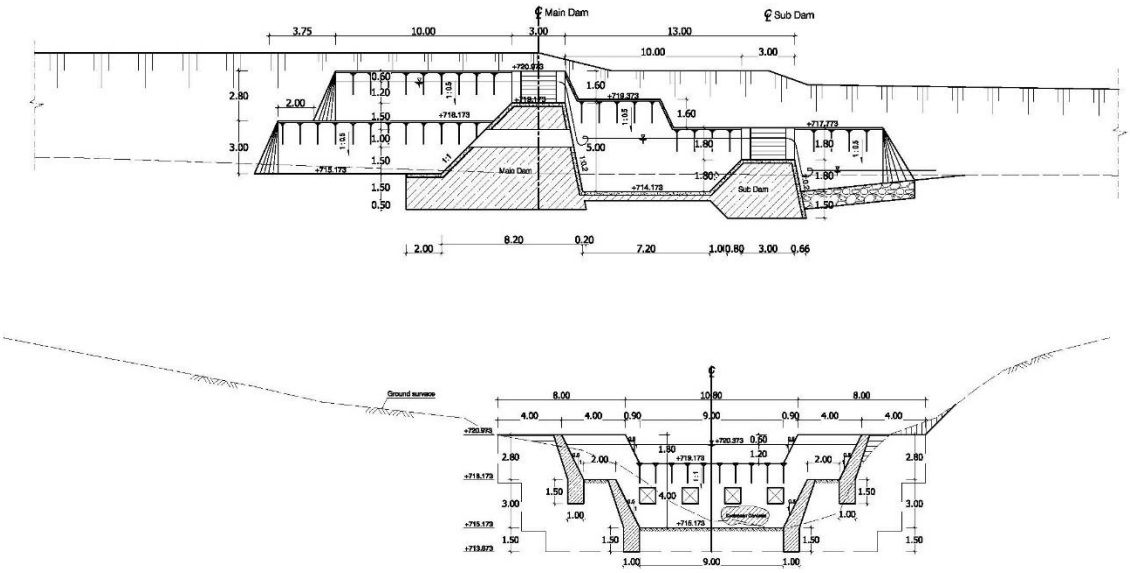
[14] Pratiwi, R.D.S. 2016. Planning of an Open Type Sabo Dam (Hole Type) as a Sediment Control Building for Mount Semeru on the Mujur River, Lumajang Regency. Surabaya : Institut Teknologi Sepuluh Nopember.

Figure 2: Typical Design of Sabo-Dam Construction



Source: Detail Engineering Design, 2022.

Figure 3: Cross Section of the Sabo Dam Plan



Source: Detail Engineering Design, 2022.

55. The detention pond will function as a temporary flood storage area when the river discharge exceeds its capacity. It can also be infiltration facilities that maintain the elevation of the groundwater level and water quality.[15] Three detention ponds, namely in villages of Jayawaras, Paminggir, and Sukakarya of Tarogong Kidul SubDistrict (Garut) will be developed. The technical data for the plan is presented as follows.

Table 10: Basic Design of Detention Basins

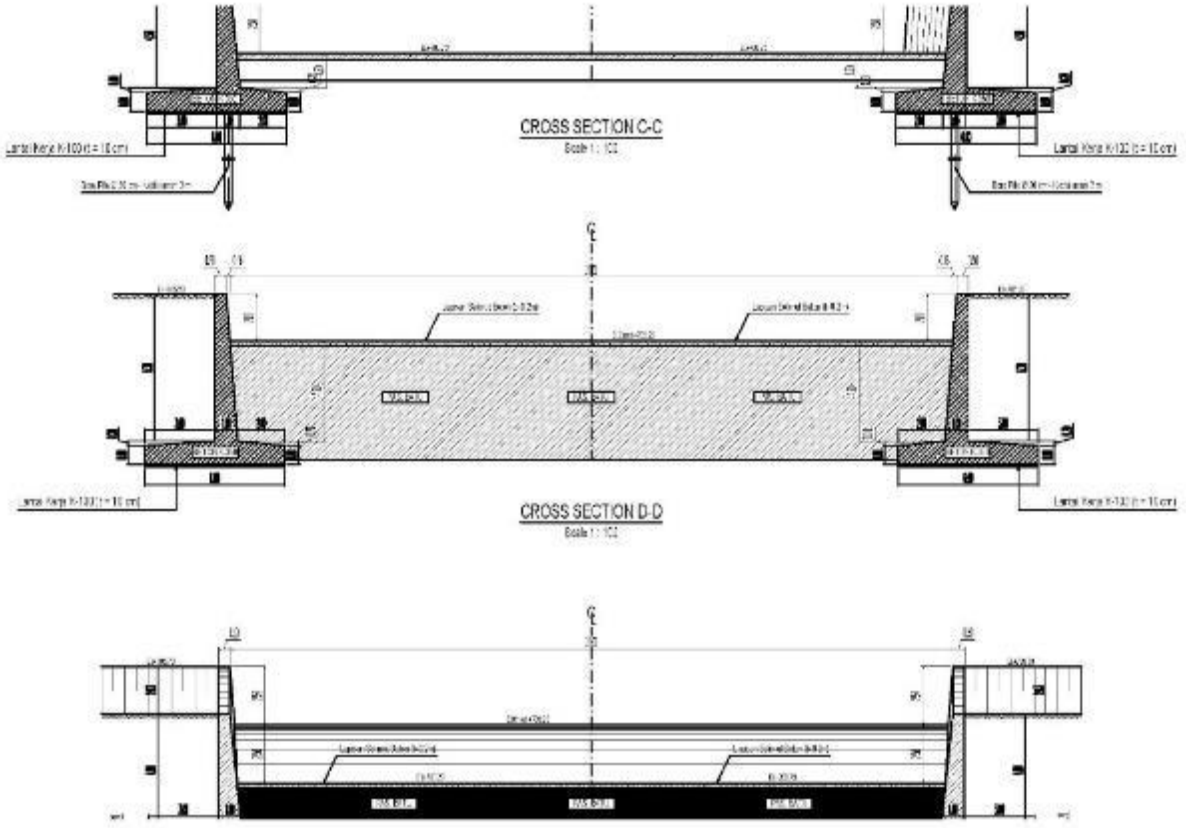
No	Detention Basin	Area (ha)	Depth (m)	Storage Volume (m^3)
1.	Jayawaras (CM-4a)	1.700	4,5	18.000
2.	Paminggir (CM-4b)	4155	6	27.007
3.	Sukakarya (CM-4c)	14.820	6	74.100

Source: Detail Engineering Design, 2022.

56. The typical design of a detention basin is presented in Figure 4 and Figure 5.

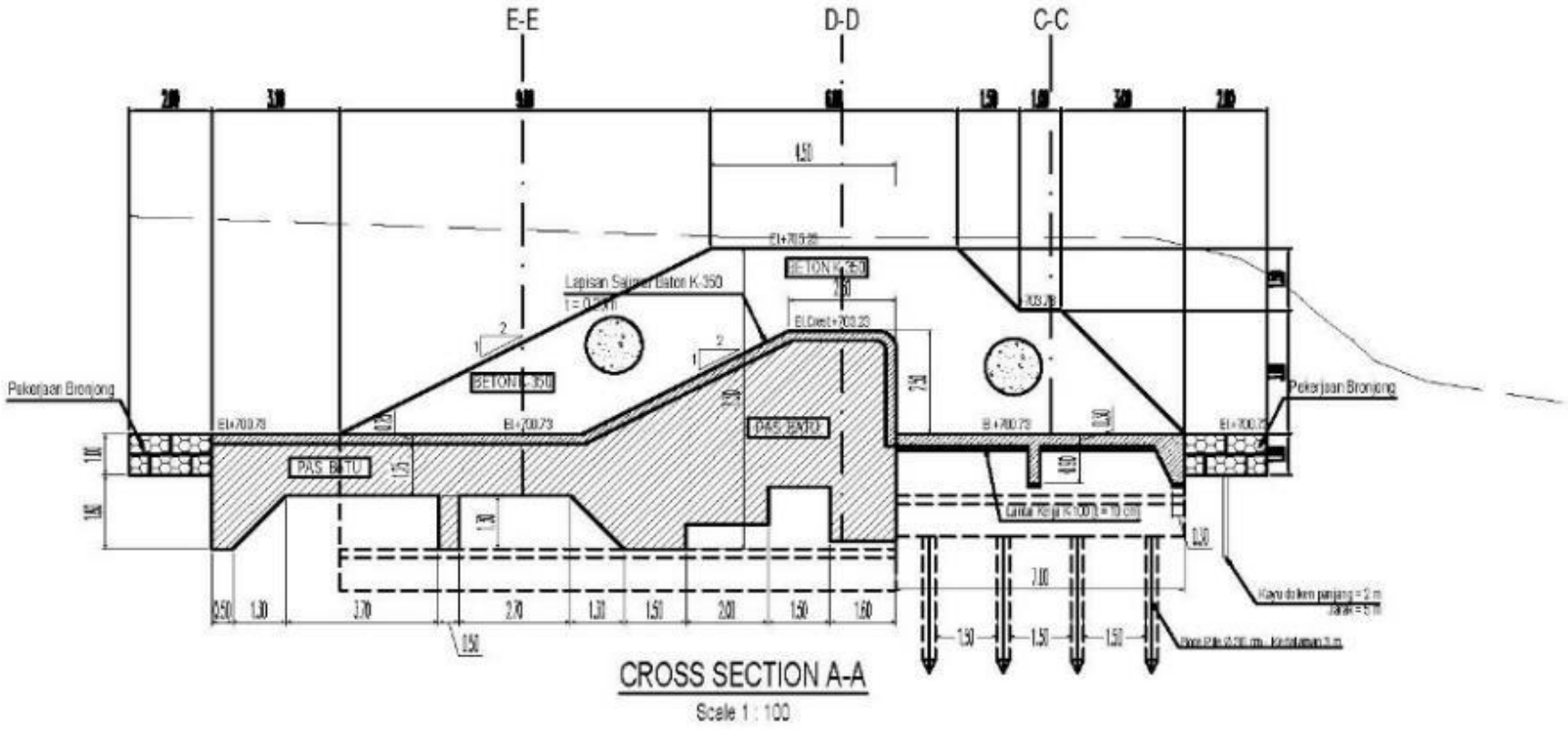
[15] Harmani, E. 2016. Retention Ponds as an Alternative for Flood Control. Surabay : Universitas Dr. Soetomo.

Figure 4: Detention Pond Development Plan



Source: Detail Engineering Design, 2022.

Figure 5: Cross Section of Detention Pond Construction



Source: Detail Engineering Design, 2022.

Figure 6: Location Map of Detention Basin Plan

(a) Jayawaras (b) Paminggir (c) Sukakarya

Source: Detail Engineering Design, 2022.

57. The components for improving and expanding the embankment covers several locations: Upper the Cimanuk River, Cipeles Village, Tomo Village, Rambatan Channel, and the Kertasemaya. The embankment will also be reinforced with a gabion arrangement or reinforced concrete retaining wall with length and height as presented as in the following table.

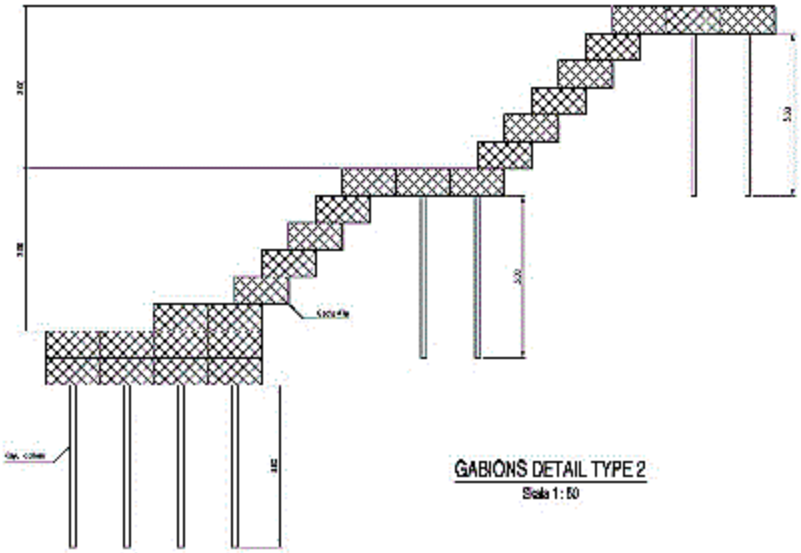
Table 11: Technical Data of Repair and Raising of River Embankments

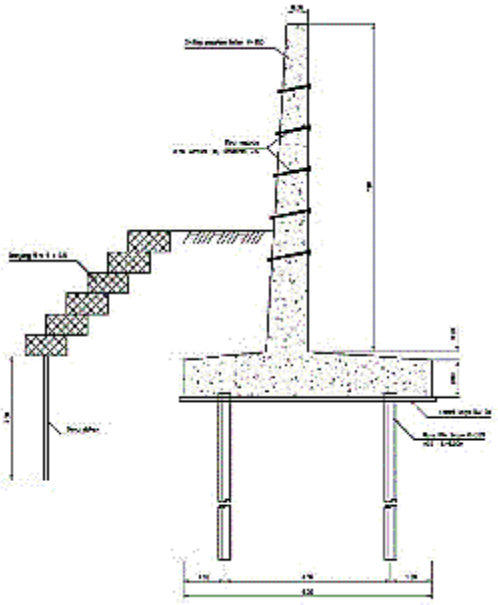
No.	Proposed Sub-Project	Description
1	Rising Dikes at Upper Cimanuk River (CM-7)	Right Length: 3,5 km Left Length: 4,5 km Height: 1 – 2,5 m
2	Rising Dikes of Cipeles (CM-8)	Length: 476,2 m (right)
3	Rising Dikes of Tomo (CM-9)	Right Length: 2,4 km Left Length: 2,1 km
4	Rising Dikes of Rambatan Channel (CM-11)	Length: 20 km (Left and Right) Height: 2 – 3 m
5	Rising Dikes of Kertasemaya (CM-13)	Length: 1,3 km (Left and Right) Height: 1,5 m

Source: Detail Engineering Design, 2022.

58. The typical design of the Repair and Raising of River Embankments and maps of location are presented in Figure 7**,** Figure 8**,** and Figure 9.

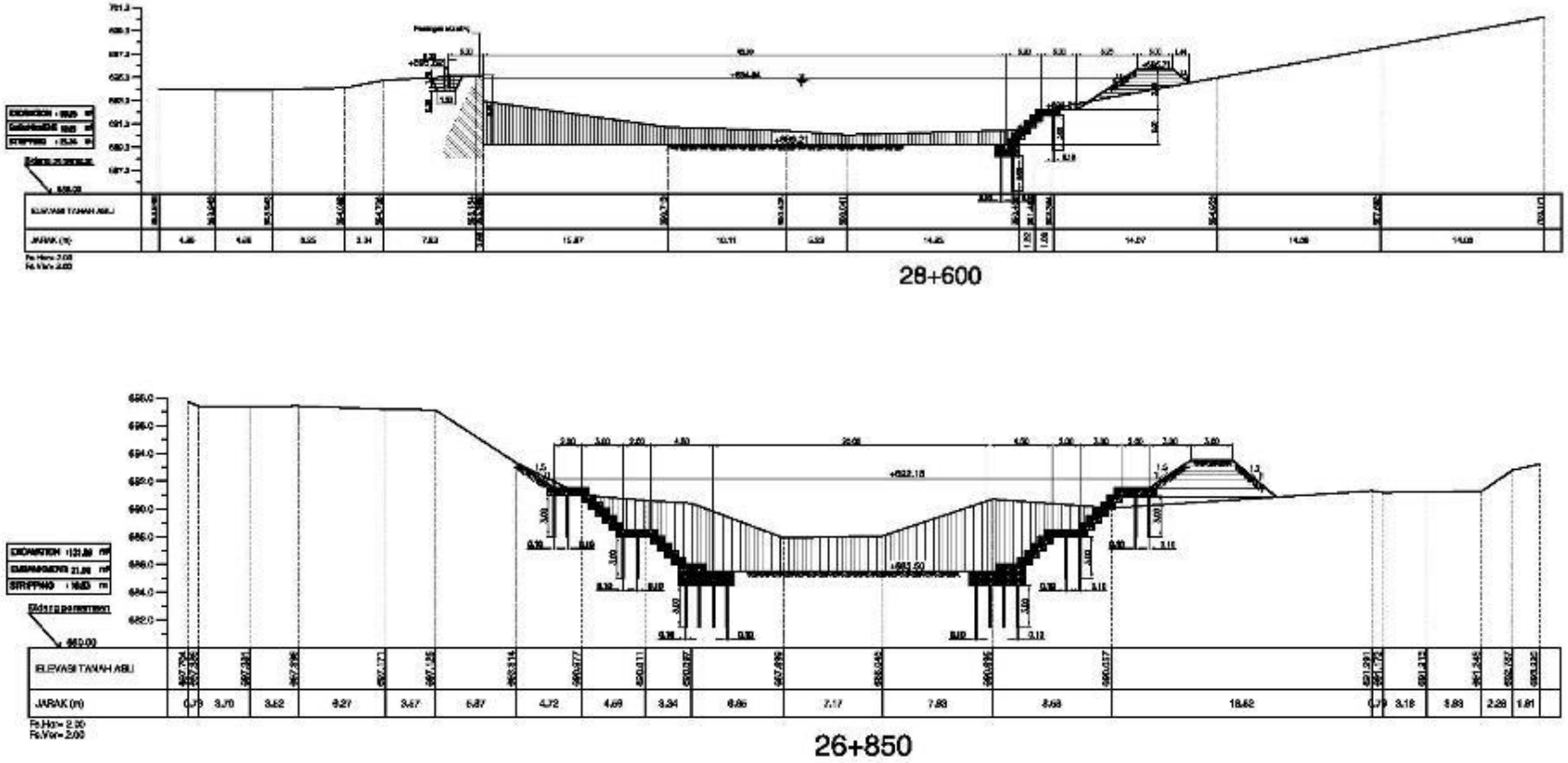
Figure 7: Typical Design of Embankment Reinforcement Plan





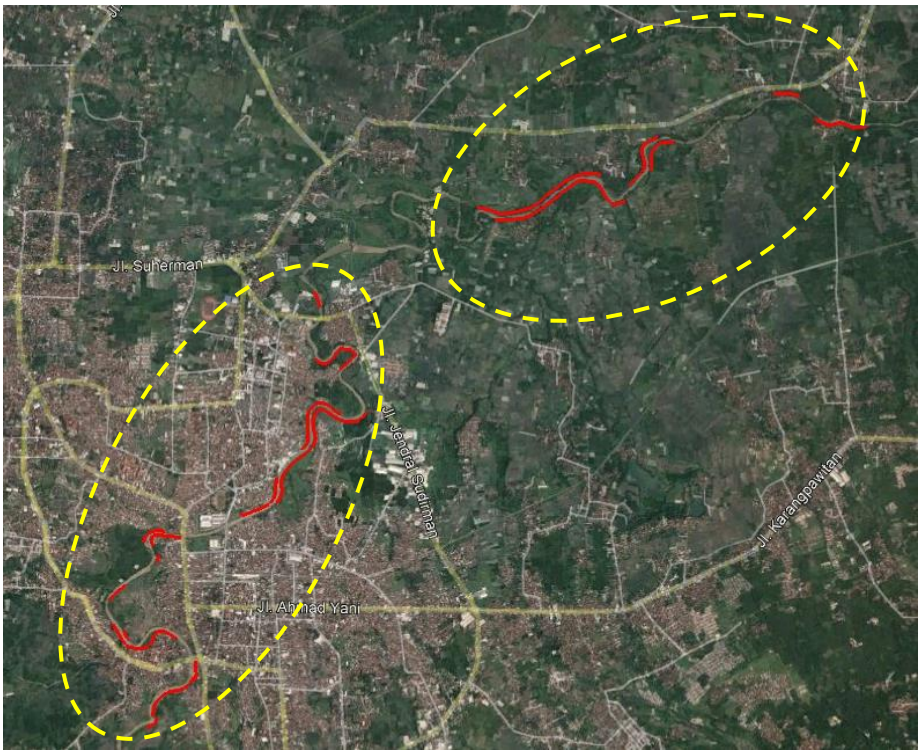
Source: Detail Engineering Design, 2022.

Figure 8: Typical Design of Embankment Repair and Raising Dike

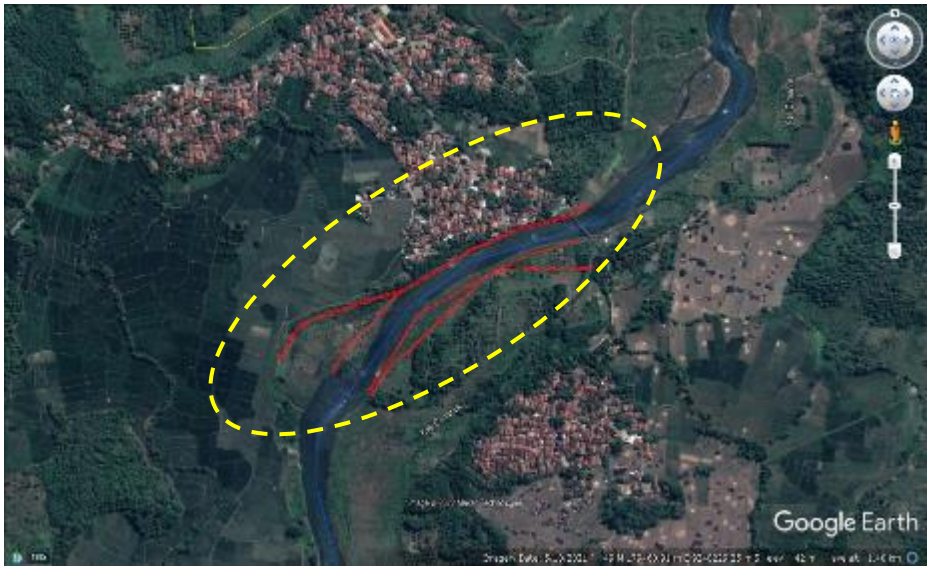


Source: Detail Engineering Design, 2022.

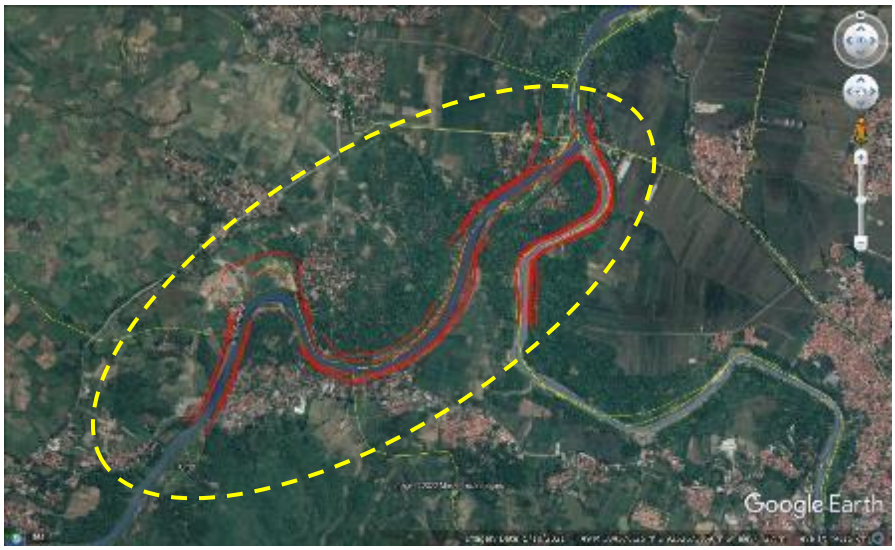
Figure 9: Location Map of the Planned Embankment Repair and Raising Dike Activities



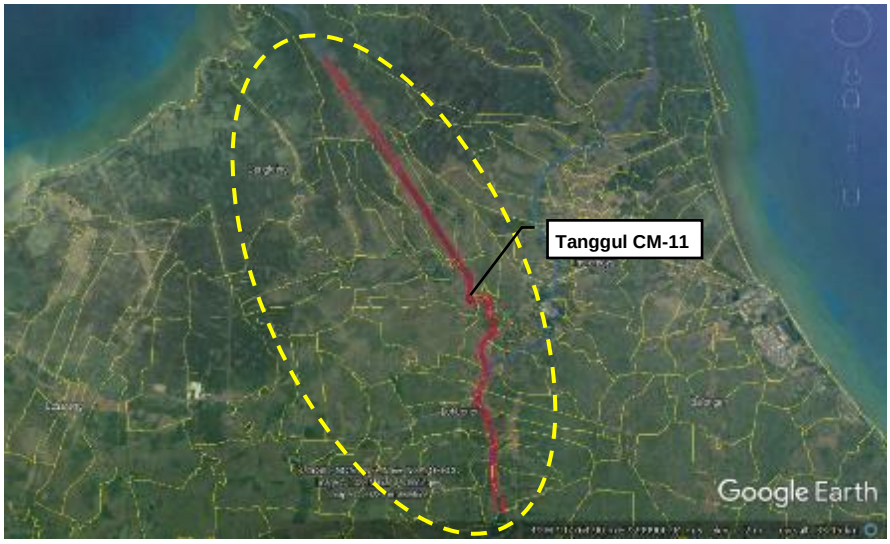
(a) Dikes at Upper Cimanuk River



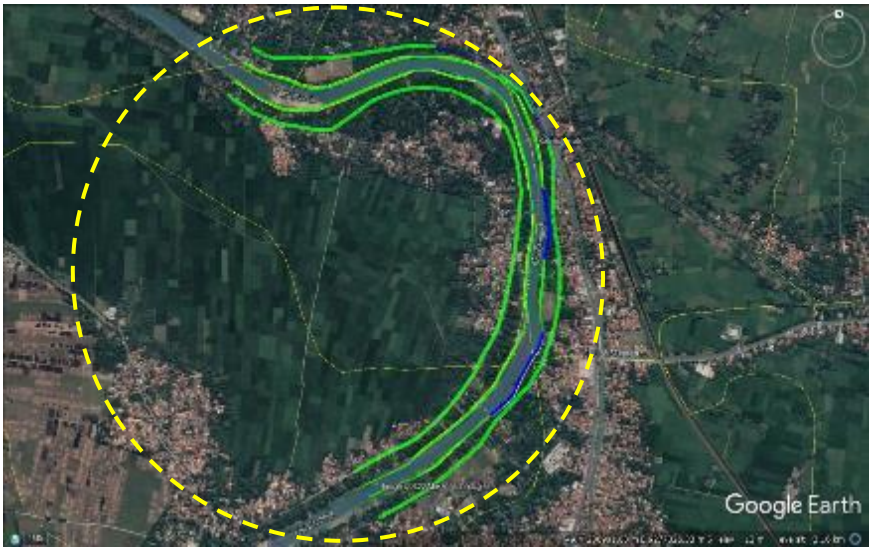
(b) Dikes at Cipeles



(c) Dikes at Tomo



(d) Rising Dikes of Rambatan Channel



(e) Dikes at Kertasemaya

Source: Detail Engineering Design, 2022.

59. The crib can prevent erosion/scouring on embankments or river cliffs, which can cause landslides. In detail, the proposed cribs is presented in the Table 12.

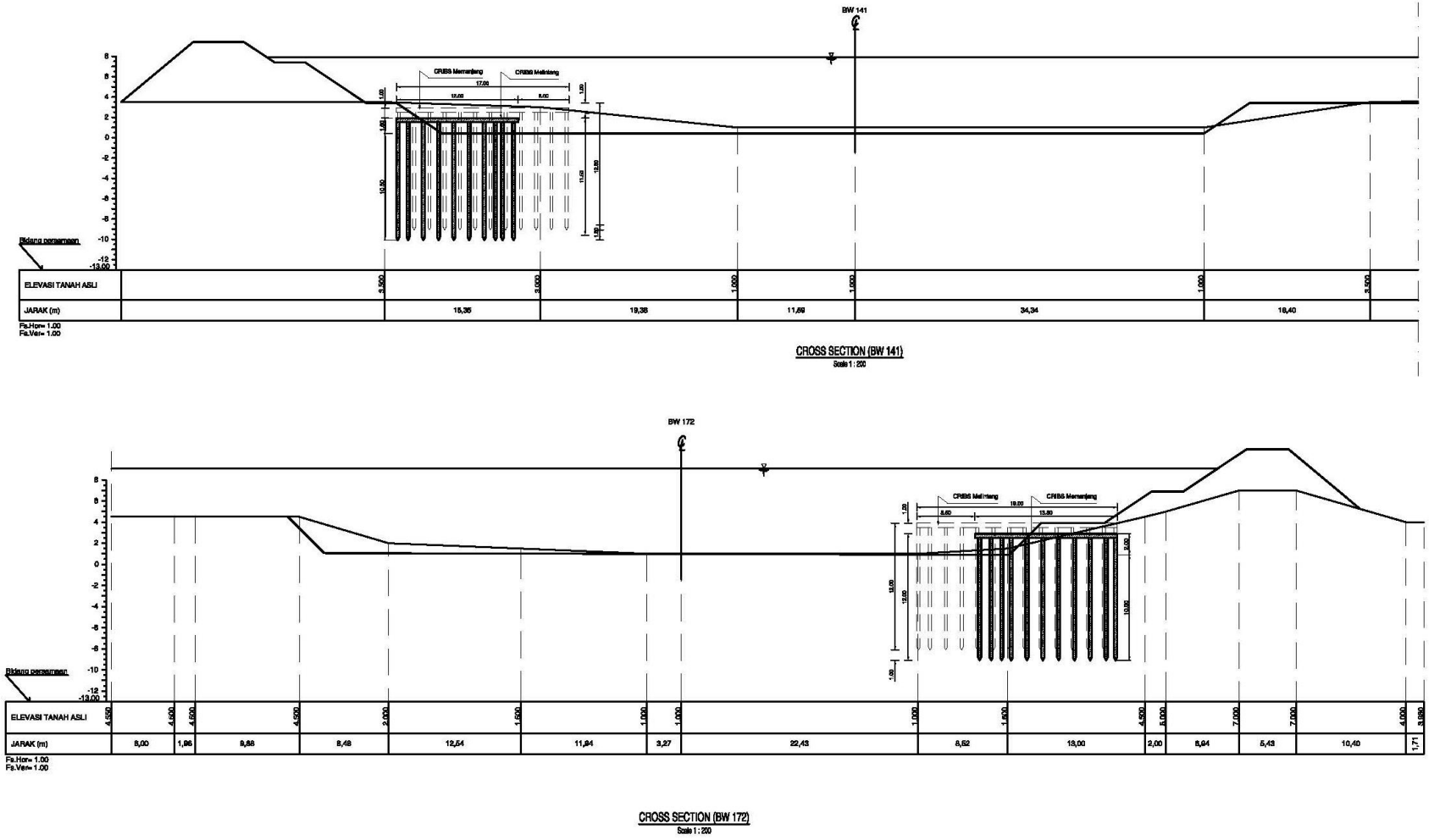
Table 12: Basic Design of Repairing Existing Cribs

No.	Proposed Sub-Project	Description
1	Krib CM-10a	Length: 287 m
2	Krib CM-10b	Length: 151,6 m
3	Krib CM-10c	Length: 214 m
4	Krib CM-10d	Length: 276 m
5	Krib CM-10e	Length: 367 m

Source: Detail Engineering Design, 2022.

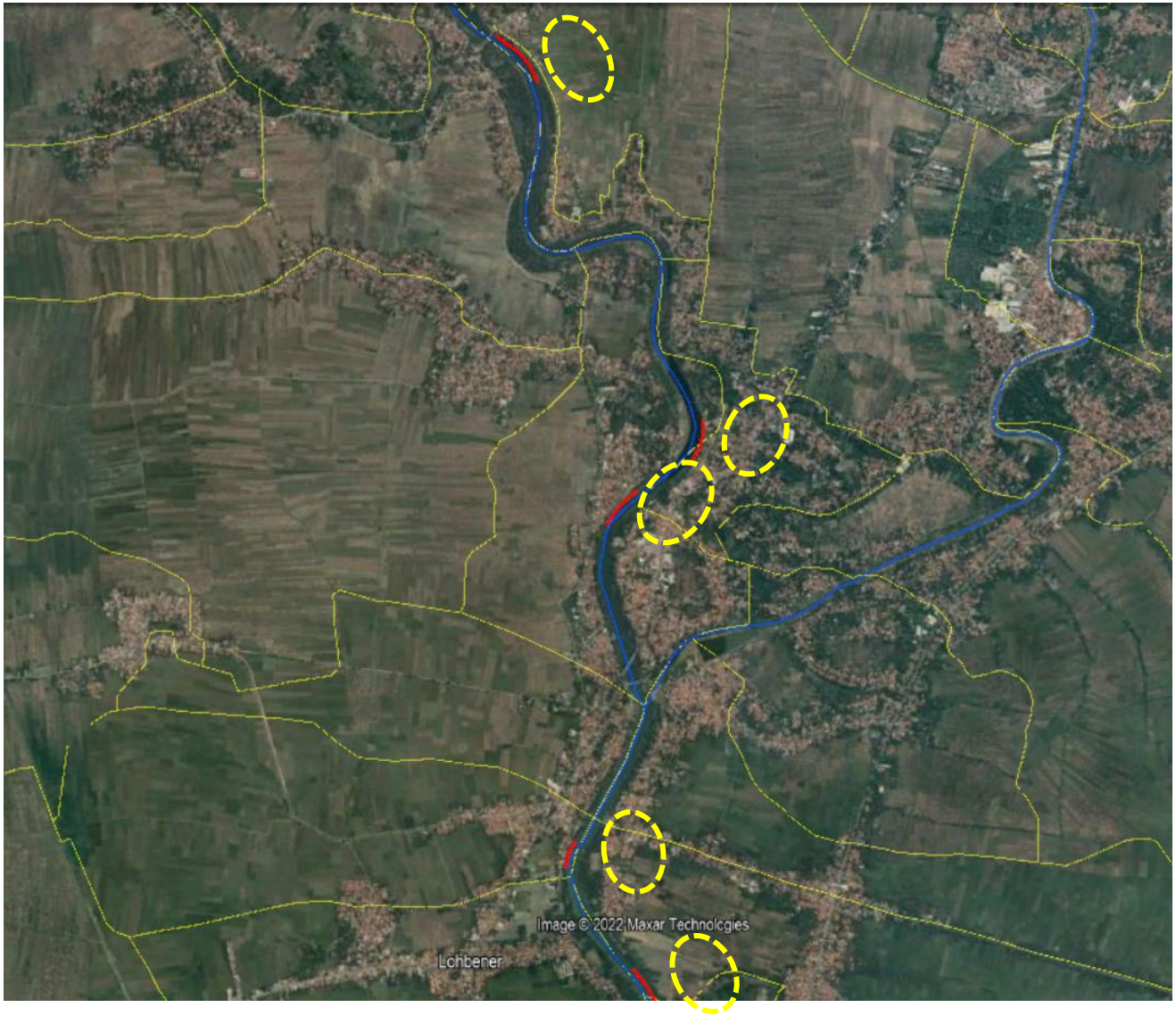
60. The typical design of Existing Cribs and its location are presented in Figure 10 and Figure 11, respectively**.**

Figure 10: Typical Design of Repairing Existing Cribs Construction



Source: Detail Engineering Design, 2022.

Figure 11: Map of Cribs Building Repair Proposed subproject



Source: Detail Engineering Design, 2022.

IV. DESCRIPTION OF ENVIRONMENT (BASELINE DATA)

A. Physical Resources

1. Climate

61. The Cimanuk River system is located in West Java which belongs wet tropical climates category. The average air temperature in northern part of West Java is 26.2°C, and the average air humidity is 84.4. While a high humidity level exists in most low-lying parts of the province, it drops significantly in the uplands. The predominant winds are monsoon and trade winds. The northeast monsoon occurs from November to March, and normal weather is cloudy and rainy. The southeast wind system prevails from June to September during the dry season. The basin is particularly susceptible to El Nino events causing long dry seasons.

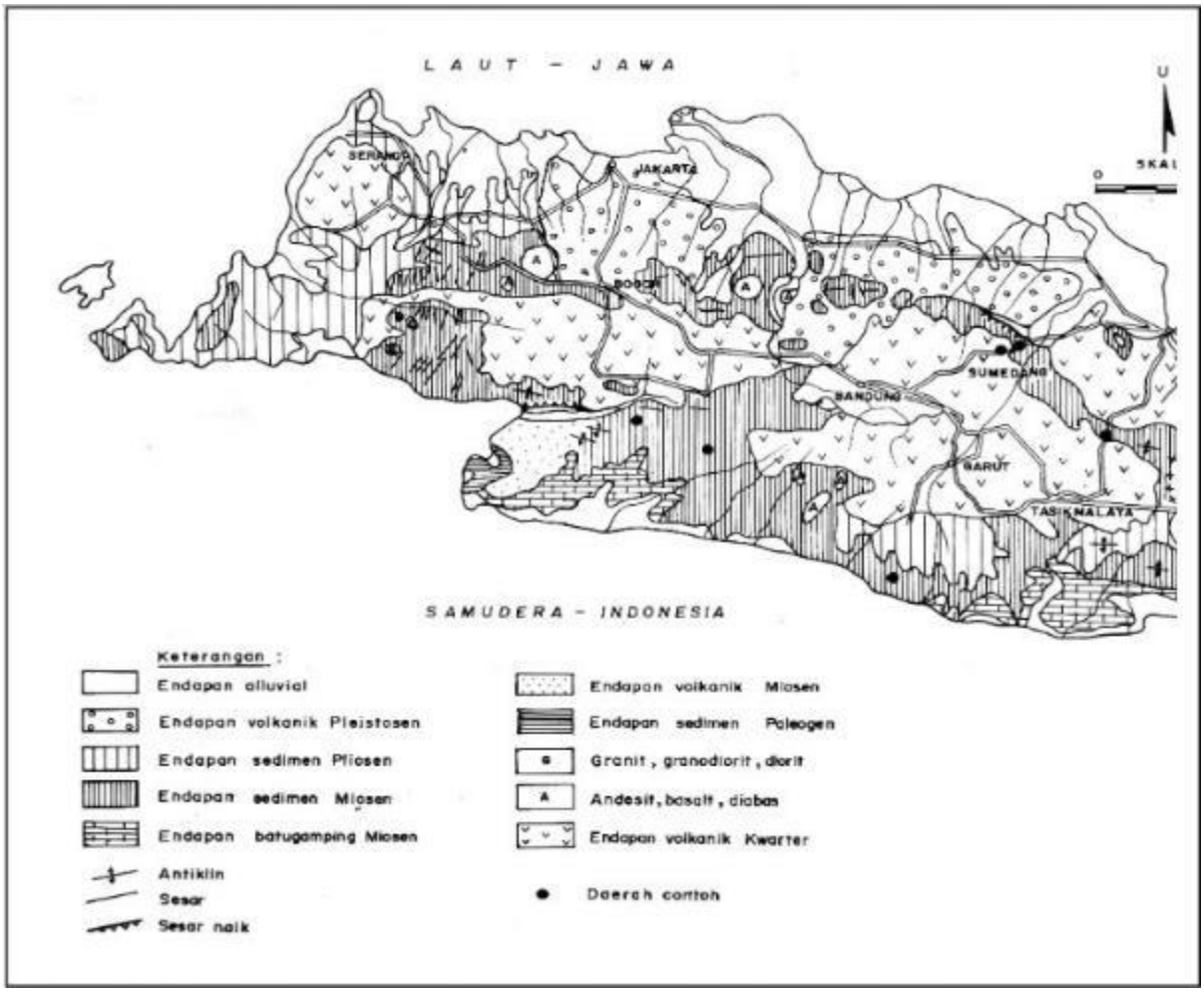
62. The climate in West Java changes compared to last year. This triggers the increase of rainfall as recorded in 2021. The annual rainfall in West Java is 3,786.60 mm, greater than the rainfall in 2020 of 2,420.40 mm. In addition, the rainy days also increased to 262 days (2021) from the rainfall recorded in 2020 (157 days).

63. The data from the Indonesian Meteorology, Climatology and Geophysics Agency (BMKG, 2021), the hottest days occur in March and October, while the coldest days occur in January. Meanwhile, the highest monthly rainfall is 454.3 mm, and the lowest is 33.2 mm. Wet months where rainfall is above 200 mm occur for 6 months, namely October-December, March, and May. The dry months where rainfall is less than 100 mm occur for 3 months, from June to August.

2. Geology

64. The province of West Java has natural conditions with a complex geological structure with mountainous areas in the middle and south and lowlands in the north. West Java was a mélange complex in the tertiary era, a mixing zone between oceanic and continental crust rocks. It consists of metamorphic, volcanic, and igneous rocks known only from drilling data in the northern part of the West Java Sea. The geological conditions of the area traversed by the Cimanuk River vary, as shown in the following figure.

Figure 12: West Java Regional Geological Map



Source: TRTA Consultants.

65. Based on the geological map above, the area traversed by the Cimanuk River has various geological structures. The geological structures grouped by area are listed in the table below.

Table 13: Geological Structure of The Area Traversed By The Cimanuk River

No	Regency	Geological Structure
1	Indramayu	Alluvial Deposit
2	Sumedang	Miocene Sedimentary Deposits
		Quarter Volcanic Deposits
3	Majalengka	Pleistocene Volcanic Deposits
		Alluvial Deposit
		Quarter Volcanic Deposits
4	Garut	Quarter Volcanic Deposits

Source: Sampurno, 1976.

3. Water Quality

66. Monitoring river water quality shall be done regularly for sustainable water resource management. The water quality referred to secondary data of the measurement carried out in 2018.

67. Monitoring river water quality shall be done regularly for sustainable water resource management. The water quality referred to secondary data of the measurement carried out in 2018.

68. The water quality measurements are compared against river water quality standards Class IV for as set forth in Government Regulation No. 22 of 2021. The class is suitable for irrigating and/or other uses that require the same water quality.

69. The following table shows the results of the water quality measurement based on several parameters.

Table 14: Cimanuk River Water Quality Test Result

No	Sample	Test Result (Point)						Unit
		A	B	C	D	E	F	
1	TSS	< 50	< 50	< 50	< 50	< 50	66	mg/L
2	Nitrate	< 10	0,72	< 10	< 10	< 10	< 10	mg/L
3	BOD	< 3	< 3	< 3	< 3	< 3	< 3	mg/L
4	COD	< 25	< 25	< 25	< 25	< 25	< 25	mg/L
5	Phosphate	> 0,2	< 0,2	> 0,2	< 0,2	< 0,2	< 0,2	mg/L
6	Sulfate	27,37 - 43,15	27,37 - 43,15	27,37 - 43,15	27,37 - 43,15	27,37 - 43,15	27,37 - 43,15	mg/L
7	TDS	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	mg/L
8	pH	8,14 - 8,7	8,14 - 8,7	8,14 - 8,7	8,14 - 8,7	8,14 - 8,7	8,14 - 8,7	-

Source: Nurrohman, Widyastuti, and Suprayogi, 2018.

70. The results are compared with the water quality standards as in Appendix 6 of Government Regulation No. 22 of 2022.

71. The water quality analysis results indicate the content of pollutants found in various sampling locations. The concentration of TSS at all test points met the class 2 quality standard, and the highest concentration identified at point F with a value of 66 mg/L. Intensive paddy farming and settlements at the downstream area cause this condition. For all test points the nitrate met the class 2 water quality standard, and the highest concentration recorded at point B, with a value of 0.72 mg/L. The use of fertilizers identified as potential sources such as chemical fertilizers or manure for nitrate contamination.

72. The highest concentrations of BOD and COD are recorded at point F, caused by agricultural and residential waste. The phosphate at sampling points of A and C have exceeded the water quality standard (Class 2). The higher phosphate concentration resulted from the use of fertilizers, detergents, and industrial wastewater discharge as well as household activities.

73. The sulfate concentration ranges from 27.37 to 43.15 mg/L, meeting the class 2 water quality standard. The TDS at all measurement points shows a value below the class 2 water quality standard. The highest TDS value is identified at point D, caused by dissolved materials from the use of fertilizera and carried by surface runoff. The average pH value in the Cimanuk River ranges from 8.14 to 8.7 and still meets the class 2 water quality standards.

74. In addition to comparison of concentration of key parameters with the standard, the Pollution Index (PI) method was also used to evaluate the water quality status. The following tables showed the classification and category of the Pollution Index.

Table 15: Quality Status Assessment Based on Pollution Index

Pollution Index (PI)	Water Quality
$0 \leq Pij \leq 1,0$	Meet Quality Standards (Good Condition)
$1,0 \leq Pij \leq 5,0$	Lightly Polluted
$5,0 \leq Pij \leq 10$	Moderately Polluted
$Pij \geq 10$	Heavily Polluted

Source: Nurrohman, Widyastuti, and Suprayogi, 2018.

Table 16: Cimanuk River Quality Status Results

Sample	Pollution Index (PI)	Water Quality
A	2,23	Lightly Polluted
B	4,22	Lightly Polluted
C	2,13	Lightly Polluted
D	2,05	Lightly Polluted
E	2,19	Lightly Polluted
F	5,95	Moderately Polluted

Source: Nurrohman, Widyastuti, and Suprayogi, 2018.

75. Overall, the river is categorized as lightly polluted, except at point F, where the water quality is moderately polluted.

76. More recent data on the water quality of the Cimanuk Watershed (Tomo segments) shown in Table 17. The data indicates that some key parameters have been exceeded, especially in dry season such as TSS (in March), BOD (in March), COD (in October), free chlorine (in March, June, and October), fecal coliform and total coliform (in March and June).

Table 17: Water Quality in Cimanuk River (Tomo Segment) – All units in mg/L, except expressed otherwise

Segment	Coordinate	Temperature	pH	Conductivity	TDS	TSS	DO	BOD	COD	NO2	NO3	NH3	Free Chlrorine	T-P	Phenols	Oil & Grease	Detergent	Fecal Coliform	Total Coliform
Standard (GR No. 22/2021) Class 2		Deviation 3	6 - 9	-	1000	50	4	3	25	0.06	10	0.2	0.03	0.2	0.005	1	0.2	1000	5000
Tomo-1 (March)	06o45'43.1" 108o08'03.1"	28 oC	8.2	217	144	74	6.9	3.8	19	<0.02	<1	0.1	0.1	<0.08	0.001	0.35	<0.08	2000	20000
Tomo-2 (June)	06o45'43.1" 108o08'03.1"	26 oC	7.8	208	133	38	6.5	<1	22	<0.02	<1	0.06	0.1	<0.08	0.002	<0.11	<0.08	15955	70837
Tomo-3 (October)	06o45'43.1" 108o08'03.1"	27 oC	8.1	214	153	9	7.3	2.8	30	<0.02	<1	<0.05	0.1	<0.08	0.004	<.011	0.08	39	321

Source: Environmental Performance Indicators Document (DIKPLHD, West Java, 2021)

77. To complete the data, a laboratory testing conducted for the water quality and noise and air quality. The sampling points for the measurement are presented in the following table and figure.

Figure 13: Map of Sampling Points for Air Quality, Water Quality and Noise Measurement

Code	Type of Sampling	Sub District	District	Coordinate	
CMaba01	Water	Torogongkidul	Garut	7°13'10.86"S	107°53'58.77"E
CMair01, noise01	Air, Noise	Torogongkidul	Garut	7°13'9.17"S	107°53'39.72"E
CMaba02	Water	Garut Kota	Garut	7°11'39.54"S	107°54'33.63"E
CMaba03	Water	Tomo	Sumedang	6°45'43.01"S	108° 8'0.53"E
CMair03, noise03	Air, Noise	Tomo	Sumedang	6°45'42.89"S	108° 8'5.40"E
CMaba04	Water	Bangodua	Indramayu	6°31'24.98"S	108°20'57.84"E
CMair04, noise04	Air, Noise	Bangodua	Indramayu	6°31'23.20"S	108°20'56.88"E
CMaba05	Water	Loh Bener	Indramayu	6°23'3.68"S	108°17'28.50"E
CMair05, noise05	Air, Noise	Loh Bener	Indramayu	6°23'6.18"S	108°17'26.30"E
CMaba06	Water	Cantigi	Indramayu	6°16'52.89"S	108°14'19.96"E
CMair06, noise06	Air, Noise	Cantigi	Indramayu	6°16'50.75"S	108°14'22.57"E

Source: Nurrohman, Widyastuti, and Suprayogi, 2018

B. Biological Resources

1. Aquatic Biota

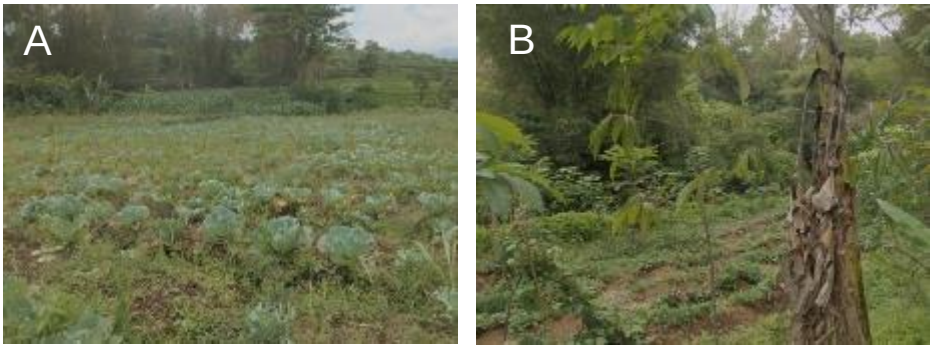
78. The nekton found in the river consists of various types of fish, among others: Belut/ Asian Swamp Eel (*Monopterus albus*), Belanak/ Grey Mullet (*Valamugil speigleri*), Keting/ Two-Spot Catfish (*Mystus nigriceps*), Julung-Julung/ Lutke's Halfbeak (*Hemiramphus lutkei*), Gelodok/ Shuttles Mudskipper (*Periophthalmus modestus*), Serrated Swimming Crab (*Scylla serrata*).

Those are cultivated, consumed, and catched by peole and has economic value. No protected aquatic biota identified in the project area (see Appendix 7).[19]

2. Terrestrial Flora and Fauna

79. Vegetation along the river banks generally consist of grass and cultivated plants such as Asian rice, corn trees, cassavas, beans, teaks, balsa trees, and others. The ecosystem of the proposed location is categorized as riparian areas, rice fields, fields, farmland, fishponds, and settlements.

Figure 14: (A) Ecosystem Upstream of Cimanuk River, (B) Ecosystem in Proposed Sabo Dam



Source: TRTA Consultants.

80. No protected flora has been identified in the subproject area as refers to the Indonesia regulation (Law No. 05 / 1990 on Conservation of Natural Resources and Ecosystems, Government Regulation No. 07 / 1999 on the Preservation of Plants and Animals, and Regulation of the Minister of Environment and Forestry P.106 / MENLHK / SETJEN / KUM.1 / 12 / 2018 on the Types of Protected Plants and Animals).

81. The type of fauna in the Cimanuk River watershed consists aves and insects. Insects found are butterflies, dragonflies, and others. Reptiles found are Asian water monitors and common sun skinks. It is shown that protected fauna species were found, which refers to the regulation.[20] The protected avifauna groups are Olive-Backed Sunbird (*Nectarinia jugularis*), Common Tern (*Sterna hirundo*), Javan Pond Heron (*Ardeola speciosa*), Collared Kingfisher (*Halcyon chloris*), Javan Kingfisher (*Halcyon cyanoventris*), Cerulean kingfisher (*Alcedo coerulescens*), Javan Blue-Banded Kingfisher (*Alcedo euryzona*), and Blue Eared Kingfisher (*Alcedo meninting*) as described in Appendix 7.

3. Protected and Conservation Area

82. **Garut District**. In reference to the Local Regulation No. 29 of 2011 concerning Garut Spatial Planning 2011-2031, the proposed subproject component are located in areas designated for Riparian, Rural Settlement, Urban Settlement, Land Movement, and Volcanic Eruption Prone

[19] Under Indonesia regulations (Law No. 05 / 1990 on Conservation of Natural Resources Hayati and Ecosystems, Government Regulation No. 07 / 1999 on Preservation of the Plants and Animals, and Regulation of the Minister of Environment and Forestry P.106 / MENLHK / SETJEN / KUM.1 / 12 / 2018 on the Types of Protected Plants and Animals)

[20] See Footnote 20.

Areas. Based on the regulation, the proposed subproject component does not conflict with the Spatial Plan.

83. **Sumedang District**. In reference to the Local Regulation of Sumedang No. 2 of 2012 on Spatial Planning of Sumedang 2011-2031, the proposed subproject component are located within riparian area. Accordingly, the proposed subproject component comply with the Spatial Plan.

84. **Majalengka District.** In reference to the Local Regulation Number 11 of 2011 concerning Regional Spatial Planning of Majalengka 2011-2031, the proposed subproject component comply with the spatial plan.

85. **Indramayu District**. In reference to the Local Regulation No. 1 of 2012 concerning Spatial Planning of Indramayu of 2011-2031, the planned location of the downstream reach of CM-11 (Raising Dikes along Rambatan Channel) is identified as the Protected Mangrove Forest Areas. For that reason, the proposed downstream reach (CM-11) is divided into three sub-reaches, and the sub-reach in the vicinity of forest area (CM 11a) has been excluded from the intervention. The areas of 3 km long toward the sea will not be dredged. Other subproject components are identified as land allocated for Aquaculture Fisheries Areas, Food Crops Agricultural Areas, Community Forest Areas, and Residential Areas, and comply with the spatial plan.

86. In addition, the subproject location also complies with Provincial Spatial Plan as stipulated in the letter of Highways and Spatial Planning Agency of West Java Province No. 763/PUR.02/Bid.PR concerning Information on Conformation of Cimanuk River Flood Control Activities with the West Java RTRTW (spatial plan). In reference to this letter, confirmed that the subproject location comly with the spatial plan.

87. Referring to the Decree of the Minister of Environment and Forestry SK. 7594/MENLHK-PKTL/IPSDH/PLA.1/9/2022 concerning Indicative Map of New Permit Moratorium, the location of the proposed subproject is not located in the prohibited areas for the new permit. Formally under AMDAL study, the subproject applies for an approval/recommendation for the spatial plan compliance from the local spatial agency and central level ATR/BPN.

88. From the above assessment concluded that the subproject location complies with national, provincial and district's spatial plan. No protected areas are located in the proximity of the project.

C. Social Economy

89. According to the Central Bureau of Statistics (BPS) Agriculture, Forestry, and Fishery; Wholesale and Retail Trade, Repair of Vehicles and Motorcycles; Manufacturing Industry; Construction; and Education Services dominate Garut economy over last five years (2016-2020). The highest share in 2020 was generated by Agriculture, Forestry, and Fishery sectors. This sector accounts for 38 percent of the regency's GRDP in 2020 (this figure increased from 37.1 percent in 2019). The share of the second-largest Wholesale and Retail Trade, Repair of Vehicles and Motorcycles in 2018-2019, has increased but decreased in 2020. In comparison, the share of the other three categories decreased in 2020. In general, the main cause of changing the share is due to the covid-19 pandemic.

90. According to the Central Bureau of Statistics (BPS) Manufacturing Industry; Agriculture, Forestry, and Fishery; Wholesale and Retail Trade, Repair of Vehicles and Motorcycles; Construction; and Education Services dominate Sumedang economy over last five years (2016-2020). The highest sector in 2020 was produced the Manufacturing sector, which contributed 20 percent of Sumedang 's GRDP in 2020 (this figure increased from 19 percent in 2019). The share

of Agriculture, Forestry, and Fisheries is the second sector that has increased in 2018-2020. Meanwhile, the share of the other three categories increased in 2019 and decreased in 2020. In general, the main cause of changing the share is due to the COVID-19 pandemic.

91. According to the Central Bureau of Statistics (BPS) Agriculture, Forestry, and Fishery; Manufacturing Industry; Wholesale and Retail Trade, Repair of Vehicles and Motorcycles; Construction; and Education Services dominate Majalengka economy over last five years (2016-2020). The highest sector in 2020 was produced by the Agriculture, Forestry, and Fisheries sector by contributing 22 percent of the regency's GRDP 2020. The share of the second-largest Manufacturing Industry in 2018-2020 has increased. In comparison, the share of the other three categories increased in 2019 and decreased in 2020. In general, the main cause of changing the share is due to the covid-19 pandemic.

92. According to the Central Bureau of Statistics (BPS) Manufacturing Industry; Agriculture, Forestry, and Fishery; Wholesale and Retail Trade, Repair of Vehicles and Motorcycles; Construction; and Mining and excavation dominate Indramayu economy over last five years (2016-2020). The highest sector in 2020 was produced by the Manufacturing Industry sector contributing 42 percent to the regency's GRDP 2020. The role of Agriculture, Forestry, and Fisheries were the second largest in 2019, decreased, and in 2020 increased. Meanwhile, the share of the other three categories increased in 2019 and decreased in 2020. In general, the main reason for the changing share of several business categories is due to the COVID-19 pandemic.

D. Social Culture

1. Population

93. Based on BPS data, the population of Garut in 2021 recorded 2,604.79 people and population growth of 0.56% per year since 2020. With an area of about 3,065.19 square km, the population density of Garut is 849.80 people per year. square kilometers. In line with population growth, this population density has increased compared to the previous year, reaching 843.54 people per square kilometer. The total workforce in Garut in 2021 recorded 1,200,346 people, consisting of 1,096,134 people working and 104,212 unemployed. Meanwhile, the non-labor force reached 712,370 people. The male population aged 15 years and above recorded 958,515 people, while the female population was 954,201 people. By occupation, most of them are entrepreneurs (self-employed) as recorded 262,589 people.

94. Based on BPS data, the population of Sumedang in 2021 recorded 1,159,346 people and population growth of 0.6% per year since 2020. With an area of around 1,558.72 square kilometers, the population density of the Sumedang is 739 people per square kilometer. This population density has increased compared to the previous year in line with population growth. The total workforce in Sumedang in 2021 recorded 639,867 people, consisting of 581,097 people working and 58,770 unemployed. Meanwhile, the non-labor force reached 294,136 people. The male population aged 15 years and above recorded 461,671 people, while the female population was 472,332 people. By occupation most of them are entrepreneurs (self-employed) as recorded 118,731 people.

95. Based on BPS data, the population of Majalengka in 2021 recorded 1,318,965 people and population growth of 1.38% per year since 2020. With an area of about 1,204.24 square kilometers, the population density of the Majalengka is 1,096 people per square kilometer. The total workforce in Majalengka in 2021 recorded 651,599 people, consisting of 614,417 working people and 37,182 unemployed people. Meanwhile, the non-labor force reached 311,882 people.

The male population aged 15 years and above recorded 477,036 people, while the female population was 486,445 people. By occupation most of them are entrepreneurs (self-employed) as recorded 116,601 people.

96. Based on BPS data, the population of the Indramayu in 2021 recorded 1,851,383 people and population growth of 0.92% per year since 2020. With an area of about 2,099.42 square kilometers, the population density of the Indramayu is 881.85 people per square kilometer. The total workforce in Indramayu in 2021 recorded 954,521 people, consisting of 875,280 working people and 79,241 unemployed people. Meanwhile, the non-labor force reached 411,887 people, dominated by taking care of the household as many as 266,110 people. The male population aged 15 years and overreached 702,298, while the female population was 664,110 people. By occupation most of them are entrepreneurs (self-employed) as recorded 192,644 people.

2. Historical or Cultural Sites

97. There is a site or cultural heritage around the location of the subproject, which officially registered with the Ministry of Education and Culture of the Republic of Indonesia. In the vicinity of the sub-project location, there is 1 (one) building in the form of an old building called Gedung Eks. Assistant Resident of Indramayu in Penganjang Village, Sindang Sub-District, Indramayu (6°19'22"S and 108°19'07"E). It is about 4.9 km from the sub-project location. Wit the relative long distance, it the sub-project will not affect the historical buildinga.

Figure 15: Gedung Eks. Assistant Resident of Indramayu

Source: TRTA Consultants.

98. In addition to the buildings recognized as cultural heritage, there are several tombs of ancestors or former people around the sub-project. The following table provides data related to sacred tombs around the sub-project location.

Table 18: Tomb Around the Location of the Sub-Project

No	Name of Tomb	Location	Coordinate Point	Distance to Sub Project
1	Patragati's Tomb	Bojongslawi Village, Lohbener Sub-District, Indramayu.	6°25'33.69"S 108°17'36.80"T	60 m
2	Mudang's Tomb	Jatisawit Village, Jatibarang Sub-District, Indramayu	6°25'40.12"S 108°17'45.65"T	165 m
3	Wangsaita's Tomb	Lohbener Village, Jatibarang Sub-District, Indramayu	6°24'2.46"S 108°17'31.55"T	40 m

Source: Survey Result, 2021

99. The location of the three graves is quite close to the sub-project area. However, the work to be carried out near the tomb area is not large, so it will not impact or affect the tomb.

Figure 16: Tomb Around the Location of the Sub-Project

(a) Patragati's Tomb

(b) Mudang's Tomb

(c) Wangsaita's Tomb

Source: TRTA Consultants.

3. Indigenous People

100. There are no indigenous people around the proposed subproject, but there are some in the proximity of the the sub-project location, namely Pulo Village. Pulo Village is one of the traditional villages in Cangkuang Village, Leles Sub-District, Garut, West Java Province.

101. The location of Pulo Village is 9.35 km from the sub-project location and is not included in the proposed subproject. Thus, the sub-project does not affect indigenous people.

Figure 17: Indigenous Peoples in West Java Province

Source: TRTA Consultants.

E. Health

102. Statistic data of Garut District (2021) shows the morbidity rate of 11.38%, which more women are sick. The residents who seek outpatient treatment using health insurance in 2021, recorded 22.63% for female and 19.46% for male, respectively. The remaining 57.91% seek treatment without using health insurance for outpatient treatment, for any reasons including no medical expenses, no transportation costs, no means of transportation, and long waiting times for services. In fulfilling immunizations, children under five receive various types of immunization, including BCG, DPT, Polio, Measles/MMR, and Hepatitis B. An 83.66% of toddlers have immunization cards, and as many as 49.5% have received complete immunizations.

103. Statistic data of Sumedang District (2021) shows the ’morbidity rate of 9.86%, which more women are sick. The residents who seek outpatient treatment using health insurance in 2021 recorded 39.25% for female and 27.52% for male, respectively. The remaining 33.23% seek treatment without using health insurance for outpatient treatment, for any reasons including no medical expenses, no transportation costs, no means of transportation, and long waiting times for services.. In fulfilling immunizations, children under five receive various types of immunization, including BCG, DPT, Polio, Measles/MMR, and Hepatitis B. 92.88% of children under five have immunization cards. As many as 77.65% have received complete immunizations.

104. Statistic data of Majalengka District (2021) shows the morbidity rate of 12.12%, which more men are sick. The residents who seek outpatient treatment using health insurance in 2021 recorded as 24.15% for female and 26.78% for male, respectively. The remaining 49.07% seek treatment without using health insurance for outpatient treatment, for any reasons including no medical expenses, no transportation costs, no means of transportation, and long waiting times for services.. In fulfilling immunizations, toddlers receive various types of immunization, including BCG, DPT, Polio, Measles/MMR, and Hepatitis B. 92.92% of toddlers have an immunization card. As many as 69.52% have received complete immunizations.

105. Statistic data of Sumedang District (2021) shows the morbidity rate of 20.77%, which more women are sick. The residents who seek outpatient treatment using health insurance in 2021 recorded as 19.97% for female and 21.52% for male, respectively. The remaining 58.51% seek treatment without using health insurance for outpatient treatment, for any reasons including no medical expenses, no transportation costs, no means of transportation, and long waiting times for services. In fulfilling immunizations, toddlers receive various types of immunization, including BCG, DPT, Polio, Measles/MMR, and Hepatitis B. 94.03% of toddlers have an immunization card, and 42.58% have received complete immunizations.

F. Public Sanitation

106. BPS data shows that 76.78% of the population of Garut in 2021 have their defecation facilities. The sources of clean water are bottled drinking water/refillable water (0.09%), piped clean water (3.55%), pump water (14.45%); protected wells/springs (54.19%), unprotected springs (21.9%), and others (0.09%).

107. Based data (2020), most residents of Sumedang (91.37%) have their defecation facilities. The clean water for bathing, washing, and others come from various sources, consisting of piped clean water (11.79%), borehole water/pumps (19.91%), protected wells/springs (61.35%), and unprotected springs (6.84%), and others (0.11%).

108. Based data (2020), most residents of Majalengka (88.42%) have their defecation facilities. Water supply for bathing, washing, and others come from various sources, as follows piped clean water (3.44%), borehole water/pumps (42.86%), protected wells/springs (49.14%), and unprotected springs (3.76%).

109. Based data (2020), most residents of Indramayu (80.47%) have defecation facilities. Water supply for bathing, washing, and others come from bottled/refilled water (0.53%), piped clean water (27.53%), borehole water/pumps (62.57%); protected wells/springs (7.76%), unprotected springs (1.48%), and others (0.12%).

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Project Area of Influence

110. ADB SPS (2009) require that impacts and risks are analyzed for the conditions reflecting pre-construction, construction, and operational stages within the subproject's area of influence. As such, this section reviews potential subproject-related impacts to identify issues requiring further attention and to screen out issues of no relevance. A similar scoping process was carried out in the Indonesia AMDAL system.

111. All proposed subprojects are located in the Cimanuk River body, but the distance among the subprojects locations is very far, thus, it is expected that there is no interaction of impact among the subprojects during the construction phase. Negative impacts on the environment are expected to occur when excavation and embankment works are carried out during the construction phase. While the main positive impact is expected to occur during the post-construction phase in the form of reduced flood potential in the affected area. The location of subprojects is far from the protected areas, so it is not expected to have a direct effect on the protected areas. The subprojects will be within the properties held by the local government and access to the subproject locations is through the public rights-of-way and existing roads.

112. Impacts and risks were analyzed in the context of the project's area of influence with associated facilities including affected upstream and downstream areas and offsite works such as borrow areas, quarries, spoil disposal areas, waste disposal, transport routes, and work camps, and storage areas. The IEE's area of influence for assessing potential impacts on air, water and noise is about 100-200m from their boundary or median. For biodiversity and eco-system assessment, the coverage however is much wider, covering all vegetation communities and fauna habitats of several kilometers.

113. There are no sensitive receptors such as schools, hospitals, or religious facilities in the area of influence, except some temporary and semi permanent houses as reported and assessed in LARP document of this project.

B. Assessment of Potential Environmental Impacts

114. Anticipated potential impacts resulting from the construction and operation :

(i) Dredging and sediment removal (transport and disposal area);
(ii) Potential disturbance to biodiversity (at the project site and proposed sediment disposal area);
(iii) Impacts due to construction activities such as water pollution, soil erosion and sedimentation, vibration, air and sound pollution, occupational health and safety, traffic safety, disease transmission, and access to local communities;
(iv) Loss of river and riparian habitat and changes in water quality due to dredging; and
(v) Potential disruption of community comfort and negative public perceptions arising from work at the construction stage that disturbs sacred cultural places.

115. Subsequently, the potential impacts have been summarized and grouped based on the development phases, i.e., pre-construction phase, construction phase, and post-construction (operation and maintenance phase).

C. Anticipated Impacts and Mitigation Measures

1. Design/ Pre-Construction Phase

116. **Overall Mitigation Measures.** Mitigation measures during the design/pre-construction phase include planning the project to minimize impacts in site selection and design, and planning the implementation of mitigation measures specified for the construction and operation phases including (i) ensuring all approvals and permits are in place; (ii) ensuring environmental requirements are incorporated in contract documents; (iii) Contractor to prepare a construction Environmental Management Plan (including Dredging Management Plan, Appendix 9) describing how the Contractor will ensure the work complies with the environmental requirements; (iv) Community consultation and project information disclosure; (v) establish Grievance Redress Mechanism; (vi) Contractor to prepare Occupational Health and Safety Plans, and (vii) Plan the project to maximize local labor and business participation (enhancing for positive impacts of social-economic aspects).

a. Climate Change Vulnerability

117. Climate change adaptation considerations have been included in the design of proposed subprojects. Climate changes and increasing rainfall intensity will generate frequent flooding. Changes in the intensity of extreme weather events as well as gradual changes in climate parameters such as precipitation can be damaging to the proposed project.

118. Insufficient attention to these impacts could increase the long-term costs of sedimentation management and to the subproject. The impact can increase the likelihood that the investment will fail to deliver the benefits as intended.

119. As shown in the screening (Table 2: Climate Screening, Appendix 1), this subproject is categorized as high score to climate change effects.

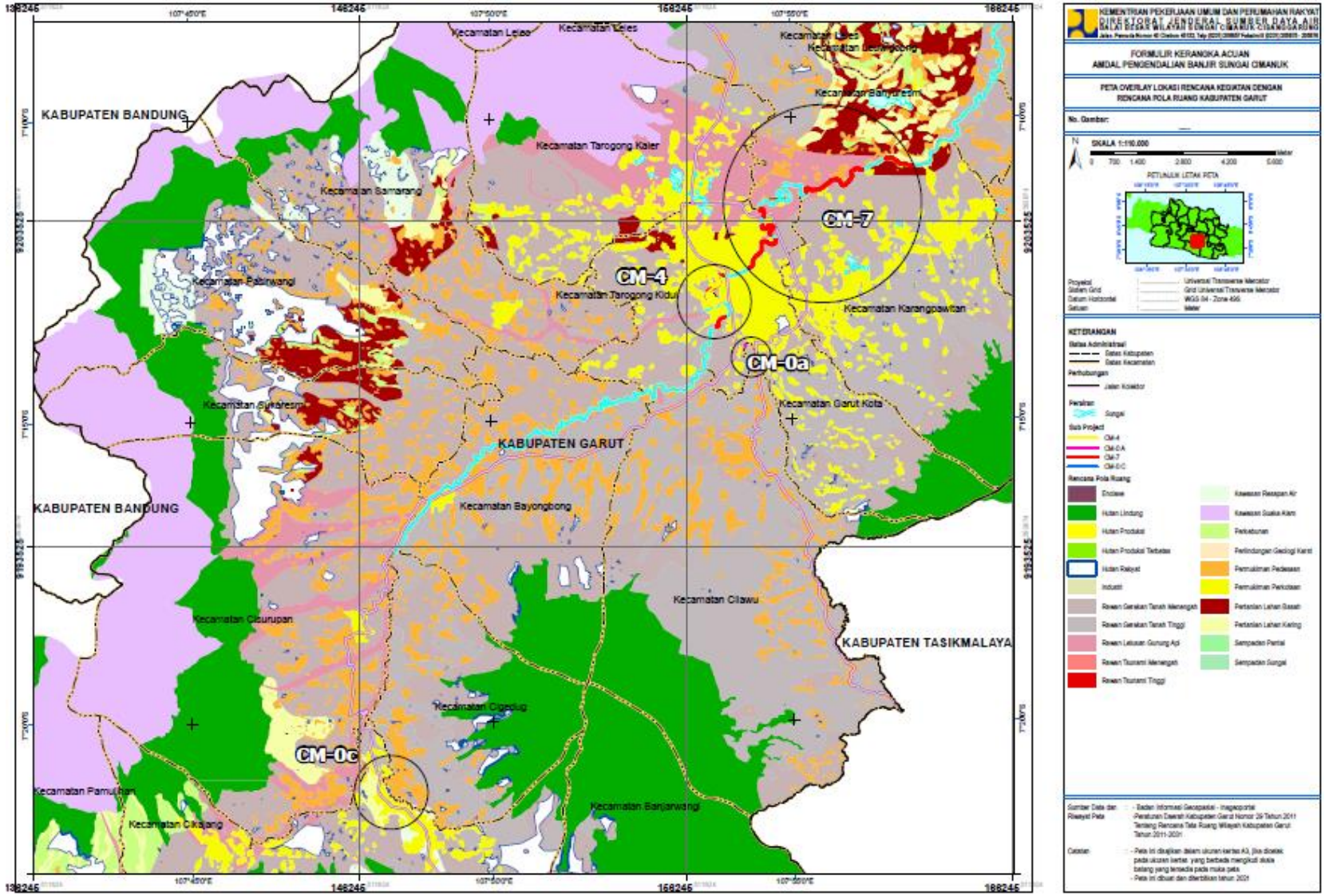
120. To appropriately address this impact, hydrology and hydraulic models were developed for the proposed subproject (during the design phase by considering extreme weather events).[21]

b. Sites Selection

121. **Land Use Change (Site's Conformity to Spatial Plan)**. The subproject complies with the regional spatial plans (RTRW) of Garut, Sumedang, Majalengka, and Indramayu and and riparian zone, as shown in Figure 18 – 21 . The project areas are already plotted in the spatial planning map of each district for the development of flood structural measures.

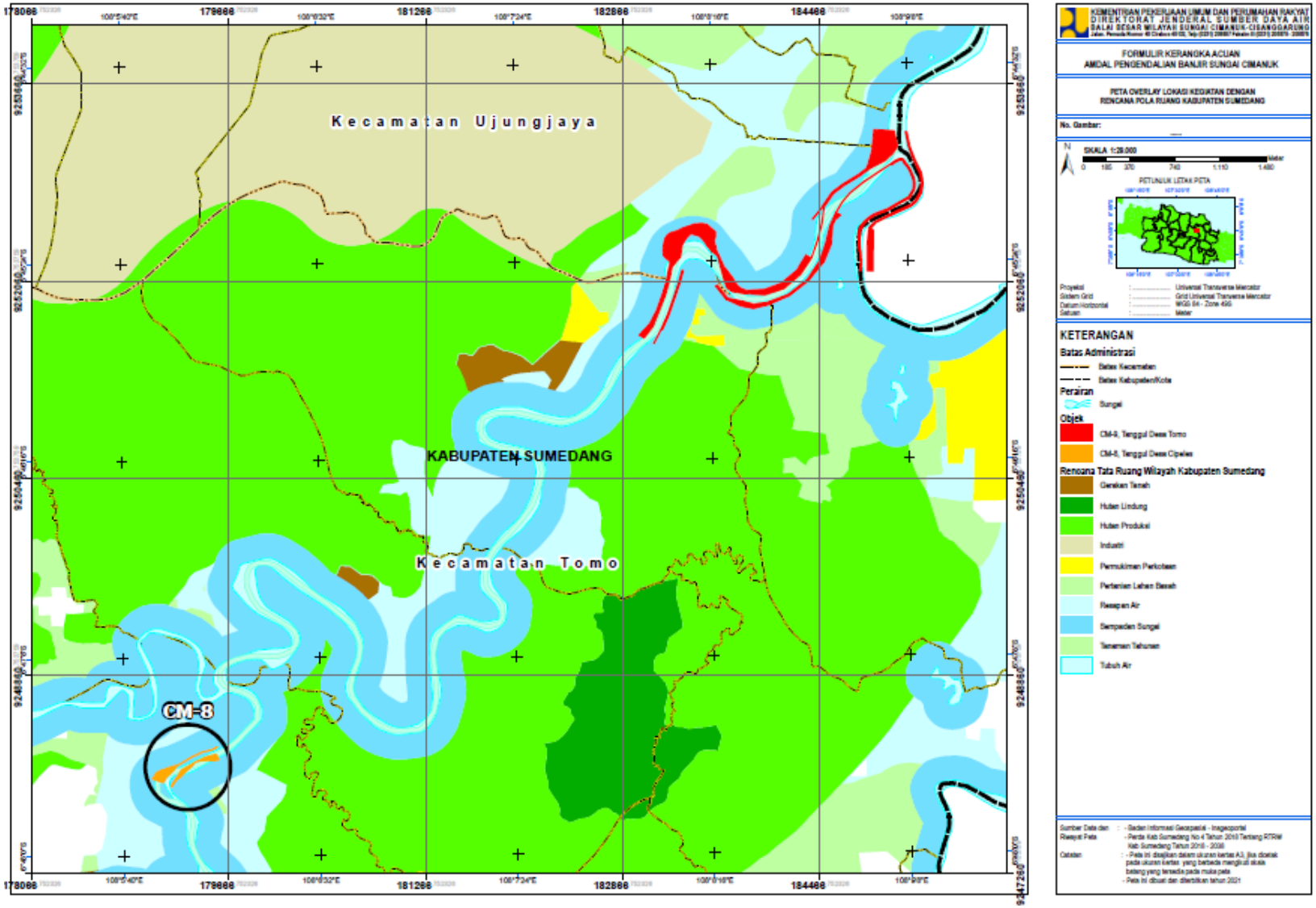
[21] Climate change projections of GOI's Climatology Meteorology and Geophysics Agency, the Dinas Meteorologi, Klimatologi, dan Geofisika (BMKG) were considered.

Figure 18: Regional Spatial Plan (RTRW) of Garut



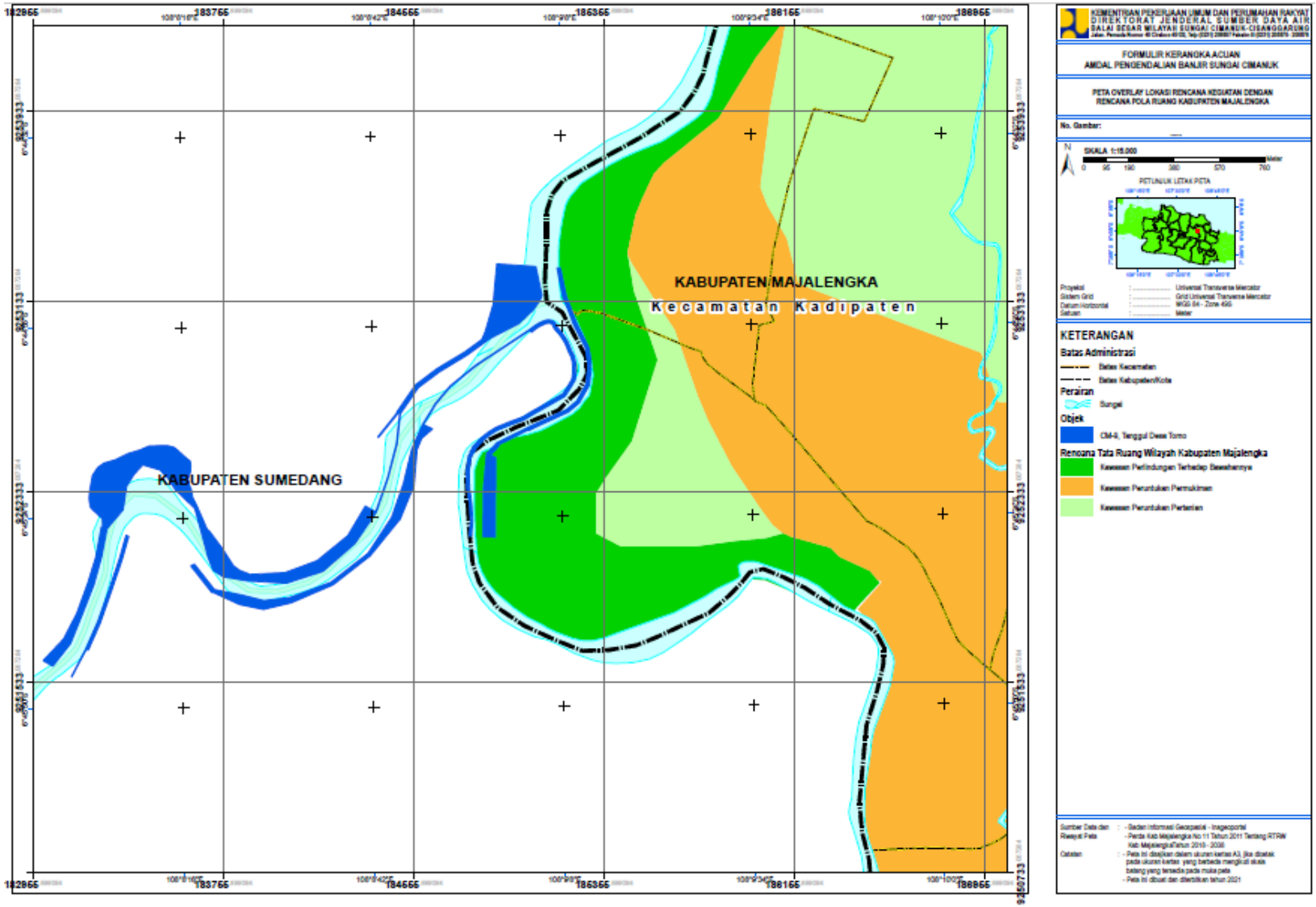
Source: Garut Regulation Number 29 of 2011.

Figure 19: Regional Spatial Plan (RTRW) of Sumedang



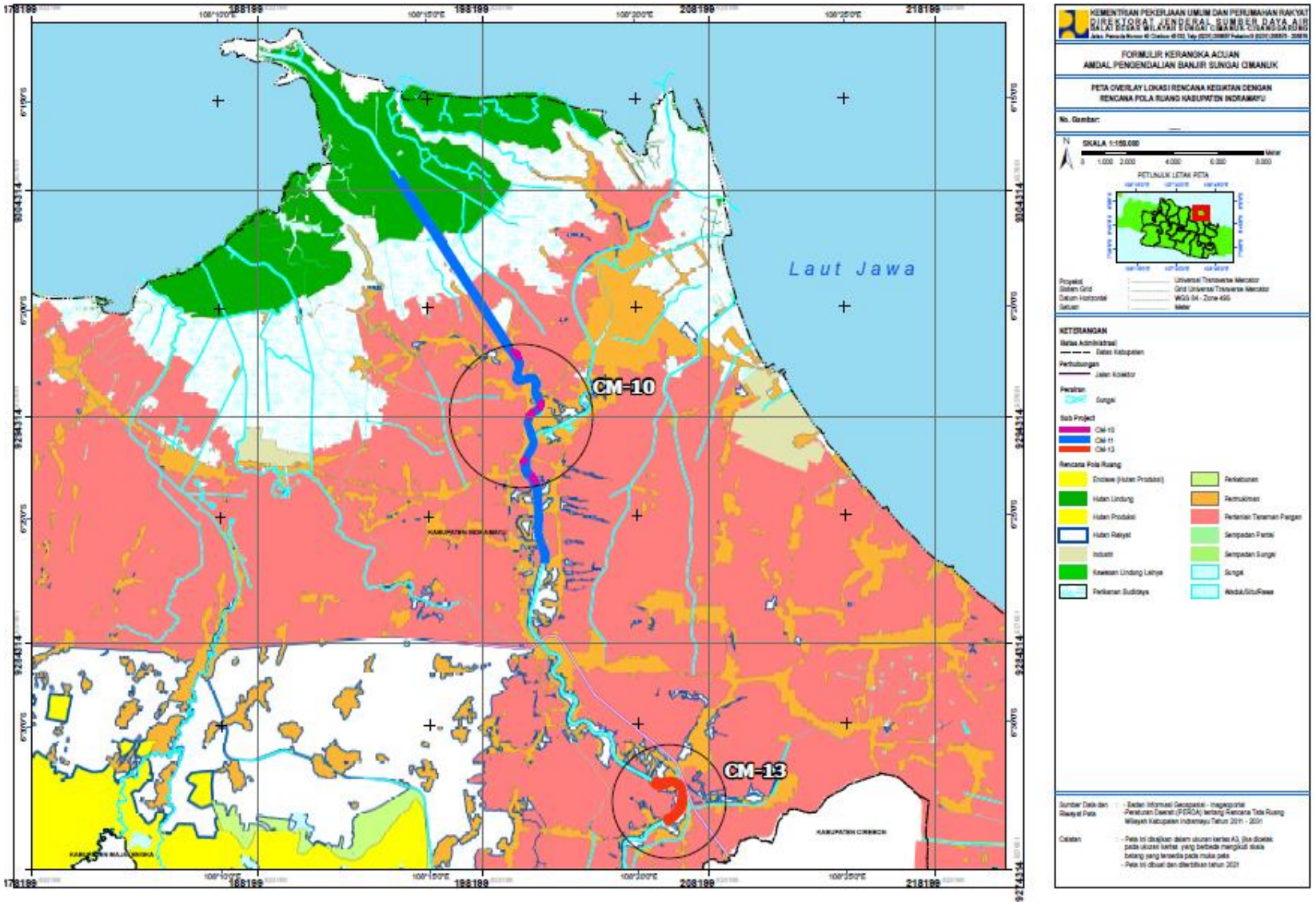
Source: Sumedang Regional Regulation Number 2 of 2012.

Figure 20: Regional Spatial Plan (RTRW) of Majalengka



Source: Majalengka Regulation Number 11 of 2011.

Figure 21: Regional Spatial Plan (RTRW) of Indramayu



Source: Regional Regulation of Indramayu Number 1 of 2012.

122. **Encroachments to Environmentally Sensitive Areas.** There will be no encroachments to environmentally sensitive areas affected by the subproject. The subproject sites are not within undisturbed landscapes. The PIPPIB (Indicative Map for Moratorium of New Permit) show that the project area is not at the border or within a protected forest and wetland (Figure 22). The map, which is regularly updated by the Ministry of Environment and Forestry[22], indicates that no protected areas are affected along the proposed subproject. This finding is also supported by the Integrated Biodiversity Assessment Tool (IBAT) map generated as part of REA.

123. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Priority is to locate these facilities near the subproject locations. However, if it is deemed necessary to locate them elsewhere, sites to be considered shall not result in the destruction of property, vegetation, and public facilities. High density residential areas will not be considered for setting up camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals to the forest, water bodies, or areas that will inconvenience the community.

124. **Site selection of materials sources.** Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and waterlogging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be included in the design specifications and on plan drawings. Local Mineral Resources and Energy Agency (*Dinas Pertambangan dan Energi*) approved sites would be selected first. If other sites are necessary, these would be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage systems, and is structurally stable areas even if some distance from construction activities. It will be the contractor's responsibility to verify the suitability of all material sources and to obtain the approval of an authorized agency. If additional quarries are required during construction the contractor shall use the mentioned criteria to select new quarry sites, with the written approval of the CPMU.

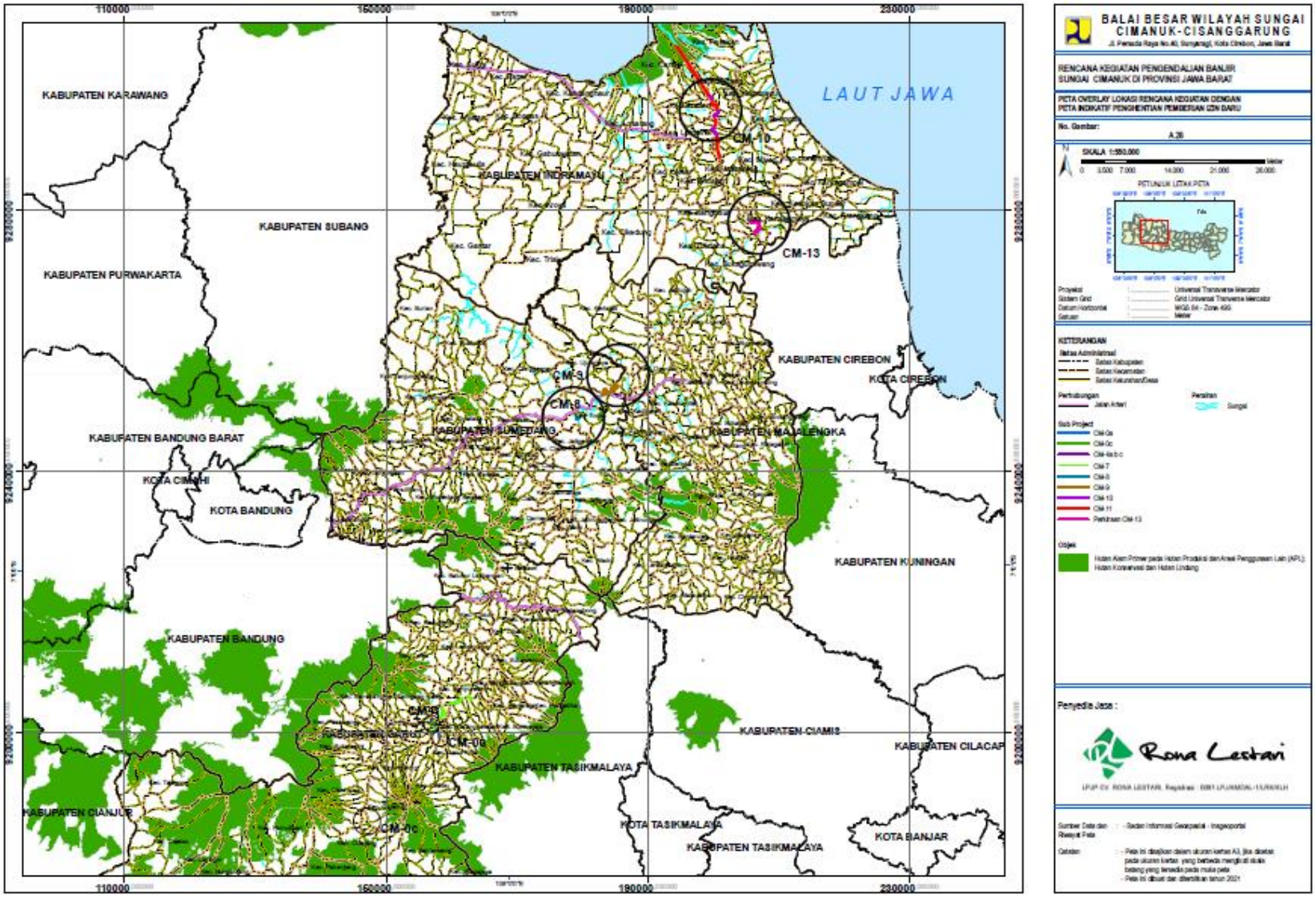
125. **Dredged Materials and Disposal Areas.** Dredging and excavation generate significant quantities of earth spoil. Management of spoil and disposal of excess spoil has the potential to impact land use, ecology, and water quality. For each subproject involving dredging and generation of excess spoil, the detailed design has been optimized to reuse spoil as much as possible in levee bank construction and other earthworks.

126. The proposed disposal area for the dredged materials (during the operational phase of a retention pond, construction of a drainage channel, or during construction for river normalization) has been part of DED activities, which shall include a quantitative analysis of spoil volumes and capacity of disposal sites. For the disposal, it shall be confirmed that the sediment is not categorized as hazardous waste (determined through the TCLP method) (Appendix 5).

127. The contractor shall prepare a dredging management plan as part of the contractor's EMP to be submitted for review by relevant agency or ADB as necessary. Each dredging management plan must highlight: key dredging processes; environmental considerations; potential impacts, mitigation and management; adaptive management strategies; and stakeholder consultation (where applicable). A sample template for the dredging management plan is presented in Appendix 8.

[22] MOEF Regulation No. SK.7594/MENLHK-PKTL/IPSDH/PLA.1/9/2022 on Indicative Map for Moratorium of New Permit (PIPPIB) Period II (2022).

Figure 22: Map of PIPPIB over Proposed Subprojects



Source: MPWH.

128. **Impacts and risks to biodiversity conservation**. The is not be located in areas that have a designation for biodiversity conservation. The site will be located in a riparian row in a way of rural area type. As indicated in Section IV.B.3, the biodiversity survey also indicated that there are no concerns about the biodiversity or protected forest around the proposed site and its surroundings.

c. Nuisance and Problems to the Public

129. The tender documents for proposed subprojects must include provisions addressing potential disturbances and problems to the public during construction. This should be reflected in the tender and construction contract of the proposed sub-project works.

130. During detailed design, construction methods have been chosen by evaluating their applicability (with consideration also to cost implications) and considered areas that are prone to traffic congestion and area with high-density housing and population.

131. The DED also review areas for quarry of construction material, borrow area for soil embankment, and disposal area for sediments. For the sediment testing (if required), the RBO shall also cooperate with a certified third-party service providers to comply with Indonesia's environmental regulations.

132. **Damage to Archaeological and Cultural Assets**. Only one building in the form of an old building called Gedung Eks. Assistant Resident of Indramayu in Penganjang Village, Sindang District, Indramayu Regency (6°19'22"S and 108°19'07"E) is 4.9 km from the sub-project location.

133. In addition to the buildings that are recognized as cultural heritage, there are several tombs of ancestors or former people around the sub-project which are well guarded and respected to this day by the surrounding community (see section IV.B.2)

134. During the construction phase, the contractor will avoid interference with the place that is respected by the community. The contractor will coordinate with caretakers or figures who have authority over the cultural heritage building.

135. Precautions will be taken to avoid potential damage to any archaeological and cultural assets by the inclusion of provisions in tender and construction documents requiring the contractors to immediately stop excavation activities and promptly inform the local authorities if archaeological and cultural assets are discovered. A "chance finds" procedure will be prepared and included in the construction method.

136. If a cultural heritage object is found during construction activities. In that case, the work must be stopped, and immediately report the findings to the competent authorities in the field of protection of cultural objects, police, and/or other related agencies as stipulated in the Law of the Republic of Indonesia Number 11 of 2010 on Cultural Heritage in Article 23 Paragraph (1) states that anyone who finds objects suspected of being Cultural Conservation Objects, buildings suspected of being Cultural Conservation Buildings, buildings suspected of being Cultural Conservation Buildings, and/or locations suspected of being a Cultural Conservation Site must report it to the competent agency in the field of culture, Police, and/or related agencies no later than 30 (thirty) days after it is found.

2. Construction Phase

137. Construction activities will introduce a range of environmental, social, and safety impacts and risks through the activities including land clearing, excavation, filling, disposal of spoil, and civil works. These impacts can be managed through good practices including IFC EHS Guidelines, and *ADB Environment Safeguards: A Good Practice Sourcebook*.

138. Such temporary, localized impacts only occur during the construction and are manageable through proper mitigation measures outlined in EMP and subsequently made operational in Construction Environmental Management Plan (CEMP), as appropriate. The impacts include but are not limited to the following.

a. Water Pollution

139. Construction activities at and/or around water areas (such as clearing of vegetation, dredging, earthworks, and construction of infrastructure) can have a significant impact on water quality such as increased turbidity via suspension of sediment in the water column. The introduction of pollutants can have adverse impacts on aquatic flora and fauna (including benthic communities), and human health, for example, excessive nutrient loading leading to eutrophication, oxygen depletion, and toxic algal blooms in the water Detention Basin.

140. **Soil Erosion and Sedimentation.** Soil erosion may be caused by exposure of soil surfaces to rain and wind during site clearing, earthmoving, and excavation activities. The mobilization and transport of soil particles may, in turn, result in sedimentation of surface drainage networks, which may impacts on the quality of natural water systems and ultimately the biological systems that use these waters.

141. **Waste and wastewater from Construction Camps**. The contractor is expected to establish temporary workers' camps during construction. Depending on the number of workers and their origin. If there is only a small number of workers employed and most of them are locally hired, there is no need to establish a permanent construction camp.

142. Improperly managed silt runoff and sanitary wastes from camps may reach nearby areas. Poor sanitation and lack of proper solid waste management at the worker's camp will provide the conditions for vermin and other disease vectors that will easily multiply and infect the workers. This may lead to the transmission of diseases from the worker's camp to other areas. These conditions will increase public health risks.

b. Air Pollution and Noise

143. **Dust and Other Air Pollutants**. Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality at the construction sites. Anticipated impacts include specks of dust and an increase in the concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons).

144. During dry periods, dust may be generated from activities associated with the construction such as trenching, earthworks, and soil preparation. Other potential sources of air pollution are large stockpiles of construction materials such as soil and aggregates. Without any mitigating measures, dust generation could be problematic during dry periods.

145. During the construction phase, there will be two main sources of air emissions, i.e., mobile sources and stationary sources. Mobile sources are mostly vehicles involved in construction activities, whereas emissions from stationary sources include construction equipment and machinery, diesel generator sets, excavation/ grading activities, etc. It would not be possible to distinguish between the emissions from project construction vehicles and equipment and emissions from non-project vehicles.

146. Construction-related airborne dust can arise from both vehicular traffic generating fugitive dust on paved and unpaved roads (and especially where there are spillages of soil from construction transport vehicles to the public roads and soil/aggregate material handling and processing). The tender and contract documents will require the Contractor to identify via the Contractor's EMP/ Work Plan methods to control dust and compliance monitoring will be carried out by the Supervising Engineer.

147. **Noise**. Noise will occur during construction due to the use of vehicles, and equipment, movement of materials, and various construction activities. Trucks/material mobilization and construction equipment, which can generate noise of 80 dB(A) from a distance of 30 meters are among the potential sources of noise during construction. The issue is mostly applicable in excavation activities.

148. During the construction phase, the noise will be generated from various activities such as site clearing, excavation, erection, and finishing. For example, the operation of heavy earth moving equipment and machinery installation potentially generate noise up to 100 dB(A) at the work sites. It is also to be noted that manual labor will significantly contribute to the works during construction. Therefore, the noise will be lower.

149. The noise impact would be localized, temporary, and during working hours only. The impact will be discussed with communities during public consultation.

150. During construction activities, a range of standard mitigation measures will be applied to meet the IFC EHS and GOI standard (whichever is stricter). Nuisance from equipment noise can be mitigated with the use of sound suppression devices for the equipment. In areas near houses/settlements or noise-sensitive sites, noisy equipment shall not be operated from nighttime to early morning (19:00H – 06:00H). Noise levels due to construction activities should not exceed the objective of 55 dB(A) near schools and residential areas as mandated by the Decree of the Minister of State for the Environment No. 48 of 1996 on Noise Levels Standard and IFC EHS Guidelines. Temporary noise barriers may be used in areas of high noise impact. Workers using or working near noisy equipment shall be provided with suitable hearing protection.

151. The Contractor shall be responsible for properly maintaining noise-generating machines. The Contractor will be required to produce operational Environmental Management Plans (including methods to control noise) to accompany normal Work Plans for approval by the Supervising Engineer. The Supervising Engineer will be responsible for immediate monitoring of compliance with environmental conditions and under Contract Conditions will be able to enforce immediate remedial action.

c. Occupational Health and Safety

152. Construction activities may pose a risk of exposure to dust, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms. Vehicular traffic and lifting equipment use in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions, and noise.

Slips and falls associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction sites.

153. Special precaution for water-related risks shall be implemented. Occupational health and safety planning and procedures shall be implemented following national standards and IFC EHS Guidelines.

154. **Community Health and Safety.** Impacts may arise from a vehicular traffic accident, nuisance from air pollution, decreasing water quality for public use (washing, bathing, and drinking), disturbance to public access to rivers, and impact on public safety related to excavation, and other construction activities. Community health and safety planning and procedures shall be implemented following IFC EHS Guidelines. However, as the construction occur mainly in rural area, such impacts might be minimum.

155. **Traffic Safety**. Construction activities may result in a significant increase in the movement of heavy vehicles for the transport of construction materials and equipment which increasing the risk of traffic-related accidents and injuries to workers and local communities. The narrow rural roads might be used for the transport of materials and sediment, which may increases the risk. As the volume of traffic generated below the criteria and the traffic impacts only occurs during construction, no ANDALALIN study required. The incidence of road accidents involving project vehicles during construction should be minimized through sound temporary traffic management planning in consultation with local traffic control authorities, as provided in EMP.

156. **Occupational Health and Safety at Work Sites**. Occupational health and safety planning and procedures shall be implemented following IFC EHS Guidelines. Hazards may exist in all construction sites in many different forms such as sharp edges, falling objects, flying sparks, chemicals, noise, and various potentially dangerous situations. Good practices in construction occupational health and safety requirements that employers protect their employees from workplace hazards that can cause injury.

157. Implementation of the works shall refer to construction safety standards and Occupational Health and Safety Plan (OHSP), including health protocol for COVID-19, as applied in Indonesia and ADB requirements. The Contractor will train, direct, monitor, and control the contractors' staff on how good work practices are complied with to prevent accidents for the workers and the general public. This shall include, among others, emergency procedures with the required resources, a clear description of responsibilities and management, specific requirements of occupational health and safety policies and regulations, training requirements, and site safety rules.

d. Access to Local People

158. **Reduced Access to the Riparian Area.** Access to the river and other works areas will be restricted during construction due to public safety requirements. This may affect the local activities of local people who use river floodplains as agricultural land, livestock, or other economic activities. LARP report (as complementary to this draft IEE) already identified and proposed the handling of the social related issues of the people occupying the riparian area. Local communities will be consulted about this during construction and mitigation measures shall be put in place to address any concerns, where feasible.

e. Biodiversity (Flora and Fauna)

159. Construction of the subproject will require the clearing of riparian vegetation at several spots. During the field survey, the areas were assessed and found that they are farmland/gardens with vegetation in the form of grass and cultivated crops. No flora or fauna was found that was protected, threatened, or had conservation value. Therefore, it is expected that there will be no significant impacts on biodiversity.

160. All works are required to avoid natural/critical vegetation and habitats, including for the proposed disposal areas. For modified habitats, any loss of biodiversity shall be avoided but it it is not feasible, then the subproject shall ensure no net loss of biodiversity through minimizing, mitigating, and offsetting impacts.

161. It was also found that there will be no impacts on listed, rare, endangered, vulnerable, or threatened species of flora or fauna or communities as there are none potentially affected by the project, as per the secondary data and field survey conducted by the AMDAL's subcontractor. This includes the IUCN Red List or as defined in any national legislation.

162. The project will manage potential impacts on other fishes captured by local people for consumption, especially at the down stream. There will be no dredging at the downstream to protect the mangrove and fishery resources.

163. There are no areas of "Critical Habitats" that might be impacted[23]:

164. The project will not significantly convert or degrade "Natural Habitats", as defined in the *Asian Development Bank Safeguards Policy Statement*, 2009.[24]

165. There will be no impacts on the ecological components as identified in the national, provincial, or district requirements.[25],

[23] "*Critical Habitat: A subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities.*"

[24] *Natural Habitat: Land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions."* The significant conversion or degradation is (i) the elimination or severe diminution of the integrity of a habitat caused by a major, long- term change in land or water use; or (ii) the modification of a habitat that substantially reduces the habitat's ability to maintain viable populations of its native species. Significant conversion may include, for example, land clearing; replacement of natural vegetation (for example, by crops or tree plantations); permanent flooding (by a reservoir for instance); drainage, dredging, filling, or canalization of wetlands; or surface mining (SPS, Appendix 1, Section 8).

[25] As per the regulations including Law No. 11/2013 on Ratification of Nagoya Protocol on Access to Genetic Resources and Fair and Balanced Benefit Sharing of Its Utilization upon Biodiversity Convention; Law 18/2013 on Prevention and Eradication of Forest Destruction; Decree of Minister of Environment No. 62/2013 on Managing Agency for the Reduction of Emissions from Deforestation and Degradation of Forests and Peatlands; Government Regulation of the Republic of Indonesia No. 07 / 1999 on The Preservation of The Type of Plant and Animal; Government Regulation of The Republic Of Indonesia No. 8/1999 on Utilization of Wild Plants and Animals Species; Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.106 / MENLHK / SETJEN / KUM.1 / 12 / 2018 on The Types of Protected Plants and Animals.

166. The issue of displacement of rare or endangered species is not applicable since there are no known rare or endangered species within the proposed site, as discussed and presented in Section IV.B and Appendix 7.

f. Impact on physical cultural resources

167. **Potential Damage to Archaeological and Cultural Assets**. Although at present there is no significant archaeological and cultural assets that identified during this IEE, this potential during construction phase for these impacts requires precautionary measures.

168. The consultation will be carried out with authorities, experts, local organizations, and local people to identify the likely presence of archaeological and cultural assets potentially affected by the works. Construction contract documents will include provisions requiring the contractors to immediately stop excavation activities and promptly inform the local authorities if archaeological and cultural assets are discovered. Anticipating the possible finding, a “chance finds” procedure is included in CEMP.

g. Construction Wastes and Closure

169. **Non-Hazardous and Hazardous Waste.** The non-hazardous solid waste generated during construction activities includes inert debris from damaged facilities, excess fill materials from grading and excavation activities, scrap wood, and metals. Other non-hazardous solid wastes include office, kitchen, and workcamp wastes. Hazardous solid waste includes asbestos-containing demolition waste, contaminated soils, which could potentially be encountered on-site due to previous land use activities, or small amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill clean-up materials from oil and fuel spills.

170. **Oil and other hazardous materials were released**. The presence of oil products and other hazardous materials is expected in the construction, which includes fuel, oil, grease, paints, and solvents. These materials are associated with the operation of heavy equipment and vehicles and various construction activities. Some of these materials may accidentally be released into the environment.

171. The Contractors will be required to raise awareness for all workers regarding the prevention and management of spills and proper disposal of used containers. Fuel and oil shall be stored in a designated secured area provided with an impermeable liner to prevent accidental spills from seeping into the ground. The hazardous waste management will refer to GoI Regulation No. 22/2021 (Appendix IX).

h. Social Economic Impacts

172. **Increased Employment Opportunities at Work Sites**. The impacts are expected to be beneficial and significant since employment opportunities in the area will increase during the construction period.

173. Whenever possible, the Contractor shall be required to use available local labor for these construction activities. The recruitment of workers shall be coordinated with the local officials. Referring to baseline data (Section IV.D), there are enough qualified workers/laborers in the area and some of them are unemployed. The community also expressed during public consultation to be involved as a construction workforce.

174. **Maintaining Labor Standard**. The Contractor and PMU are responsible for ensuring that international labor standards– as reflected in national labor laws and regulations are adhered to. CPMU is ultimately responsible for monitoring compliance with national labor laws and regulations, provided that these national laws are consistent with international labor standards. CPMU or PIU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity; and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS and COVID-19 to employees and local communities surrounding the project sites. These will be monitored as part of the project's safeguards reporting requirements.

3. Operational and Maintenance Phase

175. The operation and maintenance of flood management infrastructure will generate a range of potential environmental impacts and risks which are identified and mitigated in EMP, including:

(i) Loss or reduction of lateral connectivity between the main river channel and floodplains.
(ii) Loss of riverine and riparian habitat and changes in water quality due to dredging.
(iii) Spillage during transport of dredged materials (if it is not at the river right of way).
(iv) Loss of biodiversity at the disposal area of dredged materials.
(v) Aesthetic and safety issues of dumping dredged materials at areas nearby people residents.

D. Cumulative Environmental Impacts

176. **Cumulative Effects.** The cumulative effects would be the increasing volume of sediment to be disposed of and difficulty to find suitable areas for disposal areas.

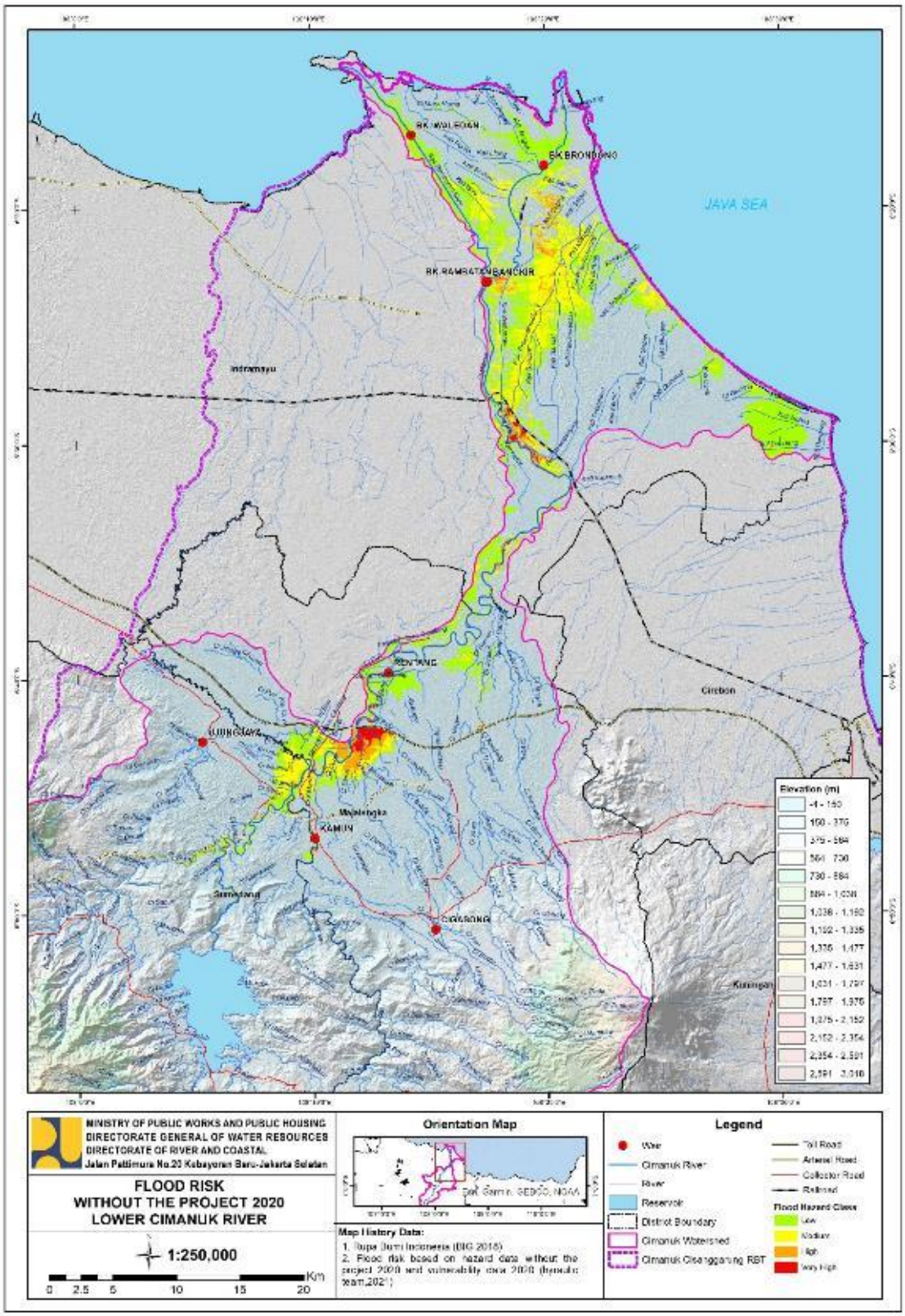
177. Indirect impacts are adverse and/or beneficial environmental impacts that cannot be immediately traced to a subproject activity but can be causally linked. Induced impacts are adverse and/or beneficial impacts on areas and communities from unintended but predictable developments caused by a subproject that may occur later or at a different location.

178. Other activities that would potentially add cumulative impacts of sedimentation, especially agriculture. As refer to the study in the Upper Cimanuk watershed the agricultural activities contribute to the increase of BOD, N, P, TSS, and pesticides. In addition, the dryland farming also contribute as a source of pollutant load in BOD parameter amounts to 15143.66 kg/day ; N parameter at 4,85 kg/day; P parameter at 34924.91 kg/day; TSS parameter at 1,17 kg/day; and pesticide parameter at 558.80 kg/day.[26]

179. The operation of flood control infrastructure is expected to impact positively, especially in reducing flood potential. The design team has simulated a flood scenario based on Q25 in the conditions before and after treatment, as shown in Figure 23 to Figure 30.

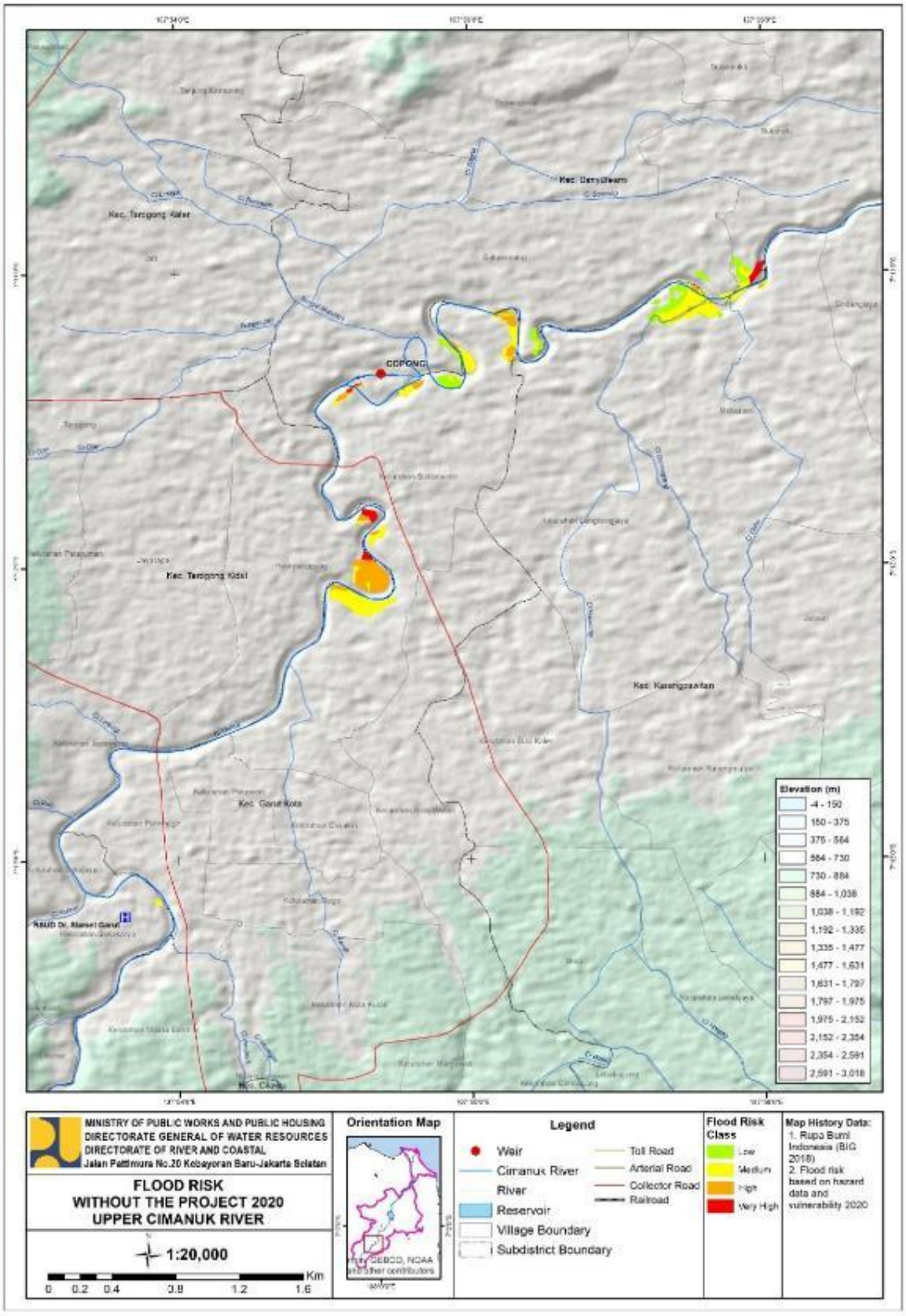
[26] Hatmoko, et al, "The Impact of Agricultural Activities on Load Capacity in the Upper Cimannuk", Indian Journal of Research, Volume VI/ December 2017.

Figure 23: Flood Risk Without Project (Lower Cimanuk River) – 2020



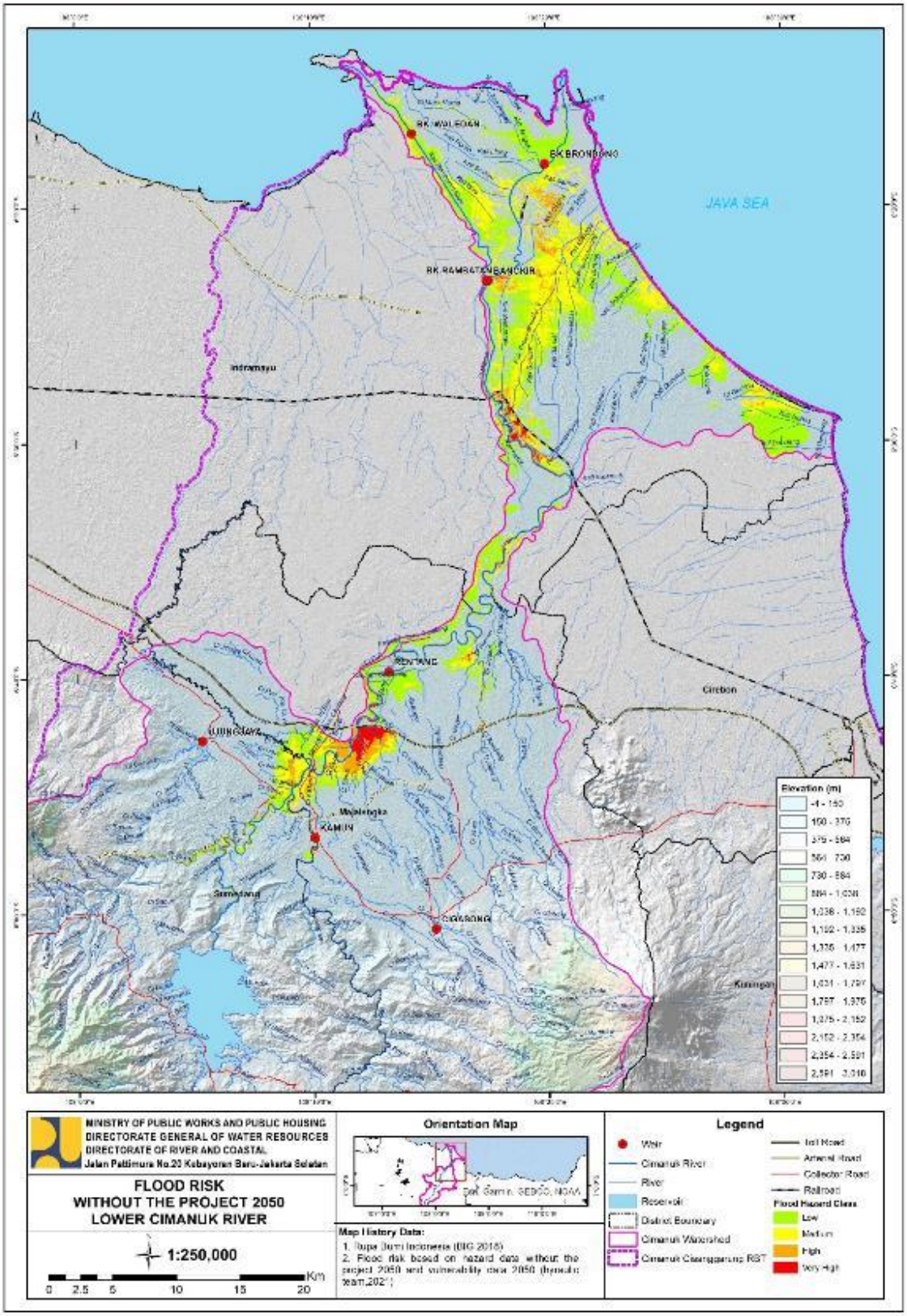
Source: Ministry of Public Works and Public Housing.

Figure 24: Flood Risk Without Project (Upper Cimanuk River) – 2020



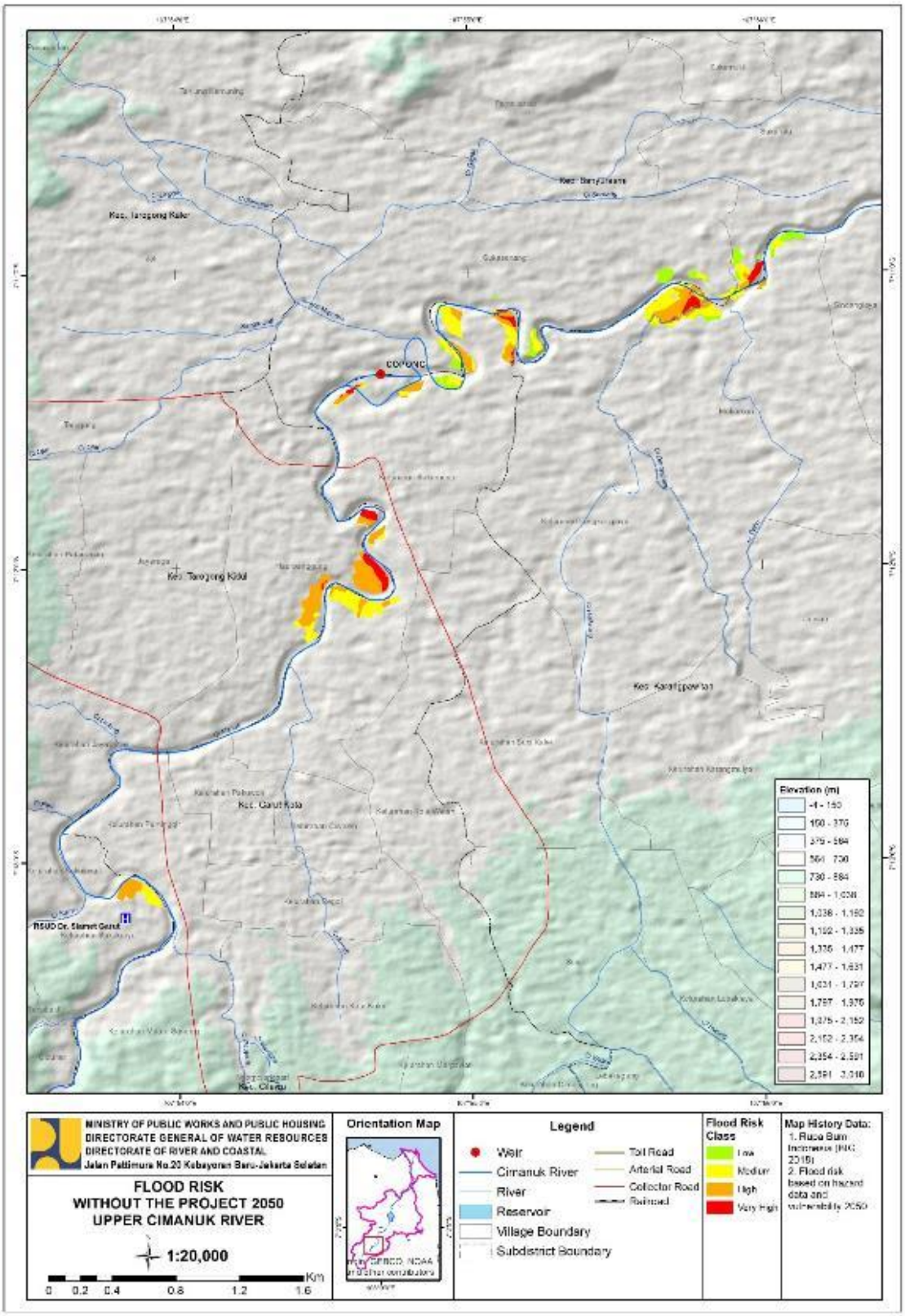
Source: Ministry of Public Works and Public Housing

Figure 25: Flood Risk Without Project (Lower Cimanuk River) – 2050



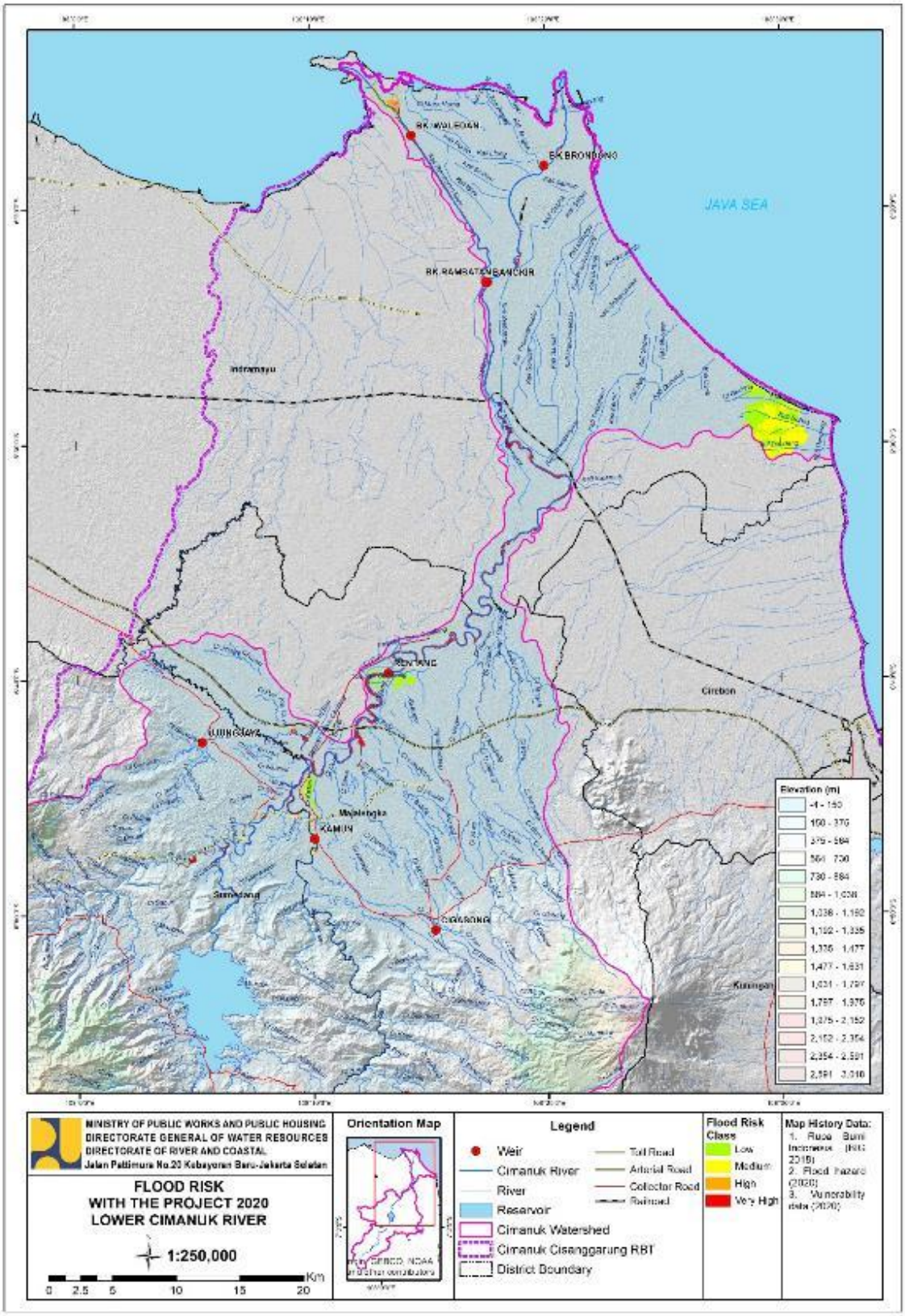
Source: Ministry of Public Works and Public Housing

Figure 26: Flood Risk Without Project (Upper Cimanuk River) – 2050



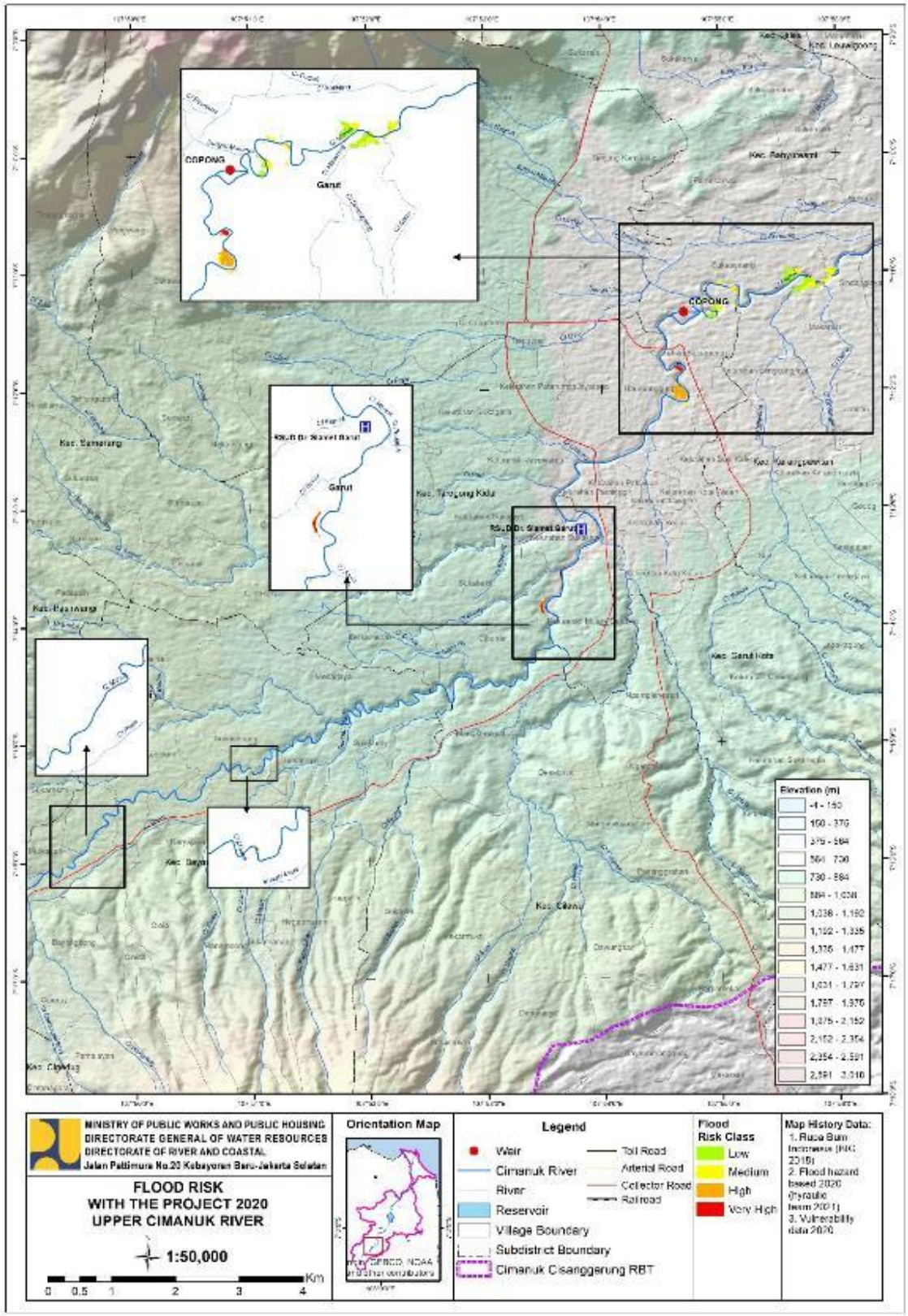
Source: Ministry of Public Works and Public Housing

Figure 27: Flood Risk With Project (Lower Cimanuk River) – 2020



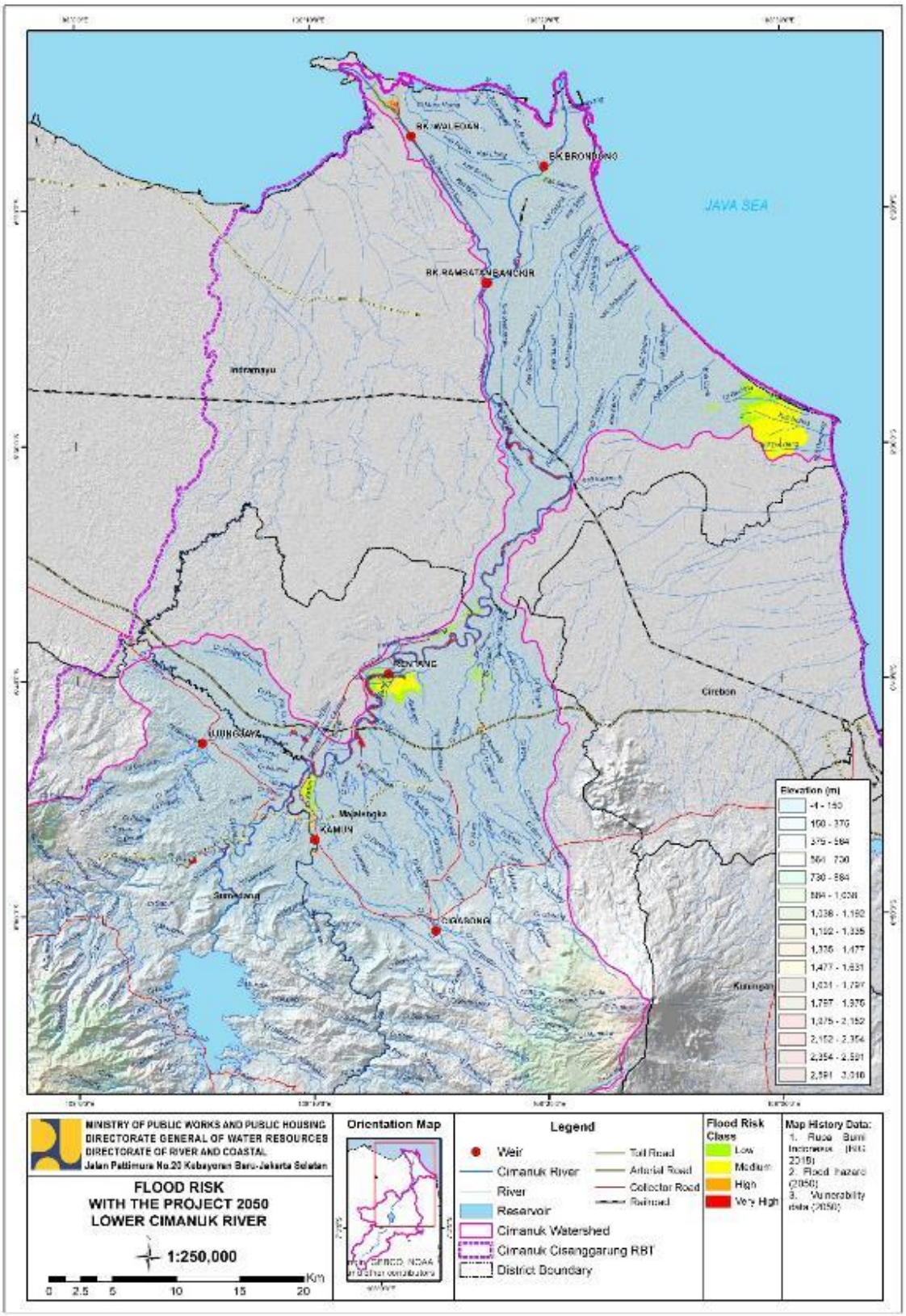
Source: Ministry of Public Works and Public Housing.

Figure 28: Flood Risk With Project (Upper Cimanuk River) – 2020



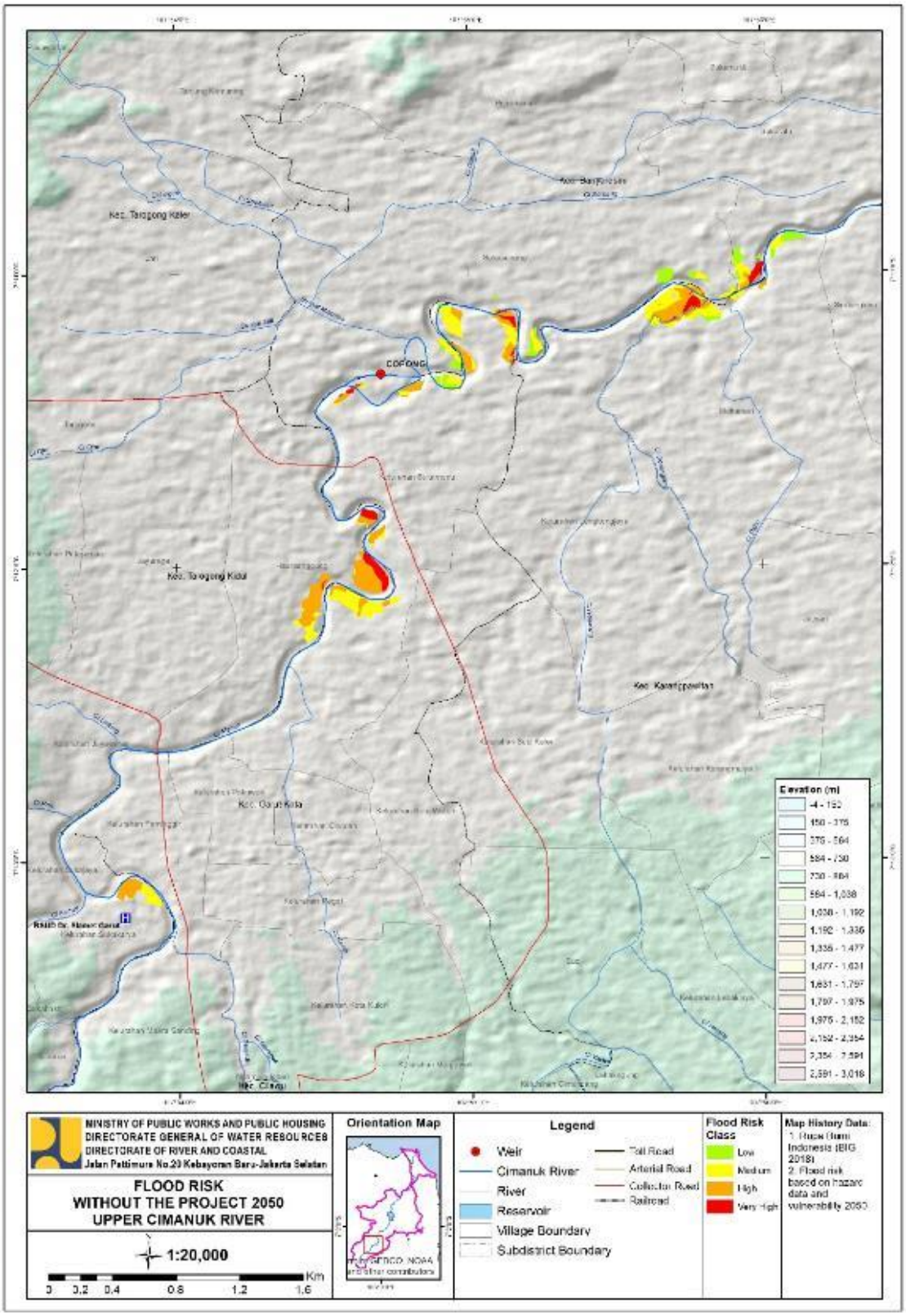
Source: Ministry of Public Works and Public Housing.

Figure 29: Flood Risk With Project (Lower Cimanuk River) – 2050



Source: Ministry of Public Works and Public Housing.

Figure 30: Flood Risk With Project (Upper Cimanuk River) - 2050



Source: Ministry of Public Works and Public Housing

E. Climate Change Impacts

180. In reference to REA (Checklist for Preliminary Climate Risk Screening), the subproject is categorized as Medium to High. The subproject has been designed to accommodate potential water level increase, and by considering associated hydro-meteorological parameters and future climate change conditions.

VI. ANALYSIS OF ALTERNATIVES

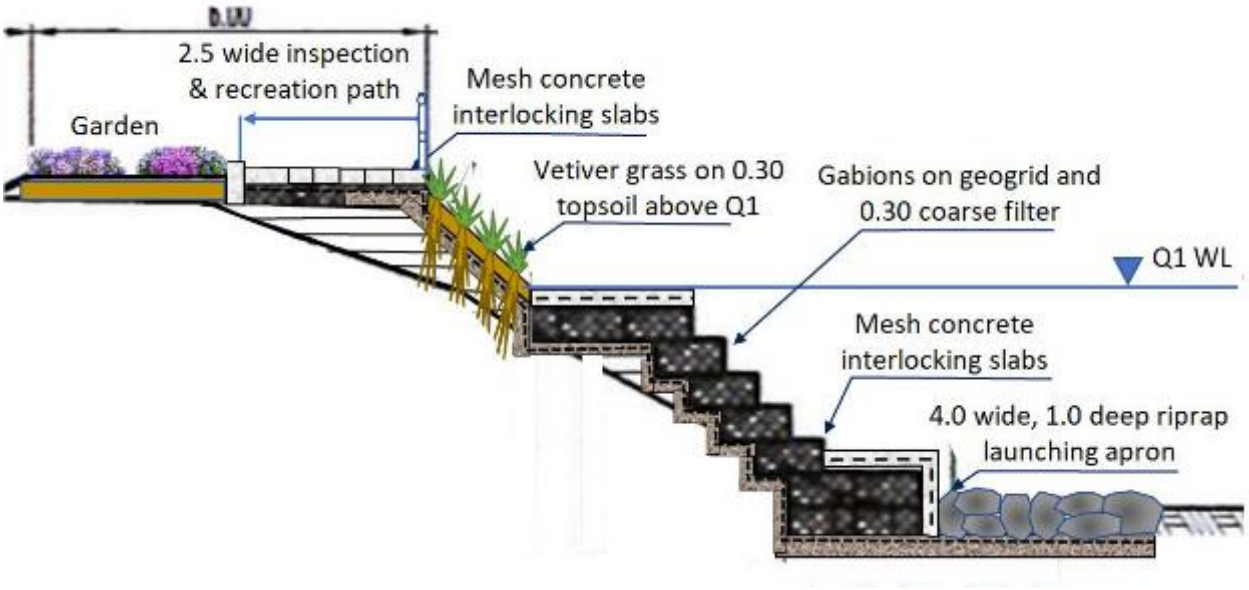
181. An analysis of subproject alternatives was undertaken during the pre-feasibility phase to determine the most financially and technically feasible way of achieving the project objectives while minimizing environmental and social impacts.

182. The consequences of the “no-project” alternative are a continuation of current conditions, which were identified in the TRTA pre-feasibility report as Scenario 1. Without the project, the existing condition of poor flood management will continue. With the subproject, as proposed by RBO (identified in the TRTA pre-feasibility report as Scenario 2), and enhancements proposed by the project (identified in the TRTA pre-feasibility report as Scenario 3), the area will be protected from the severe flood.

183. The Cimanuk Assessment Report (PFS) and the Cimanuk FRM Master Plan of FMNJP recommended to incorporate NBS solutions in the designs. This was particularly stressed in replacing hard surfaces with NBS designs and in particular the use of vetiver grass, other vegetation and gabions rather than concrete to stabilise slopes and resist river erosion and scour. The selection of NBS has several advantages, among others:

(i) they are normally less expensive;
(ii) they are regenerative and can be used as basic material for future works;
(iii) they facilitate bioremediation to improve water quality;
(iv) they support biodiversity;
(v) they can be of use to local communities as fodder crops and enhance aquaculture if properly managed;
(vi) they generally look better; and
(vii) they absorb carbon dioxide whereas steel production and transport per ton creates 1.5 tons of CO2 and concrete 0.24 tonnes of CO2 per cubic meter of concrete.

Figure 31: Typical NBS river protection on medium slope



Source: Ministry of Public Works and Public Housing.

184. There is some excavation, bank strengthening and protection at bends using hybrid NBS protection by combining vetiver grass bank strengthening mainly above water levels with gabions below. NBS has been considered and combined with structural measures.

VII. INFORMATION OF DISCLOSURE, CONSULTATION, AND PARTICIPATION

185. The Implementing Agency (IA) works with the district, province, and national agencies and local communities regularly.

186. The RBO met with provincial representatives, local organizations, and community representatives in all locations proposed for the project also including relevant agencies, and NGOs. This included the identification of suitable alternative sites, land ownership, and other local issues.

187. Further consultation and participation will continue through the construction and operation phase. This includes keeping local communities and stakeholders informed of the project and establishing a Grievance Redress Mechanism to receive and address complaints and concerns.

188. **Information Disclosure.** The project documents will be published on the ADB website. Environmental assessment documents will be made available to the public as part of the Indonesia approval process.

189. The public consultation was carried out on February 9-11, 2022, which was intended to inform people about the proposed projects. A summary of the target group, agenda of the public consultation axis is documented in Appendix 10.

190. Before the public consultation, coordination was carried out with local environmental agencies and also authorized officials in the local area. Due to a Restriction on Community Activities (PPKM) in the local area, public consultation was carried out in several sessions

complied with health protocols for the prevention of *coronavirus disease* (COVID-19) transmission.

191. Suggestions, inputs, and opinions from the community in public consultation are outlined below.

(i) People concern on land acquisition because some of the subproject components requires land, and residents also use riparian area for economic activities. They expect the commensurate compensation for the land.
(ii) People worry their activities or access will be disrupted due to impacts of heavy equipment operation, transportation, and mobilization of heavy equipment, which also generate potential impacts of noise.
(iii) People worry about mobilization of heavy equipment during construction will damage village facilities such as road. They expect the facilities will be repaired as its initial condition or better.
(iv) People asked for the rehabilitation of several abandoned drains. In particular they expect the good quality construction to ensure its proper function. Therefore, the rehabilitated embankment does not collapse and cause flooding.
(v) People expect relevant government to bring back the issue of land-use conversion to the river or forest border areas at the upstream of Cimanuk River and calls for reforestation.

192. **Future Disclosure and Consultations.** Public consultation and participation activities will be conducted in the future during the construction and operation phase. The RBO will host public consultations and information disclosure throughout the construction phase on an area-by-area basis to sort out any potential problems. In these construction consultations, specific concerns of the people such as the disturbance associated with the excavations in their area shall be discussed in detail. The records of environmental and social complaints received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues shall be kept.

VIII. GRIEVANCE REDRESS MECHANISM

193. In compliance with ADB SPS (2009), the project will establish a Grievance Redress Mechanism (GRM) for receiving and resolving grievances including complaints and concerns from affected people and stakeholders about environmental and socio-economic issues concerning the project. Complaints are to be resolved promptly with a process that can readily be understood and accessed by all segments of affected people and is responsive to gender and cultural aspects.

194. The RBO and the Contractor will inform and consult each community about the GRM and how it will work via a community meeting held before construction commences. Signs at the sites and notices on community notice boards will give the contact details for lodging complaints.

195. Grievances, complaints, and concerns can be lodged with the RBO or the Contractor on site. A GRM Register will be kept on-site in which complaints are recorded. The grievance will be assessed by the RBO to confirm that it is related to the project. If it is urgent or can be immediately resolved, action will be taken and recorded in the GRM Register and the complainant informed. The complaints to be responded within one week. Where this cannot occur, the complainant will

be advised on what action to be taken. If a complainant approaches the Contractor directly, the Contractor will receive the information and pass it on to the RBO. The Contractor will take any immediate action necessary to resolve the issue if practical and appropriate. Where there is urgency in terms of safety, damage to property, or the environment, then this will be acted on urgently manner. The proposed .timeline for the GRM as follows.

Table 19: Proposed Timeline for GRM

Stage	Activities/Responses	Timeline (Maximum Working Days)
1	Submission of Complaints	1
2	Registration, Eligibility Assessment, and Confirmation of Eligibility	3
3	Assessment and Identification of Action	10
4	Confirmation by Affected Person, or First Appeal	10
5	Review, Eligibility Assessment and Confirmation of Appeal by City Level GRC	3
6	Assessment and Identification of Action by City Level GRC	10
7	Confirmation by Affected Person, or Second Appeal	10
	Implementation of Action, Monitoring, Reporting	as defined in the Decision and time-bound action plan
	Closure of Complaint	

Source: LARP - FMNJP (2022).

196. Regular meetings between the Contractor and RBO will review the complaints register as part of regular meetings and reporting. A summary of complaints will be given in regular reports and any outstanding grievances identified. The RBO Environmental Officer will review the GRM Register for complaints and confirm that they are resolved satisfactorily. Any outstanding complaints will be investigated. The RBO and Contractor will work together proactively to ensure grievances are satisfactorily resolved.

197. Where complaints cannot be resolved by the GRM process the complainant will be able to take their complaint to normal legal processes.

198. Training in awareness of the GRM will be provided to the IA and Contractor staff. There will be no fees or charges made concerning lodging complaints or otherwise accessing the GRM.

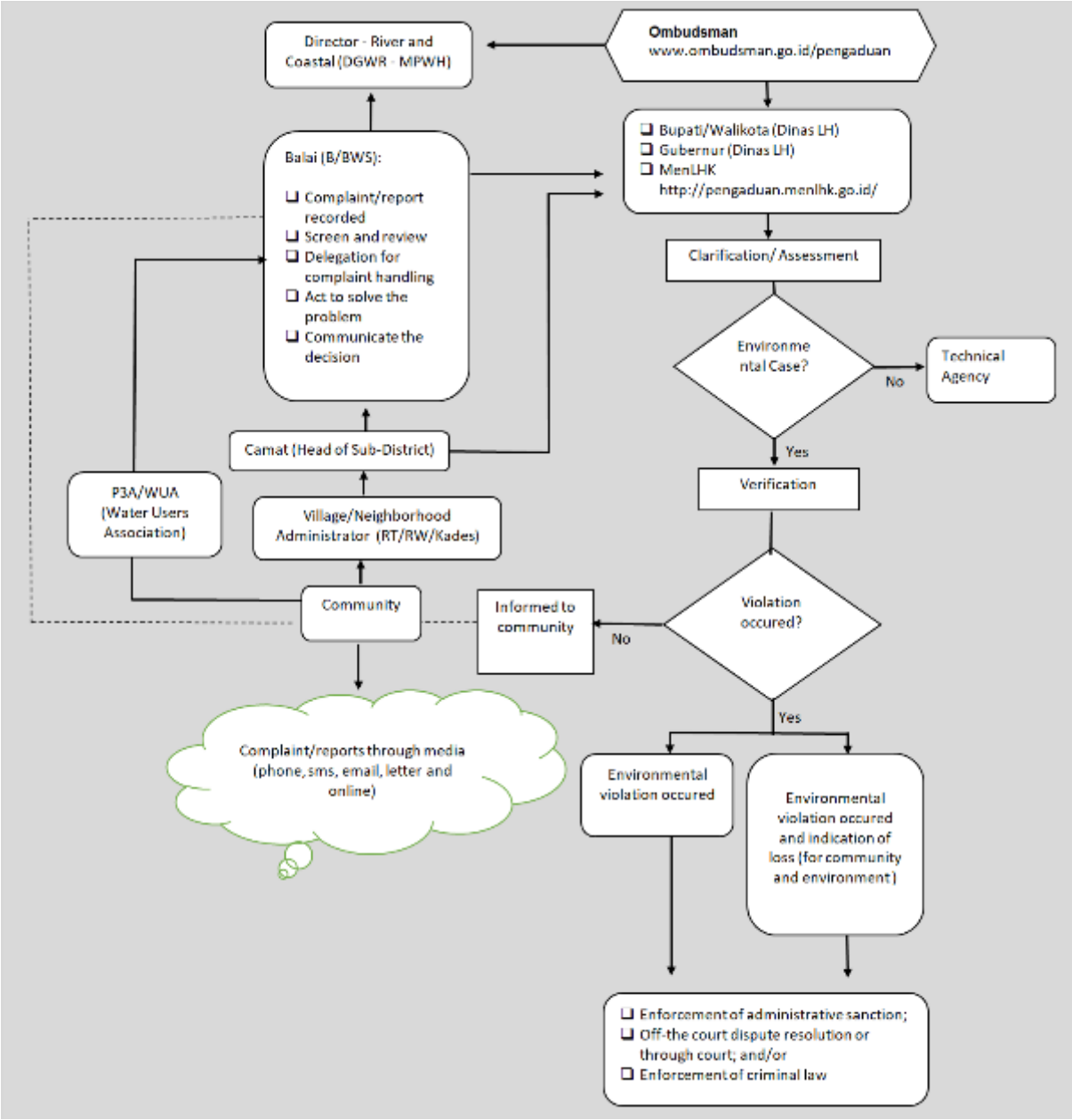
199. Typical grievances that may occur in projects of this nature may include (but are not limited to) damage to or use of public or private property or communal resources, safety risks or incidents, noise, dust, fumes, water pollution, litter, rubbish dumping, unauthorized land use, unauthorized tree cutting or vegetation removal, hunting, antisocial or criminal behavior, and harassment.

200. Any complaints and concerns of the affected people must be addressed promptly at no cost to the complainant and without retribution. There will be two GRMs for this Subproject. The first one shall address the grievances associated directly with the construction activities, while the second one shall address the grievances on land acquisition, compensation, and resettlement (this will be covered under Social Safeguard). The GRM for the construction activities shall be explained fully to the various areas where construction activities are expected before the start of construction when Contractors are already selected at that time. This is appropriately done during public consultations in the detailed design phase when actual alignments will have been made for the proposed works.

A. Complaint to Environmental Agency

201. Complaints about the environmental performance of projects can also be brought to the local agency responsible for enforcing the AMDAL system. The Agency is also involved in monitoring the water quality of rivers.

Figure 32: Typical Flowchart for GRM in DGWR – MPWH



Source: Ministry of Public Works and Public Housing.

IX. ENVIRONMENT MANAGEMENT PLAN

202. This section addresses the need for mitigation and management measures for the subprojects, which include i) mitigating measures to be implemented, and ii) required monitoring associated with the mitigating measures. The institutional setup, as presented in the implementation arrangement (in section X) discusses the roles during implementation and the required monitoring. It also outlines the requirements and responsibilities during the pre-construction, construction, and operation phases.

A. Environmental Mitigation and Management Plan

203. Table 20 presents the information on EMP including (i) required measures for each environmental impact that requires mitigation, (ii) locations where the measures apply, (iii) associated cost, and (iv) responsibility for implementing the measures. The details of mitigating measures were discussed in Section 5, where the need for mitigation of each impact was determined in the scoping process.

204. **Budget for Environmental Mitigation Measures of Construction**. During the pre-construction phase, the RBO will prepare tender documents with provisions for the required environmental measures conduct meetings for stakeholders' consultations. During construction, all costs of environmental mitigation measures shall be borne by the contractor and are considered part of their contracts as specified in the technical specifications. For budgetary purposes, this can be estimated at 1 - 3% of the total direct cost of the FRM works. The tender documents shall include a lump sum bid item in the bill of quantities to be titled "Environmental Mitigation Measures". During the operation phase, all cost of mitigation measures are part of the operation and maintenance costs of flood control infrastructure, while some were already included in the construction of particular items. The project will provide capacity building including environment.

205. **Tender Documents and Construction Contracts**. The EMP of the subproject shall form part of the bidding and contract documents. This includes the contractor's submittal of a Construction EMP (CEMP) within a month prior to the construction. Tender documents and construction contracts shall therefore include environmental management provisions on the following issues: (i) erosion and sediment runoff, (ii) noise and dust, (iii) vehicular traffic, (iv) construction wastes, (v) oil and fuel spillages, (vi) construction camps, (vii) public safety and convenience, (viii) occupational health and safety, (ix) proper closure of construction sites, and (x) potential damage to any archaeological and cultural assets.

206. **Construction's EMP**. During construction, each contractor shall be guided by its detailed CEMP. This shall be based on the EMP with details on staff, resources, implementation schedules, and monitoring procedures. It shall include specifications on requirements for dust control, erosion and sediment control, avoidance of casual standing water, management of solid wastes, workers' camp sanitation, pollution from oil, grease, fuel spills, and other materials due to the operation of construction machinery, safety and traffic management, avoidance of inconveniences to the public, air, and noise pollution control. It shall also include guidance on the proper design of the construction zone, careful management of stockpiles, vegetation, topsoil, and vehicles and machinery. The agreed CEMP will be the basis for monitoring by CPMU, RBO, , and other monitoring parties. The CEMP will allow construction supervision engineer to focus on what are specific items expected from the contractor regarding environmental safeguards on a day-to-day basis.

207. **Unanticipated Environmental Impacts**. Where unanticipated environmental impacts become apparent during project implementation, the RBO shall prepare a supplementary environmental assessment and EMP to assess the potential impacts and outline mitigation measures and resources to address those impacts.

Table 20: Environmental Management Plan

Impact	Activities	Mitigating measures	Implementer	Supervisor
Pre-Construction				
Design (DED)	Finalization of DED	Update the IEE and EMP, in case major change in the DED	RBO/IA	PMU/PMO
Construction EMP (CEMP)	CEMP (including Sediment Management Plan)	1. Assign environmental officer and/or EHS officer at the site 2. Prepare construction EMP (including a spoil management plan/ sediment management plan as part of the contractor's EMP' for sites requiring dredging	Contractor	PMU/PMO
Risk of unexploded object (UXO)		1. Conduct site investigation and consult local authority and community 2. Offsite area such as borrow pits or disposal sites can have UXO risks.	Contractor	PMU/PMO
Administrative issue (Permit and Approval)	Bidding and contracting	1. Comply with all statutory requirements set out by Government; 2. Confirm Government approval and secure requisite permits etc. 3. PMUs ensure the EMP be included in bidding docs thus in contracts. 4. To ensure that funds will be allocated during the implementation, the bidding documents shall include a lump sum bid item in the bill of quantities to be titled "Environmental Mitigation Measures". It shall be clarified in the specification documents that the environmental mitigating measures identified in the Environmental Code of Practice (ECOP) and EMP are to be charged to this item. This will allow the construction supervision engineer to require the contractor to quickly address the environmental issues during construction.	Contractor	PMU/PMO
Encroachment of protected areas	Select suitable Quarry, borrow pits and disposal sites, areas for equipment, site offices, and storage areas	1. Quarry, borrow pits and disposal sites, areas for equipment, site offices, and storage areas selection criteria considering both technical and environmental aspects: 2. Select locations of quarry site/s (for loose material other than stones) as included in the design specifications and on plan drawings to avoid disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. 3. Local Mineral Resources and Energy Agency (Dinas Pertambangan dan Energi) approved sites would be selected first.	Contractor	PMU/PMO

Impact	Activities	Mitigating measures	Implementer	Supervisor
		4. If other sites are necessary, these would to be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage system, and in structurally stable areas even if some distance from construction activities 5. If additional quarries will be required after construction is started, then the construction contractor shall use the mentioned criteria to select new quarry sites 6. Located beyond of right-of-way/demarcation of riparian zone: at least 5 (five) meters from the foot of river with embarkment; at least 100 (one hundred) meters from the riverbank of large river without embankment; at least 50 (fifty) meters from the riverbank for tributary without embankment outside of settlement area 7. Alternatively, outsource of quarry, borrows pits and disposal with competent and certified third parties		
Site selection of supporting facilities	Site selection of construction work camps and other supporting facilities.	1. Avoid location which promote instability and result in destruction of property, vegetation, and public facilities. 2. Avoid thickly populated residential areas for setting up camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). 3. Extreme care will be taken to avoid disposals to the forest, water bodies or in areas which will inconvenience the community.	Contractor	PMU/PMO
Construction				
Air Pollution: Dust	Earthworks and movement of vehicles can pose nuisance to nearby communities	1. Require the contractor to cover materials with tarpaulin or other suitable materials while in transit to avoid spillage of materials. 2. Moisten earthen roads during dry and dusty conditions, particularly roads near residences and through the town core area. 3. Impose speed limits on construction vehicles. 4. Conduct regular maintenance on construction equipment and vehicles to control air emissions during vehicle operation. 5. Sites of borrow pits and spoil disposal must be at least 300 m from residential areas so as to reduce dust from these sites. 6. Effective dust suppression measures will be implemented near sensitive receptors such as schools, hospitals, or housing.	Contractor	PMU/PMO

Impact	Activities	Mitigating measures	Implementer	Supervisor
Nuisance Noise: Affect workers and community health	Operation of construction equipment will cause excessive noise	1. Limit construction activities, particularly operation of noise generating equipment at night. 2. Position any stationary equipment that produces high noise levels such as diesel generators as far as practical from sensitive receptors. 3. Erect temporary barriers around construction sites especially near schools, hospitals, and houses. 4. Install noise suppression devices to noise generating equipment. 5. Require drivers to minimize blowing of horn and to comply with speed limits. 6. Provide information to community on schedule of construction activities through billboard/signs. 7. Set appropriate working time limitations as refers to domestic regulations and IFC/WB EHS guidelines and consultation with the affected community	Contractor	PMU/PMO
Water Quality	From camp and digging	1. Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. 2. Provide adequate water supply and temporary toilet facilities at the worker's camp. 3. Cooperate with local cleansing agency or private sector for the desludging of temporary toilets and dispose the sludge	Contractor	PMU/PMO
	Maintenance Dredging	1. Prepare Dredging Management Plan as part of the CEMP for the sites requiring dredging 2. Apply Seasonal restrictions (or Environmental Windows) on dredging operations and should be determined in the early stages of the assessment by consultation 3. Schedule the dredging work during dry season	Contractor	PMU/PMO
Soil Erosion/ Contamination	Earth moving work Loss of valuable topsoil	1. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. 2. Avoid cutting trees as much as possible and minimize damage to native vegetation. 3. Implement landscaping and planting of trees/vegetation at sites of the proposed facilities. 4. Soil erosion management plan to be prepared by the contractor and to be approved by the responsible authority before construction starts. 5. Maintain slope stability at cut faces by implementing erosion protection measures. 6. Construction in erosion and flood-prone areas should be mainly restricted to the dry season. 7. Control silt runoff and cover soil stockpiles;	Contractor	PMU/PMO

Impact	Activities	Mitigating measures	Implementer	Supervisor
		8. Locate temporary soil stockpiles in areas where runoff will not induce sedimentation of waterways. 9. Establish protection measures for river embankment works, cut slopes, material stockpiles and other areas at risk of soil erosion prior to periods of heavy rainfall		
Construction debris and spoil;	Solid wastes, inert construction wastes, and hazardous wastes during construction	1. Surplus excavated material/cut soil will be used as backfill material for low-lying areas that have been identified by the village authority. 2. Provide appropriate segregation bins or areas for construction wastes. 3. Secure and control storage of all hazardous materials including fuels. 4. Reuse recyclable construction wastes such as wood, steel, and scaffoldings or sell to junk shops. 5. Solid waste to be collected and disposed in approved disposal site of the districts. 6. The contractors will prohibit activities such as cutting wood for cooking, hunting, or wildlife trade.	Contractor	PMU/PMO
Clearing of Vegetation	Poor planning and execution of tree clearing vegetation removal a loss of vegetation	1. Prior to tree felling, please ensure onsite inspections of trees will be conducted, by a suitably qualified expert, to ensure no nests are present. Any requirements for nest removal will be conducted by relevant agencies, or NGOs, and any actions recorded/ reported. 2. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. Avoid cutting trees as much as possible and minimize damage to native vegetation. 3. Roads and paths will only be sufficiently wide to accommodate construction vehicles/equipment to minimize land take. 4. Manual labor will be utilized in sloping terrain where use of heavy equipment would cause unnecessary damage. Steep exposed slopes will be graded and covered with bush and grass to minimize erosion. 5. Implement landscaping and planting of trees/vegetation at sites of the proposed facilities. 6. Consider the need for the development of a tree planting schedule to strengthen and rehabilitate areas that have been impacted by construction activities (i.e., riparian zone) 7. Select the most suitable species (for example, under NBS the project propose vetiver species) to maintain bank stability once the riparian zone and associated vegetation has been stripped	Contractor	Supervision (resident) Engineers
Social disturbance	Community access to areas, schools,	1. Walking access will be maintained to affected properties and access routes will be temporarily lined with timber or similar material. Particular attention will be given	Contractor	Supervision (resident) Engineers

Impact	Activities	Mitigating measures	Implementer	Supervisor
	religious buildings, village offices, market affected	to ensuring safety along roads and paths used by pedestrians. 2. Install barriers and safety warning signs on road sections and if necessary, deploy traffic aides/ flag persons at affected locations. Information boards at blocked roads will provide information about the temporary closure of roads, schedule of works and the traffic-rerouting plan. 3. Require the contractor to immediately rehabilitate the excavated areas and any damaged road and path sections. 4. Enclose construction site perimeters so that pathway use, and access remains unimpeded.		
Damage Physical Cultural resources (PCR)	Uncover relics and artifacts during civil works.	1. Chance-find procedure: 2. in the event of accidental finds relics, should immediately cease any works in the area and protect the site 3. Promptly report the find to their supervisor who immediately report local authority for PCR, e.g., cultural relic bureau. 4. Contractor will ensure that the workforce is briefed on this procedure during prior training on EMP/ECC.	Contractor	Supervision (resident) Engineers
Community Health & Safety	open excavation etc	1. Install barricades/barriers and sturdy plate covers in open excavations during non-working time. 2. Install warning signs in the area before works commencement. 3. Conduct consultation and dialogue to and update local community members of possible disruption due to construction activities 4. Details of works that will disrupt access should be placed as signs.	Contractor	Supervision (resident) Engineers
Increased Volume of Traffic	Increased traffic volumes and higher speeds may lead to accidents	1. Prepare a traffic control and management plan together with the local traffic police prior to any construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signs, controls and planning. 2. In case of lane closures, deploy workers to direct traffic. 3. Signage and other appropriate safety features will be installed to indicate construction works are being undertaken 4. Speed limits shall be established in the work sites to minimize the risk of accidents.	Contractor	Supervision (resident) Engineers
Sanitation	Workers camps	1. Provide Sanitation Facilities 2. One toilet, one tap / basin, one toilet for every 6 people, Fresh cold running water 3. Convenient location to accommodation; Provision of soap, Ventilation to open air 4. Separate facilities for men and women, Clean and hygienic	Contractor	Supervision (resident) Engineers

Impact	Activities	Mitigating measures	Implementer	Supervisor
		5. Septic tank/sewage treatment facility, or pit latrines located at least 200m from surface waters, and in areas of suitable soil profiles and above the groundwater levels 6. Separate area for sick workers to prevent transmission of disease 7. Detail on the sanitation of the workers camps and other requirements refers to IFC / EBRD guidelines https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_workersaccommodation)		
Occupational Health and Safety	may pose hazards to workers because of the use of heavy equipment, lifting of heavy loads, and exposure to open excavations and chemicals.	1. Require the contractor to implement the construction health and safety plan in accordance with the World Bank EHS Guidelines (http://www.ifc.org/ehsguidelines) as a minimum standard. The contractor will appoint an environment, health and safety officer to ensure implementation of the plan. The plan will at minimum include: 2. Provision of first-aid facilities readily accessible by workers. 3. Provision of personal protective equipment (PPEs) such as hard hats, gloves, and rubber boots. 4. Prepare PPE for working near water bodies and a safety plan to ensure construction workers are trained on the dangers and risks of working near water bodies 5. Wearing of PPEs while working onsite will be a mandatory requirement for workers. 6. Posting of safety signs/reminders in strategic areas within the construction area. 7. Installation of sufficient lighting at night. 8. Ensure that vehicle and equipment operators are properly licensed and trained. 9. Provide staff with COVID 19, communicable disease and HIV-related awareness training. 10. The contractor will be required to provide priority hiring of qualified construction workers from the villages and to consult with the local authorities to avoid conflict if migrant workers brought in.	Contractor	Supervision (resident) Engineers
	Construction site working conditions	1. Form a joint team to plan and organize commencement and/or return to work 2. Develop or convene a joint occupational safety and health committee with members representing the employer and workers 3. Train team members on the basic principles for the formulation and implementation of occupational safety	Contractor	Supervision (resident) Engineers

Impact	Activities	Mitigating measures	Implementer	Supervisor
		and health preventive and control measures. 4. Ensure preventative measures are in place before resuming or beginning construction work 5. Adopt engineering, organizational and administrative measures 6. Promote personal hygiene 7. Provide personal protective equipment (PPE) and inform workers of its correct use 8. Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge and in sufficient number, along with instructions, procedures, training and supervision 9. Non-medical face-coverings (such as homemade cloth masks) should be worn as mitigation for catching and transmitting the virus, but are not to be treated as substitutes for proper hand washing 10. Health surveillance and insurance 11. Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms 12. Monitor the health status of workers, develop protocols for cases of suspected and confirmed COVID-19. The protocol will state that: 13. Promote a safe and healthy working environment free from violence and harassment. 14. Encourage health promotion and wellbeing in the workplace through enough rest, balance of physical and mental activity and adequate work life balance 15. Implement prevention and control measures for the use and storage of chemicals, particularly those used for disinfection during COVID-19 16. Review emergency preparedness plans		
Operation and Maintenance				
Flood Risk	Reduction of Flood Risk	1. Perform regular inspections of levees and flood control buildings 2. Maintaining river channel, riverbank, and riparian zones 3. Carry out regular inspections and supervision along the river channel 4. Perform regular dredging to maintain the dimensions of the river trough 5. Maintaining the stability of the riverbank 6. Cooperate with authorized institutions in controlling development plans and activities in floodplains 7. Prepare flood risk management plans and emergency response for the detention basins	Balai (RBO)	DGWR

Impact	Activities	Mitigating measures	Implementer	Supervisor
Soil and Sediment	Erosion and sedimentation	1. Undertake dredging and works on river channels and banks during the dry season when river levels are at a minimum 2. Use dredging methods that minimize sediment suspension such as cutter suction dredge, use of silt curtains 3. sites for disposal areas shall not promote instability and result in the destruction of property, disturbance to vegetation and fauna (biodiversity) and public facilities (see Pre-Construction Measures) 4. Minimizing the area of vegetation clearing and land disturbance at any one time 5. Stabilising and revegetate disturbed areas as soon as possible 6. Undertaking and completing works in smaller sections in order to minimise the time for which disturbed areas are left exposed. 7. Monitoring work areas and changing work methods if sediment is entering river or sediment plumes are observed in river. 8. Carrying out earthworks during dry weather. 9. Carrying out soil erosion and sediment control measures in accordance with good construction practices.	Balai (RBO)	DGWR

Source: Ministry of Public Works and Public Housing.

B. Environmental Monitoring Plan

208. Table 21 presents the information on (i) aspects or parameters to be monitored, (ii) location where monitoring is applicable, (iii) means of monitoring, (iv) frequency of monitoring, (v) responsibility of compliance monitoring, and (vi) cost of monitoring.

209. The RBO Environment Officer shall provide the CPMU with its monthly environmental monitoring reports. The CPMU shall consolidate all monthly environmental monitoring reports of all subprojects and prepare a monthly and quarterly environmental monitoring report. Using the quarterly reports, the CPMU shall prepare the semi-annual environmental safeguards progress report which shall be submitted to ADB and detail the status of mitigating measures implementation. The Environmental Monitoring Plan is presented in Table 21. The roles of the CPMU and the PIU are outlined in the succeeding section for institutional arrangement.

Table 21: Environmental Monitoring Plan

Aspects/ Parameters	Indicators	Location	Means of Monitoring	Frequency	Respon sibility	Super vision	Cost
Water quality (with key standard parameters)	pH, BOD, COD, TSS, E-Coli (Key parameters of Water Quality for Irrigation Water- Gov Regulation No. 22/2021)	At river (or canals) and/or water body likely polluted by the project	Visual observation and by laboratory when there is complaints, dispute or deemed necessary by	As required in AMDAL document	Contractor	PMU/ PIU	Included in constructi on cost

			PMU and its experts				
Erosion and sedimentation	Heavy metals in the sediment (*Gov Regulation No. 22/2021)*	At the location of earth work and excavation	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Part of consultant's construction supervision
Dust, cover of stockpiles	Dust, SO2, NO2, and others *(Gov Regulation No. 22/2021)*	At the location of stockpiles	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Part of consultant's construction supervision
Noise levels not to exceed 55 dB(A) near schools and residential areas;	Noise Level (Decree of MOE No. *KEP-48/MENLH/11/1996*)	At the construction site and nearby areas	Use of sound meter	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Same as above
Accident and incident related to hazard condition and hazard actions to occupational health and safety	• Fatality Rate • Near miss Rate • PPE, Signs/Warnings	Project area and associated area (road and workshop) and nearby areas (public areas)	Observation, documentation and reporting	Routinely	Contractor	PMU/ PIU	Included in construction cost
Solid and hazardous wastes	Volume of wastes and/or spill (if any)	construction site and nearby areas	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Part of consultant's construction supervision
Flora and fauna	Number of trees cut and fauna disturbed (if any)	construction site and nearby areas	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Part of consultant's construction supervision

Source: Ministry of Public Works and Public Housing.

210. **Environmental Monitoring Cost.** Monitoring cost for pre-construction is a minimal cost to CPMU since this is simply verification by the CPMU on whether the EMP is included in tender and contract documents. Construction monitoring cost is a minimal cost to PIU since it will be their personnel who will do checking/inspections of the construction activities and its part of their operational costs. Monitoring the cost of construction supervision consultants is also minimal costs since this is a form of checking/inspections cost and part of their contracts. The cost to PMU

for the GRM is also minimal since these are only meetings for resolving the complaints and it is included in the contractor's contract.

211. **Project Performance Monitoring.** Project performance monitoring presents the desired outcomes as measurable events by providing parameters or aspects that can be monitored and verified (Table 22). Tendering the process advocating environmentally responsible procurement is a desired outcome during the pre-construction phase. This can easily be verified by checking if EMP requirements are incorporated in construction contracts. The construction phase desired outcomes include effective management of environmental impacts and reduce risk to the public.

Table 22: Project Performance Monitoring

Desired Outcomes	Aspects / Parameters to be monitored	Means of Monitoring	Monitoring Frequency	Implementation	Compliance Monitoring	Monitoring Cost
PRE-CONSTRUCTION PHASE						
Detailed design is environmentally responsive	EMP requirements incorporated in detailed design	Verify detailed design documents	Two reviews: (i) draft detailed design documents and (ii) prior to approval of final documents	Design consultants/ PPIU	CPMU	Part of project management in detailed design (minimal cost)
Tendering process advocates environmentally responsible procurement	EMP requirements incorporated in construction contracts	Verify construction contract documents	Prior to finalization of construction contract documents	Design consultants/ PPIU	CPMU	Part of project management in tendering (minimal cost)
CONSTRUCTION PHASE						
Effective management of environmental impacts during construction	Number of public complaints on construction activities	Verification of contractor's records; PIU/ PMU's coordination with local officials	Once a month	Contractor	Construction supervision consultants, CPMU/ PPIU	Part of consultant's construction supervision contract; minimal cost to CPMU/PIU
Reduce risk to workers and the public during construction	Number of accidents involving construction activities	Verification of contractor's records; PIU/ PMU's coordination with local officials	Once a month	Contractor	Construction supervision consultants, CPMU/ PIU	Part of consultant's construction supervision contract; minimal cost to CPMU/ PIU
Post CONSTRUCTION PHASE						
(Not applicable – Monitoring during project phase only)						

Source: Ministry of Public Works and Public Housing.

X. IMPLEMENTATION ARRANGEMENT

212. **Institutional Setup.** The DGWR is the Executing Agency responsible for the overall subproject including environment, while the subproject implementation unit (PIU) is the Cimanuk Cisanggarung River Basin Organization (RBO) which will establish a PIU headed by a manager (PIU head) with experience in the externally financed subproject. PIU will be responsible for the day-to-day implementation of the Subproject and will be accountable for technical, safeguards, and financial reporting. A summary of the implementing organizations and corresponding management roles and responsibilities are documented below (Table 23).

Table 23: Role and Responsibilities of Project Stakeholders

Project Implementation Organizations	Management Roles and Responsibilities
National Steering Committee Ministry of National Development Planning/ BAPPENAS Ministry of Public Works and Housing	• Oversee progress and guide the project implementation • Monitor and evaluate the overall project performance and outcomes • Review and endorse annual work plans
Executing Agency Ministry of Public Works and Housing through the Directorate General of Water Resources	• Overall responsible for the implementation of subprojects • Will establish a Central Project Management Unit (CPMU) within the Directorate General of Water Resources (DGWR) to consolidate activities and reporting from Project Management Units (PMUs) and Project Implementing Units (PIUs) • Supported by a secretariat consisting of representatives of concerned Directorates. The CPMU secretariat will be headed by the Director of System and Strategy for Water Resources Management (DSSWRM), DGWR, and staffed with financial management, monitoring and reporting, procurement, and social and environmental safeguards, gender, and technical personnel. • Ensure that loan covenants are complied with • Maintain project accounts, monitor financial and physical progress, and report such progress to ADB • Prepare withdrawal applications (WA) including retention of supporting documents and submit the WAs (through MOF) to ADB. • Lead and coordinate activities related to financial management and financial audit • Consolidate quarterly and annual reports, including safeguards and audited annual project financial statements, and submit them to ADB.
Project Management Units Directorate General of Water Resources	• Establish PMUs headed by a project director and staffed with social and environmental safeguards, gender, procurement, financial management, and technical personnel • Provide quarterly and annual reports including audited annual financial statements as required under the loan agreement • Provide operational support for project activities • Coordinate with the government and partner agencies for successful implementation of the project • Prepare annual contract awards and disbursement projections, requesting budgetary allocations for counterpart funds;
Project Implementing Units <u>Output 1:</u> - Directorate of Technical Guidance; Directorate of Operation and Maintenance; River Basin Organizations (RBOs); DGWR - Ministry of Home Affairs <u>Output 3:</u>	• Establish PIUs headed by a project director and staffed with social and environmental safeguards, gender, procurement, financial management, and technical personnel • Responsible for implementation of all subprojects under each implementing agency's purview • Recruit design and supervision consultant for all subprojects under its purview • Prepare safeguards planning documents, implement environmental and social safeguards plans, and monitor safeguards-related activities for ADB and government requirements. • Undertake day-to-day implementation activities

Project Implementation Organizations	Management Roles and Responsibilities
Directorate of River and Coastal; RBOs; DGWR	• Supervise design, supervision, and management consultants • Manage the procurement process (prepare bidding documents, manage the bidding process, submit required documents to ADB for required clearances) in coordination with Regional Procurement Agencies • Implement procurement, safeguards activities, and gender action plan • Manage financial management including preparing the budget, annual projections, process invoices, withdrawal applications, etc.
Ministry of Finance	• Establishment of advance account on behalf of the executing agency. • Allocation and timely release of counterpart funds • Authorize withdrawal application submitted by the executing agency. • Communicate with ADB for any amendments in the reallocation of the loan amount. • Administer advance account
Regional Procurement Agencies (MPWH)	• Conduct procurement for packages under the CPMU and PIU authorities
Provincial and Local governments	• Facilitate land clearance • Ensure issuing of relevant permits • Integration of activities
Asian Development Bank	• Undertake regular project reviews and facilitate implementation of the project, including compliance by the executing agency and implementation agencies to obligations and responsibilities

Source: Ministry of Public Works and Public Housing.

213. **At the National Level** - the DGWR with the Directorate of WRM System and Strategy (SSPSDA) will function as Central Project Management Unit (CPMU), supported by the Ministry of Finance, that will provide technical advice and coordination to the provincial and district Bappeda planning agencies. The CPMU will appoint a designated environmental safeguard consultant to ensure the principle of environmental safeguard in the project, from planning to implementation.

214. The CPMU shall appoint a staff acted as Environment Officer for FMNJP, to oversee the implementation and monitoring of environmental safeguards requirements. With assistance from the Environmental Specialists of the PPC team, the PMC shall be responsible for the following activities related to environmental safeguards: (i) confirm that the IEEs are 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 the required AMDAL, a GOI requirement, has been prepared during detailed design and approved by the respective environment agency, the Ministry of Environment and Forestry; (iii) confirm that the EMP is included in the bidding documents and civil works contracts; (iv) ensure Construction's EMPs (CEMPs) are prepared by contractors prior to actual construction; (v) establish 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; (vii) review, monitor and evaluate the effectiveness of the implemented CEMPs, and recommend necessary corrective actions; (viii) prepare monthly and quarterly environmental monitoring reports and submit semi-annual environmental monitoring report to ADB; (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 (GRM) in a timely manner.

215. The executing and implementing agencies are required to retain adequate staff and consultants with relevant qualifications and experience, to be able to adequately design and deliver the environmental safeguards plans for the subproject. They remain responsible for

reviewing and if necessary updating the environmental safeguards plans at the time of each scheduled bi-annual report, particularly with regards to potential changes in subproject scope, location, and timing, that might require additional resources.

216. **At the Regional level**, The RBO will collaborate with both national-level agency and regional agency stakeholders. In addition to coordinating with the DGWR and the Directorate of River and Coast, the RBO authorities shall also work closely with local governments, and the key regional technical agencies (Water Resources/Irrigation, Bappeda, Agriculture, Environment and Forestry), both provincial and district level. The RBO shall also appoint an environmental safeguard focal person to ensure the application of safeguard principles and processes (from planning to preparatory and implementation stage) as per ADB and national standards. The environmental safeguard focal person must have a good understanding of ADB SPS 2009 and related GOI regulations regarding environmental regulations.

217. The following are the role of the environmental safeguard focal person that will be appointed at the RBO level:

(i) Work in coordination with contractors for the day-to-day implementation and monitoring of safeguards plans, including implementation of IEE activities.
(ii) Supporting the functioning of the GRM. The environmental safeguard staff will be a member of the Grievance Redress Committee.

218. **Provincial Government**. The Central Java and West Java Provincial Governments will be responsible to address complaints and objections (grievances).

219. **District/City Local Government.** The district governments will play an important role at the site level, including implementing IEE to ensure that the subproject is in line with the *Rencana Tata Ruang dan Wilayah* (spatial plan) (RTRW).

220. **Subdistrict and village governments** - and their leaders will be directly involved in facilitating, planning, preparing, and implementing the IEE activities.

221. At the bottom of this institutional setup are the contractors which are responsible for implementing the required environmental mitigation measures as defined by their respective approved CEMP. Close coordination between the contractors and the Environment Officer of PIU is needed to ensure good planning for mitigation measures and ensure timely implementation. The contractors are also directly involved in addressing grievances during the construction period since their activities will cause disturbances to the public. Oftentimes, complaints can easily be resolved between the contractors and the complainants. The contractor's highest official at the site such as the Construction Manager or Construction Superintendent shall be a member of the Environmental Compliance Committee (ECC).

222. External environmental monitoring will be done by Dinas Lingkungan Hidup as required by its mandate. DLH is tasked to prepare and implement regional policies and rules to promote environmental protection and conservation. It reports to the Regent through the Regional Secretary. 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 (Indonesia EIA system). It is their responsibility for enforcing the AMDAL system. It is also involved in monitoring the water quality of rivers in respective districts and provinces.

223. **Implementation Schedule**. As presented in the project description, construction of the subproject is scheduled to start in 2021, CPMU shall ensure that construction contract provisions related to the contractor's EMP shall be included in the tendering stage.

224. **GOI Approval**. Under GOI's Environmental Regulation (No. 22/2021)[27], the RBO shall apply for AMDAL approval from the Ministry of Environment and Forestry.[28]

225. **Capacity Building**. The project will recruit consulting services for (i) project management advisory services, including detailed engineering designs, preparation of contract documents, support to PIUs on construction supervision and quality control; and (ii) institutional development and capacity building. During the pre-construction and construction period, it shall be necessary to provide an Environmental Advisor to the CPMU.

XI. CONCLUSION AND RECOMMENDATION

226. Based on the screening for potential environmental impacts and risks of the proposed subproject, there are no significant negative environmental impacts and risks that cannot be mitigated. With the EMP, the proposed subproject can be implemented in an environmentally acceptable manner. There is no need for further environmental assessment study. A full EIA is not warranted and the subproject's environmental classification as Category B is deemed appropriate.

[27] Recently GR No. 27/2012 has been diluted into GR No. 22/2021 on Implementation of Environmental Protection and Management, as mandated in Law No. 11/2020 on Job Creation.

[28]

Appendix 1. Screening and Rapid Environmental Assessment (REA)

Table 1: Rapid Environmental Assessment (REA) Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES, and approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	Indonesia: Flood Management in North Java (FMNJP)
Sector Division:	SEER

A. Flood Risk Management[29]

227.

Table 1: Rapid Environment Assessment (REA) Checklist

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			Subprojects located in or adjacent to environmentally sensitive areas will not be eligible. Screening and eligibility criteria will be defined in the Environmental Assessment and Review Framework (EARF).
▪ Cultural heritage site		X	
▪ Protected Area		X	Based on the PIPPIB map and spatial plan (RTRW), project areas are not located in protected areas. This will be confirmed with respective DLH (Indramayu Regency, Sumedang Regncy, Majalengka Regency, and Garut Regency)
▪ Wetland		X	
▪ Mangrove		X	
▪ Estuarine		X	

[29] The template for "Ports and Harbors" is used to cover the impact of land transformation of water area, especially dredging.

Screening Questions	Yes	No	Remarks
▪ A buffer zone of protected area		X	
▪ Special area for protecting biodiversity		X	
B. Potential Environmental Impacts Will the Project cause…			
▪ encroachment on precious ecology resulting in loss or damage to fisheries and fragile coastal habitats such as coral reefs, mangroves, and seagrass beds?		X	
▪ short-term increase in turbidity and sunlight penetration, as well as changes in sediment pattern and, flows at dredging site?		X	Avoidance or mitigation measures will be applied such as dredging in the dry season, use of cutter suction dredge, and/or turbidity curtains.
▪ removal and disturbance of aquatic flora and fauna at dredging site?	X		Dredging activities may impact both aquatic flora and fauna. Mitigation measures will be proposed and implemented in EMP
▪ deterioration of water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		X	Mitigation measures will be proposed and implemented in EMP for the construction camp
▪ alteration of the bottom surface and modifications to bathymetry, causing changes in the tidal bore, river circulation, species diversity, and salinity?		X	Not applicable
▪ changes in sediment pattern and littoral drift that may cause beach erosion of neighboring areas?		X	Not applicable
▪ modification of terrestrial habitat by upland disposal of dredged material or covering of potential archaeological sites with dredge spoil?		X	Dredged sediment will preferably be placed on the adjacent levee banks or used for bank construction. Spoil locations if required will be selected away from habitats or archaeological sites
▪ short-term air quality degradation due to dredging-related operations?		X	Any emissions from equipment or fugitive dust associated with dry bulk materials will be minor and minimized by appropriate dust control, equipment exhausts, and maintenance
▪ noise and vibration due to blasting and other civil works?		X	No blasting is expected
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	X		Physical construction hazards will be consistent with construction projects and managed appropriately.
▪ dislocation or involuntary resettlement of people?		X	Will be studied under LARP

Screening Questions	Yes	No	Remarks
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?		X	
▪ other social concerns relating to inconveniences in living conditions in the project areas?	X		Access to the river will be restricted in works areas during construction. The design will incorporate access to the river in consultation with the local community.
▪ social conflicts if construction depletes local fishery resources on which communities depend for subsistence?		X	
▪ poor sanitation and solid waste disposal in construction camps and worksites, and possible transmission of communicable diseases from workers to local populations (such as STIs and HIV/AIDS)?		X	Waste management following good practice. Communicable disease awareness training will be provided to workers.
▪ social concerns relating to local inconveniences associated with the port operation (e.g. increased volume of port traffic, greater risk of accidents, communicable disease transmission)?		X	[NOT RELEVANT] Port is not part of the project.
▪ deterioration of water quality due to ship (e.g. ballast water, oil waste, lubricant and fuel spills, sewage) and waterfront industry discharges?		X	[NOT RELEVANT] Ships and waterfront industry not involved.
▪ increased noise and air pollution resulting from airborne emissions (e.g. gas, smoke, fumes) from maneuvering and berthing ships and the waterfront industry?		X	
▪ large population increase during project construction and operation that causes an increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	Large workforce not anticipated
▪ social conflicts especially when workers from other areas are hired?		X	Local workers will be prioritized, as they meet the requirement.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?		X	Explosives not anticipated. Fuel and chemicals will be managed following good practice.
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning?		X	Access to the project sites will be restricted in works areas during construction. The design will incorporate access to the river in consultation with the local community. Safe access to public use areas will be provided during operation in consultation with local people.

Table 2: Preliminary Climate Risk Screening

Screening Questions		Score	Remarks[30]
Location and Design of the project	Is sitting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1	Siting of sediment trap will consider climate and weather-related disaster
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed, etc)?	1	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind, and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1	The project needs to be designed to accommodate future climate change scenarios.
	Would weather, current, and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	0	

Options for answers and corresponding scores are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered as a low-risk project. If adding all responses will result in a score of 1-4 and no score of 2 was given to any single response, the project will be assigned as the medium-risk category. A total score of 5 or more (which includes providing a score of 1 in all responses) or a 2 in any single response, will be categorized as the high-risk project.

Result of Initial Screening (Low, Medium, High): Medium

Other Comments

[30] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Appendix 2. List of Indonesia Regulations Related to Environmental Safeguard

No.	Legal Hierarchy	Laws and Regulations Referred
A	Constitution	1) UUD 1945 (Indonesia's Constitution)
B	TAP MPR	2) Article 5 TAP MPR (Decree of Supreme People Assembly) No. IX/MPR/2001 on Agrarian Reform and Natural Resource Management
C	Laws	1) Law No. 5/1960 on Basic Stipulation of Agrarian Regulation 2) Law 5/1990 on Conservation of Living Natural Resources and Ecosystems 3) Law 12/1992 on Cultivation of Plants 4) Law 7/994 on Ratification of Agreement Establishing the World Trade Organization 5) Law No. 5/1994 on Ratification of UN Convention on Biodiversity (UN-CBD) 6) Law No. 39/1999 on Human Right 7) Law No. 41/1999 on Forestry 8) Law 13/2003 on Labor 9) Law No. 31/2004 jo. UU No. 45/2009 on Fishery 10) Law 17/2004 on Ratification of the Kyoto Protocol to the United Nations Framework Convention on Climate Change 11) Law 24/2007 on Disaster Management 12) Law No. 26/2007 on Spatial Plan 13) Law 14/2008 on Disclosure of Public Information 14) Law 19/2009, Ratification of the Stockholm Convention on Persistent Organic Pollutants 15) Law 32/2009 on Environmental Protection and Management 16) Law 36 /2009 on Health 17) Law 11/2010 on Cultural Heritage 18) Law No. 11/2013 on Ratification of Nagoya Protocol on Access to Genetic Resources and Fair and Balanced Benefit Sharing of Its Utilization upon Biodiversity Convention 19) Law 18/2013 on Prevention and Eradication of Forest Destruction 20) Law 1/2014 (Amendment to Law of 27/2007 on the Management of Coastal Areas and Small Islands 21) Law No. 37/2014 on Soil and Water Conservation 22) Law No. 17/2019 on Water Resources 23) Law No. 11/2020 on Job Creation
D	Government Regulation	1) Government Regulation 102/2000 on National Standardization 2) Government Regulation (Minister of Agriculture) 1/2007 on Active Materials of Prohibited and Restricted Pesticides 3) Government Regulation 21/2008 on Disaster Management 4) Government Regulation 30/2009 on Implementation Procedures for Reducing Emissions from Deforestation and Forest Degradation (REDD) 5) Government Regulation 70/2009 on Energy Conservation 6) Government Regulation 1/2010 on Water Pollution Control System 7) Government Regulation 6/2010 on Norms, Standards, Procedures and Criteria for Forest Management in Protected Forest Management Units

No.	Legal Hierarchy	Laws and Regulations Referred
		8) Management and Monitoring Efforts and Statement of Capability to Manage and Monitor the Living Environment 9) Government Regulation 17/2012 on Guidelines for Community Involvement in the Process of Impact Assessment and Environmental Permitting 10) Government Regulation 145/2013 on Measuring, Reporting and Verifying Climate Change Mitigation Actions 11) Government Regulation No. 121/2015 on Commercialization of Water Resource 12) Government Regulation No. 24/2018 on OSS (Online Single Submission; Electronically Integrated Permitting Services) 13) Government Regulation No. 5/2021 on Implementation of Risk Based Commercial Business Permit 14) Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management
E	Presidential Decrees and Regulations	1) Presidential Instruction 9/2000 Mainstreaming Gender in the Development Process 2) Presidential Decree 32/1990 on Management of Protected Areas 3) Presidential Decree 46/2001, Operation of the National Greenhouse Gas Inventory 4) Presidential Regulation 23/1992 on Ratification of the Vienna Convention for Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer as Adjusted and Amended by the Second Meeting of the Parties London, 27-29 June 1990 5) Presidential Decree 23/1992 on Ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer 6) Presidential Decree 46/2005 Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer 7) Presidential Regulation Number 10 of 2011 on National Institution of Coordination of Agricultural, Fishery and Forestry Counseling. 8) Presidential Regulation 61/2011, on National Action Plan for Greenhouse Gas Emission Reduction
F	Ministerial Decrees	1) Minister of Labor Decree 5/1996 on Work Safety and Health Management System 2) Decree of the Head of Environmental Impact Management Agency 299/1996 on the Technical Direction of Social Assessment in EIA/AMDAL. 3) Decree of the Head of Environmental Impact Management Agency 124/1997 on the Public Health Assessment in EIA/AMDAL 4) Decree of Minister of Environmental Affairs 45/2005 on Guidelines for the Formulation of Reports on the Realization of Environmental Management Plans (RKL) and Environmental Monitoring Plans (RPL) 5) Minister of Public Works Decree 9/2008 on Management System for of Worker Safety and Health in the Construction of Public Works 6) Minister of Environment Decree 31/2009 on Direction and Control of implementation of Environmental Management, Ecolabelling, Clean Production, and Environmental Technology Use in Regions. 7) Minister of Environment Decree 9/2010 on Guidelines on Community Grievances and Handling of Grievances Caused by Pollution and/or Degradation

No.	Legal Hierarchy	Laws and Regulations Referred
		8) Minister of Environment Decree Number 17 of 2012 on Public Participation in AMDAL and Environmental License 9) Minister of Environment Decree Number 15 of 2013 on Measurement, Notification, and Verification of Mitigation Actions for Climate Change 10) Minister of Environment Decree Number 03/2013 on Environmental Audit 11) Decree 62/2013 on Managing Agency for the Reduction of Emissions from Deforestation and Degradation of Forests and Peat lands 12) Special assessment for traffic generation and its impacts for settlements and infrastructure projects (Decree of Ministry of Transport No. PM 75/2015) 13) Regulation of Ministry of Environment and Forestry No. P.31/MENLHK/SETJEN/SET.1/5/2017 on Guideline of Gender Mainstreaming in Environment and Forestry and Regulation of Ministry of Forestry No. P.65/Menhut-II/2011 on Guideline of Gender Responsive Planning and Budgeting in Forestry Sector 14) Decree of Minister of Environment No. P.22/Menlhk/Setjen/Set.1/3/2017 on Procedure of Complaint on Pollution and/or Environmental Deterioration and/or Forest Destruction 15) Ministerial Regulation of Environment and Forestry No. P.34/MENLHK/SETJEN/KUM.1/5/2017 on Acknowledgment and Protection of Local Wisdom in Natural Resource and Environmental Management 16) Ministerial Regulation of Environment and Forestry No. P.36/MENLHK/SETJEN/KUM.1/6/2017 on Registration and Notification Procedure of Hazardous Materials 17) Ministerial Regulation of Environment and Forestry No. 4/2021 on List of Business Plans and/or Activities Requiring AMDAL, UKL-UPL or SPPL

Appendix 3. Ambient Air Quality and Noise Standard

Ambient Air Quality

Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management

No	Parameter	Measurement Time	Quality Standard
1	SO_2 (Sulphur Dioxide)	1-hour	150 µg/m^3
		24-hours	75 µg/m^3
		1-year	45 µg/m^3
2	CO (Carbon Monoxide)	1-hour	10,000 µg/m^3
		8-hours	4,000 µg/m^3
3	NO_2 (Nitrogen Dioxide)	1-hour	200 µg/m^3
		24-hours	65 µg/m^3
		1-year	50 µg/m^3
4	O_3 (Ozone)	1-hour	150 µg/m^3
		8-hours	100 µg/m^3
		1-year	35 µg/m^3
5	HC (Hydrocarbon)	3-hours	160 µg/m^3
6	TSP (Dust)	24-hours	230 µg/m^3
7	PM_{10} (Particle < 10 µm)	24-hours	75 µg/m^3
		1-year	40 µg/m^3
	$PM_{2.5}$ (Particle < 2.5 µm)	24-hours	55 µg/m^3
		1-year	15 µg/m^3
8	Pb (Lead)	24-hours	2 µg/m^3

Parameters for Noise

Decree of State Minister of Environment No. KEP-48/MENLH/11/1996 on Noise Level Standard

No	Parameters	Standard (dB)
A.	Noise Level	
A.1	Area by Its Allocation	
1	Residential and Settlements	55
2	Commercial and Service	70
3	Office and Trade	65
4	Green Open Space	50
5	Industries	70
6	Government and Public Facilities	60
7	Recreation Area	70
8	Special Areas:	
	- Airport, Train Station, Port	70
	- Cultural Heritage	60
A.2	Surrounding of Activities	
1	Hospital or similar facilities	55
2	School or similar facilities	55
3	Worship or similar facilities	55

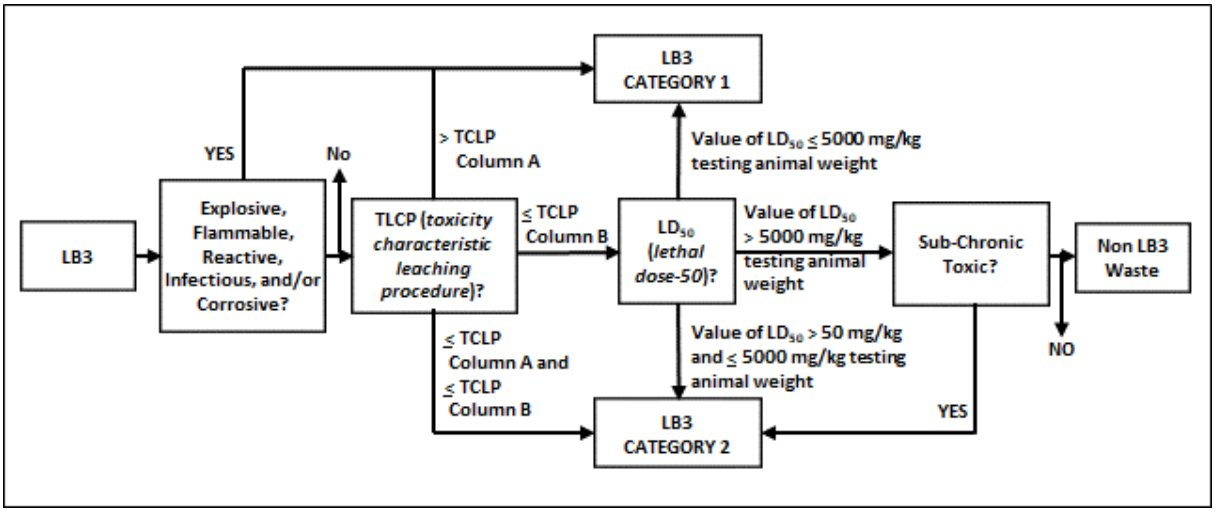
Appendix 4. Water Quality Standard

Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management

PARAMETER	UNIT	CLASS				REMARKS
		I	II	III	IV	
Physical						
Temperature	^0C	Deviation 3	Deviation 3	Deviation 3	Deviation 3	Temperature deviation from its natural condition
Dissolved residue	mg/L	1000	1000	1000	2000	
Suspended residue	mg/L	50	50	400	400	
Inorganic Chemicals						
pH		6 - 9	6 - 9	6 - 9	5 - 9	If naturally the range is beyond, the pH determined based on natural condition
BOD	mg/L	2	3	6	12	
COD	mg/L	10	25	50	100	
DO	mg/L	6	4	3	0	Minimum limit
Total Phosphate as P	mg/L	0.2	0.2	1	5	
NO3 as N	mg/L	10	10	20	20	
NH3-N	mg/L	0.5	(-)	(-)	(-)	For fishery, contents of free ammonia for sensitive fishes ≤ 0.02 mg/L as NH3
Arsenic	mg/L	0.05	1	1	1	
Cobalt	mg/L	0.2	0.2	0.2	0.2	
Barium	mg/L	1	(-)	(-)	(-)	
Boron	mg/L	1	1	1	1	
Selenium	mg/L	0.01	0.05	0.05	0.05	
Cadmium	mg/L	0.01	0.01	0.01	0.01	
Chrome (VI)	mg/L	0.05	0.05	0.05	0.01	
Copper	mg/L	0.02	0.02	0.02	0.2	For conventional drinking water treatment, Cu ≤ 1 mg/L
Iron	mg/L	0.3	(-)	(-)	(-)	For conventional drinking water treatment, Fe ≤ 5 mg/L
Lead	mg/L	0.03	0.03	0.03	1	For conventional drinking water treatment, Pb ≤ 0.1 mg/L
Manganese	mg/L	0.1	(-)	(-)	(-)	
Mercury	mg/L	0.001	0.002	0.002	0.005	
Zinc	mg/L	0.05	0.05	0.05	2	For conventional drinking water treatment, Zn ≤ 5 mg/L
Chloride	mg/L	600	(-)	(-)	(-)	
Cyanide	mg/L	0.02	0.02	0.02	(-)	
Fluoride	mg/L	0.5	1.5	1.5	(-)	
Nitrite as N	mg/L	0.06	0.06	0.06	(-)	For conventional drinking water treatment, NO2-N ≤ 1 mg/L
Sulfate	mg/L	0.03	0.03	0.03	(-)	
Free chlorine	mg/L	0.03	0.03	0.03	(-)	For ABAM is not required
Sulfur as H_2S	mg/L	0.002	0.002	0.002	(-)	For conventional drinking water treatment, S as H_2S ≤0.1 mg/L
Microbiology						
Fecal coliform	Number/100 ml	100	1000	2000	2000	For conventional drinking water treatment, fecal coliform ≤ 10000
Total coliform	Number/100 ml	1000	5000	10000	10000	

Appendix 5. TCLP of Hazardous Wastes

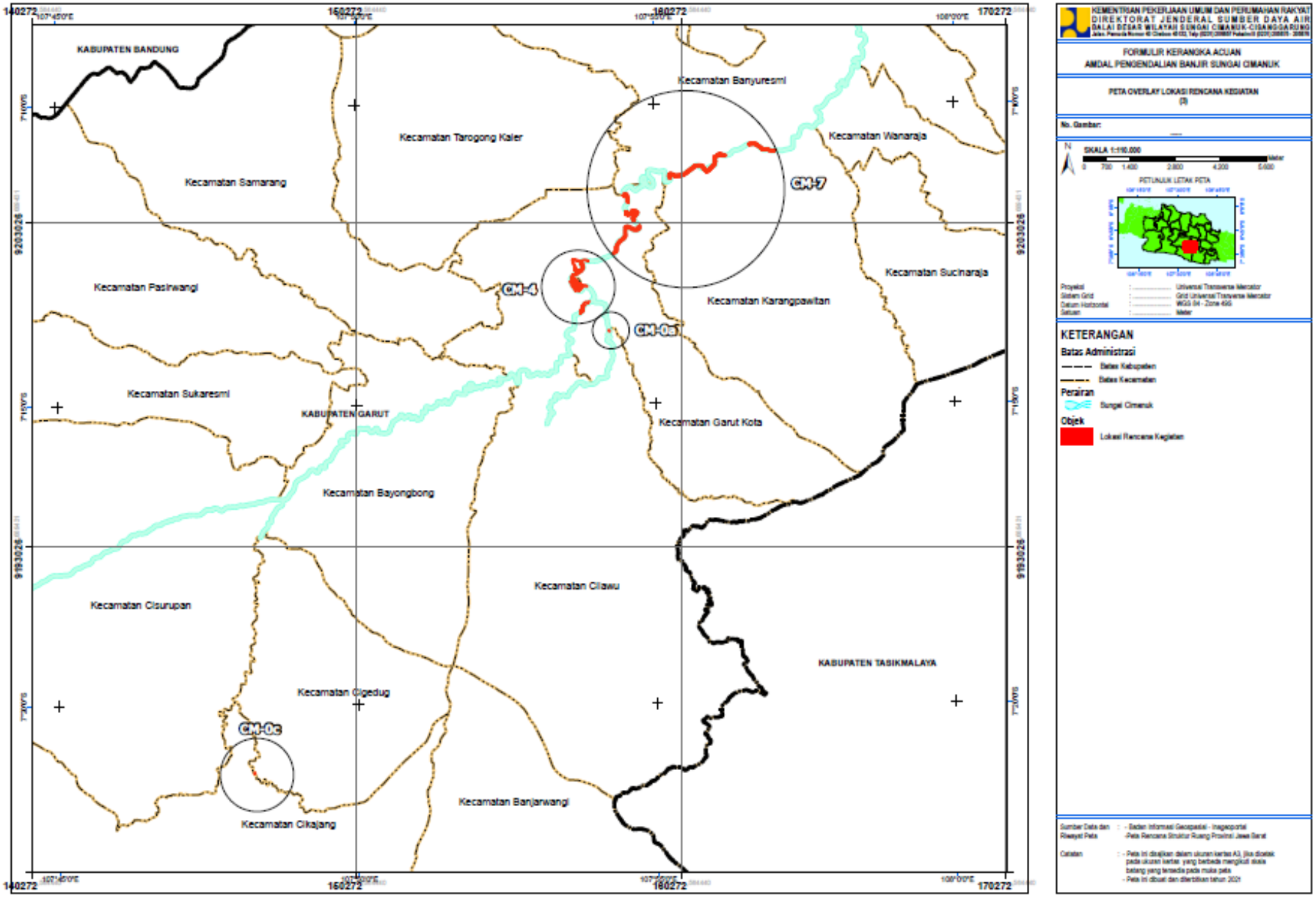
5.1 Characteristic (TCLP) Test for LB3 (Hazardous Wastes)

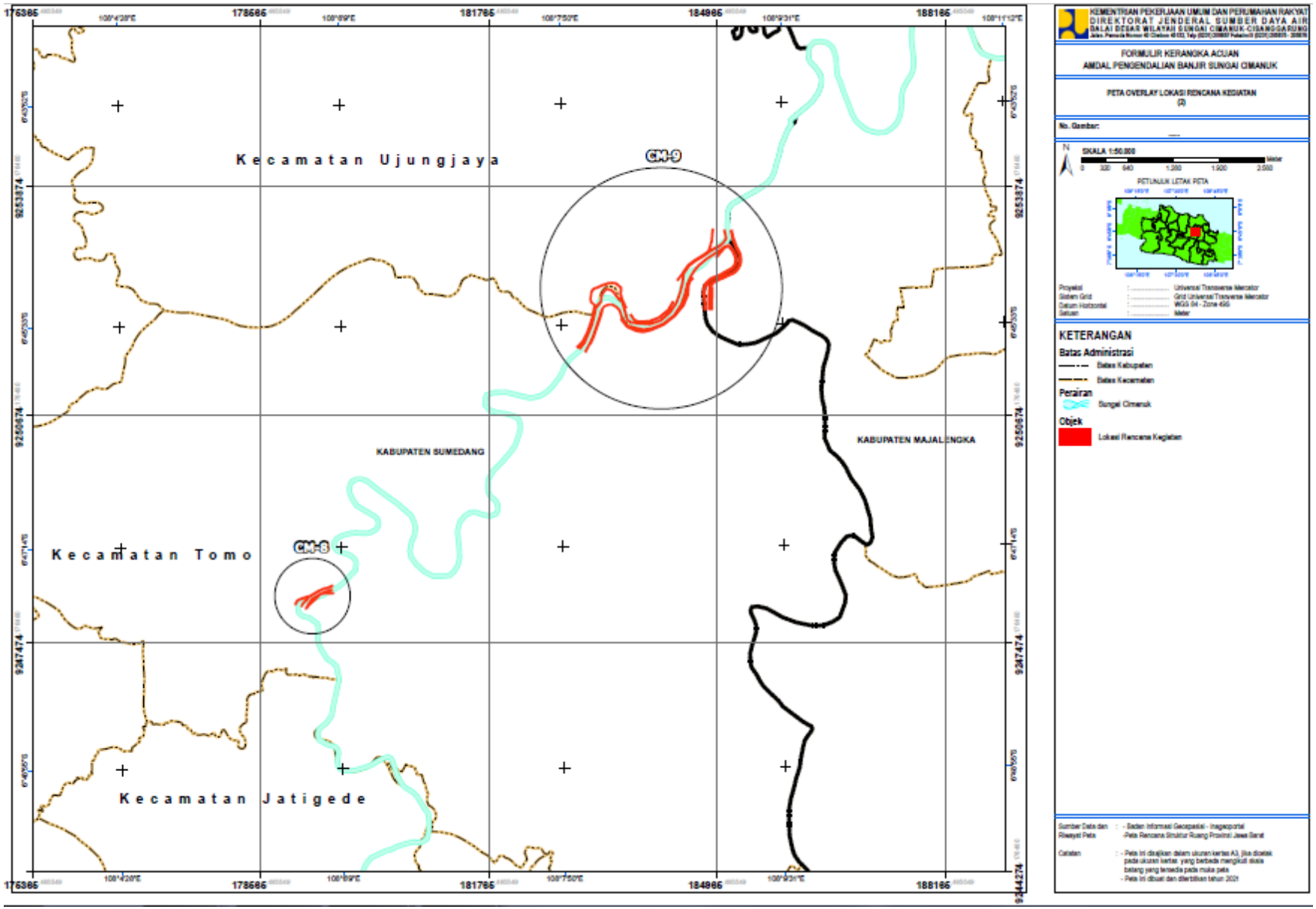


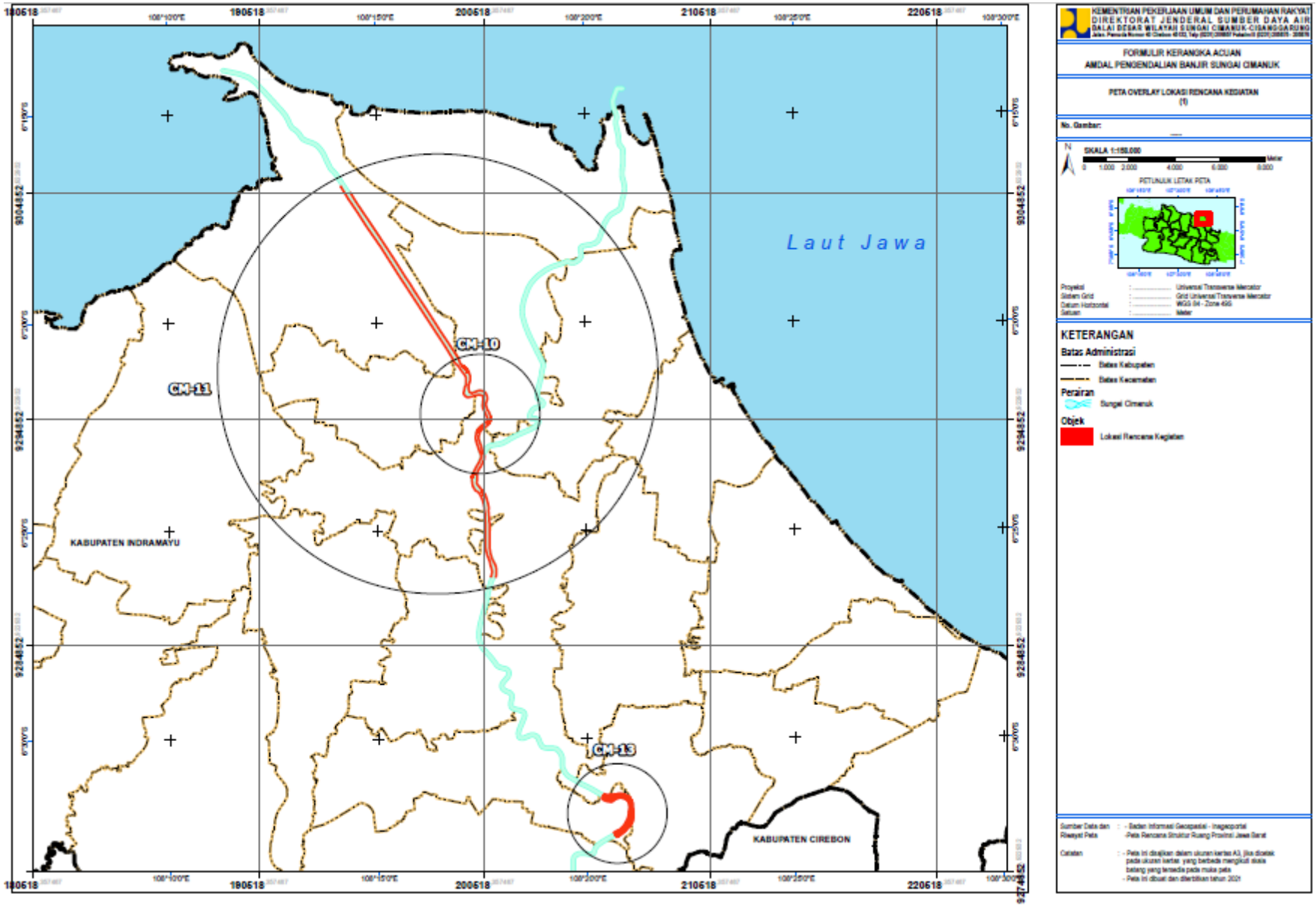
5.2 Threshold Values for Contaminants Identification

CONTAMINANT	TCLP[(1)]-A	TK[(2)]-A	TCLP-B	TK-B	TCLP-C	TK-C
Unit (Dry Weight)	(mg/L)	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)	(mg/kg)
PARAMETERS						
ANORGANIC						
Antimony, Sb	6	300	1	75	0,4	3
Arsenic, As	3	2000	0,5	500	0,2	20
Barium, Ba	210	25000	35	6250	14	160
Beryllium, Be	4	4000	0,5	100	0,2	1,1
Boron, B	150	60000	25	15000	10	36
Cadmium, Cd	0,9	400	0,15	100	0,06	3
Chrome six vallances, Cr^{6+}	15	2000	2,5	500	1	1
Copper, Cu	60	3000	10	750	4	30
Lead, Pb	3	6000	0,5	1500	0,2	300
Mercury, Hg	0,3	300	0,05	75	0,02	0,3
Molybdenum, Mo	21	4000	3,5	1000	1,4	40
Nickel, Ni	21	12000	3,5	3000	1,4	60
Selenium, Se	3	200	0,5	50	0,2	10
Silver, Ag	40	720	5	180	2	10
Tributyltin oxide	0,4	10	0,05	2,5	0,02	R[(3)]
Zinc, Zn	300	15000	50	3750	20	120

Appendix 6. Project Description of Cimanuk River FRM Subproject







Appendix 7. Inventory and Analysis of Flora and Fauna

1. Flora

Of the types of flora listed based on field identification using the inventory method and interviews with the surrounding community, none of the surrounding locations are included in the protected category according to the Law of the Republic of Indonesia No. 05 of 1990 concerning Conservation of Biological Natural Resources and Their Ecosystems, Government Regulation of the Republic of Indonesia No. 07 of 1999 concerning Preservation of Plant and Animal Species, and Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.106/MENLHK/SETJEN/KUM.1/12/2018 concerning the Second Amendment to the Regulation of the Minister of Forestry Environment Number P.20/MENLHK /SETJEN/KUM.1/6/2018 concerning Protected Types of Plants and Animals.

The information on flora data based on the results of initial identification around the Cimanuk River flood control location can be seen in the table below.

Table 1. Flora Found Around the Location of the Planned Flood Control Activities in the Cimanuk River

No	Species Name	Local Name	Family	Status	Habitus
1	*Ochroma pyramidale*	Balsa tree	Malvaceae	LC	Woody Tree
2	*Bambusa* sp	Bamboo	Poaceae	LC	Non-Woody Tree
3	*Averrhoa carambola*	Star fruit	Oxalidaceae	-	Woody Tree
4	*Capsicum annum*	Chili pepper	Solanaceae	-	Bush
5	*Capsicum frutescens*	Tabasco pepper	Solanaceae	LC	Bush
6	*Casuarina equisetifolia*	Coast She Oak	Casuarinaceae	LC	Woody Tree
7	*Polyalthia longifolia*	False ashoka	Annonaceae	-	Woody Tree
8	*Zea mays*	Corn	Poaceae	LC	Shrub
9	*Zingiber officinale*	Ginger	Zingiberaceae	-	Shrub
10	*Syzygium aqueum*	Watery rose apple	Myrtaceae	-	Woody Tree
11	*Tectona grandis*	Teak	Verbenaceae	-	Woody Tree
12	*Gmelina arborea*	White teak	Verbenaceae	LC	Woody Tree
13	*Elaeocarpus ganitrus*	Blue Marble Tree	Elaeocarpaceae	-	Woody Tree
14	*Vigna radiata*	Mung beans	Fabaceae	LC	Shrub
15	*Glycine max*	Soybean	Fabaceae	-	Shrub
16	*Arachis hypogaea*	Peanut	Fabaceae	-	Shrub
17	*Plumeria acuminata*	Kemboja	Apocynaceae	-	Non-Woody Tree
18	*Muntingia calabura*	Jamaica cherry	Muntingiaceae	-	Woody Tree
19	*Terminalia catappa*	Country almond	Combretaceae	LC	Woody Tree
20	*Ipomoea batatas*	Sweet potato	Convolvulales	DD	Bush
21	*Manihot esculanta*	Cassava	Euphorbiaceae	-	Shrub
22	*Artocarpus camansi*	Breadnut	Moraceae	-	Woody Tree
23	*Leucaena leucocephala*	River tamarind	Fabaceae	LC	Woody Tree
24	*Swietenia mahagoni*	Mahagony	Meliaceae	NT	Woody Tree
25	*Mangifera indica*	Mango	Anacardiaceae	DD	Woody Tree
26	*Azadirachta indica*	Neem	Meliaceae	LC	Woody Tree
27	*Ananas comusus*	Pineapple	Bromeliaceae	-	Woody Tree
28	*Artocarpus heterophyllus*	Jackfruit	Moraceae	-	Woody Tree

No	Species Name	Local Name	Family	Status	Habitus
29	*Oryza sativa*	Asian rice	Poaceae	-	Bush
30	*Carica papaya*	Papaya	Caricaceae	DD	Non Woody Tree
31	*Musa* sp	Banana	Musaceae	LC	Non Woody Tree
32	*Mimosa pudica*	Sensitive plant	Fabaceae	LC	Bush
33	*Passiflora foetida*	Wild Maracuja	Passifloraceae	-	Bush
34	*Ceiba pentandra*	Kapok tree	Malvaceae	LC	Woody Tree
35	*Pennisetum purpureum*	Elephant grass	Poaceae	LC	Bush
36	*Imperata cylindrica*	Cogon grass	Poaceae	-	Bush
37	*Cyperus rotundus*	Purple nutsedge	Poaceae	LC	Bush
38	*Syzygium polyanthum*	Indian bay leaf	Myrtaceae	-	Woody Tree
39	*Mikania micrantha*	Bitter vine	Asteraceae	-	Liana
40	*Albizia chinensis*	Chinese albizia	Fabaceae	-	Woody Tree
41	*Centrosema pubescens*	Butterfly pea	Fabaceae	-	Bush
42	*Sphagneticola triloba*	Wedelia	Asteraceae	-	Bush
43	*Streblus asper*	Siamese rough bush	Moraceae	LC	Woody Tree
44	*Artrocarpus altilis*	Breadfruit	Moraceae	-	Woody Tree
45	*Colocasia esculenta*	Taro	Araceae	LC	Bush
46	*Saccharum officinarum*	Ratoon sugarnace	Poaceae	-	Shrub
47	*Solanum melongena*	Eggplant	Solanaceae	-	Shrub
48	*Samanea saman*	Rain tree	Fabaceae	LC	Woody Tree
49	*Ipomoea cairica*	mile-a-minute vine	Convolvulaceaae	LC	Bush
50	*Cosmos caudatus*	Wild cosmos	Asteraceae	-	Bush
51	*Hibiscus tiliaceus*	Sea Hibiscus	Malvaceae	LC	Woody Tree
52	*Curcuma zedoaria*	White turmeric	Zingiberaceae	DD	Shrub

Source: Analysis Results, 2021

2. Fauna

The existence of flora is not far from fauna because the diversity of flora in an area is a habitat for certain fauna. The types of fauna found in the planned Flood Control activities in the Cimanuk watershed are groups of aves, insects, mammals, and nekton.

Table 2. Fauna Found Around the Location of the Planned Flood Control Activities in the Cimanuk River Cimanuk Cisanggarung Watershed

No	Species Name	Local Name	Family	Status	
AVIFAUNA					
1	*Ardeola speciosa*	Javan pond heron	Ardeidae	PP	LC
2	*Lonchura maja*	White-headed Munia	Estrildidae	-	LC
3	*Lonchura leucogastroides*	Javan Munia	Ploceidae	E	LC
4	*Lonchura punctulata*	Scaly-breasted Munia	Ploceidae	-	LC
5	*Centropus sinensis*	Greater coucal	Cuculidae	-	LC
6	*Nectarinia jugularis*	Olive-backed Sunbird	Nectariniidae	UU/PP	LC
7	*Dicaeum trochileum*	Scarlet-headed Flowerpacker	Dicaeidae	E	LC
8	*Ardea cinerea*	Grey heron	Ardeidae	-	LC
9	*Halcyon cyanoventris*	Javan Kingfisher	Alcedinidae	UU/PP/PM	LC
10	*Halcyon chloris*	Collared Kingfisher	Alcedinidae	UU/PP/PM	LC
11	*Cisticola juncidis*	The zitting cisticola	Sylviidae	-	LC
12	*Orthotomus sepium*	Olive-backed Tailorbird	Sylviidae	E	LC
13	*Orthotomus sutorius*	Common Tailorbird	Sylviidae	-	LC
14	*Aegithina tiphia*	Common Iora	Chloropseidae	-	LC
15	*Pycnonotus aurigaster*	Sooty-headed Bulbul	Pycnonotidae	-	LC

No	Species Name	Local Name	Family	Status	
16	*Sterna hirundo*	Common tern	Sternidae	UU/PP/PM	LC
17	*Sterna fuscata*	Sooty tern	Sternidae	UU/PP/PM	LC
18	*Numenius arquata*	Eurasian curlew	Scolopacidae	PM	NT
19	*Turnix suscitator*	Barred buttonquail	Turnicidae	-	LC
20	*Passer montanus*	Eurasian Tree Sparrow	Ploceidae	-	LC
21	*Passer montanus*	Eurasian Tree Sparrow	Ploceidae	-	LC
22	*Lalage nigra*	Pied Triller	Campephagidae	-	LC
23	*Artamus leucorhynchus*	White-breasted Woodswallow	Artamidae	-	-
24	*Butorides striata*	Striated heron	Ardeidae	-	LC
25	*Nycticorax nycticorax*	Black-crowned night-heron	Ardeidae	-	LC
26	*Egretta alba*	Great egret	Ardeidae	-	LC
27	*Egretta sacra*	Pacific reef heron	Ardeidae	-	LC
28	*Egretta garzetta*	Little egret	Ardeidae	UU/PP	LC
29	*Bubulcus ibis*	Cattle egret	Ardeidae	-	LC
30	*Hirundo rustica*	Barn Swallow	Hirundinidae	-	LC
31	*Pycnonotus goiavier*	Yellow-vented Bulbul	Pycnonotidae	-	LC
32	*Prinia flaviventris*	Bar-winged Prinia	Cisticolidae	-	LC
33	*Prinia inornata*	Plain Prinia	Cisticolidae	-	LC
34	*Geopelia striata*	Zebra Dove	Columbidae	-	LC
35	*Alcedo coerulescens*	Cerulean kingfisher	Alcedinidae	UU/PP/PM	LC
36	*Alcedo euryzona*	Javan Blue-banded Kingfisher	Alcedinidae	UU/PP/PM	LC
37	*Alcedo meninting*	Blue eared kingfisher	Alcedinidae	UU/PP/PM	LC
38	*Pericrocotus cinnamome*	Small Minivet	Campephagidae	-	LC
39	*Actitis hypoleucos*	Common sandpiper	Scolopacidae	-	LC
40	*Collocalia linchi*	Cave-Swiftlet	Apodidae	-	LC
41	*Collocalia esculanta*	Glossy Swiftlet	Apodidae	-	-
INSEKTA					
1	*Danaus gilippus*	Queen Butterfly	Nymphalidae	-	-
2	*Junonia orithya*	Blue pansy butterfly	Nymphalidae	-	-
3	*Leptosia nina*	Psyche Butterfly	Pieridae	-	-
4	*Limenitis arthemis*	White admiral	Nymphalidae	-	-
5	*Mycalesis mineus*	Dark Brand Bush-Brown	Nymphalidae	-	-
6	*Neptis hylas*	Common Sailor	Nymphalidae	-	-
7	*Papilio polytes*	Common Mormon	Papilionidae	-	-
8	*Papilio satapes*	Swallowtail butterfly	Papilionidae	-	-
9	*Pelopidas conjunctus*	Conjoined swift	Hesperiidae	-	-
10	*Phyciodes cocyta*	Northern Crescent	Nymphalidae	-	-
11	*Pyrgus communis*	Common checkered-skipper	Hesperiidae	-	-
12	*Speyeria diana*	Diana Fritillary	Nymphalidae	-	-
13	*Taractrocera archias*	Orange skipper	Hesperiidae	-	-
14	*Tirumala septentrionis*	Dark Blue Tigger	Nymphalidae	-	-
15	*Ypthima horsfieldii*	Common Five Ring	Nymphalidae	-	-
16	*Crocothemis servilia*	Scarlet Skimmer	Libellulidae	-	LC
17	*Diplacodes trivialis*	Blue Ground Skimmer	Libellulidae	-	LC
18	*Orthetrum sabina*	Green Skimmer	Libellulidae	-	LC
19	*Pantala flavescens*	Wandering Glider	Libellulidae	-	LC
20	*Phlaeoba fumosa*	Brown Grasshopper	Acrididae	-	-
21	*Oxya japonica*	Japanese Rice Grasshopper	Acrididae	-	-
22	*Lumbricus rubellus*	Earthworm	Lumbricidae	-	-
23	*Metioche vittaticollis*	Silent leaf-runner Cricket	Gryllidae	-	-
MAMALIA					
1	*Canis lupus familiaris*	Dog	Canidae	-	-

No	Species Name	Local Name	Family	Status	
2	*Ovis aries*	Sheep	Bovidae	-	-
3	*Capra aegagrus hircus*	Goat	Bovidae	-	-
4	*Bubalus bubalis*	Domestic water buffalo	Bovidae	-	-
5	*Bos taurus*	Cow	Bovidae	-	-

Source: Analysis Results, 2021

The fauna that was analyzed was included in the protected category according to the Law of the Republic of Indonesia No. 05 of 1990 concerning Conservation of Biological Natural Resources and Their Ecosystems, Government Regulation of the Republic of Indonesia No. 07 of 1999 concerning Preservation of Plant and Animal Species, and Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.106/MENLHK/SETJEN/KUM.1/12/2018 concerning the Second Amendment to the Regulation of the Minister of Forestry Environment Number P.20/MENLHK /SETJEN/KUM.1/6/2018 concerning Protected Types of Plants and Animals. In addition, according to the IUCN Red List 2021, there is fauna that is identified as being in the category of LC (least concern) conservation status, which means that these faunas have been evaluated/identified but do not meet the requirements to be categorized as critically endangered, threatened with extinction, vulnerable or almost extinct.

3. Aquatic Biota

Downstream of the Cimanuk River is an estuary in Indramayu Regency. The downstream area of the river includes the north coast of West Java which is vegetated with mangroves. The plants found are mangroves in general, such as *Rhizophora apiculata*, *Rhizophora stylosa*, and *Avicennia marina*. In addition, there are also many shrimp pine trees (*Casuarina equisetifolia*) as beach protection in Karangsong.

The fauna found was a group of nekton (fish and crustaceans). From the nekton found, various types of fish are distinguished according to the type of location they live. Nekton is found in diadromous fish (fish that can live in fresh water and saltwater). Diadromous fish are divided into anadromous and catadromous fish. Anadromous fish (fish that spend their lives growing up in the sea and moving or looking for fresh water to spawn or lay eggs). While the type of catadromous fish (fish that spend their lives growing up in fresh water and move or look for seawater to spawn or lay eggs), such as mullet (*Valamugil seheli*). And *euryhalines* (nekton that can adapt to estuarine water conditions and mangrove ecosystems), namely mullet fish (*Valamugil speigleri*), glodok fish (*Periophthalmus modestus*), julung-julung fish (*Hemiramphus lutkei*), and mangrove crabs (*Scylla serrata*). The further upstream the river is found, the stenohaline fish (fish that live in a narrow salinity range/freshwater), namely the keting fish (*Mystus nigriceps*).

Table 3. Nekton Found in Cimanuk River

No	Species Name	Local Name	Family	Status
1	*Monopterus albus*	Asian swamp eel	Synbranchidae	LC
2	*Valamugil speigleri*	Grey mullet	Mugilidae	-
3	*Periophthalmus modestus*	The shuttles mudskipper	Poeciliidae	LC

4	*Mystus nigriceps*	Two-spot catfish	Bagridae	LC
5	*Hemiramphus lutkei*	Lutke's halfbeak	Hemiramphidae	-
6	*Scylla serrata*	Serrated swimming crab	Portunidae	-

Source: Analysis Results, 2021

From the results of the analysis of aquatic biota, nothing is included in the protected category according to the Law of the Republic of Indonesia No. 05 of 1990 concerning Conservation of Biological Natural Resources and Their Ecosystems, Government Regulation of the Republic of Indonesia No. 07 of 1999 concerning Preservation of Plant and Animal Species, and Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.106/MENLHK/SETJEN/KUM.1/12/2018 concerning the Second Amendment to the Regulation of the Minister of Forestry Environment Number P.20/MENLHK /SETJEN/KUM.1/6/2018 concerning Protected Types of Plants and Animals. Meanwhile, according to the IUCN Red List 2021, there is fauna that is identified as being in the category of LC (least concern) conservation status, which means that the fauna has been evaluated/identified but does not meet the requirements to be categorized as critically endangered, threatened with extinction, vulnerable or nearly extinct.

Appendix 8. Dredging Management Plan (Template)

This is a general template of dredging management plan, and the Contractor is responsible to adjust and prepare a detailed and site specific plan.

(Source: chrome- https://www.epa.sa.gov.au/files/14229_flinders_ports_dredging_plan_2019.pdf with simplification and modifications)

1. INTRODUCTION 6

1.1. General 6

1.2. Purpose 7

1.3. Scope of Document 7

2. SCOPE OF WORK 8

2.1. Project Overview 8

2.2. The Works 9

2.2.1. Dredging Limits and Depths 9

2.2.2. Batters 9

2.3. Tolerances 9

2.4. Dredging Quantities 10

3. WORK METHOD 11

3.1. Mobilisation and Preparation 11

3.2. Pre-Dredge Survey 11

3.3. Selection of Work Method 11

3.4. Equipment 11

3.5. Dredging Method 13

3.6. Dredge Spoil Method 16

3.7. Regulations for Dredging Equipment 17

3.8. Plant Operating Hours 17

3.9. Demobilisation 17

4. EQUIPMENT MAINTENANCE 17

5. SAFE IMPLEMENTATION OF SIMULTANEOUS OPERATIONS 19

5.1. Voyage Planning – Commercial Traffic 19

5.2. Voyage Planning - Recreational Traffic 19

6. ENVIRONMENTAL MANAGEMENT 19

6.1. Contractor’s corporate statement with respect to environment 19

6.2. Adaptive Management 20

6.3. Outdoor lighting 21
6.4. Environmental training 21
6.5. Waste Management & Hazardous Substances 21
6.5.1. Hazardous waste 22
6.5.2. Waste Management Measures 22

7. DREDGING CONTROL & SURVEY 23
7.1. Dredging Control 23
7.2. Survey 24

8. REFERENCES, 25

Appendix 9. Public Consultation

9.1 Announcement and Information Disclosure

DLH Indramayu

DLH Kuningan

DLH Sumedang

Tolengas Village

Sukaratu Village

Cintasih Village

Palabuan Village

Kulon Rambatan Village

Sukakarya Village

Kalimati Village

Legok Village

Lohbener Village


Cipeles Village


Kertasemaya Village


Jatisawit Village

9.2 Coordination, Planning, and Participants of Public Consultation

The public consultation on the Cimanuk River Flood Control was conducted by involving the affected communities. Before the implementation of the public consultation, the initiator coordinates with:

1. Relevant agencies (West Java Provincial Environment Service, Indramayu Regency Environmental Service, Sumedang Regency, Majalengka Regency, and Garut Regency, affected District Police, and affected District and Village Governments)

2. Community leaders who will be involved in the public consultation process (Head of the affected village, Mrs. PKK, and community leaders/affected people)

After coordinating with all related parties, it was decided that public consultation activities for the Cimanuk River Flood Control proposed subproject were carried out with the following details

1. Wednesday, February 09, 2022, session one at 08.00 – 12.00 at the Lohbener District Office, Indramayu Regency

2. Wednesday, February 09, 2022, session two at 13.00 – finished at the Jatibarang District Office, Indramayu Regency

3. Thursday, February 10, 2022, 08.00 – 12.00 at the Tomo District Office, Sumedang Regency

4. Friday, February 11, 2022, session one at 08.00 – 12.00 at the Garut City District Office, Garut Regency

5. Friday, February 11, 2022, session two at 13.00 – finished at the Tarogong Kidul District Office, Garut Regency

Public consultations are carried out face-to-face. The implementation of public consultations is carried out by complying with health protocols for preventing the *transmission of Coronavirus Disease* (Covid-19), which are carried out as follows.

1. Maintain distance between participants by providing space between seats and the registration queue.

2. Participants must wear a mask that covers the nose and mouth.
3. Provide hand washing facilities using soap and water or alcohol-based *hand sanitizer*.
4. Before entering the public consultation location, participants must wash their hands with soap or *hand sanitizer*.

Participants in the public consultation on the Cimanuk River Flood Control consisted of several community elements. Given the Covid-19 outbreak, the local government has limited the number of people in this public consultation. The following table presents the composition of the participants in the public consultation at each meeting (session) held.

Table 1Participants of the Public Consultation in Lohbener District, Indramayu Regency

No	Participant Element	Amount (person)	Percentage (%)
1	Affected Communities	20	40%
2	Village/District Government	12	24%
3	Initiator	3	6%
4	Related Agencies	5	10%
5	TNI/POLRI	10	20%
	TOTAL	50	100%

Source: Public Consultation Results, processed by the authors, 2022

The total number of participants in the public consultation in Lohbener District, Indramayu Regency, was 50 people, with the majority of the affected community being 40% (20 people).

Table 2Participants of the Public Consultation in Jatibarang District, Indramayu Regency

No	Participant Element	Amount (person)	Percentage (%)
1	Affected Communities	33	63%
2	Village/District Government	7	13%
3	Initiator	3	6%
4	Related Agencies	4	8%
5	TNI/POLRI	5	10%
	TOTAL	52	100%

Source: Public Consultation Results, processed by the authors, 2022

The total number of public consultation participants in Jatibarang Sub-district, Indramayu Regency, was 52, with the majority of the affected community representing as much as 63% (33 people).

Table 3Participants of the Public Consultation in Tomo District, Sumedang Regency

No	Participant Element	Amount (person)	Percentage (%)
1	Affected Communities	16	48%
2	Village/District Government	6	18%
3	Initiator	3	9%
4	Related Agencies	2	6%
5	TNI/POLRI	6	18%
	TOTAL	33	100%

Source: Public Consultation Results, processed by the authors, 2022

The total number of participants in the public consultation in Tomo Sub-district, Sumedang Regency, was 33 people, with the majority of the affected communities representing 48% (16 people).

Table 4Participants of the Public Consultation in Garut City District, Garut Regency

No	Participant Element	Amount (person)	Percentage (%)
1	Affected Communities	40	68%
2	Village/District Government	7	12%
3	Initiator	3	5%
4	Related Agencies	3	5%
5	TNI/POLRI	6	10%
	TOTAL	59	100%

Source: Public Consultation Results, processed by the authors, 2022

The total number of participants in the public consultation in Garut City District, Garut Regency, was 59 people, with the majority of the affected community representing as much as 68% (40 people).

Table 5Participants of the Public Consultation in Tarogong Kidul District, Garut Regency

No	Participant Element	Amount (person)	Percentage (%)
1	Affected Communities	16	44%
2	Village/District Government	5	14%
3	Initiator	3	8%
4	Related agencies	4	11%
5	TNI/POLRI	8	22%
	TOTAL	36	100%

Source: Public Consultation Results, processed by the authors, 2022

The table above shows that most public consultations were from elements of the affected community. The total number of public consultation participants in Tarogong Kidul District, Garut Regency, was 36 people, with the majority of the affected community representing as much as

44% (16 people). With such a composition, it is hoped that suggestions, opinions, and responses will be more objective because they are delivered by those who live in the area that will be affected by the planned activities.

In the public consultation, the proponent conveys information about the planned activity, including a description of the scheduled activity, potential impacts, and the affected environmental components. The seminar method carries out the submission of information related to the scheduled action. Information is conveyed through Presentation Slides with the help of an LCD Projector. Furthermore, the community will submit suggestions, opinions, and responses to the planned activity based on the information presented. The initiator and related parties can then submit their responses to the community's input.

9.3 Documentation Records

Wednesday, February 09, 2022, session one at 08.00 – 12.00 at the Lohbener District Office, Indramayu Regency

Wednesday, February 09, 2022, session two at 13.00 – finished at the Jatibarang District Office, Indramayu Regency



Thursday, February 10, 2022, 08.00 – 12.00 at the Tomo District Office, Sumedang Regency





Friday, February 11, 2022, session one at 08.00 – 12.00 at the Garut City District Office, Garut Regency.






Friday, February 11, 2022, session two at 13.00 – finished at the Tarogong Kidul District Office, Garut Regency






9.4 List of Attendants

DAFTAR HADIR KONSULTASI PUBLIK
AMDAL PENGENDALIAN BANJIR SUNGAI CIMANUK
PROVINSI JAWA BARAT

Hari/ Tanggal : Rabu/ 09 Februari 2022
Tempat : Kantor Kecamatan Lohbener, Kabupaten Indramayu
Pukul : 08.00-12.00 WIB

NO	NAMA	ALAMAT / INSTANSI	TANDA TANGAN
1	Wartika	Rambatan Wetan	1
2	KARTAWIN	Rambatan Kulon	2
3	Edi. S	Sindang Kerta	3
4	DEDE. S	— " —	4
5	Lan	Cantigi	5
6	Suyud	Cantigi	6
7	SUTINIH	SINDANG KERTA.	7
8	M. MARZULIAN	CIREBON	8
9	SUCIPTO	"	9
10	WARNOTO, SH.	AP KAPOLSEK ARAHAN	10
11	WAHYU	Binmas polsek	11
12	Wunjala	Pawayalan	12
13	NASUR	PMC SDA	13
14	Tarung h.	PMC SDA	14
15	Rinah.	Pangindangan Kulon	15

DAFTAR HADIR KONSULTASI PUBLIK
AMDAL PENGENDALIAN BANJIR SUNGAI CIMANUK
PROVINSI JAWA BARAT

NO	NAMA	ALAMAT / INSTANSI	TANDA TANGAN
16	MASYHUDI	pangindangan kulon	16 [signature]
17	Wahyudi	Ar. Lor.	17 [signature]
18	HERIYANI	At. Lor	18 [signature]
19	Warso	Ar – Lor	19 [signature]
20			20
21	Effendi	Koramil 02 Sindang	21 [signature]
22	Sukarni	KUWU	22 [signature]
23	Sudarsono	Taro masarot	23 [signature]
24	H. Tumi'ah	Kw. Rambatan Wetan	24 [signature]
25	SRI Rahayu	Ram. wetan	25 [signature]
26	JUCHRIYAH	Ram – wetan	26 [signature]
27	Ato Triyanto	Legok	27 [signature]
28	WYT. SUGIANTO	LOHBENER	28 [signature]
29	H. NURONI	Kapolsek Lohbener	29 [signature]
30	Leila INdRa	Bid TL. DLH	30 [signature]
31	Dartu	TL – DLH	31 [signature]

DAFTAR HADIR KONSULTASI PUBLIK
AMDAL PENGENDALIAN BANJIR SUNGAI CIMANUK
PROVINSI JAWA BARAT

NO	NAMA	ALAMAT / INSTANSI	TANDA TANGAN
32	ARIES [illegible]	DLH - TL	32
33	[illegible]	CAMAT ARJAWINANGUN	33
34	[illegible]	DLH -	34
35	[illegible]	[illegible] DESA LOHBENER	35
36	HENY H	DLH	36
37	ALI ALAMUDIN	CAMAT CANTIGI	37
38	Arif Jahari	Guru Legok	38
39	Jaenudin	Pemdes Cepu	39
40	DUROKMAN	—	40
41	Dwi Haryono	PAN-LON	41
42	DIDIN	Kanit INTEL	42
43	AH. SUBARDA	BBWS Cimanuk	43
44	Imin Ratimin	kec. Lohbener	44
45	Diyadi	PAMONG	45
46	MASRONI	Kec. Lohbener	46
47	DARJONO	Kuwu Lamaran Tarung	47

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AMDAL PENGENDALIAN BANJIR SUNGAI CIMANUK
PROVINSI JAWA BARAT

NO	NAMA	ALAMAT / INSTANSI	TANDA TANGAN
48	Saefulloh	Kapolsek Sindang	48
49	Rinto. S. S.H.	Babinsa/Babhinkamtibmas Sek Lohbener	49
50	Suyono	Bhabinkamtibmas Lohbener	50
51			51
52			52
53			53
54			54
55			55
56			56
57			57
58			58
59			59
60			60
61			61
62			62